

Estimating Africa Swine Fever outbreaks in domestic pigs by using Bayesian hierarchical models.

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Introduction

African Swine Fever virus (ASFv) infection was first diagnosed in Estonian wild boars in 2014 and in domestic pigs 2015.

Aim of this study was to retrospectively predict domestic pigs outbreaks of ASFv.

Materials and Methods

Bayesian hierarchical models were used for spatio-temporal analysis with a web based application „Spatial“ (developed by European Food Safety Agency), which itself is based on R package INLA.

Spatial unit was a local municipality (n = 79) and time unit was one month (September 2014 – December 2017).

Outcome variable was domestic pigs ASFv detection in a municipality in a single month (set as binary).

Covariate was number of ASFv PCR positive wild boars detected in a municipality in single month.

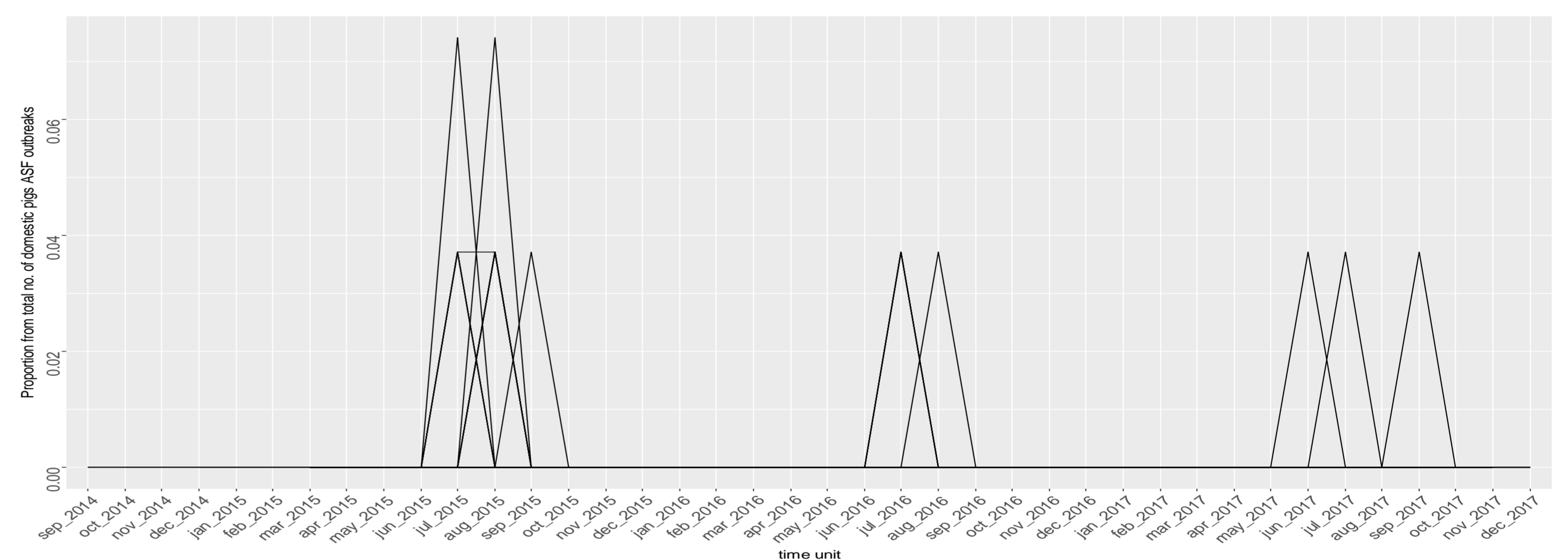
Samples

ASFv detected in domestic pigs (n = 27) and in wild boars (n = 3555).

Conclusion

ASFv detection in wild boars in a local municipality significantly increased the odds of an domestic pigs outbreak.

