Spatial clustering of neoplasia in a population of dogs from UK first opinion practice

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INTRODUCTION
There is limited research into the existence of spatial patterns of neoplasia in the UK general canine population. In addition, until now, there have been few sources of veterinary clinical data that reflect the general population of dogs in the UK and that would therefore enable such investigation. This study aimed to analyse spatial patterns of neoplastic disease in general and mast cell tumours (MCTs) specifically, in the UK first opinion practice-attending canine population, in order to generate hypotheses regarding environmental risk factors for neoplasia.

METHODOLOGY
All data derived from the database of the ‘VetCompass’ programme (Veterinary Companion Animal Surveillance System), which collects de-identified first opinion practice data directly from electronic patient records from over 450 recruited clinics. A case control study was undertaken to evaluate spatial clustering of neoplasia in general and MCTs. Cases were defined as dogs attending one of the VetCompass clinics included in this study, with a neoplasm confirmed via histopathology, or cytology reported by a specialist centre (2010–12). MCTs were the most frequently diagnosed potentially malignant neoplasm and were thus taken forward for individual spatial analysis. Partial postcodes for all cases and controls were extracted from the database and their centroid coordinates established via an online Google tool using the mean longitude and latitude of all potential postcodes corresponding to the area of the partial postcode. All mapping was completed in QGIS 2.6.1. Presence of clusters with statistically significant high/low relative risk, were identified via the spatial scan statistic using SaTScan software and a Bernoulli probability model. Statistical significance was set at 5%.

RESULTS
There was evidence of statistically significant clustering for the presence of neoplasia overall and also among the MCTs. An increase in relative risk in and around London was apparent for neoplasia overall with a reduced risk in Cambridgeshire and Oxfordshire. Interestingly, one of those areas of high relative risk identified for neoplasia overall centred in Edgeware, Greater London, was in contrast an area of low relative risk for MCTs, while a cluster of high relative risk for MCTs was centred in Hertfordshire.

CONCLUSION
Clustering of canine tumours may reflect differential geographical risk of neoplasia. These data, though preliminary, provide a useful base for more detailed analysis of geographical risk factors for neoplasia within the UK general canine population.