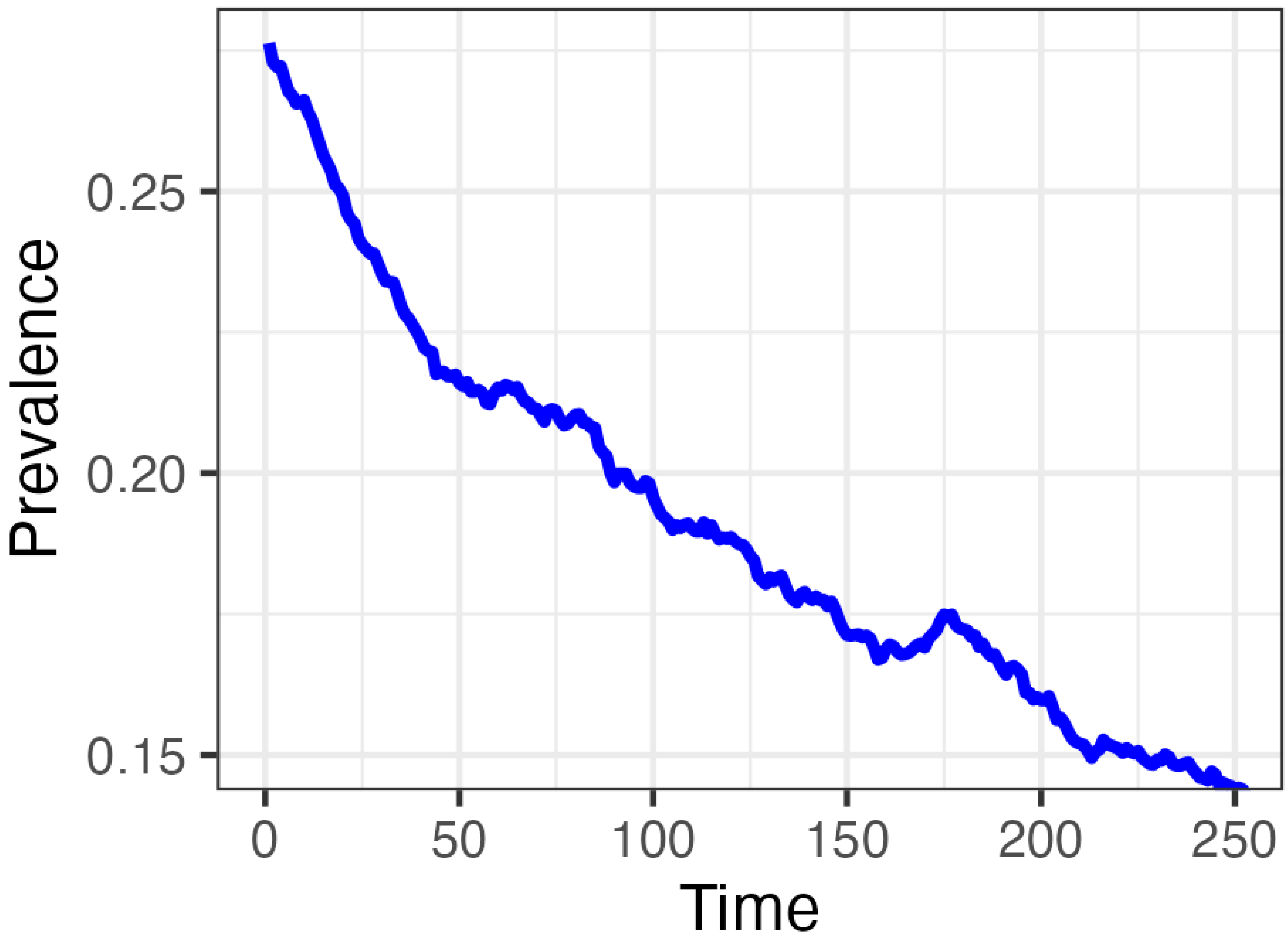
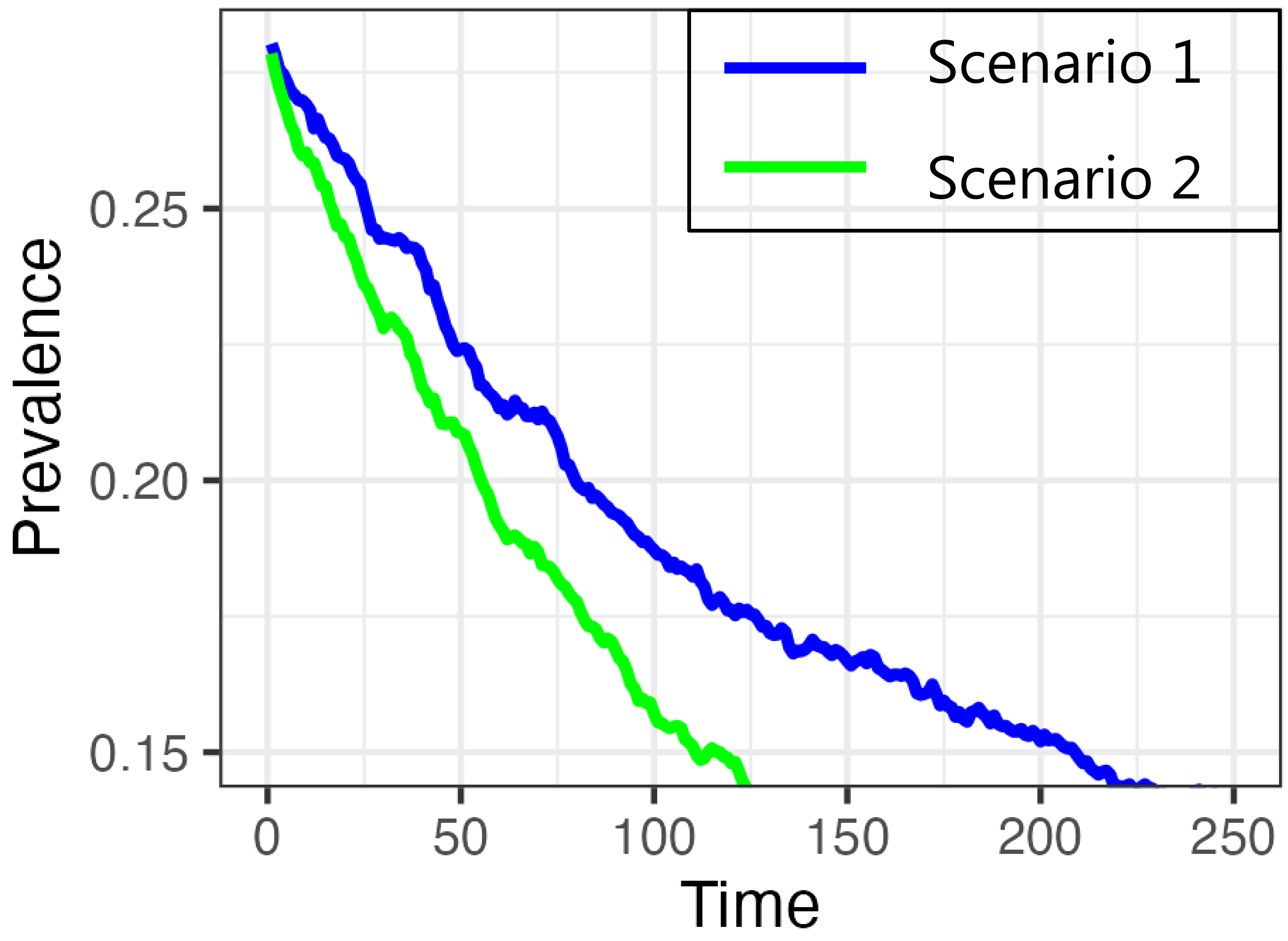
