

Is SEACFMD **really** free from Asia 1?

Evaluating the sensitivity of passive surveillance for FMD

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Sub-Regional Representation for South-East Asia, WOA, Thailand



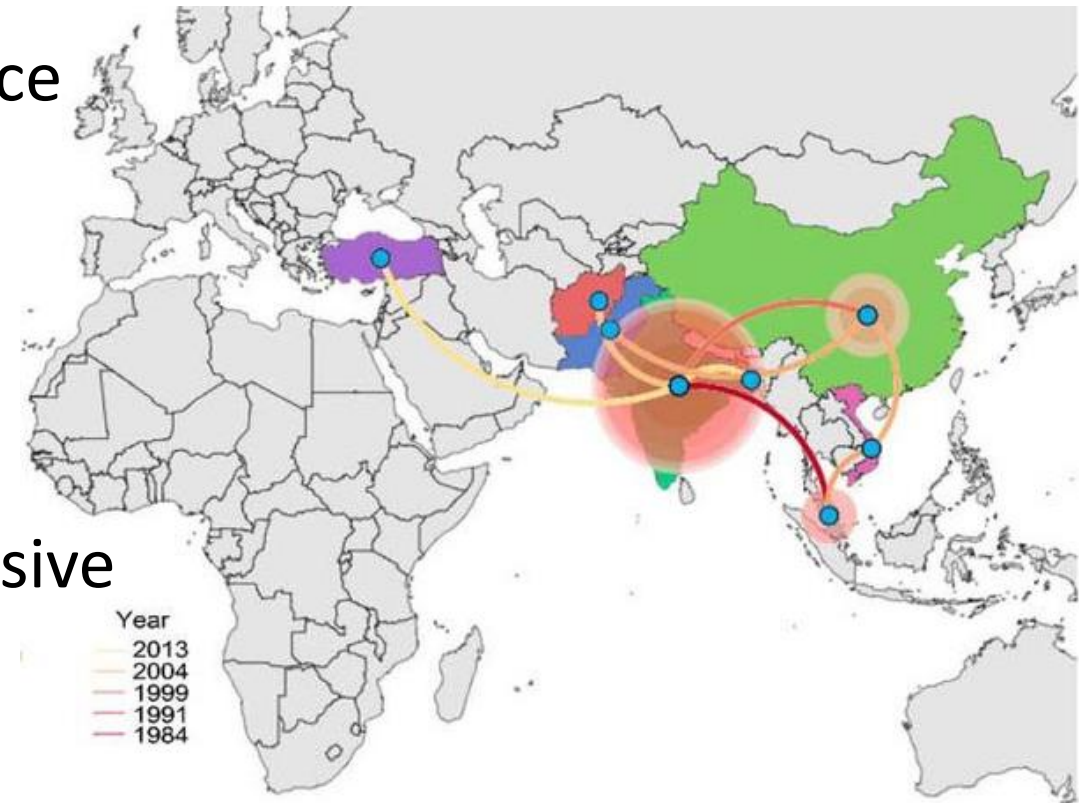
World Organisation
for Animal Health
Founded in 1924

Background

- No report of Asia 1 in SEACFMD since 2017

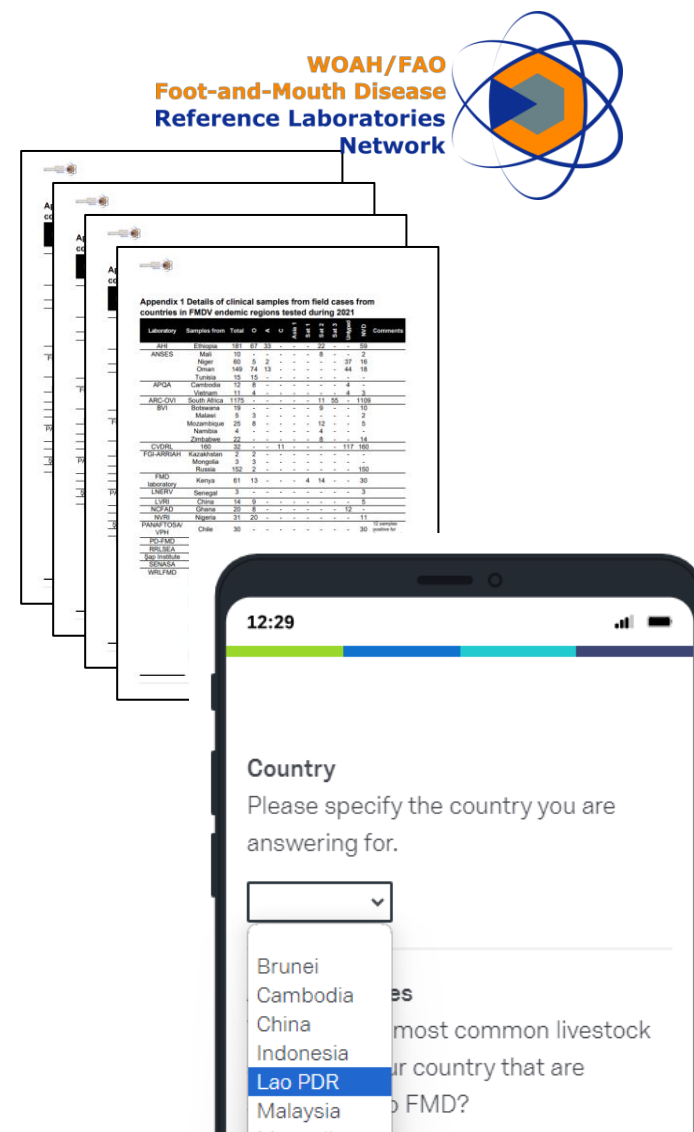
Historical spread of Asia 1 (Jara, 2019)

- Low reporting rate of passive surveillance
 - 0 – 40% (Vergne 2012; Han 2021)
- Is SEACFMD currently free from Asia 1?
- Can disease freedom be claimed by passive surveillance alone?



