



IDF ANIMAL HEALTH REPORT

Research progress | Global insights | Expert opinion



CASE STUDIES

Prudent Use of Antimicrobial Agents in Dairy Production

“UN General Assembly High-Level Meeting on Antimicrobial Resistance 2024”



PREFACE

MESSAGE FROM THE IDF DIRECTOR GENERAL

Welcome to a new edition of the IDF Animal Health Report. IDF values the work of veterinarians and other experts that work relentlessly to care for the animals that provide us with this unique liquid, milk. There is a strong correlation between animal health and better environmental performances of our sector, we are therefore committed to continue to bring the latest science and best practices to the forefront.

This edition is dedicated to the best practices in AMR within the dairy sector. Based on the One Health, we look at the actions from a holistic perspective, bringing together human, animal and environmental health. With the aim of enhancing the support we have provided to our membership for decades on this topic, while being a recognized knowledge partner for several IGOs working in this field, IDF is actively participating at the United Nations General Assembly High Level Meeting on AMR, contributing to the international efforts to tackle it through its science-based expertise.

Science informs us that one of the best ways to address AMR is through disease prevention. By focusing on prevention, the sector has reduced the need for antibiotics in livestock farming and driven the prudent use of antibiotics in cattle. This progress demonstrates the commitment of our sector to safeguard both animal health and public safety while maintaining high standards of milk and dairy production.

In this edition of the IDF Animal Health Report you will find successful case studies of AMR management from different regions of the world, with the aim of sharing knowledge, expertise and best practices on this matter which has become one of the most urgent challenges that the international community faces in its transition to the future.

Through comprehensive guidelines, we continue to empower stakeholders across the sector to make informed decisions that prioritize health and safety. Therefore, IDF will soon publish the updated version of the 'Guide to Prudent Use of Antimicrobial Agents in Dairy Production'. The guide is the result of the research taking place in the field, which is also producing methodologies and innovative technologies, some of which are discussed in the present issue and offer new opportunities to further optimize animal care, minimize the reliance on antimicrobials, and promote the One Health concept above mentioned.

It is essential that the design and implementation of these actions involve all key stakeholders—farmers, veterinarians, academics, and competent authorities. Only by working together can we ensure that best practices are not just adopted, but also continuously refined and adapted to meet the evolving needs of the sector.

Together, we are building a future where dairy health and welfare thrives in harmony with responsible antimicrobial stewardship.

Laurence Rycken
Director General, International Dairy Federation

MESSAGE FROM THE CHAIR OF THE STANDING COMMITTEE ON ANIMAL HEALTH AND WELFARE

Bacterial antimicrobial resistance (AMR) is one of the leading global threats of this century and continues to be a focus of discussion and concern in every dairy nation in the world. As this issue of the Animal Health Report goes to press the United Nations High-Level Meeting on AMR is taking place in part to review progress on global efforts to tackle AMR, and to strengthen and accelerate the resolve of all nations to do their part in this epic battle. At IDF our SCAHW is finishing its review and update of our Guide to Prudent Use of Antimicrobial Agents in Dairy Production, which should be published later this year.

Antimicrobial resistance is a daunting and complex problem that has no single solution, and while we strive to reduce antimicrobial use in our dairy production systems as part of the solution to AMR, we must do so in a balanced manner. Our goal must be to use as little antimicrobials as possible in our dairy systems, but as much as is needed to make sure we maintain the health and welfare of our dairy animals, and the quality and safety of our milk products.

We will not solve the AMR crisis quickly, but I believe that working together as a global community we will get there, as long as we all commit to taking the small steps that are needed. I'm very excited to share this Animal Health Report with you as it contains a tremendous collection of small steps being taken by IDF member countries across the world. Some of these steps address antimicrobial use oversight and decision-making, while others focus on disease prevention strategies to decrease the need to use antimicrobials. I hope you enjoy reading this report and feel as encouraged as I do that we are making progress. If by sharing these examples of small successes we encourage each other to take our own next small step to addressing AMR, then the tremendous effort by our IDF staff to pull this publication together will have been well worthwhile.

David Kelton, DVM, PhD, FCAHS

Professor Emeritus

Chair IDF Standing Committee on Animal Health and Welfare

MESSAGE FROM THE ACTION TEAM LEADER

In 2016 on behalf of IDF, I attended the first United Nations High Level on Antimicrobial Resistance (AMR). This was not the first foray by IDF into AMR but rather part of our journey in addressing AMR as part of a One Health approach. In 2013, we published the IDF Guide to Prudent Use of Antimicrobial Agents in Dairy Production which is currently being revised to reflect changes in knowledge about prudent and responsible antimicrobial use since the original publication. IDF began to address AMR decades ago with a long-term project looking at potential antimicrobial resistance of mastitis-causing organisms due to antimicrobial use to treat, control, and prevent this most economically impactful disease in dairy-producing animals.

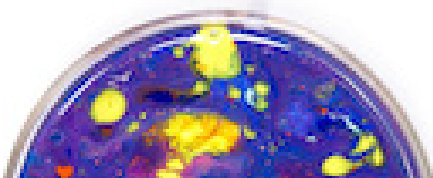
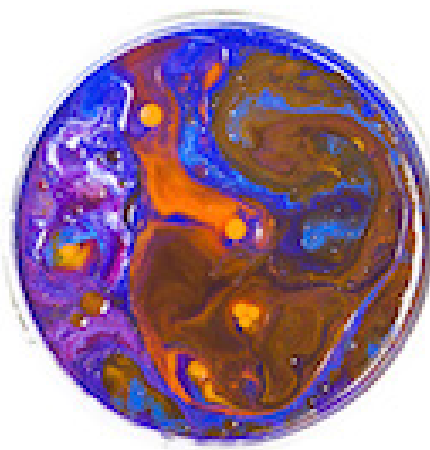
The second United Nations High Level on AMR is occurring this month and is an opportunity to accelerate action on AMR through a One Health approach. This 2024 IDF Animal Health Report focuses on case studies, research, and actions that dairy farmers around the world are taking to address AMR as part of that One Health approach. The articles contain much actionable information for the global dairy sector to accelerate action on AMR through a One Health approach.

Jamie Jonker, Ph.D.

Action Team Lead

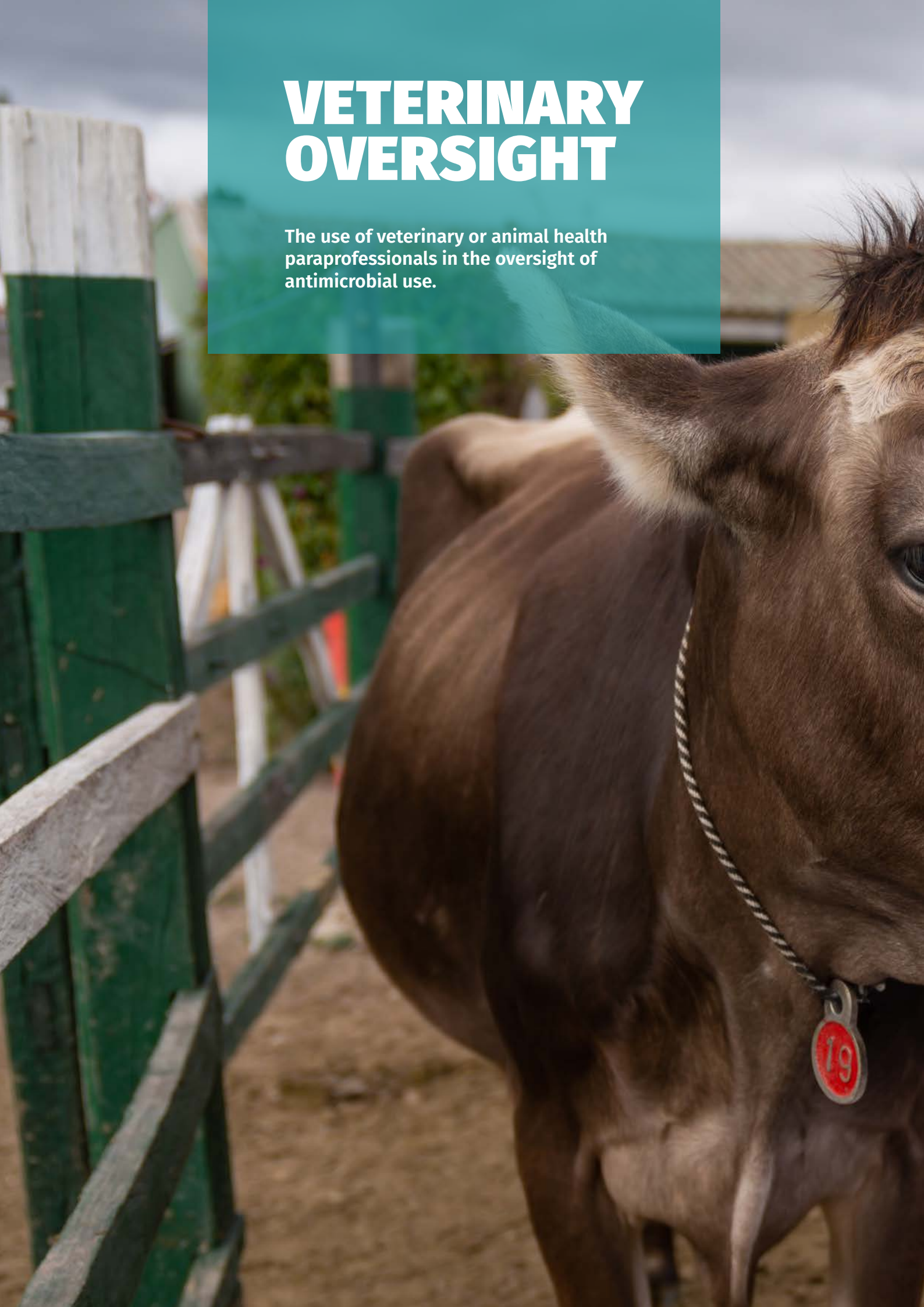
Chair IDF Science Program Coordinating Committee

Global Leaders Group on AMR member



VETERINARY OVERSIGHT

The use of veterinary or animal health paraprofessionals in the oversight of antimicrobial use.





