# Diagnosis of Mastitis in Dairy Farm Animals to Limit Antibiotic Utilization

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## ABOUT THE STUDY

Animal-friendly, cost-effective, and resource-saving milk production is the basis for long-term consumer acceptance. Bovine mastitis is a major problem in the dairy industry, affecting animal health and welfare while causing significant economic losses. Antimicrobial treatment is now required to maintain the health, welfare, and economic aspects of bovine udders. On the contrary, the emergence and spread of Antimicrobial Resistance (AMR) is a pressing public concern, and as a result, Antimicrobial Usage (AMU) in livestock production is a topic of contention. In search of the most effective and advanced methods for decreasing AMU and AMR in dairy production, topic describes and discusses possible approaches promising prompt implementation, including therapeutical alternatives as well as pro- and metaphylactic concepts such as the implementation of evidence-based mastitis therapy concepts and selective Dry Cow Treatment (sDCT). Antibiotics are classified differently depending on whether they are classified by the World Health Organization (WHO), the American Food and Drug Administration (FDA), or, as described, the European Medicines Agency (EMA). However, all three classify fluoroquinolones, third and fourth generation cephalosporins, and (partially) macrolides as antibiotics of (highest priority) critical importance for human medicine. So far, no significant increase in AMR of Mastitis-Causing Pathogens (MCP) has been observed. However, future treatments involving the aforementioned substances will have to be limited to life-threatening emergencies. As a result, in addition to the general reduction in AMU, future antimicrobial use must be limited to less critical substances, where possible. Bovine mastitis is a multifactorial disease process that is influenced by host, pathogen, and environmental factors [1,2]. Thus, potential prophylactic measures include reducing New Infections (NI) and pathogen transmission through management standard optimization, segregation and culling decisions, and reducing exacerbation of subclinical to CM through consistent feeding.

Udder health management has advanced significantly in recent years and can now be easily quantified through data analysis using test results from regular Dairy Herd Improvement (DHI) tests. The overarching goal of all measures is to reduce New Infection Rates (NIR) during lactation and the dry period [3,4].

Overall, udder health management is a continuous improvement process that has already advanced to a high level, so further improvement may enhance AMU reduction, but only progressively and over time. As the clinical outcome of mastitis is partly determined by the immunological status of the individual cow, increasing immune-competence is a theoretical option for reducing mastitis. Researchers have been working on effective vaccines for the prevention of bovine mastitis for decades, but developed vaccines, such as those against Staphylococcus aureus or Escherichia coli Intramammary Infection (IMI), produce only limited protection. AMU reduction through the use of smart, evidence-based selection criteria necessitates increased diagnostic efforts. Established tools that do not significantly delay the start of therapy are currently being developed and are not yet available (i.e., treatment apps, rapid diagnostic and resistance tests, tools for the identification of animals with low probability of cure). When the identification of therapy-worthy animals as well as treatment-requiring MCP is successful in a timely and reliable manner, it is possible to reduce AMU by 50% in CM treatment and 30% in antibiotic DCT (amount of uninfected cows) according to current knowledge. Progress in the development of therapeutic alternatives and additional work (e.g., for the identification of animals with bacteraemia in severe cases of CM) suggest that AMU will be reduced further. However, the most effective and modern methods for reducing AMU in dairy production include the use of evidence-based mastitis therapy concepts and sDCT. To avoid making mistakes that have long-term adverse consequences for animal welfare, dairy farms must conduct systematic udder health monitoring.

## REFERENCES

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