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Publication date: 2016

Document Version
Publisher's PDF, also known as Version of record

Link back to DTU Orbit

Citation (APA):
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.*

*Source: Danish Food and Veterinary Administration.

Possible influence of …

- Transmission of MRSA between stable units?
- Emission of MRSA from a pig herd through air?
- Transmission of MRSA within a unit?
- Transmission of MRSA within a pen?
- Perinatal transmission from sow to offspring?
- Spread of MRSA with humans and equipment?
- Persistently colonized pigs?
- Different routes of introduction?

Possible interventions…

- Hygiene interventions among staff?
- Cleaning and disinfection?
- Use of probiotics?
- Test-and-isolate until slaughter?
- Changes in antimicrobial consumption patterns?
- Test-and-cull among super-carrier pigs?

Acknowledgements
• This project is part of a larger project, OHLAM, funded by the Danish Ministry of Food, Agriculture and Fisheries.
• The OHLAM project includes participants from National Veterinary Institute and Statens Serum Institute.