DENMARK

A TEMPLATE FOR HANDLING STREPTOCOCCUS AGALACTIAE AT THE HERD LEVEL

DO YOU ALSO STRUGGLE WITH HANDLING *S. AGALACTIAE* IN DAIRY HERDS?

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THE FIGHT AGAINST *S. AGALACTIAE*

The eradication of *Streptococcus agalactiae* in the dairy sector, due to the zoonotic aspect and negative impact on udder health and milk quality, has been a cornerstone in improving milk quality for decades in the industrialized world. Successfully in many countries, it leading to a low prevalence at the herd level. There has been good support, mainly in the English-speaking countries with the five, and later the National Mastitis Council (NMC) 10-point plan, which predominantly aimed at contagious mastitis with blanket dry cow therapy, post-milking teat disinfection, and culling chronically infected animals. However, this disease can challenge us with the introduction of selective dry cow therapy and the increase in herd size, and human *S. agalactiae* strings.

THE TOOLS AT THE DISPOSAL OF VETERINARIANS AND CONSULTANTS

The project aims to develop recommendations in management, testing, treatment, and biosecurity for herd veterinarians and consultants in handling *S. agalactiae* based on the preference of the dairy farmer. He can accept being positive for *S. agalactiae* and then the intervention is adjusted for this; alternatively, he wants to eradicate, and needs support for this.

THE THREE WORK PACKAGES

Work Package 1

- Analysis of historical bulk milk tank data
- Collection and analysis of bulk milk tank samples
- Comparison of cell count, germ count, and variation in Ct value from PCR test

Work Package 2

- Analysis of risk factors for infection based on data from the cattle database
- Analysis of factors that affect the chance of being free of *S. agalactiae*
- Telephone interviews of farmers who have eradicated *S. agalactiae* within the past year

Work Package 3

- Development and testing of a prototype for an eradication plan
- The plan is tested in pilot herds to get the content aligned with the end-user
- Workshop with stakeholders for the development of masters for remediation

RAISING AWARENESS AS A WAY TO ERADICATE

The project is in the initial phase, where we will provide meetings and on-farm workshops for dairy practitioners to increase focus on *S. agalactiae*. Here, the primary purpose is to create awareness of the problem and motivate the herd veterinarian to provide the appropriate knowledge to the dairy farmer. Because we do not have the opportunity to rely heavily on blanket dry cow therapy and test and cull for economic reasons, we need to consider another approach for eradication. Also, the impact of the human strings of *S. agalactiae* gives another dimension to eradication. We plan to measure the success with a follow-up questionnaire, asking the participating veterinarians about their perception of the manual and challenges in remediation in the herd.

STØTTET AF

Mælkeafgiftsfonden

LIMITATIONS PUSH TOWARDS SMARTER WORK

Dairy farms in Denmark have a mandatory herd health contract if the cow number is > 100 cows, and our average is 260 in 2024. With a prevalence of 12.4 % positive *S. agalactiae* herds, the average herd veterinarian usually got a limited number of positive herds within their client base. We will provide this manual to the dairy practitioners, built from research and experience with handling *S. agalactiae* herds, with the purpose of support and to make them feel more confident in the dialogue with the dairy farmer. When you got limitations in the use of antimicrobials and endless culling, you need to work smarter!

A WORK NEVER COMPLETE

Our analysis has identified several risk factors we want to address when we share the manual. Also, we plan an interview with the dairy farms that changed the status and eradicated *S. agalactiae* from the herd, to gain insight into the process obstacles and practical procedures at the dairy farm. Our surveillance at the bulk tank level also needs reconsideration, as the proportion of herds changing status in the national program based on individual positive animals in herds negative on bulk milk tank is unacceptable. Next, whole genome sequencing is added, and the herds are divided into categories according to the source of infection – cows or humans.

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AUSTRALIA

ANTIMICROBIAL PRESCRIBING GUIDELINES FOR DAIRY CATTLE

Antimicrobial prescribing guidelines for dairy cattle veterinarians in Australia developed in partnership between the Australian dairy sector's major antimicrobial use stakeholders.

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USE AS LITTLE AS POSSIBLE, AS MUCH AS NECESSARY

The dairy industry is responsible for maintaining the health, welfare, and productivity of its animals and ensuring safe food products for human consumption. Access to effective antimicrobials is an important part of this responsibility to ensure those animals requiring it, can be treated by farmers and veterinarians effectively. The Australian dairy industry has an ongoing commitment to antimicrobial stewardship, outlined under its industry Sustainability Framework, to 'use as little as possible, as much as necessary'. Australia's Chief Veterinary Officer has commended the Australian dairy industry for our leadership, with very low antimicrobial usage compared to other countries and favourable reputation for low levels of antimicrobial resistance.

GUIDELINES DEVELOPED BY AUSTRALIA'S LEADING DAIRY CATTLE PROFESSIONALS

The Antimicrobial prescribing guidelines for dairy cattle were developed and published by the Australian Veterinary Association (AVA) with the support of Animal Medicines Australia and Animal Medicines Australia for Australian dairy cattle veterinarians. They provide peer-reviewed, best-practice and evidence-based guidelines for the most important clinical conditions of dairy cattle in Australia where antimicrobials may be indicated.

In 2017, the Australian Veterinary Association initiated on a joint project with Animal Medicines Australia, to develop

"The Australian dairy industry's 'as little as possible, as much as necessary' method is particularly commendable and demonstrates their commitment to using antimicrobials responsibly."

Dr Mark Schipp, Australian Chief Veterinary Officer

best-practice prescribing guidelines for horses and livestock species. The AVA is approximately half-way through this major undertaking, with guidelines for pigs, poultry, sheep, dairy cattle, and feedlot cattle completed and freely available to all veterinarians on the AVA website. The dairy cattle guidelines were developed with financial support from Dairy Australia by an expert panel consisting of Australia's leading dairy cattle veterinarians and antimicrobial stewardship academics including Associate Professor John House, Dr Matthew Izzo, Professor Jaqueline Norris, Dr Stephen Page, and Professor Glenn Browning.

AWARENESS IS KEY TO SUCCESSFUL IMPLEMENTATION

Since the Antimicrobial prescribing guidelines for dairy cattle were published there have been several conference presentations and electronic direct mail (EDM) newsletters aimed at increasing awareness of the guidelines amongst

Australian dairy cattle veterinarians. Given the reliance of Australian veterinarians on clinical experience (Tree et al., 2022) there remains opportunity to continue to drive awareness as well as develop extension materials that ensure the guidelines are accessible in the field (e.g. smartphone app, glove-box guide).

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CANADA

RESEARCH ON DAIRY FARMERS' AND VETERINARIANS' ANTIMICROBIAL TREATMENT DECISION MAKING PROCESS

STUDIES IDENTIFY DAIRY FARMERS' AND VETERINARIANS' VIEWS ON DUTY OF CARE FOR ANIMALS, AND ANTIMICROBIAL USE.

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FARMER'S AND VETERINARIAN'S DECISION-MAKING MINDSET FOR AMU USE IS KEY

Antimicrobial use (AMU) and antimicrobial resistance (AMR) are important and complex for the dairy sector, implicating public health, animal health and welfare, economics and market incentives, and veterinary and farmer relationships. Prudent use of antimicrobials is crucial for dairy animals' health and the ecology of AMR in animals and people. There are regulatory and market pressures to reduce AMU that vary among countries. Veterinarians are typically key influencers of animal health practices on dairy farms but there is only a small amount of research on dairy farmers' and veterinarians' decision-making mindset for AMU. This set of qualitative studies aimed to better understand their thinking and practices on AMR and AMU.

The studies aimed to explore Canadian dairy farmers' and veterinarians' attitudes towards AMU and AMR, identify factors influencing AMU decisions, assess the role of veterinary guidance in AMU practices, and suggest improvements for effective antimicrobial stewardship in the dairy sector.

SOCIAL DYNAMICS AND PEER INFLUENCES DETERMINE THE ATTITUDES AND BEHAVIOURS OF CANADIAN DAIRY FARMERS AND VETERINARIANS

The research used qualitative methods to gather insights into the attitudes and behaviours of Canadian dairy farmers and veterinarians regarding antimicrobial use

”Effective antimicrobial stewardship requires evidence for farmers and veterinarians on disease prevention and treatment options that maintain animal welfare.”

