

P4

Assessing the role of private haulage companies in the spread of swine infectious diseases in Great Britain (GB)

Porphyre T.¹, Bronsvort B.M.D.C.¹, Gunn G.J.², Correia-Gomes C.²

¹The Roslin Institute, Midlothian, United Kingdom, ²Scotland's Rural College, Epidemiology Research Unit, Future Farming Systems, Inverness, United Kingdom

Introduction

Understanding the complexity of any live animal trade network is critical for predicting the spread of infectious diseases in livestock industries, assessing the benefit for prevention and control measures, and designing cost-efficient surveillance programmes. However, attention has mainly focused on the direct movements of live animals between premises, whereas the role of haulage vehicles used to transport these animals, an indirect route for disease transmission, has largely been ignored. Here we aimed to both assess the impact of sharing haulage vehicles from livestock transport service providers on the connectivity between farms and the risk posed by such behaviour on the spread of swine infectious diseases in GB.

Methods

Using movement records from Scotland, England and Wales from April 2012 to March 2014, we built a series of directed and weighted networks consisting in two layers of identical nodes, linking nodes (farms) through (1) the direct movement of pigs and (2) the shared use of individual haulage vehicles. Haulage contact definition integrates the date of the move and the contamination period (the duration in which lorries are left contaminated by pathogens and act as fomites). In these networks, all contacts were aggregated over the period of either 7 days or 28 days, which were chosen to be similar to farm-level infectious period for key swine viruses, such as African and classical swine fevers and foot-and-mouth disease. We first performed descriptive network analyses to assess the role of haulage on network connectivity. The reproduction number R was then computed to explore how viruses may spread throughout the GB pig sector.

Results

Our results showed that sharing livestock haulage vehicles increases the number of indirect contacts between farms and may be a more important driver than the direct movement of animals, when considering disease transmission during an outbreak in the pig sector in GB. In particular, sharing haulage

vehicles, even if lorries' contamination period is < 1 day, will limit the benefit of the standstill regulation, increasing the number of premises that could potentially be infected in an outbreak and more easily rising R above 1.

Conclusions

This work confirms that sharing haulage vehicles has significant potential for spreading infectious diseases within the pig sector. The cleansing and disinfection process of haulage vehicles is a critical control point for risk mitigation in an outbreak.