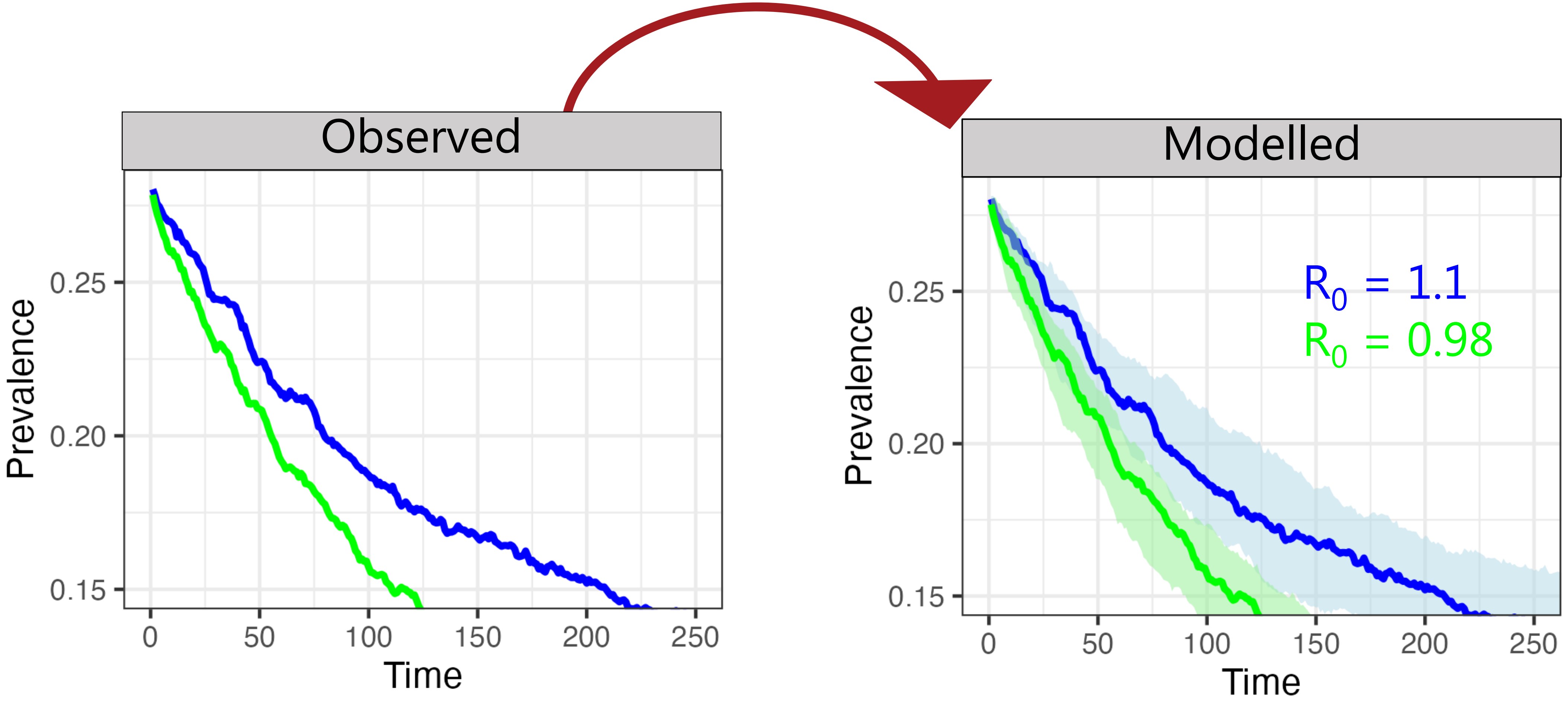
Is the current PRRS control strategy sufficient in Denmark?