Stephen LeBlanc

and resistance. The methods included focus groups and surveys with thematic analysis to explore the complex attitudes, experiences, and influences affecting Canadian dairy farmers' and veterinarians' AMU decisions. Focus groups facilitated in-depth discussions, enabling researchers to capture perspectives and insights that might not be as easily accessible through surveys or individual interviews. This method was particularly effective in understanding the social dynamics and peer influences within the farming community and the practical implications of veterinary advice on daily farm operations.

SIMILARITIES AND DIFFERENCES BETWEEN THE OPINIONS OF VETERINARIANS AND FARMERS

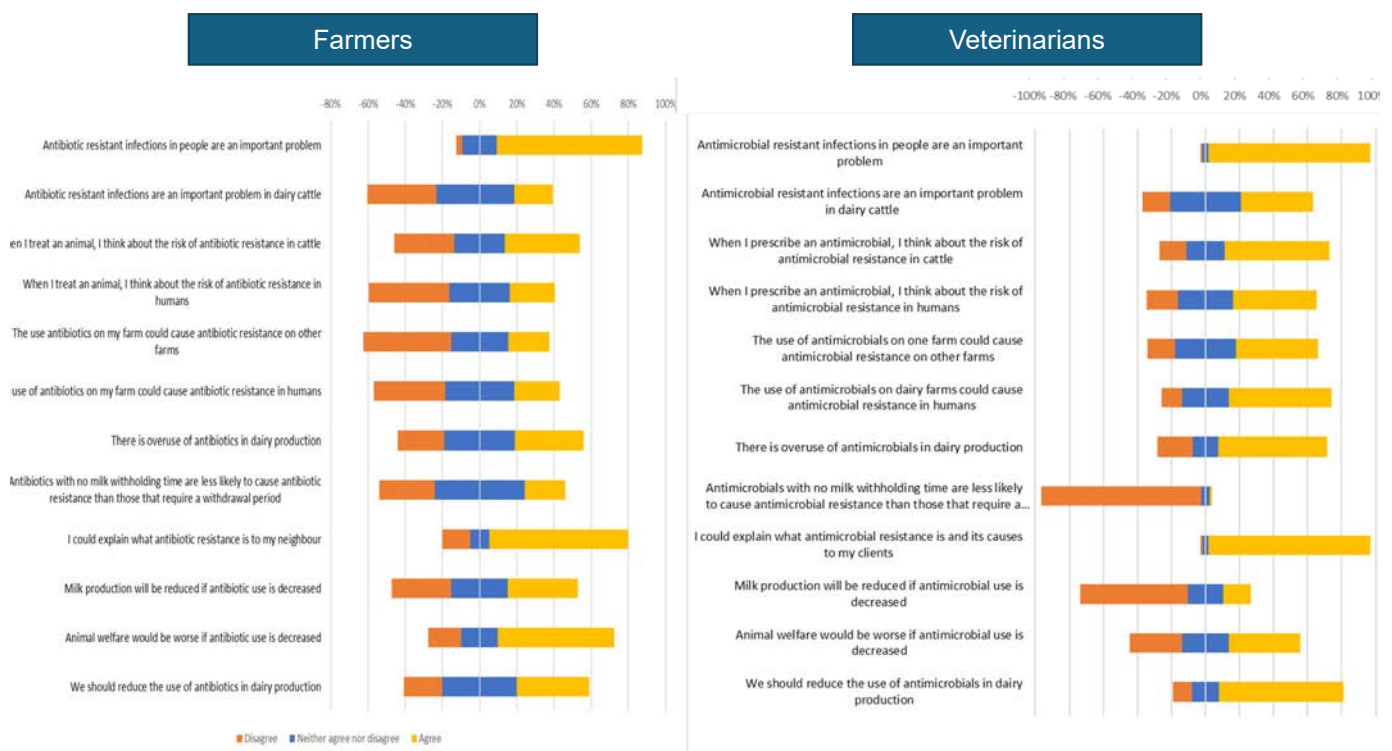
- Farmers and veterinarians agreed that AMR was an important problem in people, but farmers did not see AMR

as a problem in dairy cattle.

- Farmers use a combination of personal judgment and external advice (primarily from veterinarians) to make decisions on AMU. Farmers put considerable weight on their experience and their duty of care to their animals.
- Veterinarians are the primary source of information on prudent AMU for farmers. However, farmers did not always follow protocols or consult their veterinarian about AMU.
- Farmers generally considered that AMU on their farm was appropriate and necessary. Both farmers and veterinarians expressed concerns for animal welfare if AMU were simply decreased.
- Neither group supported greater regulation but were receptive to benchmarking farm-level AMU against peers and were open to more information about AMR and stewardship.

AMU REDUCTION MUST MAINTAIN ANIMAL WELFARE

The research provides insights into the attitudes and practices of antimicrobial use in the Canadian dairy industry. To be accepted and implemented, efforts to reduce AMU must demonstrate that animal welfare will be maintained. Veterinarians and policy makers can use this information to inform programs to achieve antimicrobial stewardship. Benchmarking of AMU, peer-to-peer learning, and one-on-one conversations of farmers with their veterinarian are likely to be influential in effecting changes in behaviour.



Survey results of Canadian dairy farmers' and veterinarians' views on antimicrobial resistance and antimicrobial usage. The data are from Cobo et al. 2022 and 2023.

EDUCATION AND COMMUNICATION EFFORTS WILL CONTINUE

Based on the outcomes of these studies, the next steps are:

- Improved education and training for farmers and veterinarians regarding AMU and AMR
- More targeted veterinary-farmer communication about opportunities to reduce AMU
- Research is underway to assess anti-inflammatory treatments as alternatives to antimicrobials for metritis in dairy cows and diarrhoea in dairy calves

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SOUTH AFRICA

EFFORTS TO PROMOTE THE RESPONSIBLE USE OF ANTIBIOTICS ON DAIRY FARMS IN SOUTH AFRICA

THE QUICKEST WAYS TO REDUCE ANTIMICROBIAL USE IS THROUGH LEGISLATION. THE BEST WAY IS THROUGH FARMER EDUCATION, BIOSECURITY AND IMPROVED COW IMMUNITY.

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A FIELD WITH ROOM FOR IMPROVEMENT

Antimicrobial resistance on dairy farms is experienced mainly in mastitis treatments. In South Africa, certain oxytetracycline and sulphonamide injectable antibiotics and certain antibiotic mastitis remedies are available for the public to purchase off-the-shelf, without a veterinary prescription (Fig 1). Treatment of mastitis is largely unsupervised by veterinarians (Petzer, 2024). Up to 40% of mastitis milk yield no bacterial growth on culture. In addition, a proportion of mastitis infections are cleared by the cow's immune system. Antibiotics approved for use in the udder of dairy cows are therefore effective in only 20–50% of clinical mastitis cases.

EDUCATION AS A KEY TO IMPROVEMENT

Milk South Africa's approach is to educate farmers in the responsible use of and methods to reduce dependence on antimicrobials. This can primarily be achieved through vaccination, good nutrition and management to boost the animal's immune system, a veterinary herd health plan, and an effective biosecurity plan.

TWO BODIES CONTRIBUTING TO ANIMAL HEALTH

The veterinary advisor for Milk South Africa frequently presents talks at conferences, on farmer days and webinars to promote biosecurity, herd health programs and the responsible use of antimicrobials, in addition to writing articles for the agricultural press.

"Antibiotics should not be used to compensate for poor hygiene, animal husbandry or farm management"

Speksnijder et al, 2014

The Dairy Standard Agency of South Africa audits dairy farms regularly to ensure that herd health programs, vaccination plans, and biosecurity measures are in place in addition to the proper handling, control and storage of medications.

Veterinarians are urged to include the following in their herd health programs:

- customised vaccination programs,
- biosecurity plans
- treatment protocols for specific diseases to reduce the inappropriate use of antimicrobials.

A WORK IN PROGRESS

This is an ongoing process. Research by Karzis and Petzer (2024 – in press) showed an overall decrease in antibiotic resistance of most mastitis pathogens tested between 2010 and 2016, just to increase sharply from 2016 to 2021 for most South African registered intramammary antibiotics. The results indicated that from 2015 to 2021, resistance to ampicillin increased in *Staphylococcus aureus* from 14% to 72%; for non-areus staphylococci from 29% to 55%, and for *Streptococcus uberis* from 5% to 19%. Resistance to cephalixin over the same periods decreased or remained virtually the same (Table 1).

THE FARMERS GAIN THE MOST

Through research we are aware of the size of the problem and where the weaknesses are in our system that need to be addressed. 60% to 80% of antimicrobials used on dairy farms



Fig 1. Certain antibiotics are available to farmers without veterinary prescription. (Chimes)

in South Africa are used for mastitis treatment. The inappropriate use of mastitis antimicrobials has been identified as the area where the most gain can be had for the least effort. The main beneficiaries will be the farmers through less resistant diseases on their farms and the financial savings by not spending on inefficient antimicrobial therapies. The value of prevention being much better and cheaper than a cure is severely under-appreciated.

