

Absence of Asia 1 reports in SEACFMD

Disease freedom or surveillance gaps?

Masako Wada, Jun Hee Han, Art Subharat
EpiCentre, Massey University, New Zealand



World Organisation
for Animal Health
Founded in 1924

Background

- No report of serotype C **globally** since 2004
 - Possibly extinct – research ongoing
- No report of serotype Asia 1 in **SEACFMD countries** in 2005-2015 and 2017-2024 (current)
- Uncertainty in the chance of Asia 1 introduction
 - Unsure of vaccine recommendation
- What is the probability of Asia 1 freedom in SEACFMD countries?

Methods

- Data

- Laboratory data

- WOAAH/FAO FMD Reference Laboratory Network (2005-2022)



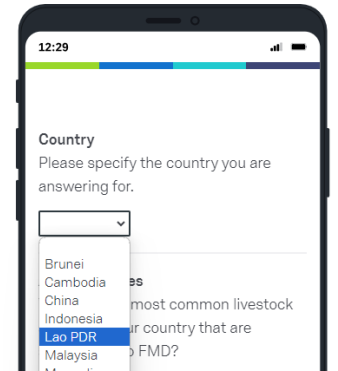
- Expert knowledge

- Online survey about surveillance, diagnostic capacity and vaccination (July 2024)

- Statistical approach

- Bayesian framework

- Estimate Asia 1 positivity given clinical FMD samples
 - Prior considers past 5 years of regional Asia 1 positivity

