Ross Davidson
SAC
e-mail: ross.davidson@sac.ac.uk
Leo Zijerveld
SAC
Glenn Marion
Biomathematics and Statistics Scotland
Mike Hutchings
SAC

The impact of social structure on spatially explicit epidemiological models

We investigate the role that social structure plays in influencing the spread of infection both in spatial and non-spatial epidemiological models. Social hierarchy is introduced into such models through covariates which affect individuals fecundity, giving rise to realistic population distributions. The effect of correlations between these covariates and the disease prevalence is examined through analytical and numerical approaches. Heterogeneous distributions of sizes of the various subpopulations, arising from the non-uniform fecundity, tend to increase disease prevalence compared to homogeneous models, and these differences are larger when spatial structure is taken into account. These findings have implications for epidemiological models, and for the deployment of disease control strategies.