

Disease Surveillance



Integrate



Real-time spatio-temporal syndromic surveillance system with application to small companion animals

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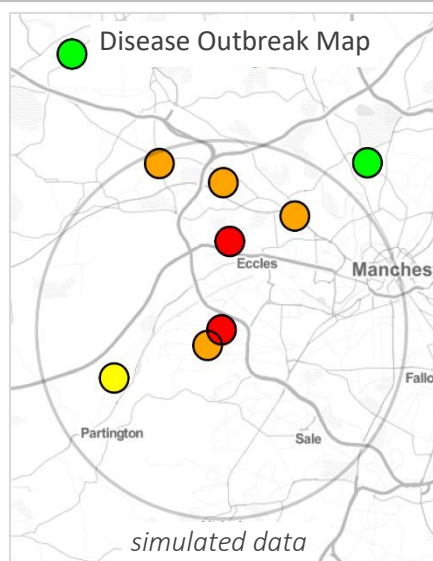
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Real-time surveillance mapping for early detection of disease outbreaks in dogs & cats

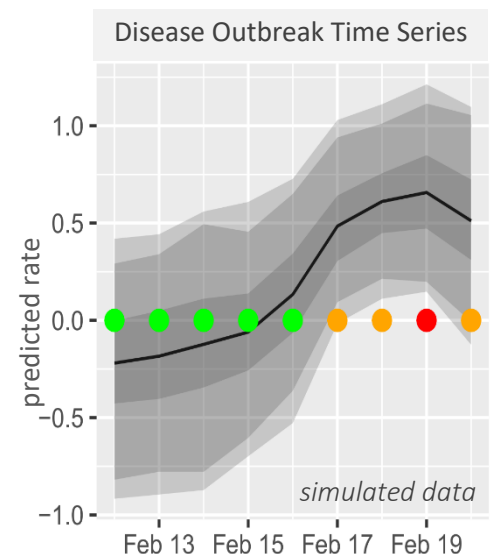


Data from a million health records from 458 UK veterinary surgeries taking part in SAVSNET

1. To accommodate the spatial and temporal correlations that would characterise an outbreak of disease, we use a spatio-temporal mixed effects regression model, and fit the model using Bayesian inference.
2. A Markov Chain Monte Carlo algorithm generates samples from the Bayesian predictive distribution of the underlying spatio-temporal surface.
3. The samples are used to compute predictive probabilities at given thresholds; a high predictive probability at a surgery on a given day gives an early warning of a possible disease outbreak.
4. This system provides end-users (i.e. practising veterinary surgeons) with decision-support tools for immediate analysis and easy interpretation of their data.



This example simulation shows a predicted disease outbreak near the centre of map (*left figure*) on 19th February. The time series plot (*right figure*) depicts the time evolution of the outbreak for the surgery located at the centre of the circle on the map.



In both figures, traffic light colours indicate probability of outbreak: ● >0.99; ● 0.99-0.9; ● 0.9-0.8; ● <0.8 (no outbreak)

This system generalises to other diseases recorded at GP or veterinary surgeries

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