

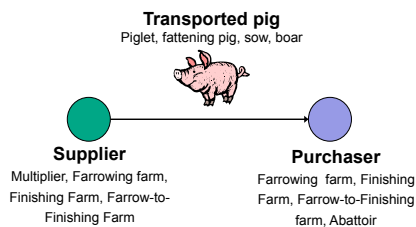
Infectious disease spread in the pork supply chain

A modelling approach using network theory

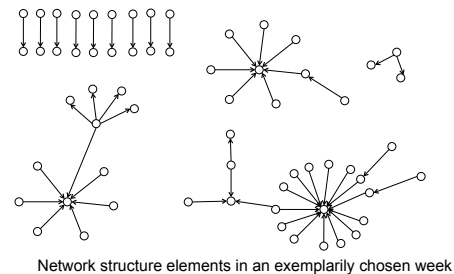
Have the network structure and the initially infected premise an impact on the course of disease spread?

Data

- 6,892 pig movements between 176 premises

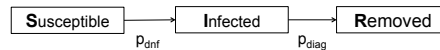


- Recording from 06/2006-05/2009 on weekly basis

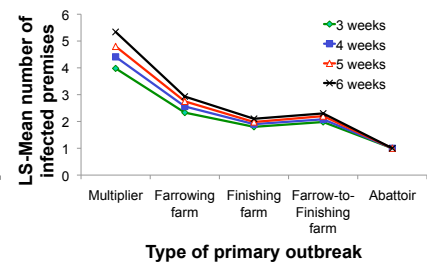
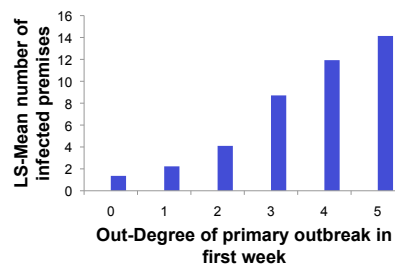
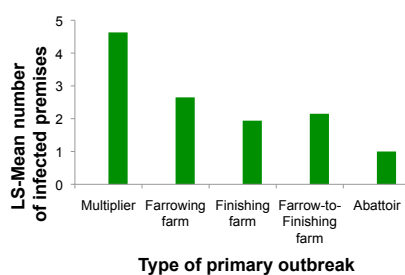


Method

- SIR-Model, dynamical percolation
- Start at one primary outbreak premise
- Scenarios:
 - Influence of temporal changes in trading relations: Random change in the order of the weeks
 - Randomly chosen primary outbreak
 - Probability of infection (p_{inf}): 0, 0.5, 0.6, 0.7, 0.8, 0.9, 1
 - Probability of detection and culling (p_{diag}): primary infected premise (3,4,5,6 weeks), secondary infected premise (1,2,3,4 weeks)



Results



Conclusion

- General structure of the network constant over time, only slight effect on epidemic.
- Course of the epidemic depends both on type and out-degree of the primary outbreak premise.
- Type of primary outbreak particularly important if long high risk period and high risk of transmission.

