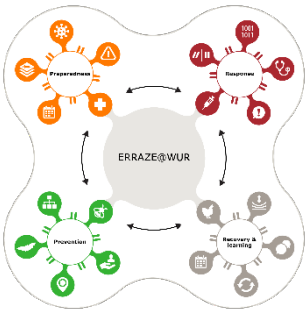
Paradigm Shifts for Global One Health

Greater resilience requires transformation and integration

Book of Abstracts

International symposium
23-25 April 2024
Wageningen, The Netherlands



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Antimicrobial use in Dutch pig farms: risk factors and associated diseases

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Objectives: Antimicrobial use (AMU) has decreased significantly in Dutch pig farms since 2009. However, this decrease has stagnated in recent years, with relatively high AMU levels still persisting during the weaning phase. Focusing on weaners, this study aimed at investigating which diseases are associated with i) overall AMU, ii) use/not use, and iii) total consumption of specific antimicrobial classes. Moreover, we investigated which farm characteristics were associated with iv) those diseases requiring AMU, v) total AMU and vi) use of specific antimicrobial classes.
Method: In 2020, cross-sectional data from 154 Dutch pig farms were collected, including information on AMU, disease aetiologies for group treatments and farm characteristics. Associations between disease occurrence and AMU (overall and per class) were assessed using multivariable generalized linear regression models. Subsequently, mixed-effects conditional Random Forest analysis was used along with the "binomialRF" algorithm for variable selection to identify farm characteristics correlated with each relative disease and AMU outcome independently.
Results: Group treatments for respiratory and musculoskeletal/neurological diseases (MNDs) along with individual treatments in weaners were significantly associated with their total AMU. Tetracyclines and penicillins were most frequently used to treat the former two aetiologies respectively. Main farm characteristics that overlapped between the disease and AMU models were: PRRS vaccination in sucklings (risk for respiratory conditions and total AMU), having fully slatted floor in weaners (risk for MNDs, total AMU and use of macrolides-lincosamides), longer lactation period (protective against MNDs, respiratory conditions, total AMU, use of tetracyclines and trimethoprim-sulphanamides and their quantities and use of penicillins). In addition, being a biological farm protected against use of specific antimicrobial classes as well as incidence of MNDs. The same was found for free-sow systems during lactation.
Conclusions: Respiratory conditions and MNDs in weaners are currently the main culprits of AMU in Dutch pig farms and their control should be prioritized by targeting farm characteristics that improve biosecurity and animal welfare. The non-parametric nature of the risk models developed here provides opportunities for developing tailor-made interventions for a given farm that seeks to reduce AMU. Furthermore, factors overlapping between disease and AMU models are candidates for future mediation analysis to broaden our understanding of the causal pathways involved.

Keywords: Epidemiology , Control measures, Antibiotics, Animal welfare, Biosecurity