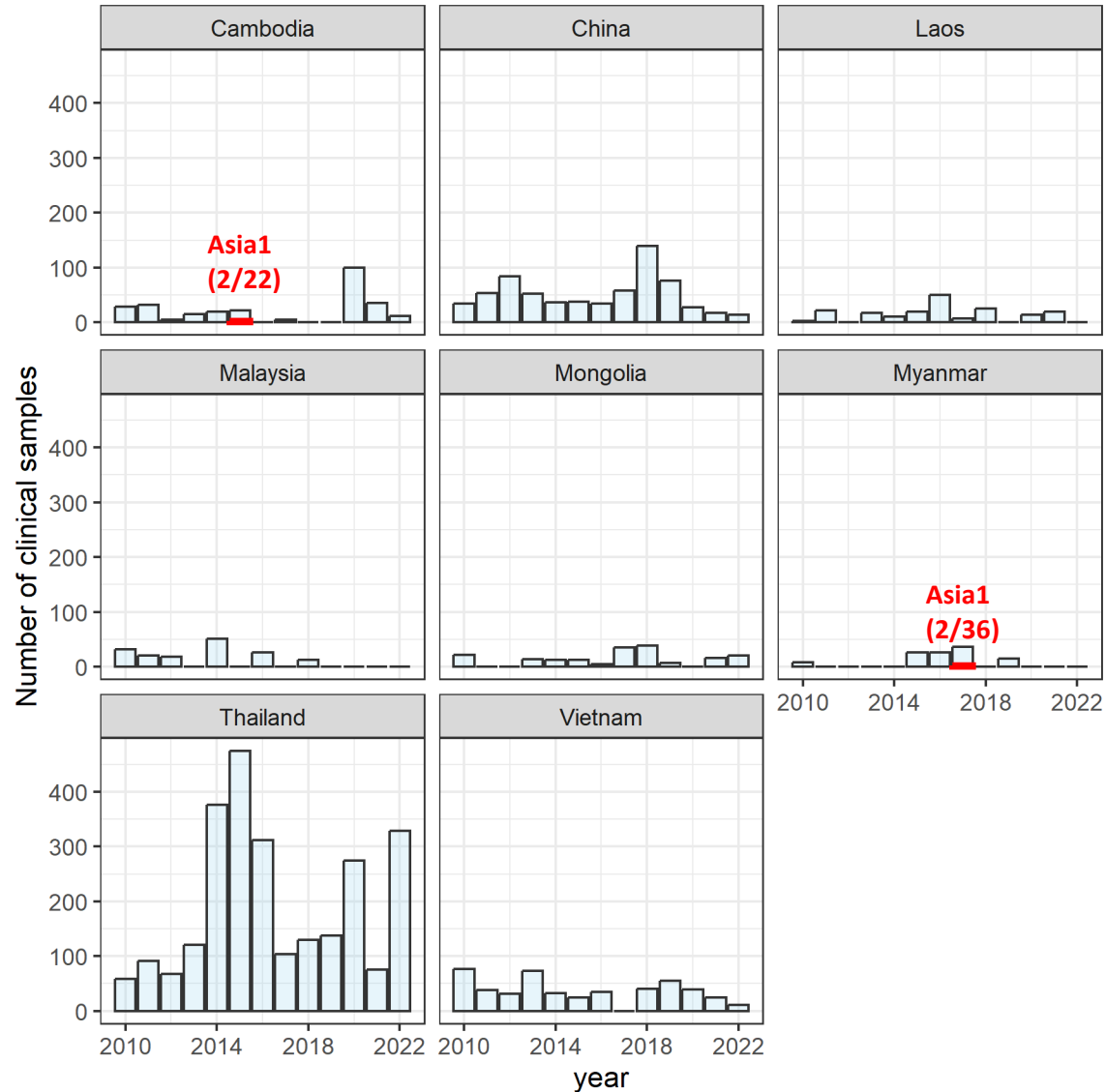


- Scenario tree model

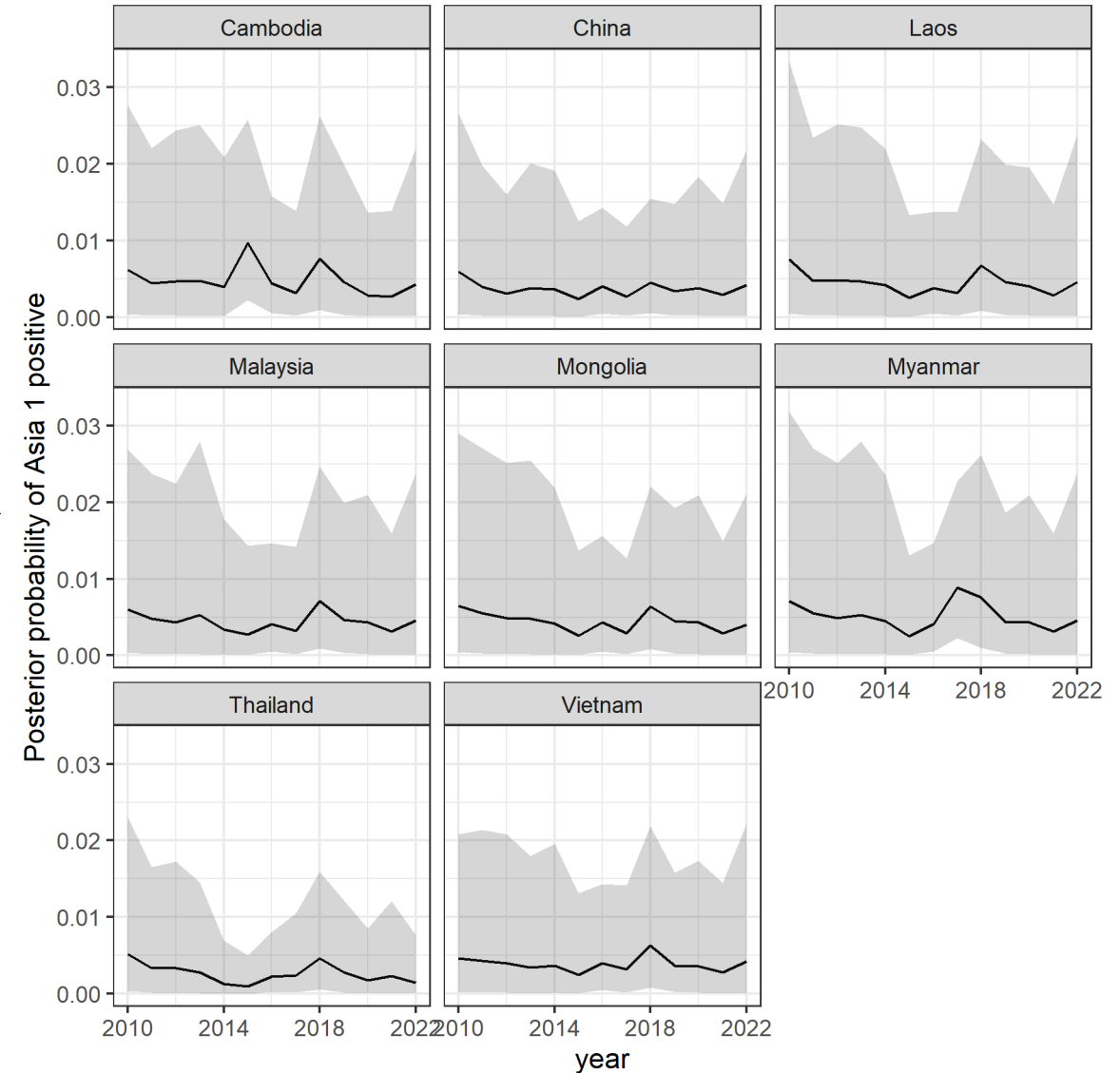
- Estimate probability of detecting Asia 1 under a design prevalence
 - Stochastic