ACTIONS THAT CONTRIBUTE TO REDUCTION OF ANTIMICROBIAL USAGE

The availability of antimicrobials without prescription needs to be changed to veterinary prescription only. This will take time to achieve. The use of blanket intramammary antibiotic treatment for mastitis needs to be discouraged. Almost half of mastitis cases improve on anti-inflammatory treatment only. Only severe cases and cases that deteriorate within the first two days need to be put on antibiotics. Mastitis cases need to be cultured to determine the causative organisms and antibiograms performed to assist in selecting the appropriate antimicrobials for use on the farm. Selective dry cow therapy needs to be promoted. Encourage the use of strip cups before every milking. The importance of good biosecurity, vaccination and good general immunity of the herd needs to be emphasised and promoted. Improve calf colostrum intake (Fig 2).

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Antibiotic	Bacteria	2010/11 Percentage (Total tested)	2015/16 Percentage (Total tested)	2020/21 Percentage (Total tested)
Ampicillin (aminopenicillins and beta-lactam)	<i>Staphylococcus aureus</i>	21% (696)	14% (547)	72% (352)
	Non-aureus staphylococci	25% (899)	29% (683)	55% (418)
	<i>Streptococcus agalactiae</i>	5% (444)	2% (209)	14% (76)
	<i>Streptococcus dysgalactiae</i>	3% (586)	1% (411)	24% (238)
	<i>Streptococcus uberis</i>	5% (732)	2% (644)	19% (380)
Cephalexin (1st generation cephalosporin)	<i>Staphylococcus aureus</i>	5% (695)	1% (549)	3% (353)
	Non-aureus staphylococci	4% (886)	2% (678)	5% (418)
	<i>Streptococcus agalactiae</i>	13% (440)	2% (209)	4% (76)
	<i>Streptococcus dysgalactiae</i>	10% (580)	2% (411)	3% (239)
	<i>Streptococcus uberis</i>	9% (721)	5% (641)	5% (381)

Table 1. Comparison of percentage resistance of 5 mastitis pathogens to ampicillin and cephalexin tested during three time periods. (Petzer 2024)

Correlation of calf IgG levels and antibiotic use

Calves 14 - 41 daysold with IgG levels of 7,5mg/ml or more
 Showed a 46% reduction in antibiotic use (measured by mg/PCU)

Calves 14 - 28 days old
 Every additional 1mg/ml of IgG resulted in a 5% reduction in antibiotic use

Fig 2. Improved colostrum intake reduces antibiotic use in calves

GERMANY

CHALLENGES IN IMPLEMENTING QUARTER-SELECTIVE DRY COW THERAPY ON COMMERCIAL DAIRY FARMS

CORRECT SAMPLING AS WELL AS GOOD MANAGEMENT ARE NECESSARY TO IMPLEMENT DRY COW THERAPY BASED ON DETECTING MASTITIS PATHOGENS.

AUTHOR

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THE PROJECT MINIMA PROPOSES THE TARGETED USE OF ANTIBIOTICS

During the last years, the development of antibiotic resistance has attracted public and political attention on strategies reducing antibiotic use. There is great potential to save antibiotics by using selective dry cow strategies. Currently, such strategies are mostly based on somatic cell count of cow composite milk, often regardless of the infection status of the individual quarters. As a result, antibiotics are often used in quarters not requiring such treatment. To achieve a more targeted antibiotic use, the project “MinimA” focused on a pathogen-based quarter-selective dry cow therapy (QSDCT) treating only quarters infected with major pathogens with antibiotics at dry-off.

The aim was to test whether a QSDCT, which had already been successfully tested at two experimental farms (Knappstein and Barth, 2016), could be transferred to the field and to identify emerging challenges.

TREATMENT BASED SOLELY ON DETECTED PATHOGEN

Sixteen dairy farms (3 organic, 13 conventional) with 80 to 1 280 cows were included in the field study. Two weeks prior to dry-off, farm personnel collected quarter milk samples (60 to 83 cows per farm) for bacteriological analysis. Results were used for treatment decisions: Only quarters infected with major bacterial

“The farmer’s mind is where quarter-selective dry cow therapy begins.”

Alexandra Beckmann

pathogens were treated with antibiotics at dry-off. In addition, all quarters received an internal teat sealant to prevent new intramammary infections. To share knowledge and challenges during implementation of QSDCT, feedback talks as well as project meetings based on the stable school concept (Ivemeyer et al., 2015) were conducted.

CHALLENGES

Less than 10% (2.6 – 28.8% at farm level) of all quarters received antibiotics at dry-off. One of the biggest challenges was antiseptic sampling. Farmers were trained using leaflets, videos and personal instruction. The use of a pre-dip improved sample quality. In addition, wet cleaning of sample vials was identified as an unexpected source of contamination. A high degree of self-organisation and precision work provided the best conditions for correct identification of quarters both during sampling and treatment, and ensured that the time schedule from sampling to drying off was adhered to.

SUPPORT OF QSDCT WITH A GUIDANCE DOCUMENT

The experience and results of this study provide an approach for other commercial dairy farms to target antibiotic therapy and avoid prophylactic use. All project farms have significantly reduced their use of antibiotics. However, there are challenges to this approach. The obstacles encountered by the farmers and the solutions implemented have been summarised in a German practical guide and can serve as a reference for other farms interested in implementing QSDCT in their herds.

LONG-TERM EFFECTS ON AMR AND HEALTH NEED TO BE STUDIED IN THE FUTURE

Given the need for selective dry cow strategies and the recent development of antibiotic benchmarking tools, QSDCT is a promising way for farmers and veterinarians to reduce antibiotic use. Due to the increased time and organisational effort required for sampling, further analysis is needed on criteria to preselect cows for sampling with the highest chance of detecting infections by major pathogens. In addition, more work is needed to assess the long-term effects of reduced antibiotic use on the development of antimicrobial resistance in mastitis pathogens and on the health and performance of treated cows. There were also frequent questions on the economic impact of pathogen-based QSDCT which still needs to be calculated.



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MORE INFORMATION (IN GERMAN LANGUAGE)

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2. Leaflets and videos for the correct sampling and application of udder injectors: <https://bit.ly/Mini-mA>.

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PREVENTIVE ANIMAL HEALTH PROGRAMME

Any programme that maintains animal health and wellbeing minimizing the risk of disease and the necessity for antimicrobial use, such as a vaccination or biosecurity programme.





CHILE

HOW ANIMAL WELFARE EXTENSION TOOLS CAN HELP TO REDUCE THE USE OF ANTIMICROBIAL

IMPROVING ANIMAL WELFARE TO ADVANCE PRUDENT USE OF ANTIMICROBIALS

AUTHOR

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A CONNECTION BETWEEN ANIMAL WELFARE AND ANTIMICROBIAL USAGE

Some welfare issues affecting dairy cattle are associated with increased use of antimicrobials to ensure proper treatment, such as clinical mastitis in lactating cows, or pneumonia and diarrhoea in calves. Improvements in animal welfare (AW) at the farm level have the potential to reduce the incidence of infectious diseases and the spread of pathogens between animals, primarily through stress reduction (immunosuppression). In this way, it contributes to a reduced use of antimicrobials, as well as a lower risk to food safety. The use of protocols and tools created by our Committee has helped improving AW on Chilean dairy farms.

The aim was to develop an AW initiative that allows farmers to monitor their herds continuously using locally validated tools. By increasing the welfare of the herds, health problems can be reduced and thus the use of antimicrobials. Initially, these tools were focused on lactating cows and calves.

THE CHILEAN MULTISTAKEHOLDER ANIMAL WELFARE TECHNICAL COMMITTEE

To form an AW initiative, the Chilean Dairy Consortium created an Animal Welfare Technical Committee in 2013. The Committee was formed by representatives from Universities, Farmers' Associations, the Agriculture Research Institute, Official Agricultural and Livestock Service, and

”Promoting animal health through animal welfare good practices will lead our sector to use antimicrobials prudently, contributing to public health”

M. Alejandra Viedma

the Consortium. Initially, a committee project was funded by the National Foundation for Agricultural Innovation; this allowed the development of an AW program to improve factors affecting the welfare and health of dairy herds, which in turn can reduce the use of antimicrobials. Locally validated animal welfare protocols were developed during the first phase. The second phase included technology transfer according to the main issues detected.

IMPLEMENTING ANIMAL WELFARE PROTOCOLS AND TRAINING ACCORDING TO THE OFFICIAL SUSTAINABILITY STANDARD

The first result was the production of a bulletin to raise awareness in the dairy sector of the production and economic implications of maintaining appropriate animal welfare. This was followed by the publication of welfare protocols for lactating cows, calf rearing, udder health and heat stress. These were the result of

joint work with the academy, the public sector, the Technological Institute and the private sector. The private sector has been involved in the gradual implementation of what has been published and in the training of field staff, as demonstrated by the application of the official sustainability standard, where animal welfare aspects have been assessed the best.

BETTER ANIMAL WELFARE THAT IS INCREASINGLY VALUED BY CONSUMERS

The implementation of the project has highlighted the concept of AW, taking into account the economic impact generated by the implementation of the practices proposed in the protocols. It has also allowed us to make progress in an area that is increasingly valued by consumers and that requires a social licence to operate, which is why farmers have benefited by adding value to their traditional system. There is also a reduction in animal health costs and the use of antimicrobials. The manuals, protocols and videos produced have supported the training of new professionals and education of farmers, specialists and employees in our dairy sector.

