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A simulation model for the spread of LA-MRSA within a pig herd

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Objectives
• Study the mechanisms of MRSA spread and persistence within a pig herd.
• Examine the short and long term consequences and cost-effectiveness of different control strategies.

Materials and methods
• Mechanistic Monte Carlo simulation in R.
• Parameterization by existing data, data harvested in other part of the OHLAM project and expert opinions.

Background
• Livestock-associated methicillin-resistant Staphylococcus aureus (LA-MRSA) is an opportunistic human pathogen.
• LA-MRSA has main reservoir in pigs, but it has also been isolated from other animals and the environment.
• In 2014, LA-MRSA was found in 68% (N=207) and 63% (N=70) of the Danish production and nucleus/multiplier herds.¹

¹Source: Danish Food and Veterinary Administration.

Possible influence of …
Transmission of MRSA between stable units?
Transmission of MRSA within a unit?
Transmission of MRSA within a pen?
Perinatal transmission from sow to offspring?

Possible interventions…
Hygiene interventions among staff?
Cleaning and disinfection?
Use of probiotics?
Test-and-isolate until slaughter?
Changes in antimicrobial consumption patterns?

Susceptible
Colonized

Transmission of MRSA from a pig herd through air?
Emission of MRSA with pigs?
Emission of MRSA with humans leaving the herd?
Emission of MRSA with super-carrier pigs?

Spread of MRSA with humans and equipment?
Perinatal transmission from sow to offspring?
Persistently colonized pigs?
Different routes of introduction?

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