Methods - data

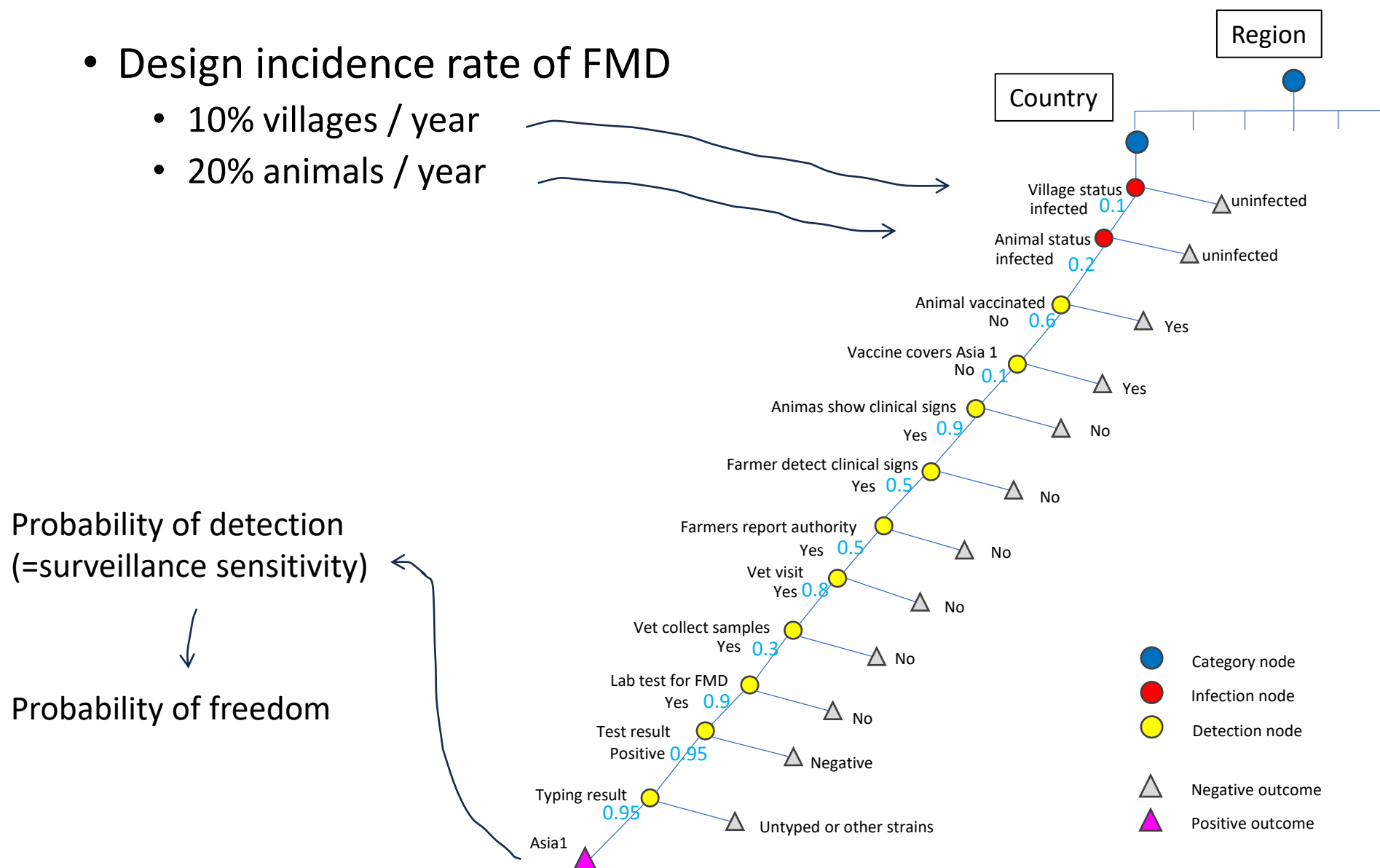
- Laboratory data
 - WOAHA/FAO FMD Reference Laboratory Network
 - Number of samples tested
 - Number of samples positive to Asia 1
- Online survey
 - From 9 countries
 - EpiNet, LabNetwork, Upper Mekong Working Group
 - Farmers behaviour, vaccination practice, veterinary service, diagnostic capacity