SPECIFIC PROTOCOL FOR THE DRY PERIOD AND EARLY POSTPARTUM SOON AVAILABLE

On dairy farms, infectious diseases such as mastitis and metritis are particularly prevalent during the transition period, and sick cows often need to be treated



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with antimicrobials for welfare reasons. To improve the welfare of transition dairy cows, our committee has developed a specific protocol for the dry period and early postpartum, which will be published in the second half of this year. Our future challenges include assessing the effectiveness of these management strategies in reducing antimicrobial use on Chilean dairy farms. In addition, evaluating antimicrobial prescription patterns and the welfare considerations that influence antimicrobial selection among Chilean dairy veterinarians will be critical to our future projects.

GUIDELINES, PROTOCOLS AND VIDEOS FROM OUR ANIMAL WELFARE PROGRAM:

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NEW ZEALAND

ANTIMICROBIAL STEWARDSHIP: A NEW ZEALAND APPROACH TO RESPONSIBLE ANTIMICROBIAL USE

OPTIMUM ANIMAL HEALTH AND WELLBEING SHOULD NOT BE DEPENDENT ON THE ROUTINE USE OF ANTIMICROBIAL THERAPY.

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RESPONSIBLE ANTIMICROBIAL TREATMENT IN ANIMALS LIMITS THE SPREAD OF ANTIMICROBIAL RESISTANT BACTERIA

The World Health Organization (WHO) predicts that antimicrobial-resistant bacteria will be one of the greatest health challenges we face (WHO, 2023). Because of the potential for transfer of resistant bacteria between animals and humans, the use of antimicrobials in animals must be done responsibly, with the highest level of awareness and a continued focus on prudent use, education and support for veterinarians, animal owners and the public at large. Although still relevant, antimicrobial therapy should not be relied upon to maintain the health and welfare of animals in the future.

A TRAFFIC LIGHT SYSTEM

The purpose of the initiative was for the veterinary profession to play a leading role in efforts to slow the development of antimicrobial resistance (AMR) and to promote the judicious use of antimicrobials in veterinary medicine through effective communication, education and support. To this end, a traffic light system was developed in 2015 that ranks antimicrobials according to a combination of World Organisation for Animal Health (WOAH) and WHO guidelines (New Zealand Veterinary Association, n.d.).

AN AMBITIOUS GOAL ACHIEVED BY A SIMPLE SYSTEM

In 2015 the New Zealand Veterinary Association (NZVA, a New Zealand veterinary membership association) published an aspirational goal: “By the

”Optimum animal health and wellbeing should not be dependent on the routine use of antimicrobial therapy”

New Zealand Veterinary Association

year 2030 New Zealand Inc. will not need antibiotics for the maintenance of (New Zealand Veterinary Association, n.d.). Although animal welfare should continue to take precedence, and antimicrobials continue to be available to do so, this was a way to declare that the veterinary profession is working towards a future without dependence on this important resource. As being the sole authorisers of antimicrobials for animal use in New Zealand, veterinarians are central in the management of risks associated with AMR development.

As part of this initiative, the NZVA published a number of guidelines for judicious antibiotic use for the veterinary profession. A traffic light system was developed based on the WHO classification system and recommendations from the World Organisation for Animal Health

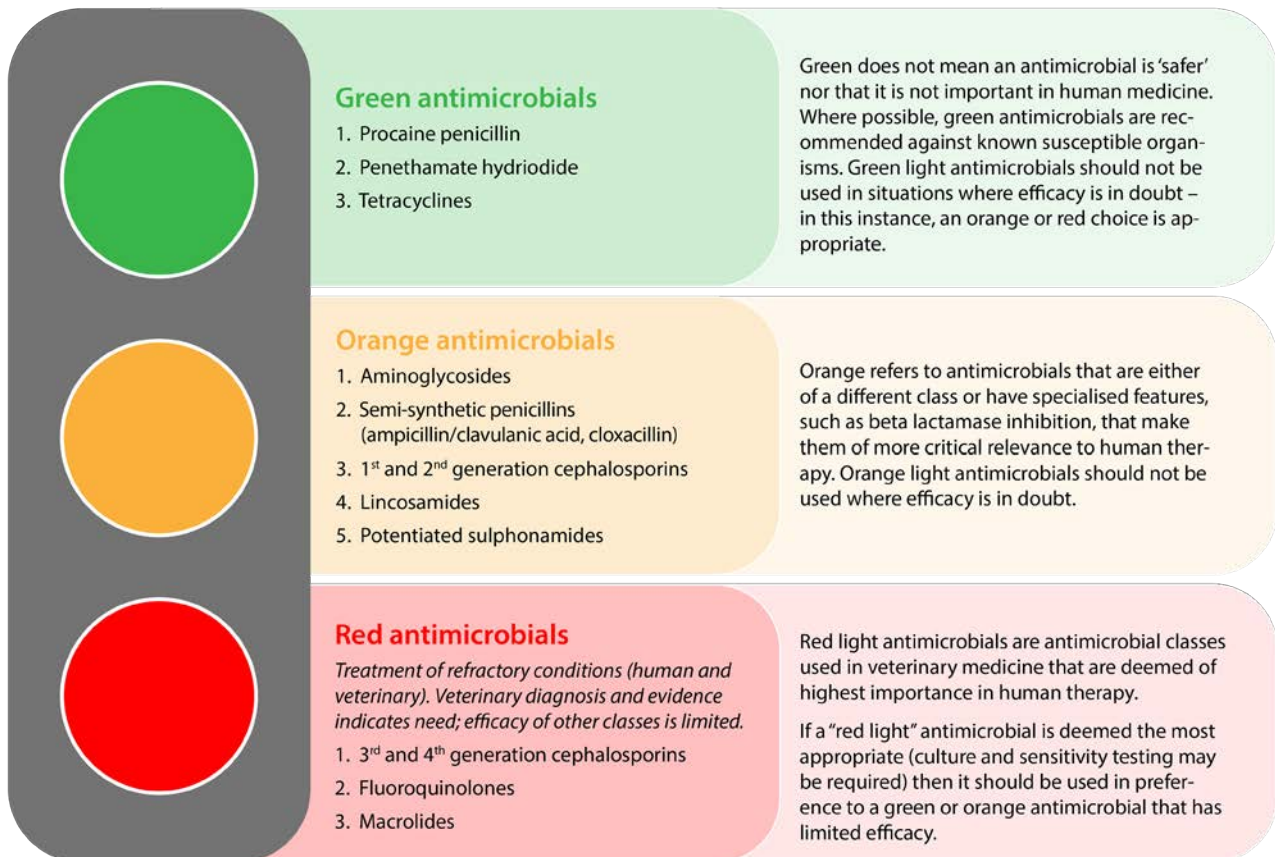
(WOAH) (Veterinary Council of New Zealand, 2022) to aid in the selection of appropriate therapy. A simple green-yellow-red classification was adopted, and antimicrobials were assigned in order of importance to human and animal medicine.

Since its development, the antimicrobial traffic light system has provided the New Zealand veterinary profession with the support required to fulfil their duties as stewards of prudent antimicrobial use. It has offered the necessary vocabulary to effectively communicate the importance to the public and to work towards an overall reduction in antimicrobial use, as well as effective use of antimicrobials in combination with sound, clinical reasoning and culture sensitivity testing.

VETERINARIANS PART OF THE SOLUTION AGAINST AMR

Antimicrobial stewardship must be practiced across all sectors to be successful. It requires awareness, commitment and good governance and it involves effective collaboration between all stakeholders to achieve the goal of reducing antimicrobial use and secure antimicrobials as a part of future treatment-options for human and animal health across the globe.

The NZVA traffic light system is an example of the veterinary profession supporting a national level government approach to AMR, established by the NZ Ministry for Primary Industries (Ministry for Primary Industries, Manatū Ahu Matua, 2024). It demonstrates the awareness that



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the veterinarian plays a critical role in AMR prevention, and it is an effort to support both veterinarians and animal owners to work effectively together towards a common goal.

Initiatives such as the NZVA traffic light system will continuously be reviewed to ensure its relevance and efficacy. It is critical that efficacy is measured, e.g. through analyses of national antibiotic compound sales and that changes are made if and when necessary. Veterinarians hold a central role in the management of AMR, and it is critical that support continues for veterinarians and animal owners as this issue continues to affect us.

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SWEDEN

HOW IS FOOT ROT AND DIGITAL DERMATITIS IN CATTLE TREATED IN SWEDEN?

NON-ANTIBIOTIC TREATMENT OF FOOT ROT AND DIGITAL DERMATITIS HAS BEEN WELL ADOPTED BY SWEDISH FARMERS AND HOOF TRIMMERS AND THE PROPORTION OF NARROW SPECTRUM PENICILLIN PRESCRIBED BY VETERINARY PRACTITIONERS WHEN TREATING SEVERE CASES OF FOOT ROT HAS INCREASED.

