Movement restrictions in a farms' network for the control of the porcine reproductive and respiratory syndrome virus

Rat-Aspert, O., Belloc, C., Lurette, A. and Krebs, S., Inra, UMR 1300, France;
stephane.krebs@oniris-nantes.fr

Introduction The transmission of the PRRSv (porcine reproductive and respiratory syndrome virus) between farms occurs because of infected neighboring farms or purchase of infected animals. Because it is difficult for a farmer to know the individual status of purchased animals, there is a need for a collective management based restriction of animal movements after assessment of farm status. We propose to assess the effectiveness of this strategy compared to the constraints it imposes. Materials and Methods We used recorded data of between-herds animal movements. The resulting network consists in real movements of different types of animals (8 kg and 25 kg piglets, reproductive gilts) between farms. We constructed a stochastic epidemiological model where herds can be susceptible or infected. The risk of infection due to trade in animals depends on the origin, the number and the type of animals purchased. The risk of infection by neighboring farms depends on the prevalence of the disease in the area. We modeled movement restrictions (based upon the farm's last test result) that respect the animals' flows to and from farms. Results The effectiveness of the restrictions of movements depends on the time between successive status assessments Halving the interval between tests (6 months to 3 months) induces a 50% decrease in risk of infection by trade. The constraint due to the increase in the number of movements and changes in the network structure depends on the prevalence in the area. Conclusion This model, highlighting the trade-off between constraints (increase in the number of movements, cost of the tests) and effectiveness (reduction in prevalence) of movement restrictions, can be a tool for decision makers to implement and monitor collective management of PRRS.