Methods – scenario tree model

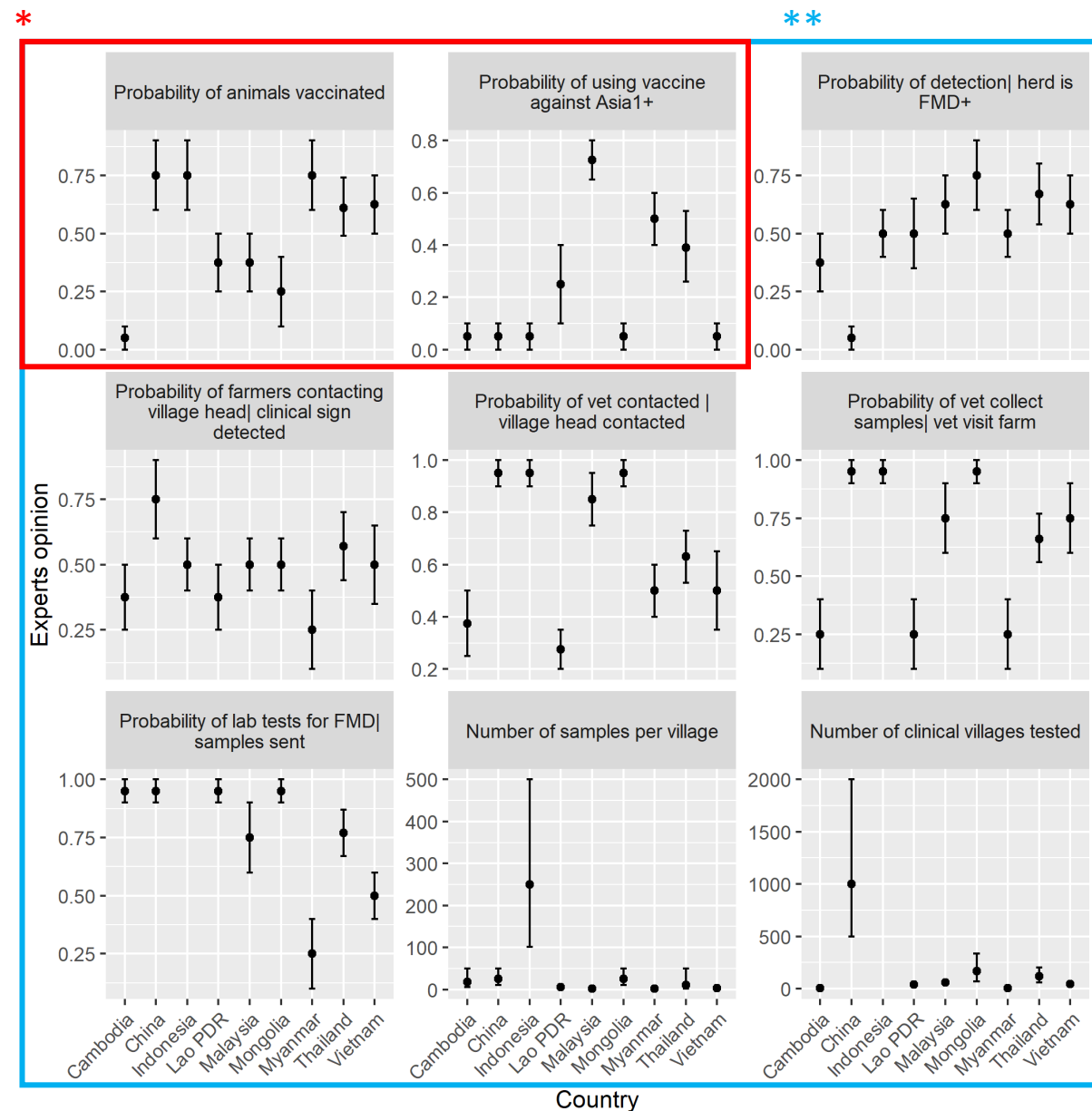
- Design incidence rate of FMD

- 10% villages / year
- 20% animals / year



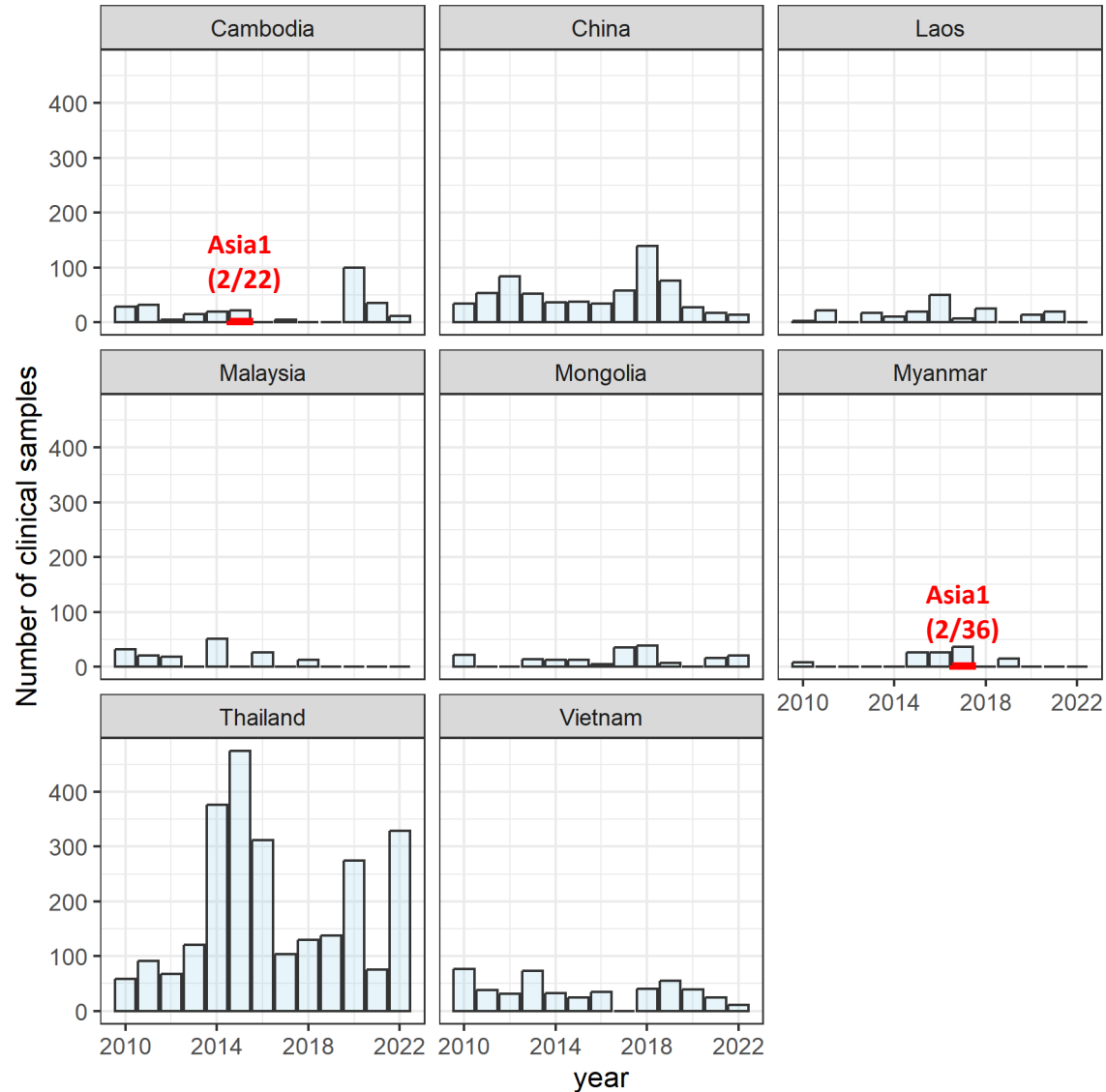
Expert knowledge

- Respondents: median 2 (1-7) per country
- Vaccination (*)
- Passive surveillance (**)