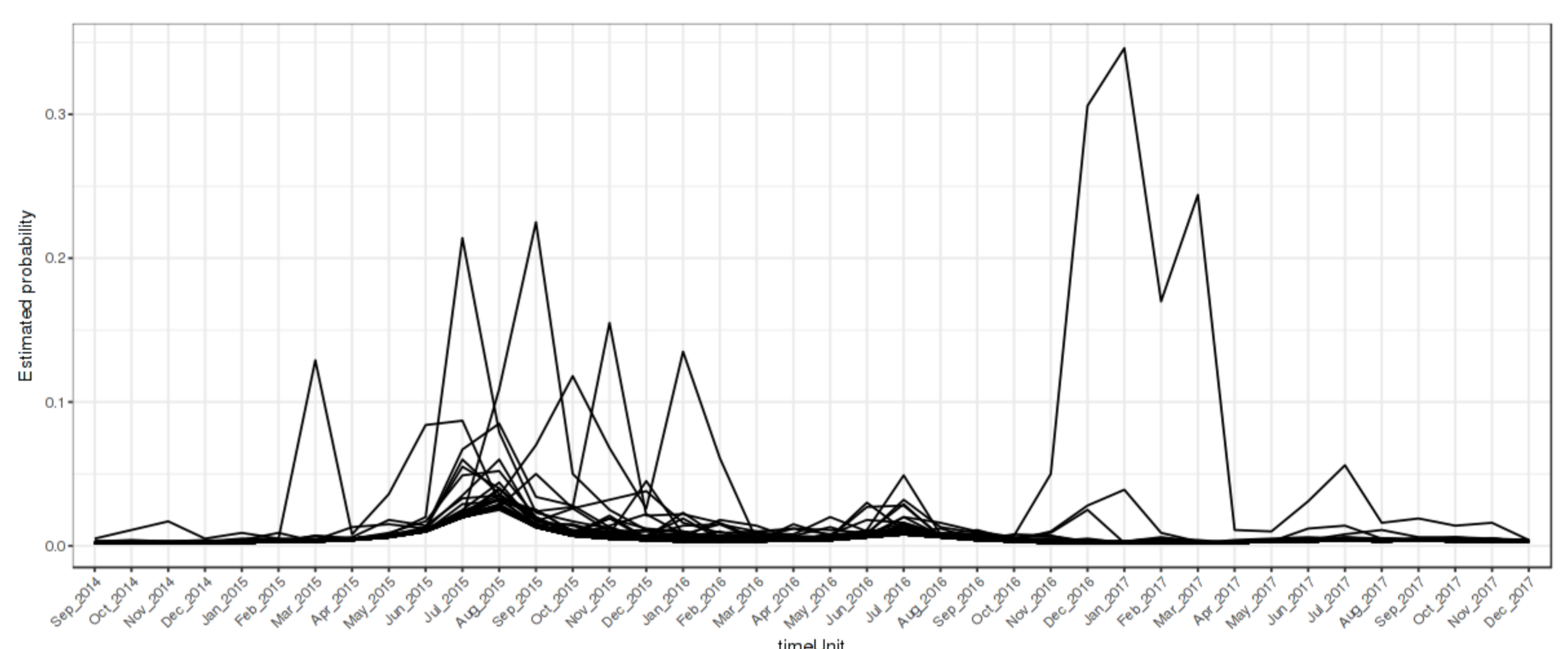
Results



ASF outbreaks in domestic pigs from September 2014 to December 2017.

Each line represents number of outbreaks (n=27) in a municipality in specific month.

Note: outbreaks in the same month overlap each other's lines



Model results.

Mean of estimated probability in spatio-temporal analysis for ASF outbreak in domestic pigs in a municipality. Note: each line indicates a municipality (n=79) and are overlapping

	Mean	SD	2.5% quantile	50% quantile	97.5% quantile
Intercept	0.003	1.349	0.002	0.003	0.005
ASFv positive wild boar	1.109	1.021	1.062	1.109	1.152

Model fixed parameters in odds ratios.

Convergence was achieved with DIC = 199.6 and effective number of parameters = 8.0. The time effect was chosen first-order random walk (RW1) as it was expected that occurrence of event in previous time point had strong effect on the event in the next time point. No space-time interaction was used.