

SIR Models for wildlife diseases

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Epidemic models characterise populations by compartments of health states. Basic epidemic models comprise compartments of susceptible (S), infected (I) and resistant (R) animals. Here we focus on dynamic models for wildlife diseases and integration across the disciplines theoretical veterinary epidemiology (SIR models), climatology (triggering of epidemics by climate anomalies depicted by e.g. NAO index or El Niño) and meteorology (airborne spread of virus). For instance, rabies in red foxes in Austria 1945 – 2005 will serve as example to demonstrate the skill of SIR models and to explain control strategies such as vaccination or hunting. Additionally, the Phocine Distemper Virus (PDV) epidemic 2002 in Northern Europe will be discussed. The application of SIR models to seal colonies at various haul-out sites in the Wadden Sea will be demonstrated. Special emphasis is given on comparisons of dead seals observed versus modelled as well as on a possible triggering of the PDV epidemic by climate anomalies. Finally, the theory of spatio-temporal epidemic models will be introduced and two models for estimating the risk of airborne spread of virus, recently developed at the VUW, will be presented.

References:

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