Is the current PRRS control strategy sufficient in Denmark?

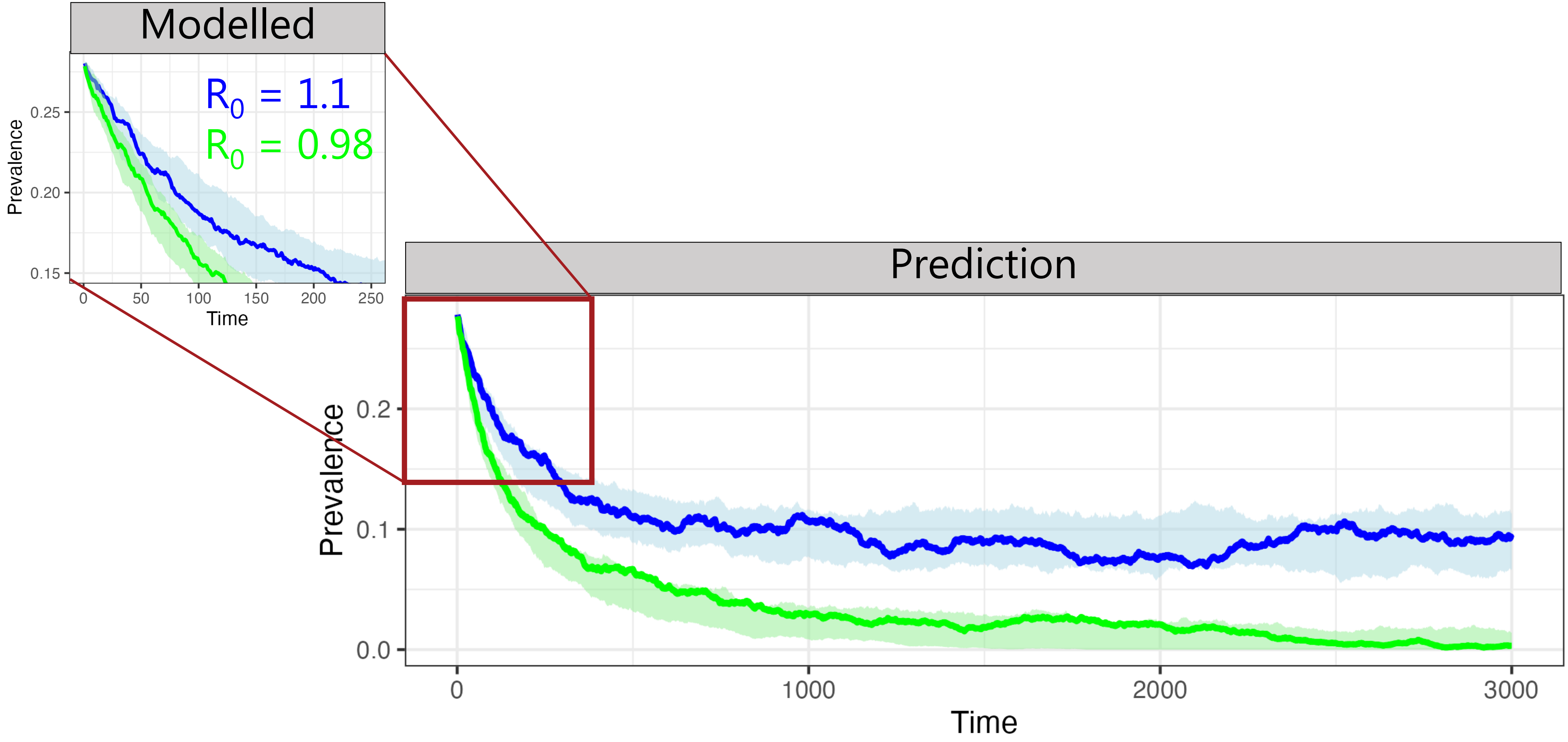


From prevalence data to transmission potential (R_0)*



*R_0 the basic reproduction ratio: the expected number of cases infected by one case in a population where all individuals are susceptible

Modelling can assess current situation AND **make prediction**!



Modelling PRRS transmission between pig herds in Denmark and prediction of intervention impact

You Chang

Infectious Disease Epidemiology &

Animal Health Economics Group (TIPTON Group)