Laboratory data

The number of samples submitted vs Asia 1 positive

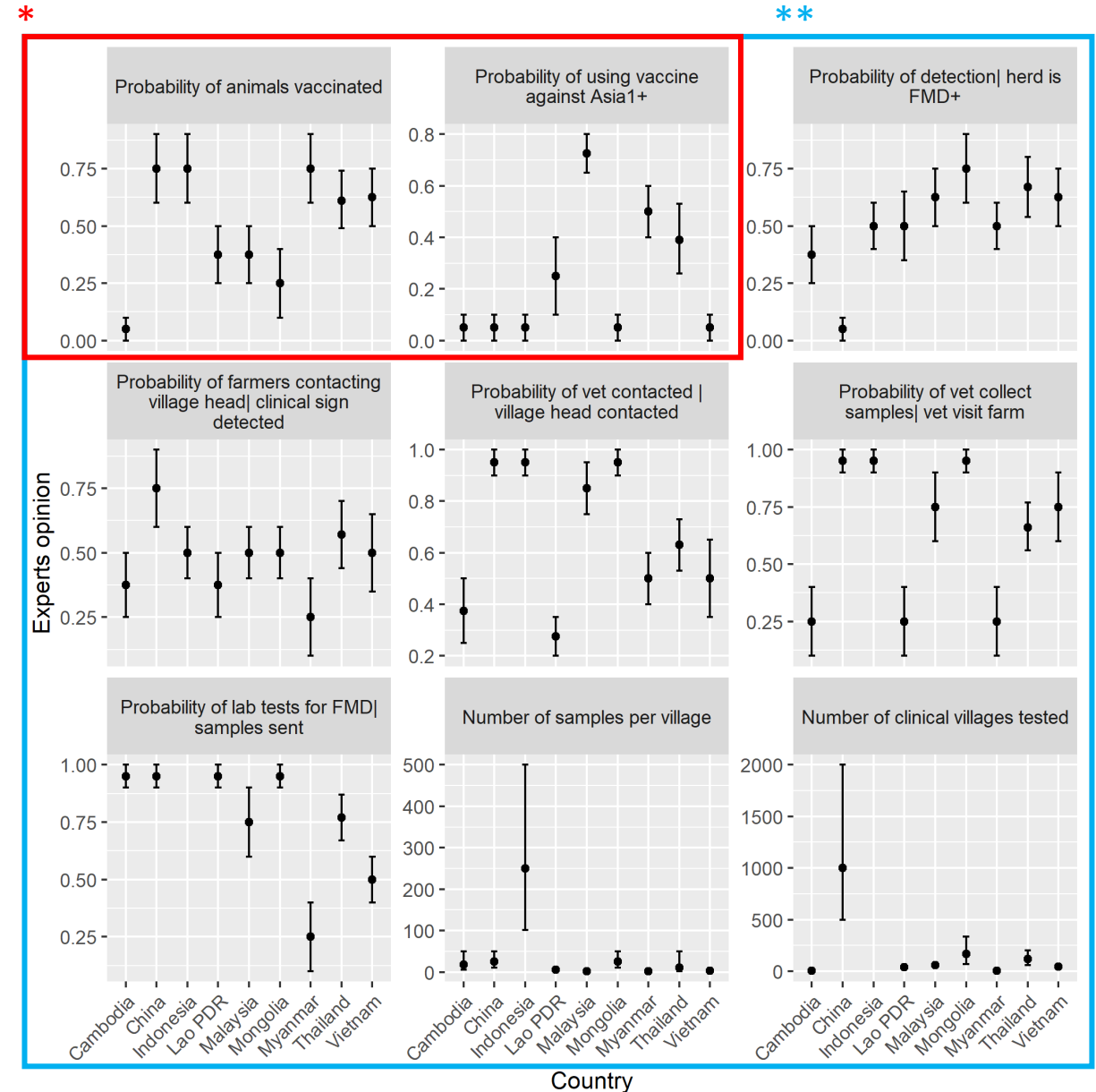


The posterior probabilities of Asia 1 positive



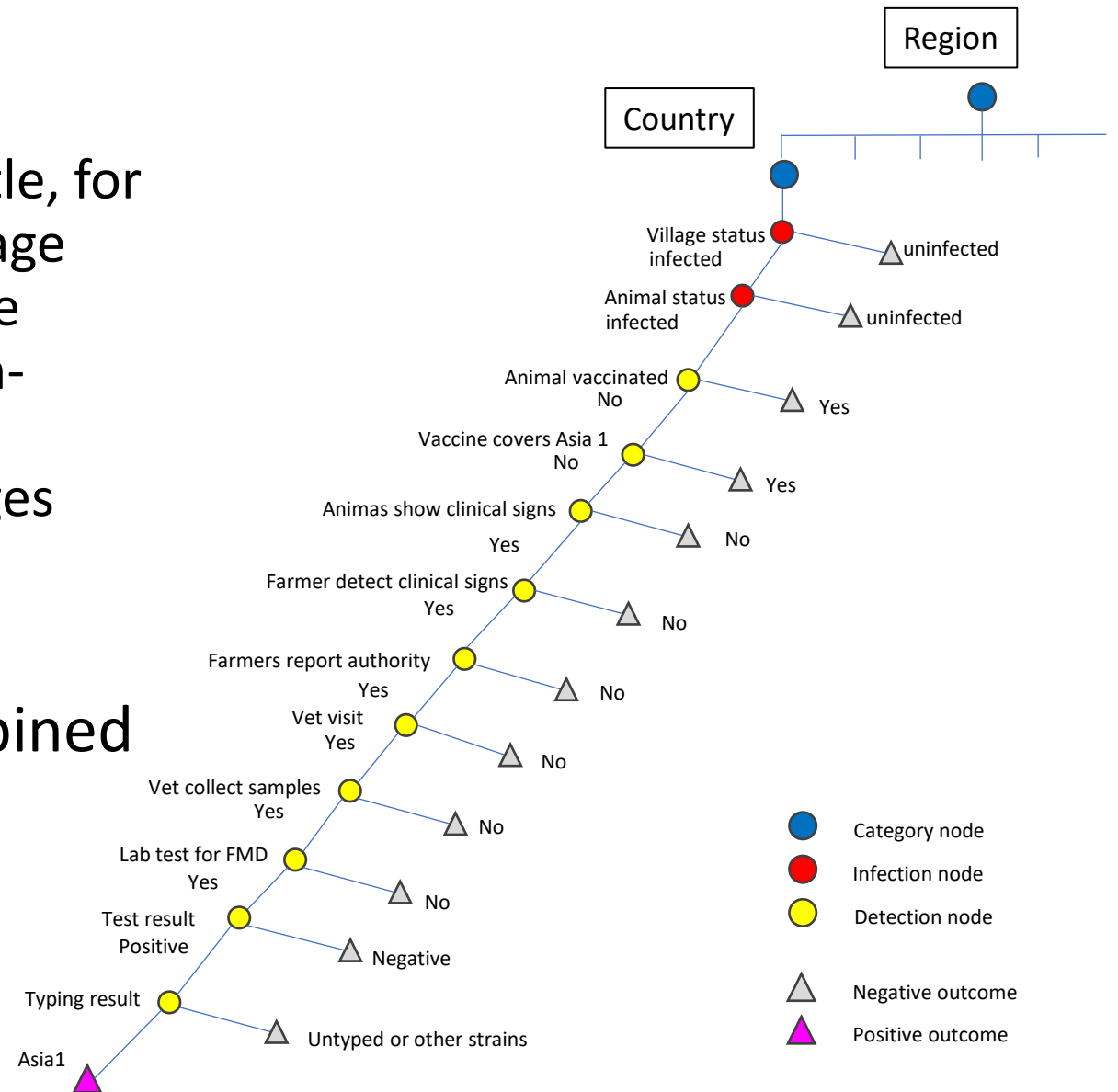
Expert knowledge

- Respondents: median 2 (1-7) per country
- Species: cattle
- Vaccination (*)
- Passive surveillance (**)
- Diagnostic capacity
 - Serotyping (5/8 countries)
 - Sequencing (2/8)
- Active surveillance
 - Outbreak surveillance (8/8)
 - Zone surveillance (7/8)
 - Abattoir surveillance (2/8)



