

DISEASE MAPPING AND CLUSTER DETECTION IN VETERINARY EPIDEMIOLOGY

Annibale Biggeri, Emanuela Dreassi, Dolores Catelan, Corrado Lagazio, Giuseppe Cringoli

University of Florence and Institute for Cancer Prevention, Florence (Italy)

e-mail abiggeri@ds.unifi.it

Disease Mapping and Cluster Detection have been widely used in Human Descriptive Epidemiology and many advances appeared in the literature (e.g. Lawson 2004). These approaches have been recently transferred to Veterinary applications (see Graham et al. 2004). Two distinctive features of veterinary data must be taken into account in statistical modelling of spatial or spatio-temporal risk: domestic animal populations are usually interned into farms and, they tend to interact with the natural environment (e.g. they not only can be exposed to environmental biological physico-chemical hazards but, through freely release of feces, they can actively contribute to the process). We discussed some implications of the previous features (Biggeri et al. 2005) with regard to hierarchical bayesian modelling and *heterogeneity* and *clustering* random terms (Besag, York, Mollié 1991). In particular the study of spatial interaction, in a broad sense, need to include information on ecological niches. Satellite imagines are important in the study of parasite infection since the agent can share several hosts with different ecologies (Cringoli et al. 2004). Second, animal populations are not easy to sample. We restrict the attention to domestic populations and, then discuss related modelling issues in the study of spatial gradients of disease. Distribution of Parasitic infections in dogs within the city of Naples, 2004, has been modelled taking into account of the two-stage sampling design based on 143 first stage transects followed by quota sampling and a total of 415 evaluated locations.

References

Besag J, York JC, Mollié A. Bayesian image restoration, with two applications in spatial statistics (with discussion). *Annals of the Institute of Statistical Mathematics*, 1991, 43: 1-59.

Biggeri A, Catelan D, Rinaldi L et al. Statistical Modelling of the Spatial Distribution of Prevalence of *Calicophoron Daubneyi* Infection in Sheep from Central Italy. *Parassitologia*, 2005, 47:157-163.

Cringoli G, Taddei R, Rinaldi L, et al. Use of remote sensing and geographical information systems to identify environmental features that influence the distribution of paramphistomosis in sheep from the southern Italian Apennines. *Veterinary Parasitology*, 2004, 122: 15-26.

Lawson AB Wiley, 2004.

Graham AJ, Atkinson PM, Danson FM Spatial Analysis for Epidemiology. *Acta Tropica*, 2004, 91:219-225.