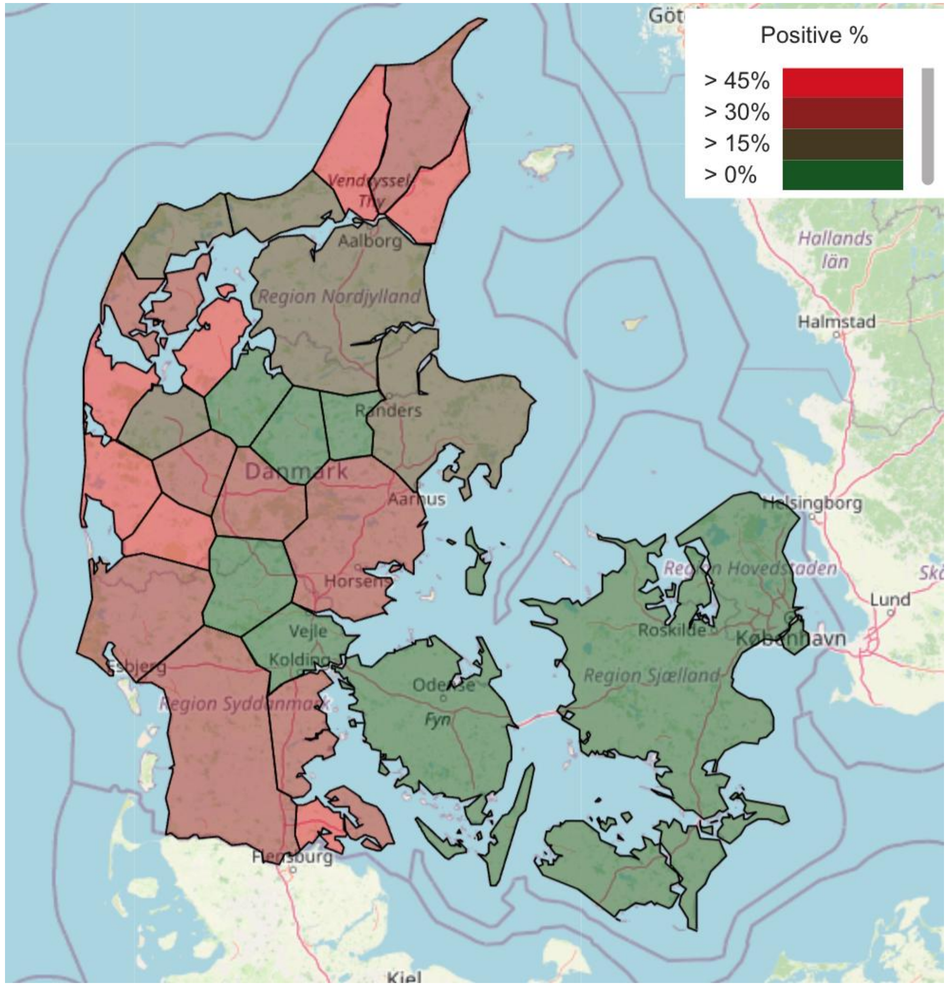
27/01/2026, Copenhagen

Svineafgiftsfonden

UNIVERSITY OF COPENHAGEN

PRRS control in Denmark: switch from voluntary to compulsory

- National herd prevalence:
  - 30% (before 2022)
  - <21% (now)
- Spatial heterogeneity
- Control measure changes over time:
  - 1993: Voluntary declaration
  - 2023: Compulsory declaration



(Source: landmand.dk; extracted 2024)

Aim

To understand PRRS transmission and predict the impact of control measures

Methods

Four Datasets used from 2020-2021

Surveillance data

herd	date_start	date_end	dt	status	status_end
1	2020-09-16	2020-12-16	90	Positive	Negative
1	2021-12-16	2021-03-16	90	Negative	Positive
1	2021-03-16	2021-12-16	180	Positive	Negative
1	2021-12-16	2022-07-16	210	Negative	NA

Administration data

Herd	Herd type	biosecurity
1	Sow	red
2	Finisher	blue
3	Weaner	blue
4	Integrate	blue

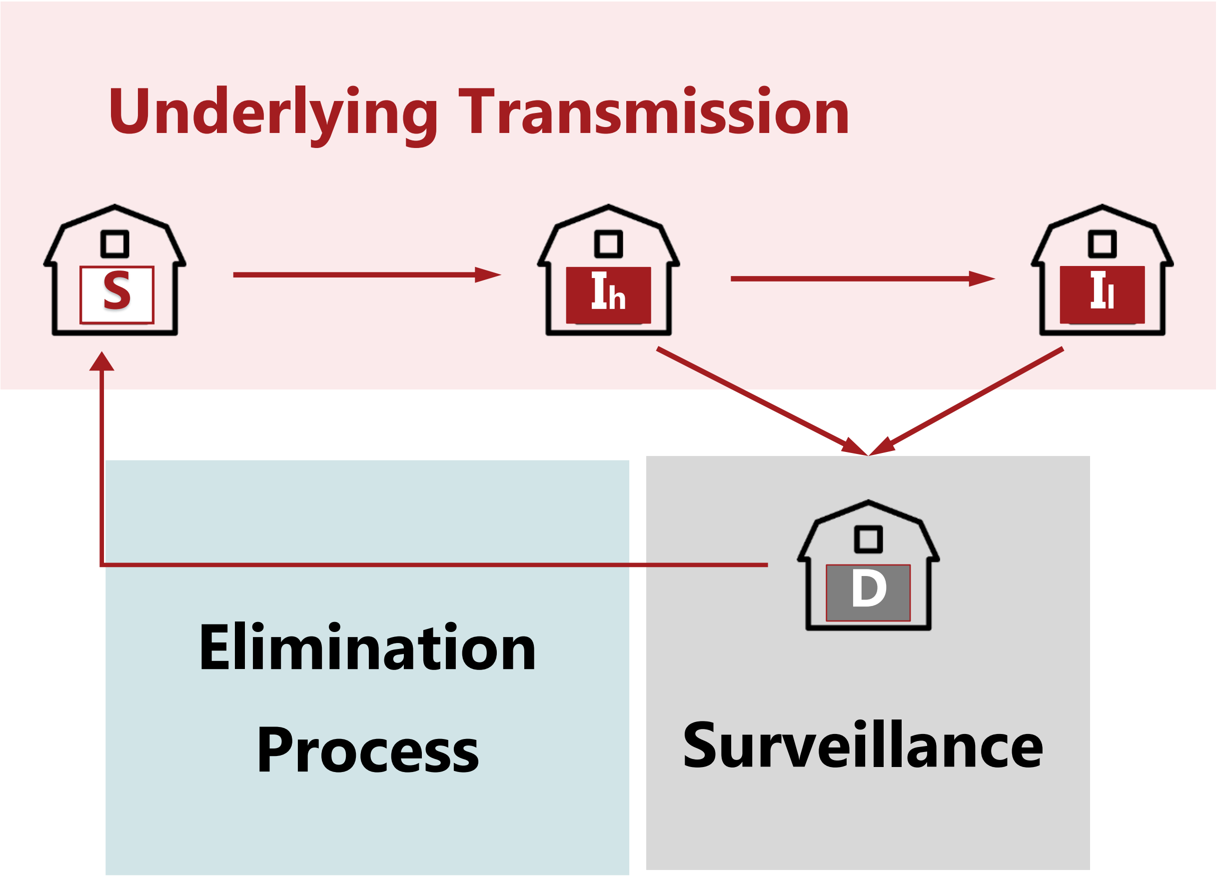
Movement data

Seller	Buyer	date	No. of pigs
1	2	2020-12-16	90
1	3	2021-03-16	90
1	3	2021-12-16	180
1	4	2022-07-16	210