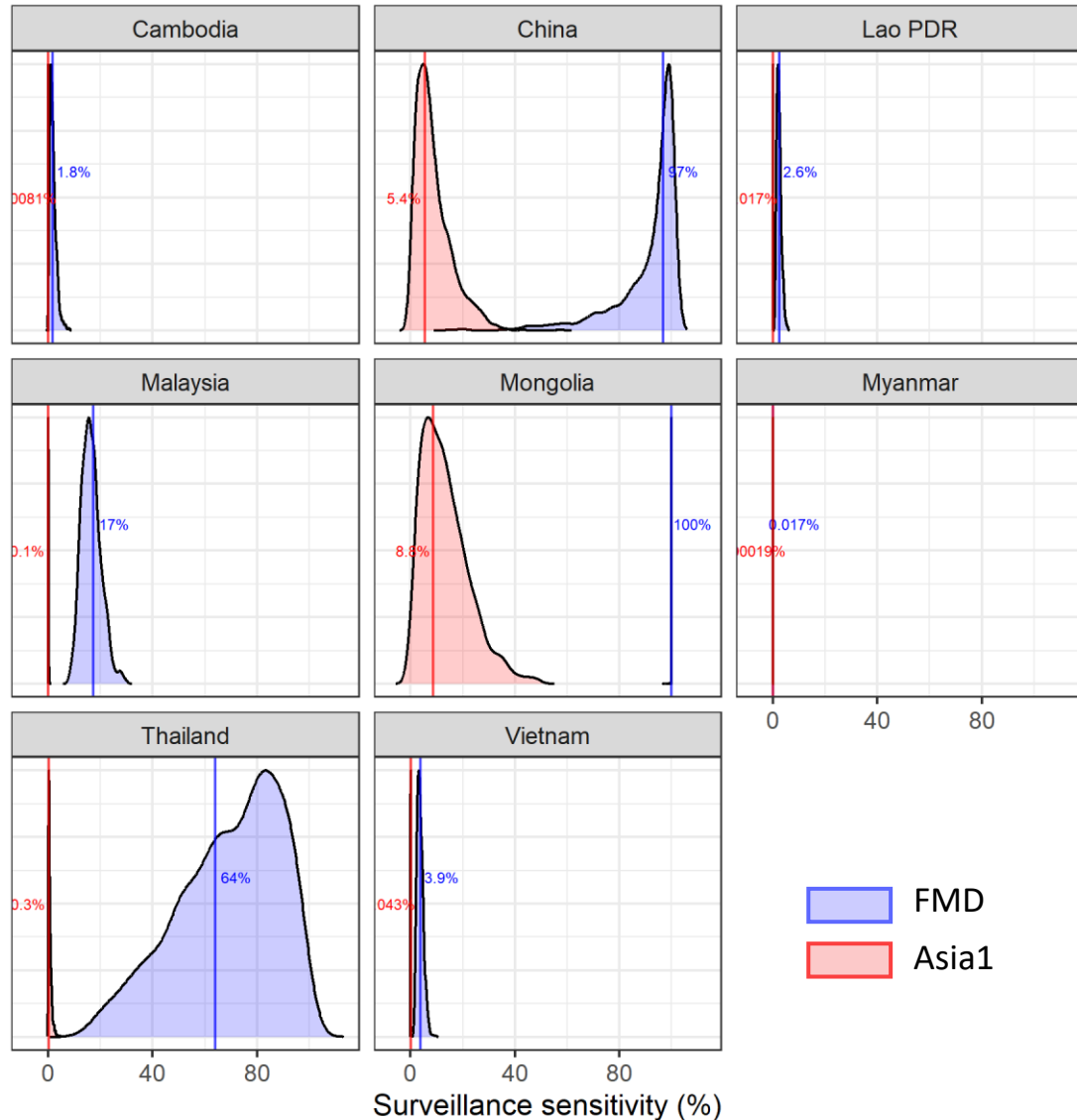
Scenario tree

- Passive surveillance branch
 - Probability of Asia 1 detection in cattle, for the given FMD prevalence at the village (10%) and animal level (20%), vaccine coverage, type of vaccines, detection-reporting-vet visit-sampling-testing probability, number of animals/villages tested & posterior Asia 1 positivity
- Surveillance branches can be combined
 - Country sensitivity
 - Region sensitivity

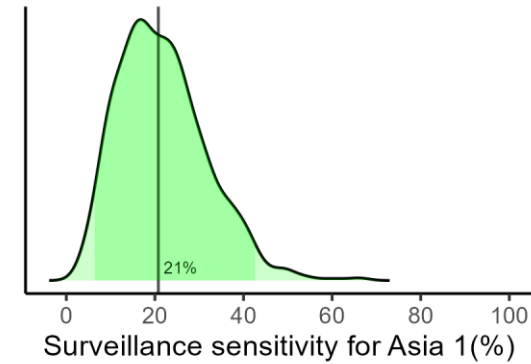


Result

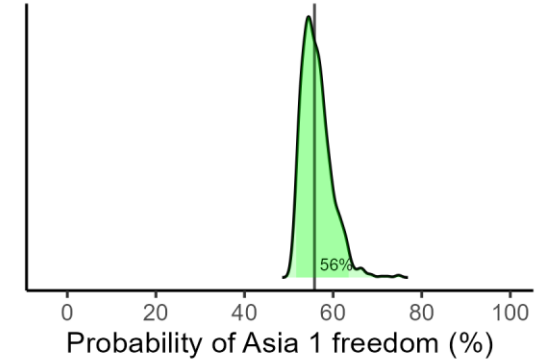
Country sensitivity



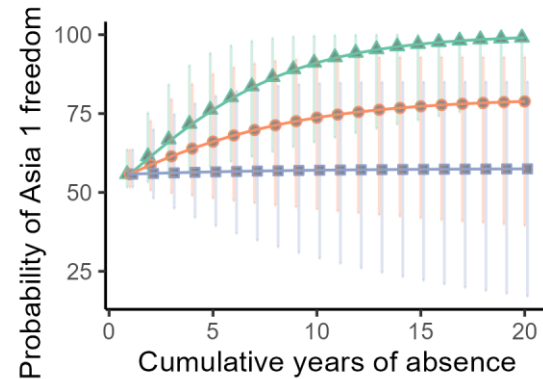
Region sensitivity



Probability of freedom (1 year of no report)

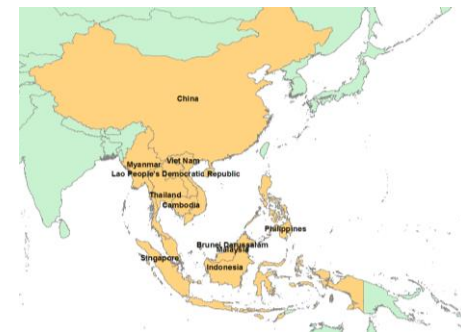


Probability of freedom (20 years, varying risk of introduction)