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INVESTIGATION OF TREATMENTS FOR FOOT ROT AND DIGITAL DERMATITIS

Foot rot and digital dermatitis (DD) cause lameness and are a great challenge for the dairy industry world-wide. Lameness reduces milk production, fertility, and decreases longevity by premature culling and death. Traditionally, infectious claw diseases have been treated with broad spectrum antibiotics both systemic (foot rot) and topical (DD). Today, alternative topical treatments have proven to be efficient and can, together with reduced risk of antimicrobial resistance (AMR), reduce cost and labour for the farmer. To investigate how treatment recommendations are practiced on farm today, this study was made as a part of the Swedish Veterinary AMR Monitoring for Pathogenic bacteria (Svarmpat).

By using narrow spectrum antibiotics for systemic treatments and/or non-antibiotic topical treatments we can reduce the risk of developing AMR. We have evaluated and compared how recommended treatment methods today and from ten years ago have been adopted in practice by Swedish farmers, hoof trimmers and veterinarians.

THE SPREADING OF THE QUESTIONNAIRES

Two questionnaires were distributed by e-mail to 2 641 dairy farmers (members of the Swedish Dairy Farmers Association) and 200 hoof trimmers, to investigate how well treatment recommendations of foot rot and DD have been adopted during a ten-year period. The dairy farmer

”The use of antibiotics for treatment of infectious claw diseases in Swedish dairy herds has decreased last ten years ”

Frida Åkerström

questionnaire was also distributed by social media in three Facebook groups. The IT platform Netigate (Netigate AB, Stockholm, Sweden) was used to summarize the replies. The response rate was 20% (525/2 641) and 22% (44/201) for farmers and hoof trimmers, respectively. Hoof trimming records and veterinary treatment reports were also retrieved and analysed historically.

SATISFACTORY RESULTS IN COORDINATION WITH PRUDENT ANTIMICROBIAL USAGE

Use of non-antibiotic treatments of foot rot and DD have increased the last ten years. The systemic use of antibiotics for foot rot decreased and penicillin is the dominant choice for severe cases, while the use of cephalosporins is phased out. Topical treatment of mild cases of foot rot with disinfectant and a bandage have increased from 22 to 74%. Hoof trimmers' use of salicylic acid and bandage increased from 54 to 95% and broad-spectrum antibiotics for DD is no longer used. Both farmers and hoof trimmers believe that they retrieve satisfactory treatment results with non-antibiotic-treatments for both foot rot and DD. From

the questionnaire, farmers said they were satisfied with treatment results and appreciated the economic benefits and animal welfare improvements of using alternative, non-antibiotic treatments.

ADDITIONAL MEASURES TO CONTROL INFECTIOUS CLAW DISEASE

Prompt treatment of an infectious claw disease causing lameness is important for the outcome and reduces the spread within the herd. Preventive, strategic measures regarding biosecurity, management, and foot environment are of greatest importance to reduce infectious claw diseases and lameness in the herd in the long term. This includes biosecurity precautions to reduce the risk of introducing contagious bacteria, clean and dry foot environment, foot bathing with a functional agent, balanced nutrition, strengthened immunity, and breeding for health. New dairy barns must secure better flooring with efficient discharge of manure and gases to diminish growth of opportunistic bacteria.

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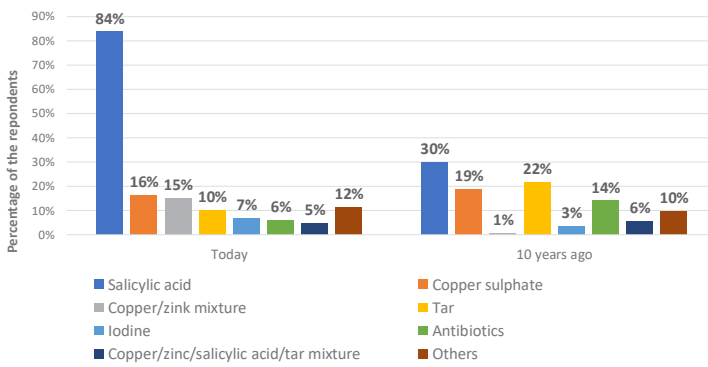


Figure 1. Farmers' treatment of digital dermatitis today and 10 years ago.



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AUSTRALIA

THE COUNTDOWN MASTITIS FOCUS REPORT

SNAPSHOT OF UDDER HEALTH FOR AN INDIVIDUAL DAIRY HERD, INCLUDING BENCHMARKING, IDENTIFYING PROBLEM AREAS AND POTENTIAL RISKS AND TRACKING PROGRESS AFTER MAKING MANAGEMENT CHANGES.

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OVERCOMING THE COST OF POOR UDDER HEALTH WITH DAIRY AUSTRALIA'S COUNTDOWN PROGRAMME

Mastitis costs Australian dairy farmers more than AU\$150 million each year through poor udder health. Reduced milk yield and poor-quality milk erode the milk income received and antibiotic therapy used to overcome udder disease adds to costs and requires careful management to prevent residues in milk and the development of antibiotic resistance.

Dairy Australia's Countdown program is the industry's flagship initiative to assist farmers and their advisors to prevent and manage mastitis. Good udder health relies on multiple factors being 'right' most of the time – and the Countdown plan consists of a set of recommendations to assist dairy farmers with profitable control of mastitis during each phase of the production cycle including what must be done, why and how it needs to be done and how to check that it has been achieved.

THE PROGRAMME PROVIDES FARM-TAILORED MASTITIS MANAGEMENT STRATEGIES

The Countdown Mastitis Focus Report uses a farm's own data to assist advisers and dairy farmers to keep track of udder health in their herd and strategically plan strategies for drying-off, calving and clinical mastitis management. It also provides an additional alert to emerging problems so that actions and advice can be targeted where needed most.

THE DATAVAT WEB PORTAL CONCENTRATES ALL THE RESOURCES

The Australian Mastitis Focus Report underwent a major redevelopment in 2021 to address data glitches, improve functionality and update definitions and calculations based on recent research from both Australia and New Zealand.

Farmers can access the new Mastitis Focus Report in DataVat, which is a web portal that allows customised, secure access to various reports, tools and resources that draw upon data in the Central Data Repository (CDR). The information in the new report is presented in a way that is pertinent for all herds regardless of herd size or calving pattern.

Farmers and advisors need to become a registered user of DataVat to access Mastitis Focus Reports. DataVat is a web portal that allows for customised, secure access to various reports, tools

"Australian dairy farmers have made great progress in udder health, contributing to on-farm efficiencies via reduced treatment costs, and to business profitability through milk quality rewards and improved milk production."

David Nation, Managing Director Dairy Australia

and resources that draw upon data in the Australian dairy industry's centralised data repository (CDR) and information from its genetic evaluation system.

Information on how to generate and read your Mastitis Focus Report can be found in the Quick Guide and User Guide which describes how to generate and interpret a Countdown Mastitis Focus Report and gives pointers for troubleshooting issues.

The 2021 redevelopment of Countdown Mastitis Focus Report was led by Dr Alison Gunn, funded by Dairy Australia, and undertaken by DataGene.

NEW OPPORTUNITIES INCLUDE EXPANDING THE PORTAL SERVICES FOR OTHER MAJOR DISEASES

Almost 68% of Australian dairy farmers (>95% of farms with >700 cows) already record health events (disease) electronically. Whilst the Countdown Mastitis Focus report targets clinical and subclinical mastitis specifically, there is considerable opportunity to broaden the scope of data-based animal-health and welfare benchmarking to include other diseases of importance, including calf morbidity and mortality, lameness, respiratory disease, metabolic disease, and others. By benchmarking their performance against their own historical performance, and other farm businesses, focus areas for improvement can be identified and appropriate and tailored support can be provided by their veterinarians and service providers. In addition, aggregated data can then be used for reporting purposes and to support investment and resourcing prioritisation at a national level.

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ANTIMICROBIAL USE PROGRAMME

A programme for determining if, when, and how and antimicrobial is used for therapeutic purposes.





ITALY

DEVELOPMENT AND APPLICATION OF PROTOCOLS FOR THE PRUDENT USE OF ANTIMICROBIALS IN LOMBARDY

THE REDUCTION OF ANTIMICROBIAL USAGE IN DAIRY HERDS IS STRICTLY RELATED TO THE APPLICATION OF CERTIFIABLE, SUSTAINABLE, RATIONAL, AND EFFECTIVE PROTOCOLS TO IDENTIFY DISEASED COWS.

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SELECTIVE DRY COW THERAPY AS A METHOD TO PREVENT MASTITIS WITH REDUCED ANTIMICROBIAL USAGE

The increasing incidence of antimicrobial resistance (AMR) affects both human and veterinary medicine and should not be underestimated in food-producing animals. In the dairy industry, the use of Selective Dry Cow Therapy (SDCT) is one of the proposed measures to reduce the use of antibiotics. This approach is now mandatory in the EU due to Directive EC 2019/6, which prohibits the use of antimicrobials to prevent infections in animals.

Therefore, the definition of a consistent and approved method to identify cows to be treated at dry-off (diseased) is crucial both for farmers who need to reduce the risk of mastitis for their cows and for health authorities who need to verify compliance.

IDENTIFYING COWS AT RISK BASED ON SCC AND DSCC

A series of field studies were developed to determine which somatic cell count (SCC) thresholds were most appropriate for identifying cows to be treated. Once the thresholds were defined, a protocol was developed and applied to verify the accuracy of detection, the frequency of new intramammary infections after calving and the relative risk factors. A follow-up study was conducted to develop a protocol to identify cows at risk based on SCC and differential somatic cell count (DSCC) and to assess the incidence of clinical mastitis after calving.