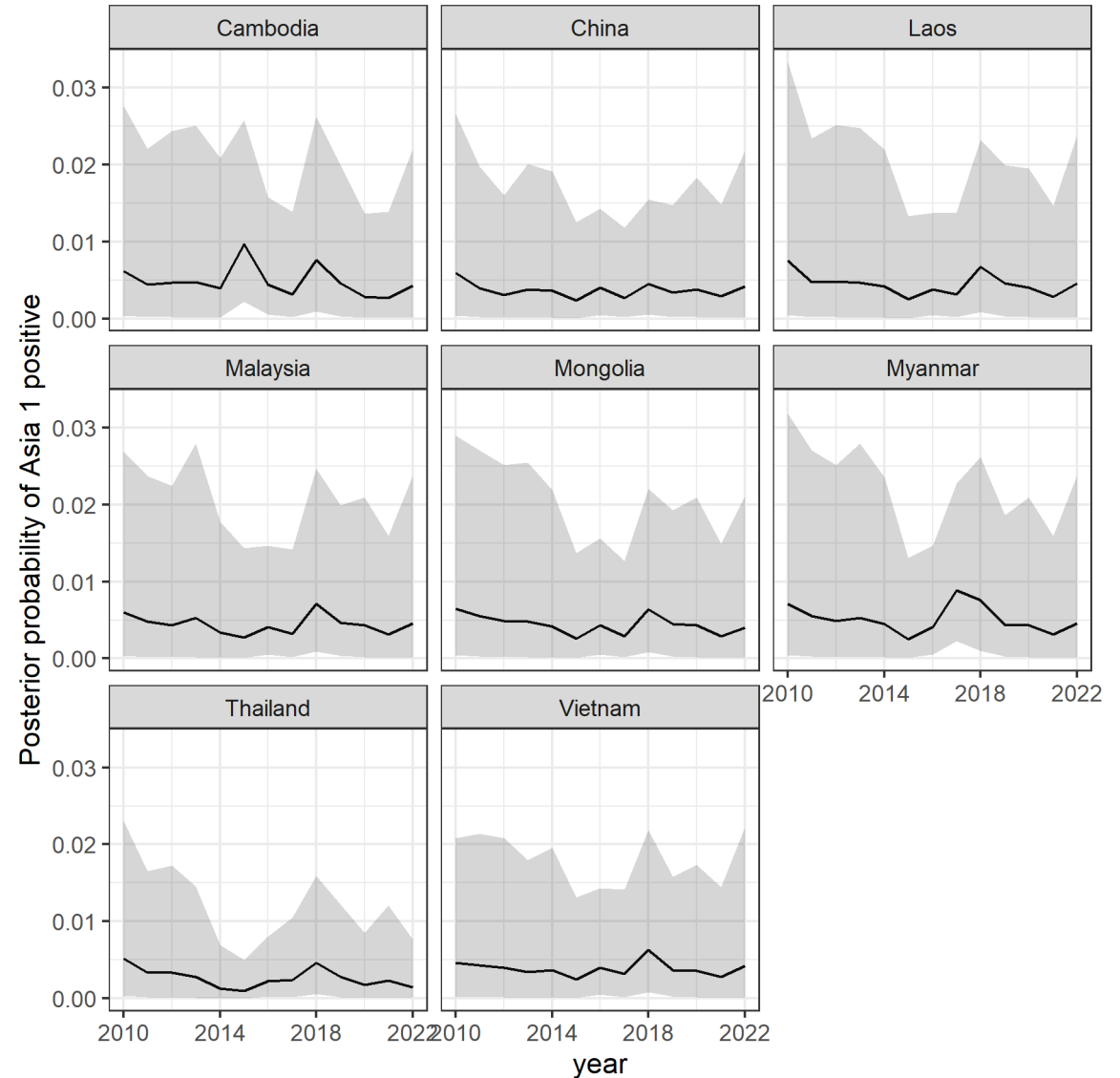


Sample Asia 1 positivity

The number of samples submitted vs Asia 1 positive

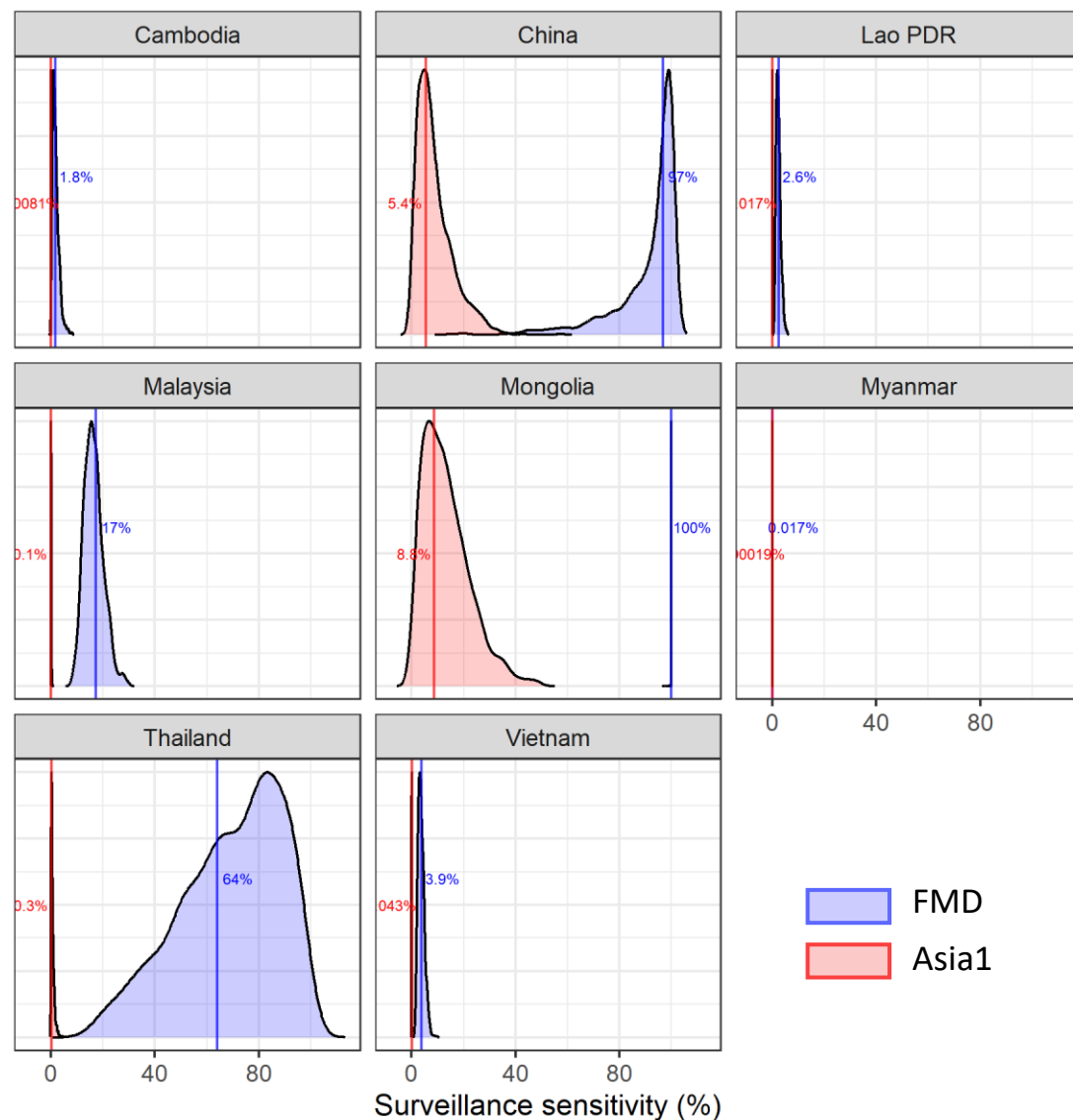


The posterior probabilities of Asia 1 positive

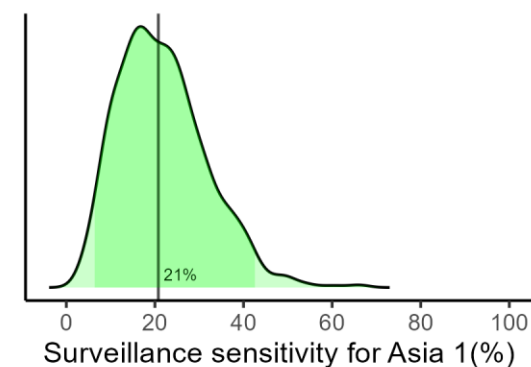