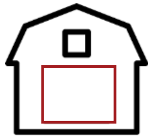
Geographic data

Herd	X	Y
1	557785	4545634
2	454534	5634532
3	464577	4567774
4	787467	6856473

Between-herd transmission model structure



Compartmental model

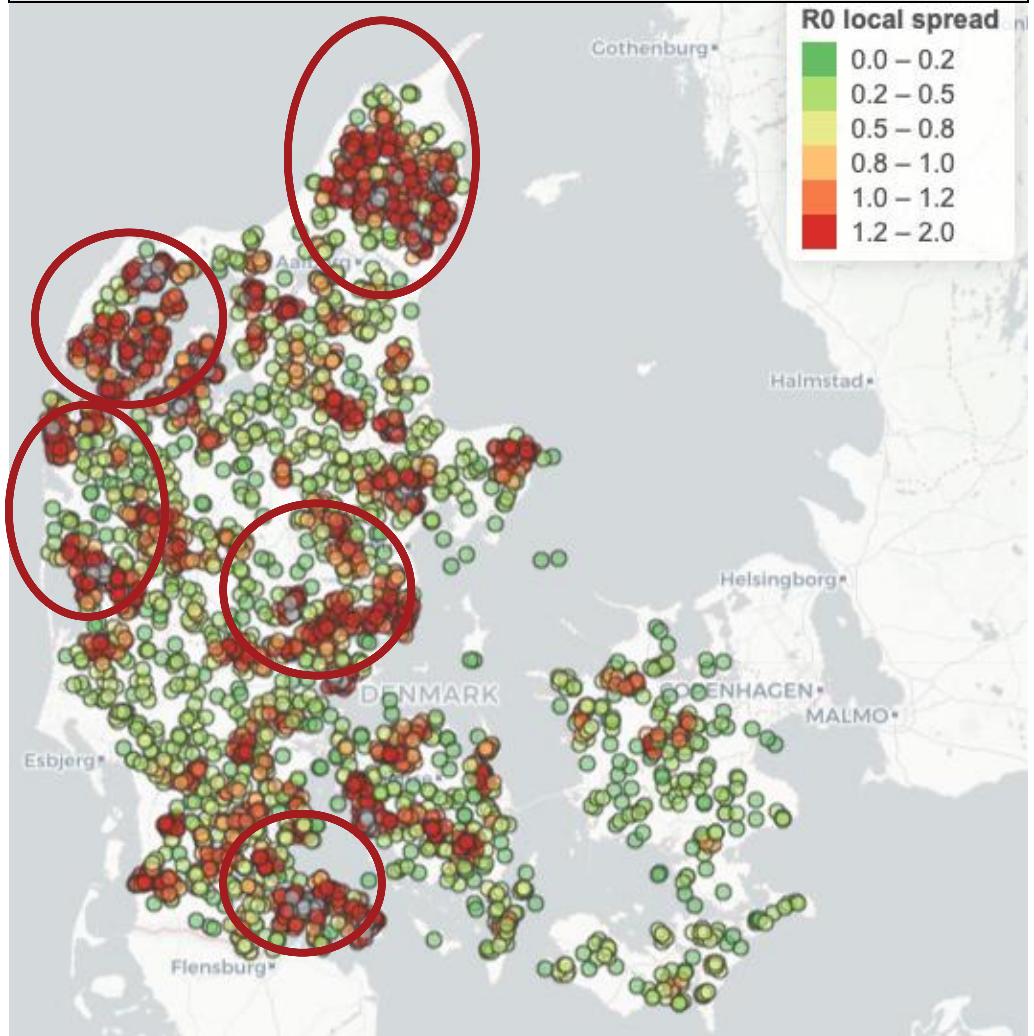


- Susceptible herd S
- Highly infectious herd I_h
- Lowly infectious herd I_l
- Detected herd D

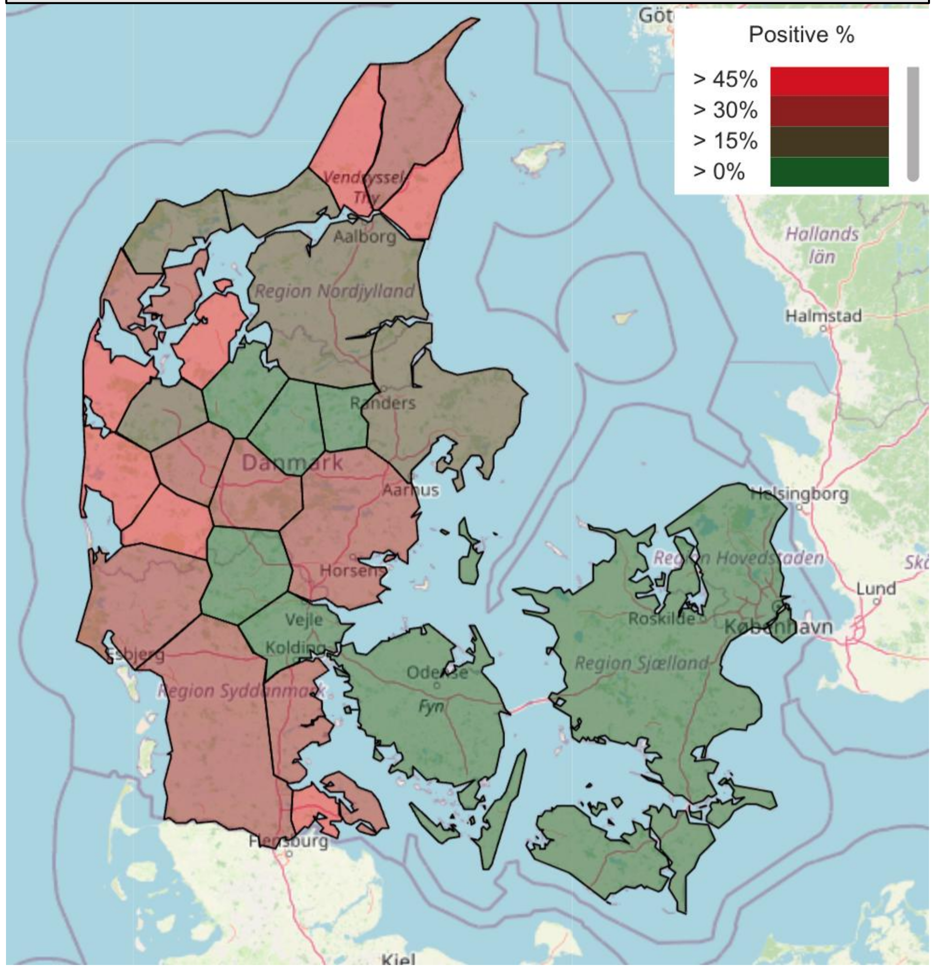
Results

Model predicted risk areas (R_0 map)

