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Drivers, dynamics and epidemiology of antimicrobial resistance in animal production by Wall, B.A., Mateus, A.L.P., Marshall, L., Pfeiffer, D.U., Lubroth, J., Ormel, H.J., Otto, P. and A. Patriarchi
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in **Significant Impact Group(s):** Other

Species targeted: Pigs;Poultry;Dairy;Beef;Sheep;
Age: Not stated;

Summary: The use of antimicrobial drugs leads to a relative increase in resistant bacteria, even though antimicrobial resistance is an old and naturally occurring phenomenon in bacteria. In intensive livestock production systems, resistant bacteria can spread easily between animals and this can be made worse if biosecurity is inadequate. Food is likely to be quantitatively the most important source of transmission from livestock to humans, although there is no direct link between rise of antimicrobial resistance in humans in relation to food consumption. In order to build successful solutions to the problem of antimicrobial resistance, is essential to understand what drives the spread of AMR in animal production. The effect of extensive and organic farming systems and antimicrobial use on the rise and spread of AMR are discussed. However it is still not clear how sustainable agriculture systems can help fight AMR.

It is now accepted that increased antimicrobial resistance (AMR) in bacteria affecting humans and animals in recent decades is primarily influenced by an increase in usage of antimicrobials for a variety of purposes, including therapeutic and non-therapeutic uses in animal production. Antimicrobial resistance is an ancient and naturally occurring phenomenon in bacteria. But the use of antimicrobial drugs – in health care, agriculture or industrial settings – exerts a selection pressure which can favour the survival of resistant strains (or genes) over susceptible ones, leading to a relative increase in resistant bacteria within microbial communities.
In intensive livestock production systems, resistant bacteria can spread easily between animals and this can be exacerbated if biosecurity is inadequate.
In aquaculture, AMR can develop in aquatic and fish gut bacteria as a result of antimicrobial therapy or contamination of the aquatic environment with human or animal waste. The extent and persistence of antimicrobial residues in aquatic systems is unknown and current evidence is conflicting.
Food is likely to be quantitatively the most important potential transmission pathway from livestock to humans, although direct evidence linking AMR emergence in humans to food consumption is lacking.
An improved understanding of the epidemiology of AMR emergence and spread in animal production will provide an essential foundation for successful mitigation strategies.
The relationships between different types of farming systems and both AMU and the emergence and spread of AMR are discussed in this paper, including extensive and organic systems, but there is still a notable lack of knowledge on the role that sustainable agriculture systems can play in combatting AMR.
Most importantly, future research needs to involve an interdisciplinary (e.g. One Health) approach, integrating agricultural, medical, environmental and social sciences, and especially recognizing the importance of human behaviour. A set of specific recommendations to fill current knowledge gaps is presented in the final section of this technical paper.

Where to find the original material:
https://agris.fao.org/agris-search/search.do?recordID=XF2017002096;
Country: UK, IT