Result

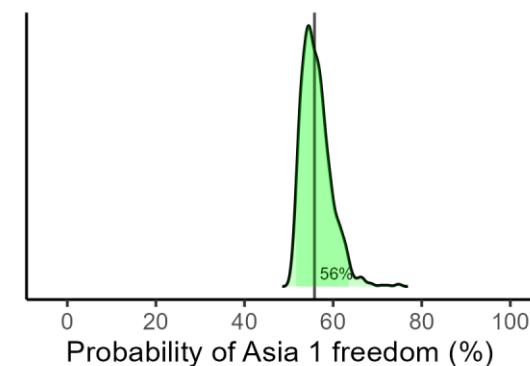
Country sensitivity



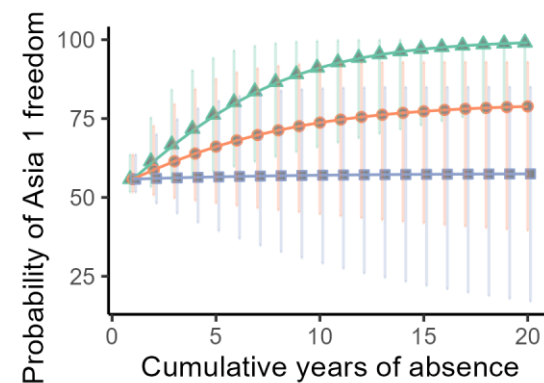
Region sensitivity



Probability of freedom (1 year of no report)



Probability of freedom (20 years of no report)