Modelled



Observed (2024)



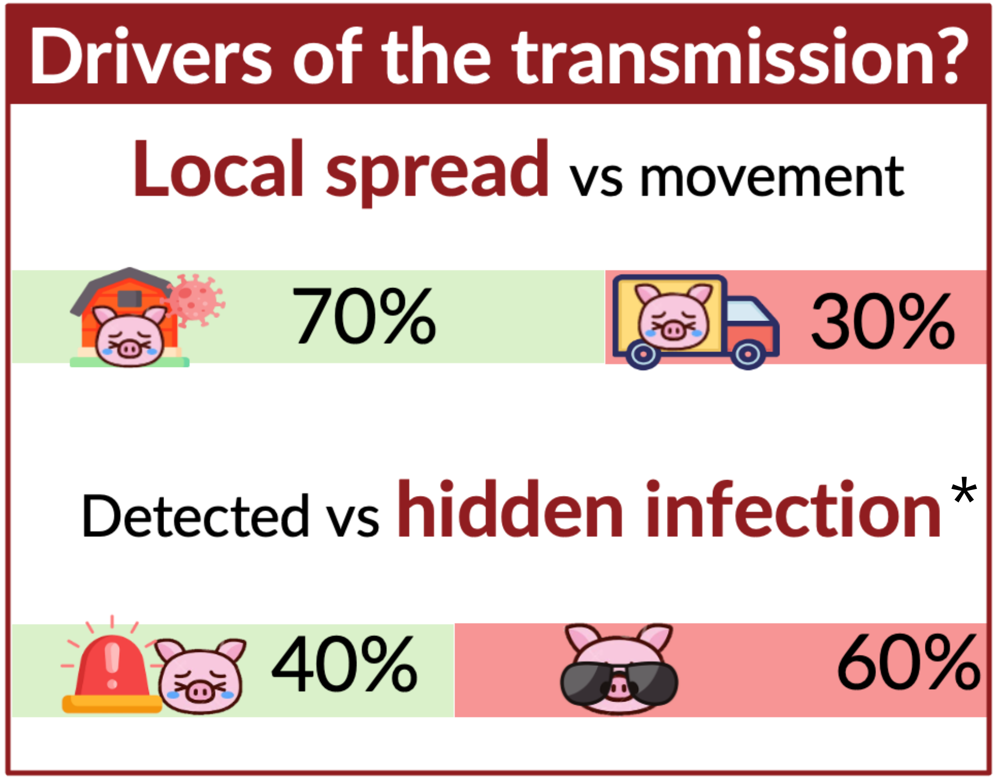
(Source: landmand.dk; extracted 2024)

Local spread dominates in finishers & sows movements drive weaners

Contribution per category

Production type	Biosecurity level	% of herds	% of I_h contribution	% of I_l contribution	% of D contribution	% of local spread
Sow	Red	1%	58%	2%	40%	79%
Sow	Blue	15%	45%	7%	48%	65%
Sow	Non-SPF	5%	33%	8%	59%	70%
Weaner	Red	0.2%	59%	4%	37%	65%
Weaner	Blue	5%	39%	22%	39%	59%
Weaner	Non-SPF	2%	33%	22%	45%	67%
Finisher	Red	2%	63%	3%	34%	65%