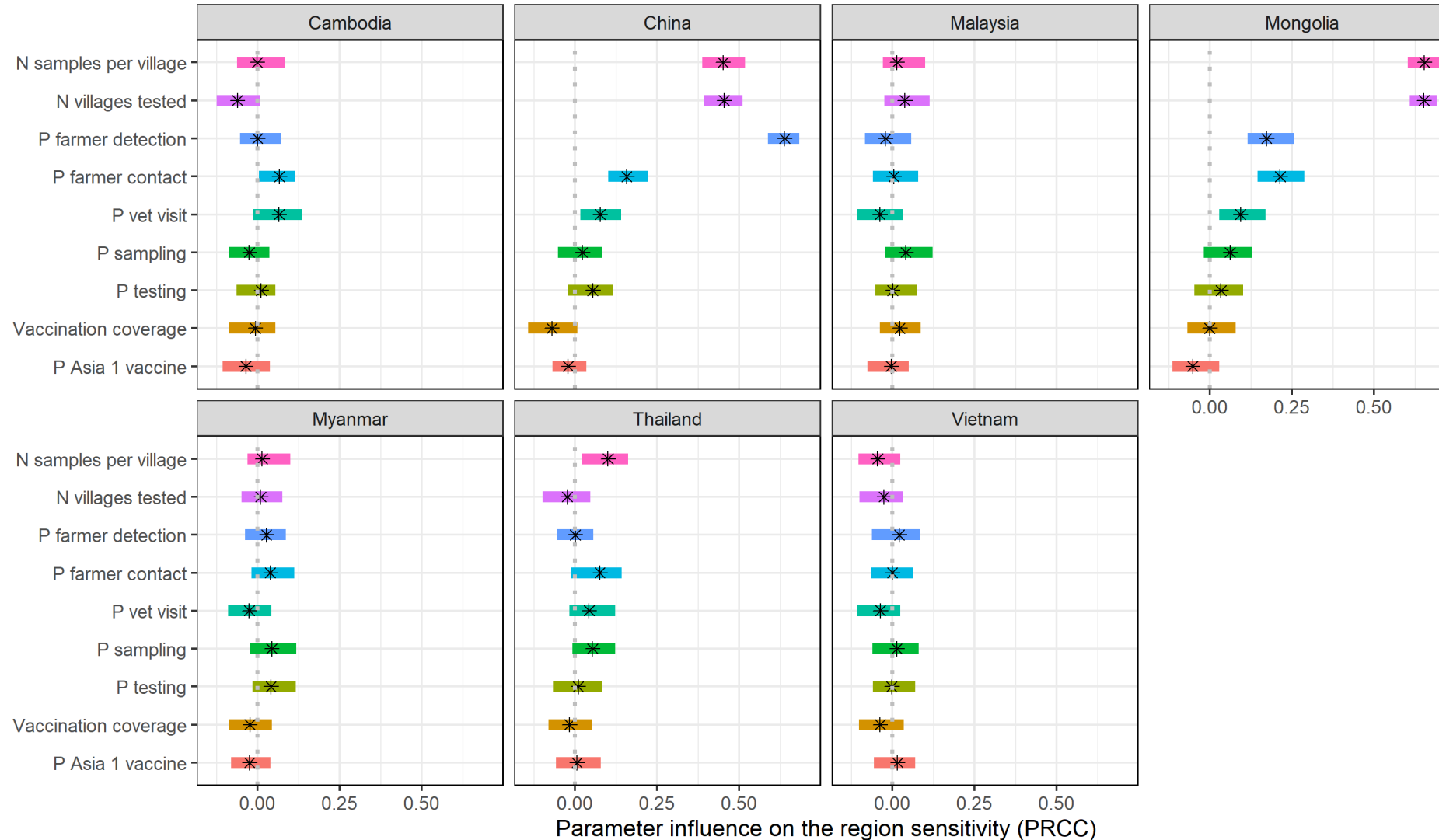
Risk of introduction

- 0%
- 5%
- 10%



Sensitivity analysis

Key parameters that influence the estimation of regional surveillance sensitivity for Asia1



Discussions

- Limited detection probability (21%) and moderate probability of freedom (56%) for Asia 1 in SEACFMD by passive surveillance alone
- The estimates would increase with addition of active surveillance
- Influential parameters need to be refined:
 1. Number of samples per village (Mongolia, China, Thailand)
 2. Number of villages tested (Mongolia, China)
 3. Probability of farmer detection (China)
 4. ...

Survey QR code



Acknowledgement

- Funding:
 - WOAHA
 - EpiCentre
- Laboratory data:
 - Pirbright
 - Pakchong
- Survey participants:
 - SEACFMD National Coordinators
 - EpiNet focal points
 - LabNetwork focal points
 - Upper Mekong Working Group Member
- Technical expertise:
 - Boloroo Purevsuren (WOAH)
 - Karma Rinzin (WOAH)
 - Ashish Sutar (WOAH)
 - Melissa Mclaws (FAO)
 - Sarah Mielke (USDA)