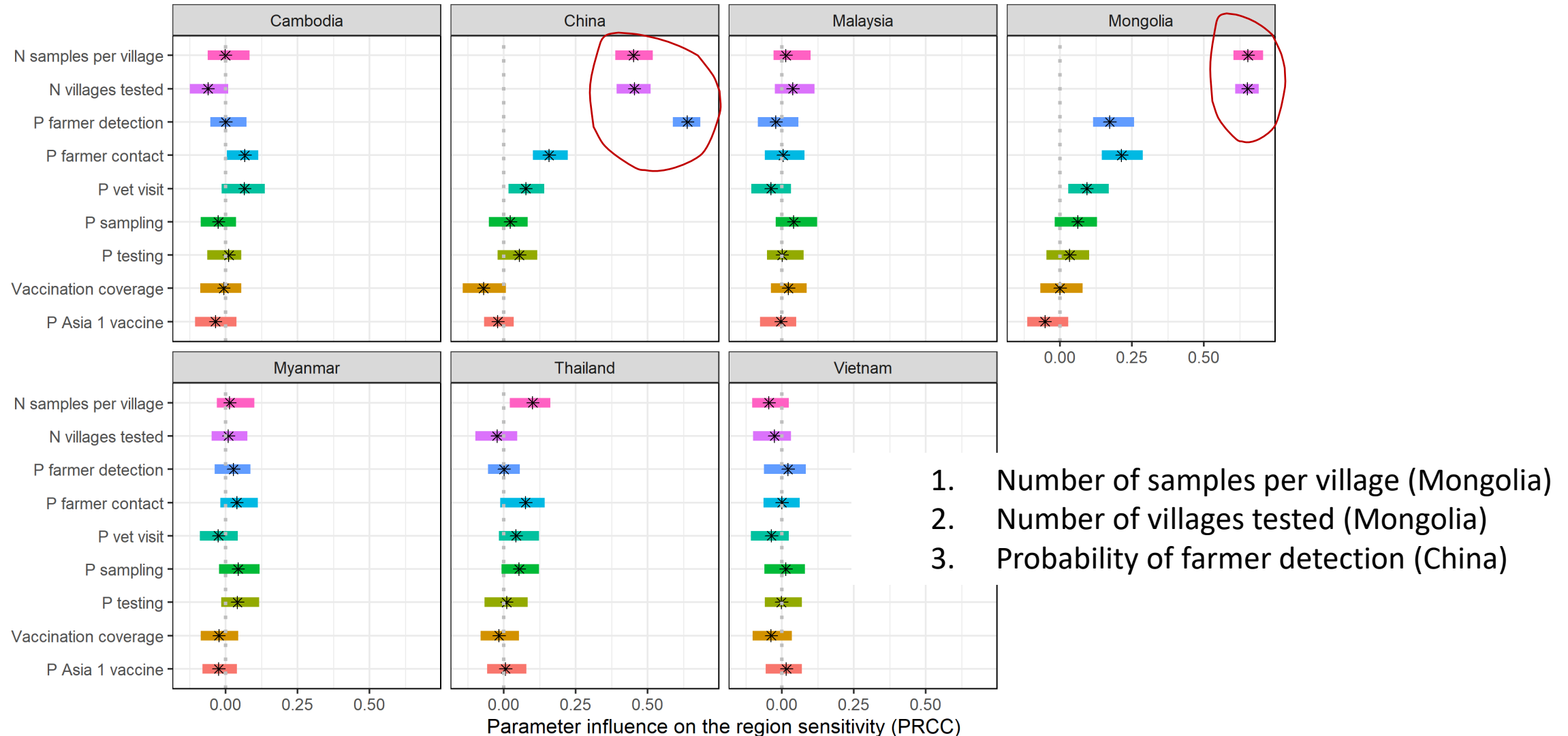
Risk of introduction

- 0%
- 5%
- 10%



Parameter uncertainty

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



Interactive tool

- <https://shiny.massey.ac.nz/mwada/asia1/>



FMDV Serotype Asia 1 Status

Generic parameter

Cambodia

China

Indonesia

Lao PDR

Malaysia

Mongolia

Myanmar

Thailand

Vietnam

Design prevalence of FMD at the village level (%)

10

Design prevalence of FMD at the animal level (%)

20

FMD test sensitivity

0.5

0.8

0.99

Probability of animals showing clinical signs | animal is susceptible and infected

0.5

0.6

1

Summary Result

Surveillance Sensitivity

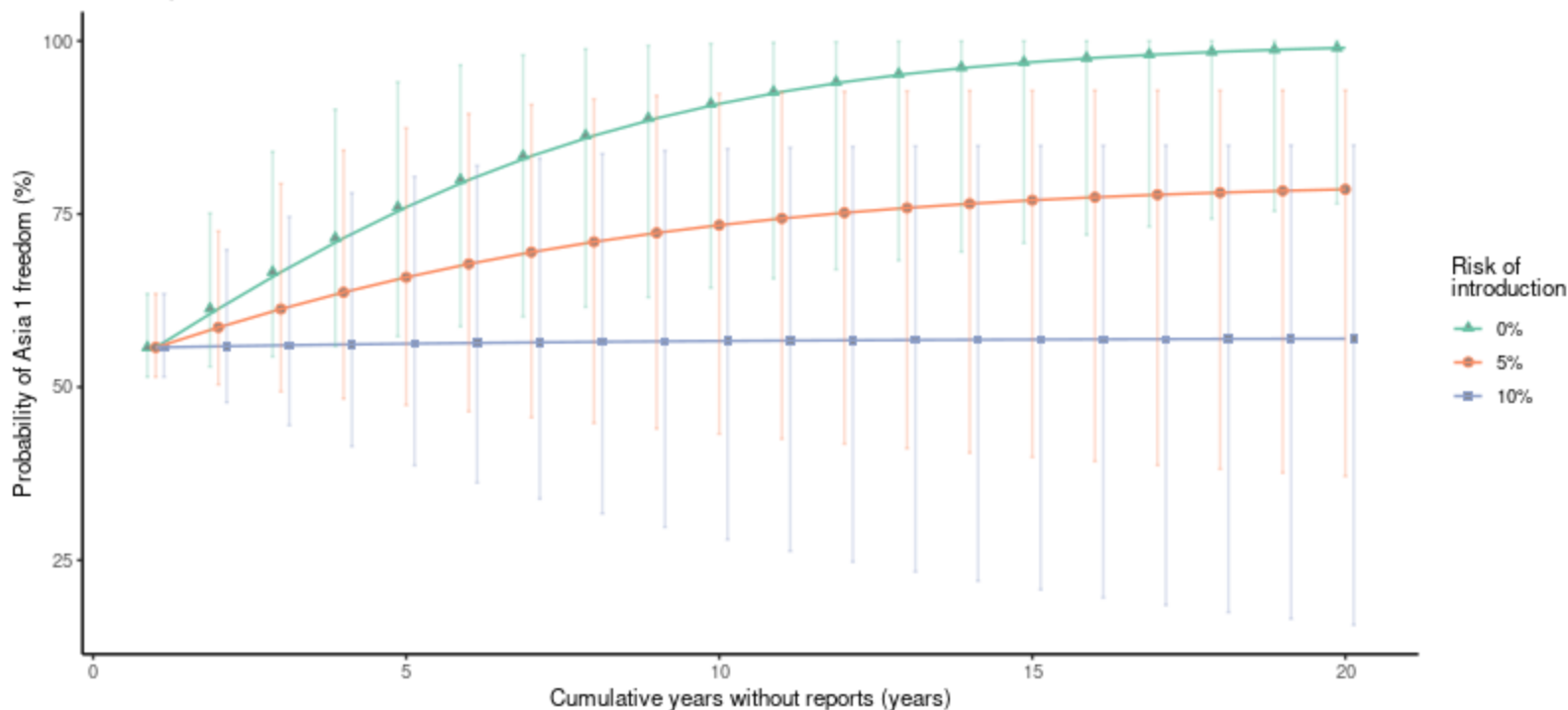
Disease Freedom (1 year)

Disease Freedom (20 years)

About

Posterior probability of Asia 1 freedom in SEACFMD, if there is no report of Asia 1 over time

Median (point) and 95% CI (errorbars) of estimation (n = 100)