”The reduction in antimicrobial usage should be the result of sustainable and effective protocols fitting the specific dairy regions.”

Alfonso Zecconi

ASSESSING RISK FACTORS

To identify the thresholds, we considered a database containing 45 682 records of cow's milk tests performed in 2017 from 709 dairy herds in the Lombardy region. The data were also analysed using five different thresholds (100 000, 150 000, 200 000 and 250 000 cells/ml). Once two thresholds were identified, this approach was verified by comparing the health status defined by SCC with the microbiological analysis.

To assess infection status, quarter milk samples were taken twice (7 days before and on the day of drying off) before drying off and twice after calving (5-7 days and 12-17 days). A database of relevant information was created to assess risk factors. A follow-up study was conducted by applying a threshold based SCC and DSCC at the first milk recording after calving and analysing positive milk samples.

RESULTS

The analysis suggests a threshold of 100 000 cells/ml for primiparous cows and 200 000 cells/ml for multiparous cows.

Of these, 55% of the bacteriologically negative cows were also identified as healthy by SCC and were therefore not treated, while 43% were treated. Only 21% of the bacteriologically positive cows were not treated.

After calving, 70% of the untreated negative cows confirmed this status, while the others developed a new IMI. Among the treated cows in the negative group, the rate of new IMI was 45%. In both cases, CNS was the most common infectious agent.

Risk factors associated with the likelihood of new and cured IMI during the dry period were parity, dry period length and teat sealant.

The frequency of environmental streptococci and coliforms increased during the dry period. In the follow-up study, treatment frequency ranged from 30% to 62%, the frequency of cows at risk ranged from 10% to 20% and the clinical mastitis rate was always below 2%.

THE USE OF SCC AND DSCC PROVED TO BE A POTENTIALLY USEFUL AND PRACTICAL ALTERNATIVE

An accurate diagnostic method is essential for an SDCT approach and protocols for prudent and rational use of antimicrobials. In addition, these protocols must be both practical and economically viable.

Microbiological analysis is the most accurate method, but it is relatively expensive, requires accurate sampling, proper delivery to the laboratory and the availability of diagnostic laboratories with sufficient expertise. The latter is often a barrier to the use of microbiological diagnostics.

The use of SCC and DSCC proved to be a potentially useful and practical alternative.

The result of this study showed that it is practically feasible to reduce the use of antimicrobials with a negligible impact on cow health. This is a consequence of monitoring udder health after calving.

The application of rational and verified protocols was shown to be the most efficient way to achieve a sustainable reduction of antimicrobial use and to comply with current legislation.

The application of SDCT will increase the need to further develop post-calving monitoring systems using different tools available, such as DSCC, and different sensors available on conventional or automated milking machines.

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SWEDEN

HEALTHY SWEDISH DAIRY COWS DO NOT NEED ANTIBIOTICS

HEALTHY COWS DO NOT NEED ANTIBIOTICS.

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EARLY AWARENESS OF THE IMPORTANCE OF PRUDENT USE

The use of antimicrobials in both humans and livestock increases the risk of microorganisms developing resistance, resistance that can cause failure to treat cases that really need to be treated to avoid death. In Sweden, awareness of the importance of prudent use of antimicrobials to livestock clearly showed when the farmers together with government and livestock organisation banned the use of antimicrobial as growth promoters in 1986. Already then, Swedish farmers knew that healthy animals do not need antibiotics.

THE MAIN POINTS OF THE SWEDISH ANTIBIOTIC POLICY

With the aim to protect the usefulness of antibiotics, a strict antibiotic policy was set in Sweden; livestock should only be treated when necessary (bacterial infections with a good prognosis), no treatments on group level or as routine prophylaxis, and antibiotics with as narrow spectrum as possible should be used.

PREVENTION AND REGISTRATION THE KEYS TO SUCCESS

Through good collaboration between all parts of the dairy industry, focus has been on preventive measures to keep livestock healthy and productive without unnecessary use of antibiotics. Only veterinarians have been allowed to initiate an antimicrobial treatment and registrations of these treatments have been recorded in the Swedish Cow Database and presented in an annual report since 2001. This data gives

“Antibiotics may help to recovery, but they will not remove the cause of disease – preventive measures will.”

Ann-Kristin Nyman

information on number of dairy cows that are treated, what they are treated for and what substances are used, and if there are regional differences.

A STEEP REDUCTION OF ANTIMICROBIALS USED

The prescription of antimicrobials to dairy cows has been reduced by 65% since 2001 (Figure 1) with only eight out of 100 cows being treated per year, and

the proportion of benzyl penicillin used has increased from 75% to 90% (Figure 2). Cephalosporines were not prescribed at all in 2022, and fluoroquinolones were prescribed in only 0.8% of the treatments. The low treatment incidence and the high proportion of benzyl penicillin used show that the health status of dairy cows is very good in Sweden and that we have good basis for keeping antimicrobial resistance at a low level.

THE MULTIPLE POSITIVE EFFECTS OF LOWER USAGE

Reducing the need of antibiotics by keeping animals healthy animals is the main key to success for the prudent use of antibiotics in the Swedish dairy sector. Low and prudent use will decrease costs for medication, and milk and meat withdrawal time for dairy farmers. It will

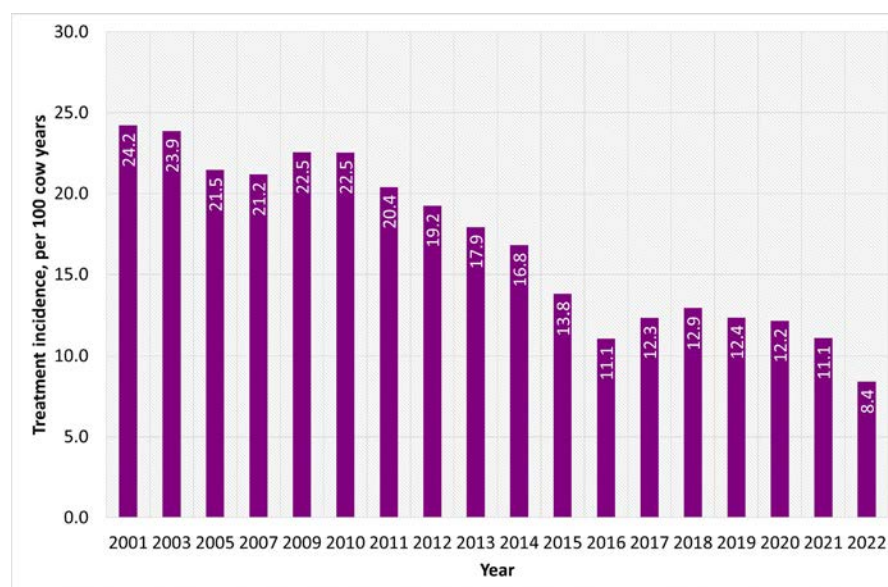


Figure 1 • Treatment incidence in dairy cattle in Sweden between 2001 and 2022

also lower the risk for the emergence and spread of AMR within and between farms, but also to humans. Milk will be safer without antibiotic residuals and consumer trust will increase with less antibiotic used. Moreover, healthy animals will be more productive and hence more profitable and more sustainable.

THE ROAD IN FRONT

There is still room for improvement as the proportion of penicillin used in some counties in Sweden could be higher for some of the diagnostic complexes. We will continue to maintain awareness among veterinarians and farmers by means of communication in technical journals, meetings and lectures, trainings as well as updated national antibiotic guidelines which will be available later this year.



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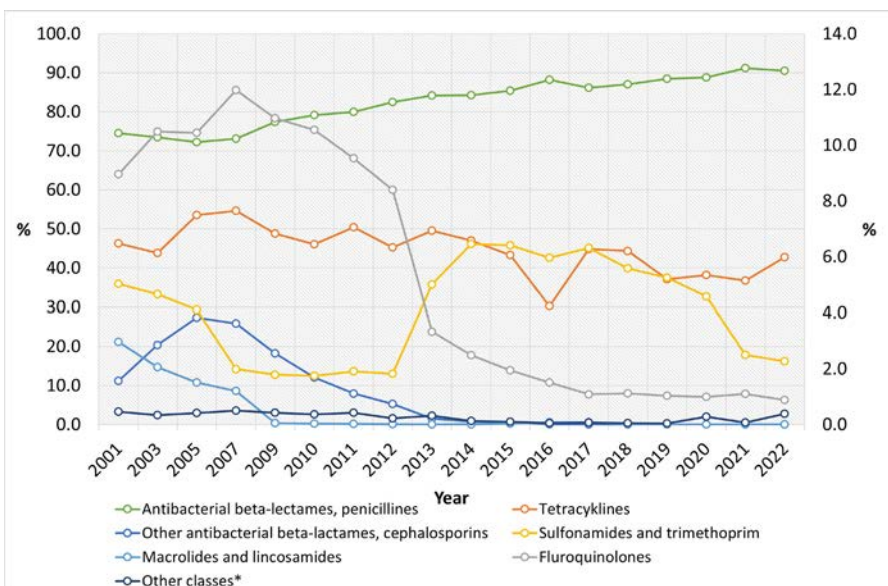


Figure 2 • Percentage of usage of major antimicrobials in dairy cattle in Sweden between 2001 and 2022

FURTHER READING

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UNITED STATES

U.S. ANTIMICROBIAL STEWARDSHIP PROGRAMME DEMONSTRATES PROGRESS ON PRUDENT USE OF ANTIMICROBIALS

EDUCATIONAL RESOURCES, VETERINARY OVERSIGHT, AND BEST PRACTICE IMPLEMENTATION LEAD TO POSITIVE OUTCOMES FOR PRUDENT AND RESPONSIBLE ANTIMICROBIAL USE IN THE U.S. DAIRY INDUSTRY.