Overall contribution

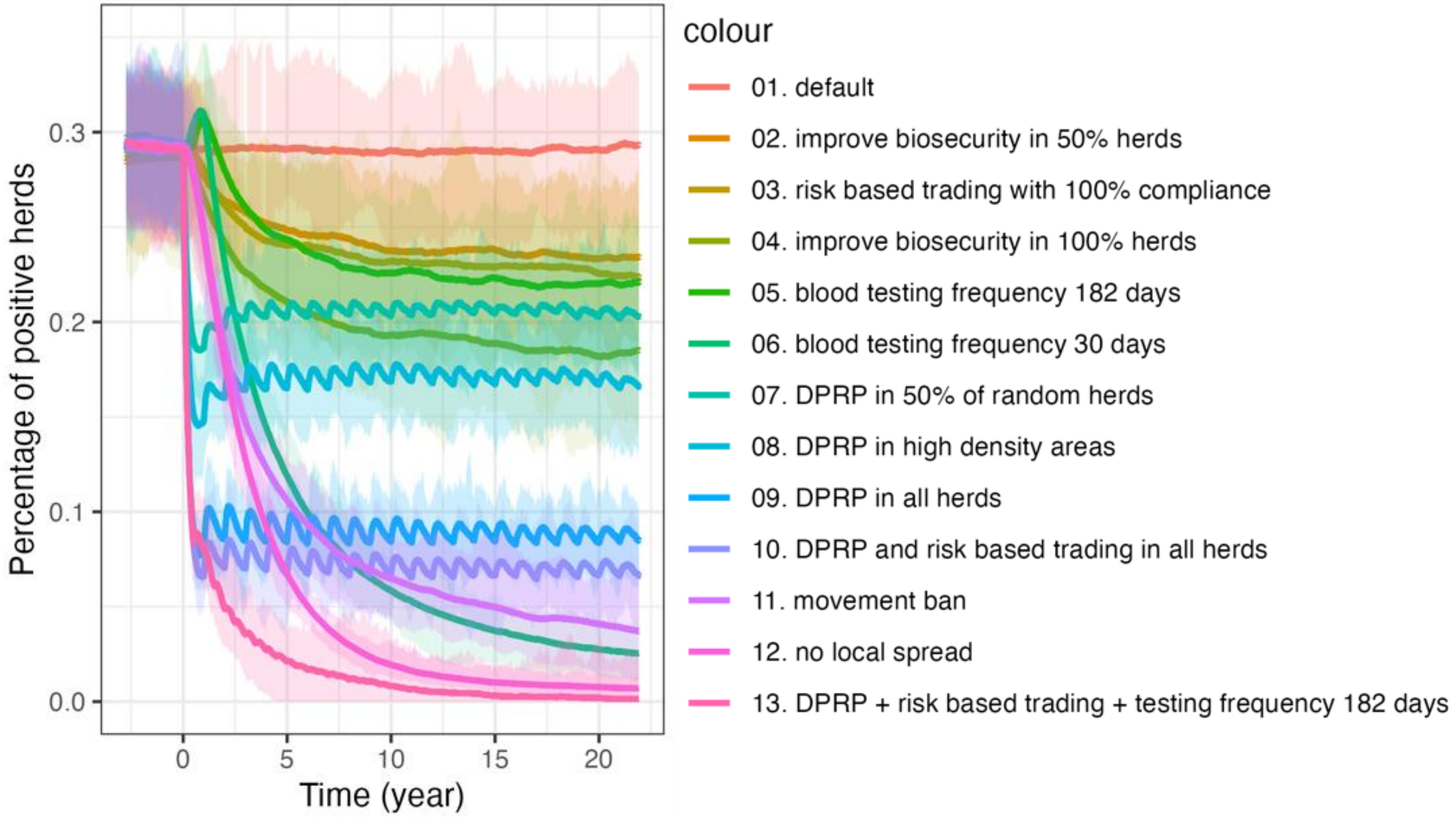


*due to infectious but undetected herds

Combined measures can eradicate PRRS

Most effective combined measures for eradication

- Risk based trading: not to move infected pigs
- DPRP: Depopulation-repopulation



Conclusion

- We estimated that highly infectious herds are 50 times more infectious than lowly infection (positive stable herds)

- Local spread drives spatial heterogeneity

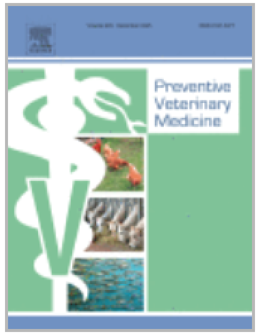
- 17% of undetected herds are responsible for 60% of total PRRS transmission

- Eradication requires multiple controls, e.g., local controls, stricter risk-based trading, and more frequent testing

SCAN ME

Preventive Veterinary Medicine

Volume 245, December 2025, 106692



Modelling PRRS transmission between pig herds in Denmark and prediction of interventions impact

You Chang [a], Ana Rita Pinheiro Marques [a], Mette Fertner [b], Nils Toft [c], Bjørn Lorenzen [c], Mossa Merhi Reimert [a], Hans Houe [a], Beate Conrady [a]

New SAF Activities in 2026: PRRS Free Tool

From

Danish Agriculture & Food Council

To

SEGES INNOVATION

Municipality-level optimal control

- New legislation
- Farmers behaviour
- Economic

Thank you








Project was financed by

Svineafgiftsfonden

EUP AH&W European Partnership on Animal Health and Welfare

Cooperation partners

SEGES INNOVATION

Danish Agriculture & Food Council

You Chang

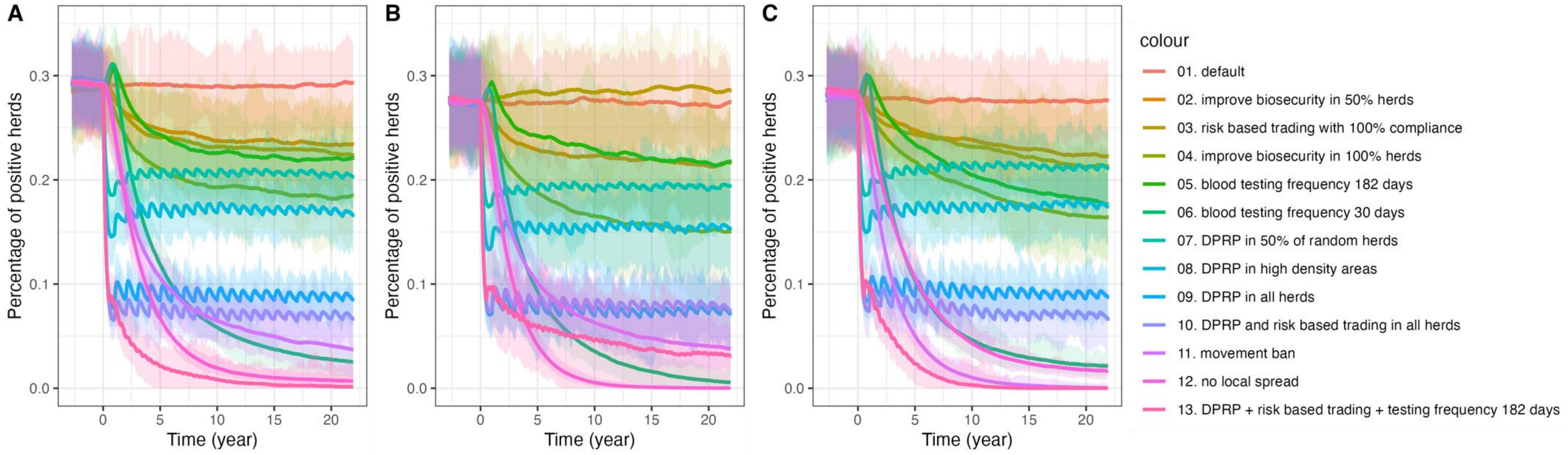
Department of Veterinary and Animal Sciences
University of Copenhagen
you.chang@sund.ku.dk