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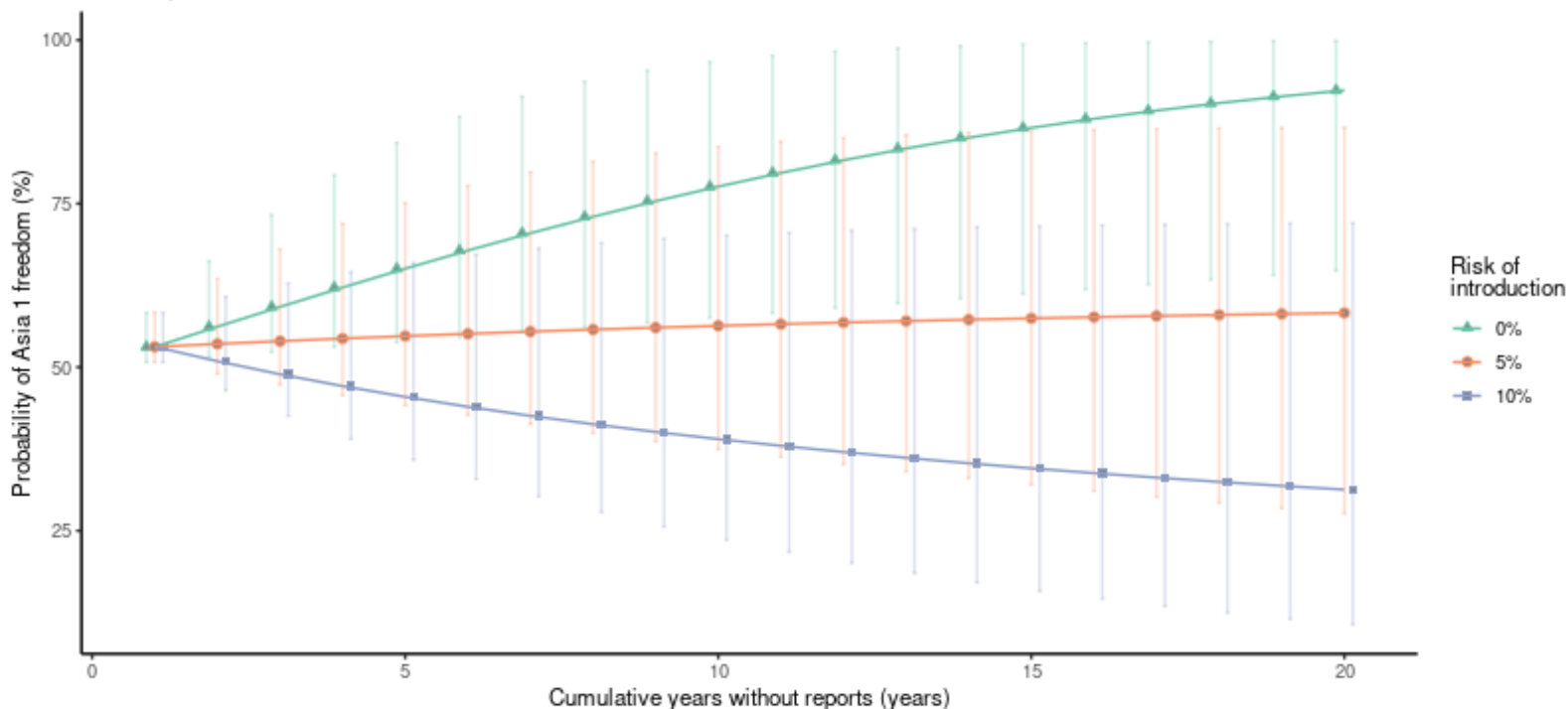
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Probability of animals vaccinated

0

0.6

0.9

1

Probability of using vaccine against Asia1+

0

0.1

1

Probability of detection | herd is FMD+

0

0.1

1

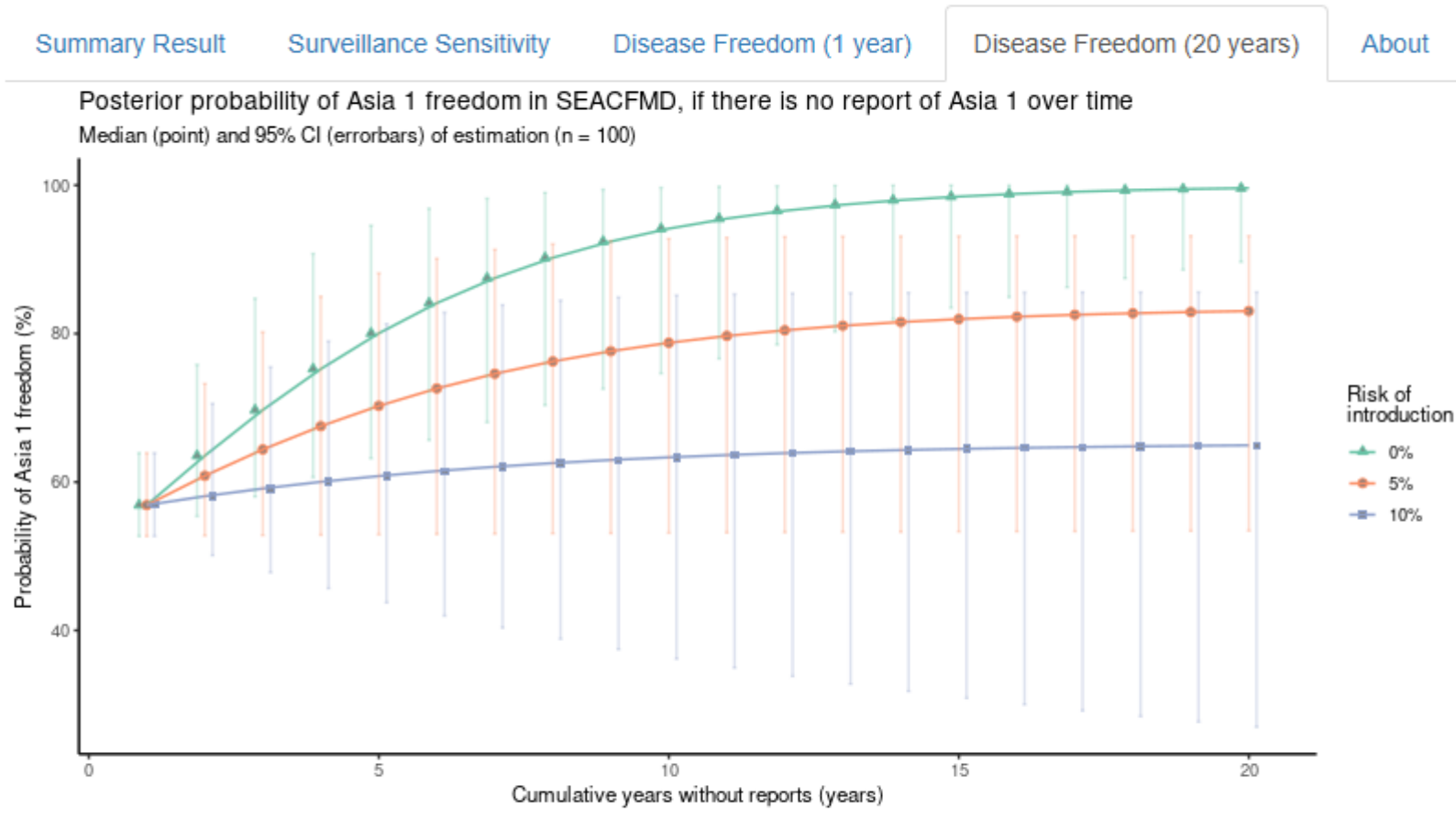
Probability of farmers contacting village head | clinical sign detected

