

## Approaches for change towards rational antibiotic use in Danish dairy herds: a literature review

Nanna K. Skjølstrup<sup>1</sup>, Carsten S. Jensen<sup>2</sup>, Dorte B. Lastein<sup>1</sup>, Liza R. Nielsen<sup>1</sup>

<sup>1</sup>*Department of Veterinary and Animal Sciences, Faculty of Health and Medical Sciences,  
University of Copenhagen, Denmark*

<sup>2</sup>*Department of Sociology, Faculty of Social Sciences, University of Copenhagen, Denmark*

**Introduction:** Antibiotic resistance (AMR) is a growing problem globally. Therefore, antibiotic use is under increasing public and scientific attention. In Denmark, we have a history of legislation restricting the use of antibiotics in the dairy sector. In 1995, the Veterinary Advisory Service Contract (VASC) was implemented with a new framework for the collaboration between the veterinarian and the farmer. This collaboration could constitute a unique setting for working with rational antibiotic use. However, no reduction in antibiotic use in cattle in Denmark has been seen over the past five years (Bortolaia *et al.*, 2019). Recent research shows that socio-economic factors including human behaviour and attitudes are important and less well described factors (Bokma *et al.*, 2018). These factors might work as barriers for obtaining rational use of antibiotics. Therefore, it is important to review the existing literature to identify these factors to work efficiently with rational antibiotic use within the herd health consultancy setting.

**Materials and methods:** Search terms were defined and a search was conducted in seven databases. Exclusion criteria were i) non-English text, ii) not regarding dairy cattle, iii) not primary literature, iv) not directly regarding antibiotic use, v) studies conducted in a non-intensive production and vi) studies not relevant for the herd health consultancy situation under Danish conditions.

**Results and Discussion:** A total of 35 relevant articles were identified of both qualitative and quantitative study design. To give an overview, the factors identified in the qualitative articles were organized in a model created with inspiration from Ellis-Iversen *et al.* (2010). The model was chosen for its holistic approach. Within the intrinsic factors, 'other blaming' is valid for both farmers and veterinarians when placing responsibility for rational use of antibiotics. A common point was identified within 'Perception of AMR', where own antibiotic use is seen as an insignificant contributor. Both farmers and veterinarians are concerned with animal welfare if antibiotic use is reduced further. Both agree that animals need treatment but with different motives. Farmers have a unique point on 'Emotions' which relates to frustrations connected with having sick animals. Regarding normative beliefs, veterinarians experience pressure from their surroundings, whereas farmers perceive the industry's expectations positively. Within the extrinsic factors, farmers are uniquely frustrated with consumer's double standards and lack of knowledge. Veterinarians focus on availability of medicines, whereas farmers focus on prices. Farmers have a unique focus point on 'Media and society' dealing with a perceived skewed view of agriculture created by media. Veterinarians ask for improved diagnostic methods and further education of both farmers and veterinarians.

**Conclusion:** This literature review identified factors of importance for veterinarians and farmers within the herd health consultancy situation considering intention to obtain rational use of antibiotics. The results are preliminary, and further analysis is on-going.

### References:

Bokma, J. *et al.* (2018). 'Risk factors for antimicrobial use in food-producing animals: disease prevention and socio-economic factors as the main drivers?', *Vlaams Diergeneeskundig Tijdschrift*, 87, 188–200.

Bortolaia, V. *et al.* (2019). DANMAP 2018 - Use of antimicrobial agents and occurrence of antimicrobial resistance in bacteria from food animals, food and humans in Denmark. Available at: [www.danmap.org](http://www.danmap.org) (Accessed: 25 November 2019).

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