Impact of interventions on observed prevalence

S1. Literature from U.S. study

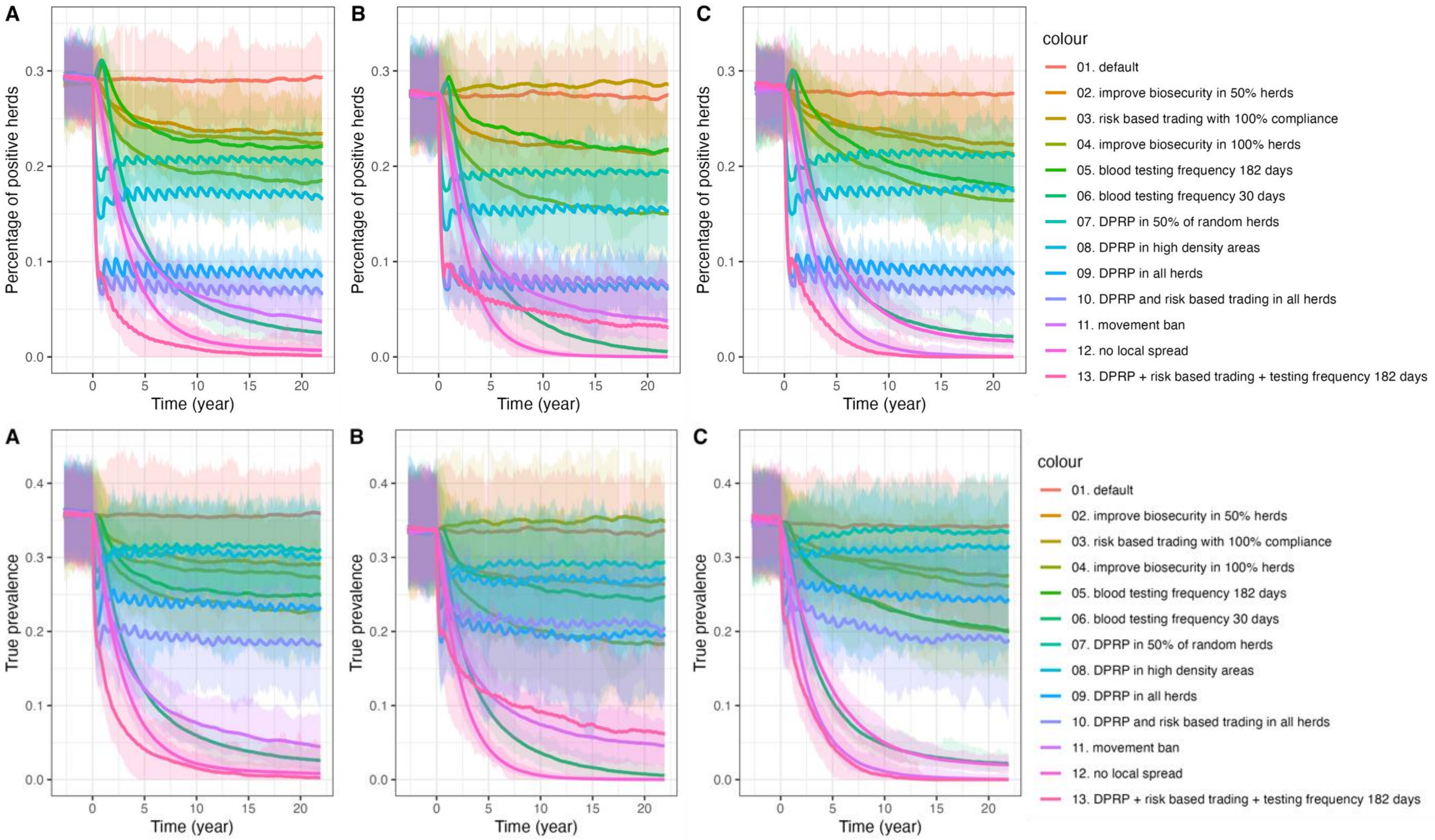
S2. Combining estimation and expert opinions

S3. Surveillance system assumption



Similar patterns for three scenarios

Impact of interventions on the true prevalence



Impact of interventions on the true prevalence

Table 6. National R_0 under different control strategies and scenarios

Control strategy	Scenario 1	Scenario 2	Scenario 3
01 default	1.56	1.51	1.52
02 improve biosecurity in 50 % herds	1.41	1.36	1.38
03 risk-based trading with 100% compliance	1.37	1.54	1.35
04 improve biosecurity in 100 % herds	1.30	1.22	1.25
05 blood testing frequency 182 days	1.33	1.33	1.25
06 blood testing frequency 30 days	1.03	1.01	
07 DPRP in 50% of the random herds	1.45	1.42	
08 DPRP in high density areas	1.43	1.37	
09 DPRP in all herds	1.30	1.24	
10 DPRP and risk-based trading in all herds	1.22	1.26	
11 movement bans	1.05	1.05	
12 no local spread	1.01	1.00 (> 1	
13 DPRP, risk-based trading in all herds and blood testing frequency 182 days	1.00 (>1)	1.07	

Source of infection	Scenario 1	Scenario 2	Scenario 3
From I_h	$\beta_{ls} = 0.0015$	$\beta_{ls} = 0.0015$	$\beta_{ls} \cdot 0.5$
From I_l and D	$0.016 \cdot \beta_{ls}$	$0.016 \cdot \beta_{ls}$	$0.016 \cdot \beta_{ls} \cdot 0.5$
Infection prob from I_h	0.26	1	1
infection prob from I_l and D	0.26	0.016	1