0

0.6

0.9

1



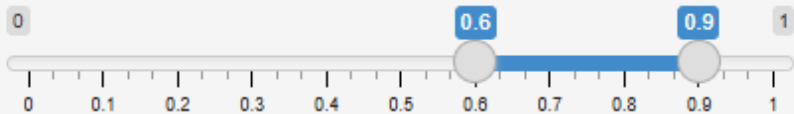
FMDV Serotype Asia 1 Status

Generic parameter Cambodia **China**

Indonesia Lao PDR Malaysia Mongolia

Myanmar Thailand Vietnam

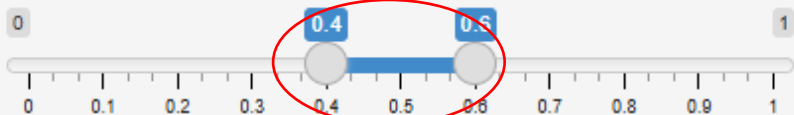
Probability of animals vaccinated



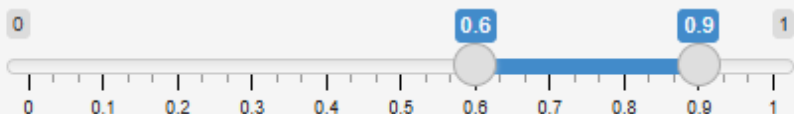
Probability of using vaccine against Asia1+



Probability of detection | herd is FMD+



Probability of farmers contacting village head | clinical sign detected



Summary Result

Surveillance Sensitivity

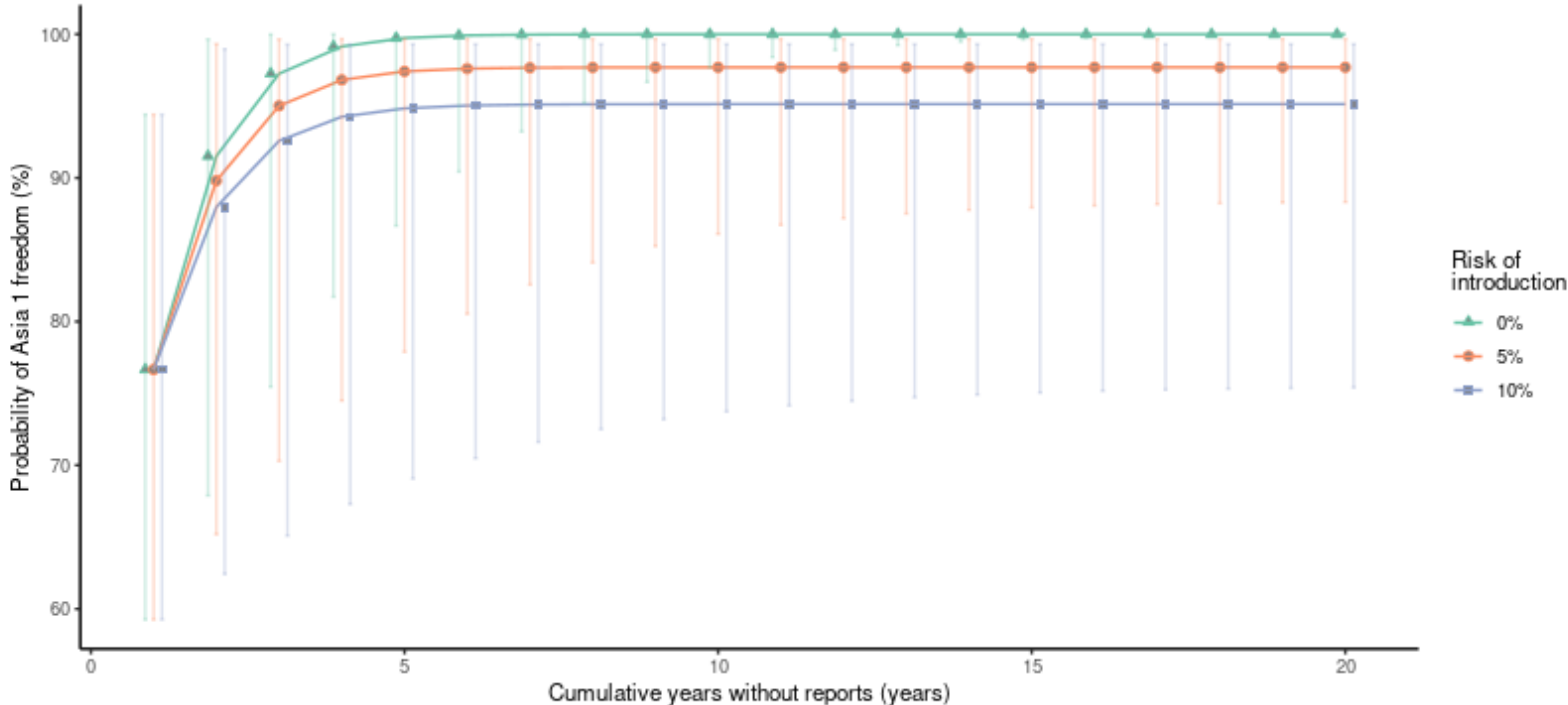
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Discussions

- Passive surveillance alone would not be sufficient to claim Asia 1 freedom in SEACFMD
 - Limited surveillance probability (21%)
 - Limited confidence of freedom (56%)
 - Unknown probability of introduction
- Key areas of uncertainty: parameters in China/Mongolia
- Active surveillance could be incorporated in future study

Summary

- Scenario tree models can be used for understanding the effectiveness of the existing surveillance and identifying key areas for enhancement



Acknowledgement

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 - Ministry of Agriculture and Rural Affairs, China
- Laboratory data:
 - Pirbright
 - Pakchong
- Survey participants:
 - SEACFMD National Coordinators
 - EpiNet focal points
 - LabNetwork focal points
 - Upper Mekong Working Group Member



Thank you

- Any questions?

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To participate in the survey

