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Modelling spread of MRSA within a pig herd

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Objectives
• Study the spread and persistence of MRSA (methicillin-resistant Staphylococcus aureus) within a pig herd
• Examine short and long term consequences and cost-effectiveness of different potential control strategies

Material and methods
• A mechanistic individual-based simulation model was built in R
• Herd model: A medium-sized Danish farrow-to-finish herd
• Infection model: SIS model with two different 'infectious stages': Intermittent or persistent MRSA shedder
• Due to uncertainty, all scenarios were modelled with three different sets of transmission rates ('low', 'medium', 'high'), estimated based on Broens et al. (2012)

Key observations
• Development over time after introduction (Fig. 1): Spread of MRSA was mainly following the movement of pigs between stable units
• Following introduction of lower numbers of intermittent shedders, MRSA would frequently fade out (Fig. 1.a + Fig. 2.a)
• After spread of MRSA has reached an equilibrium, the prevalence of MRSA shedders would be highest in the farrowing unit (Fig. 2), independent of how MRSA was introduced

References

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