AUTHOR

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THE BIG PICTURE

The U.S. dairy industry approaches antibiotic stewardship through multiple interrelated regulatory and industry programs to assure prudent and responsible use of antimicrobials on the farm, routine residue testing to assure a safe supply of milk and dairy beef, and resistance monitoring to maintain viability of antibiotics for animals and humans. All animal antimicrobials in the U.S. must be approved for use by the U.S. Food and Drug Administration (FDA). As part of safety monitoring, routine testing for antimicrobial residues occur in livestock products. All milk and meat with a residue is disposed and does not enter the commercial food supply.

THE PROMISE

The National Dairy Farmers Assuring Responsible Management (FARM) Antibiotic Stewardship Program, part of the FARM Animal Care Program, serves as an integral piece to ensure dairy farmers, veterinarians, cooperatives, and processors have the resources to be responsible stewards of the antimicrobials necessary to maintain animal health and wellbeing.

MATERIAL AND METHODS

The FARM Animal Care Program requires a written Herd Health Plan (HHP) developed through a Veterinarian-Client-Patient-Relationship (VCPR) emphasizing prevention, rapid diagnosis, and quick decision-making on necessary treatment of all sick or injured dairy cattle on the farm (FARM 2020). Annually, each dairy farm develops an HHP with their veterinarian which includes treatment protocols

“Education, veterinary oversight, and implementation of best practices produced quantifiable results in prudent and responsible antimicrobial use by U.S. dairy farmers.”

Jamie Jonker, Ph.D.

addressing the proper use of antibiotics. A comprehensive residue avoidance manual (FARM 2024) is used throughout the dairy supply chain for prudent and responsible antimicrobial use policies. Additionally, a national partnership between FARM Program and Beef Quality Assurance Program provides cross-industry coordination for meat residue avoidance initiatives.

THE HISTORY OF SUCCESS

Most recent data show 70 percent of dairy farms have a current VCPR; the remainder establish a VCPR in 173 days on average (Figure 1). Federal surveillance data indicates high levels of compliance to proper antimicrobial use. Milk residues have declined by 93 percent since 1996 to ≈0.007% bulk milk pickup tankers (Figure 2). Since 2014, dairy beef residues have declined about 76 percent (Figure 3 and 4). The Milk and Dairy Beef Drug Residue Prevention Manual and associated pocket guide documents continue to be popular resources among farmers and veterinarians.

DISCUSSION OF YOUR PROJECT

The U.S. dairy industry recognizes the value and responsibility for prudent and responsible use of antimicrobials to maintain animal health and well-being on farms. Through integration with the FARM Program, heightened awareness and execution of antibiotic and antimicrobial stewardship builds consumer trust by ensuring safe and wholesome milk and beef products which is verified by continuing improvement on veterinarian involvement in antimicrobial use decision-making and decrease in milk and meat residues.

NEW OPPORTUNITIES

Working through the process of continuous improvement, the FARM Program is focusing on implementation of prevention, treatment and control programs for animal diseases including protocols to reduce the necessity of antimicrobial use. Through analysis of treatment records, dairy farmers will have access to benchmarking tools to understand their use compared to others farms.

VETERINARY REVIEW

VETERINARIAN-CLIENT-PATIENT RELATIONSHIP (VCPR) FORM

This form is acceptable to meet the "written Veterinarian-Client-Patient Relationship that is signed by the farm owner and Veterinarian of Record annually within the previous 12 months" standard within FARM Animal Care Version 4.

FACILITY OWNER/MANAGER INFORMATION

Facility Owner/Manager Name _____

Facility Name _____ Premises ID Number (Optional) _____

Facility Address _____

City _____ State _____ Zip _____

VETERINARIAN INFORMATION

Veterinarian Name _____

Clinic Name _____ Phone Number _____

Clinic Address _____

City _____ State _____ Zip _____

I hereby certify that a valid veterinarian-Client-Patient Relationship (VCPR) is established for the above listed owner and will remain in force until canceled by either party.

Upon execution of this agreement and the establishment of the VCPR, Producer, on behalf of himself and their present or past legal representatives, predecessors, successors, assigns, agents and heirs, hereby releases and forever discharges Veterinarian from any and all claims, actions, disputes, damages or demands, at law or in equity, that Producer could or may bring in regard to Producer's participation in, or disqualification from the FARM Program. Producer expressly waives any right or claim of right to assert hereafter that any claim in such regard has through ignorance, oversight or error, been omitted from the terms of this agreement.

In addition, upon execution of this agreement and the establishment of the VCPR, FARM Program, on behalf of itself and its present or past legal representatives, predecessors, successors, assigns, agents and affiliates, hereby releases and forever discharges Veterinarian from any and all claims, actions, disputes, damages or demands, at law or in equity, that FARM Program could or may bring in regard to Veterinarian's participation in the VCPR, or Producer's participation in, or disqualification from the FARM Program. FARM Program expressly waives any right or claim of right to assert hereafter that any claim in such regard has through ignorance, oversight or error, been omitted from the terms of this agreement.

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VETERINARY REVIEW

VCPR SIGNATURE SECTION

FARM Animal Care Version 4 standards outline that VCPR must be signed at least annually. This document can be utilized for multiple years.

YEAR _____

Facility Owner/Manager Signature _____ Review Date _____

Veterinarian Signature _____ Review Date _____

YEAR _____

Facility Owner/Manager Signature _____ Review Date _____

Veterinarian Signature _____ Review Date _____

YEAR _____

Facility Owner/Manager Signature _____ Review Date _____

Veterinarian Signature _____ Review Date _____

YEAR _____

Facility Owner/Manager Signature _____ Review Date _____

Veterinarian Signature _____ Review Date _____

YEAR _____

Facility Owner/Manager Signature _____ Review Date _____

Veterinarian Signature _____ Review Date _____

YEAR _____

Facility Owner/Manager Signature _____ Review Date _____

Veterinarian Signature _____ Review Date _____

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REVISIÓN DE VETERINARIO

FORMULARIO DE RELACIÓN VETERINARIO-CLIENTE-PACIENTE (VCPR)

Este formulario cumple con la norma "escrito de Relación Veterinaria-Cliente-Paciente" que firman todos los años el propietario de la granja y el veterinario registrado dentro de los 12 meses anteriores" de la versión 4 del Programa de Cuidado Animal FARM.

INFORMACIÓN DEL PROPIETARIO/ADMINISTRADOR DEL CENTRO

Nombre del propietario/administrador _____

Nombre del centro _____ Número de identificación de las instalaciones (opcional) _____

Dirección del centro _____

Ciudad _____ Estado _____ Código postal _____

INFORMACIÓN DEL VETERINARIO

Nombre del veterinario _____

Nombre de la clínica _____ Número de teléfono _____

Dirección de la clínica _____

Ciudad _____ Estado _____ Código postal _____

Por la presente certifico que se encuentra establecido una Relación Veterinario-Cliente-Paciente (VCPR, por sus siglas en inglés) válida con el asociado propietario, la cual seguirá vigente hasta que alguna de las partes la cancele.

Con la firma de este acuerdo y el establecimiento de la VCPR, el Productor, en nombre de sí mismo y de sus representantes legales, predecesores, sucesores, cesionarios, apoderados y herederos actuales y futuros, renuncia para siempre a establecer contra el Veterinario todos los reclamos, recursos, litigios o demandas por daños y perjuicios o de otro carácter, en derecho o equidad, que el Productor podría o estaría habilitado a establecer en referencia a la participación del Productor en el Programa FARM o su inhabilitación para participar en él. El Productor renuncia de manera expresa a todo derecho o reclamo de derecho a afirmar en adelante que alguna declaración a ese respecto se haya omitido por ignorancia, descuido o error de los términos del presente acuerdo.

Además, con la firma de este acuerdo y el establecimiento de la VCPR, el Programa FARM, en nombre de sí mismo y de sus representantes legales, predecesores, sucesores, cesionarios, apoderados y asociados actuales o pasados, renuncia para siempre y para siempre a establecer contra el Veterinario todos los reclamos, recursos, litigios o demandas por daños y perjuicios o de otro carácter, en derecho o equidad, que el Programa FARM podría o estaría habilitado para establecer en referencia a la participación del Veterinario en la VCPR, o la participación del Productor en el Programa FARM o su inhabilitación para participar en él. El Programa FARM renuncia de manera expresa a todo derecho o reclamo de derecho a afirmar en adelante que alguna declaración a ese respecto se haya omitido por ignorancia, descuido o error de los términos del presente acuerdo.

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REVISIÓN DE VETERINARIO

SECCIÓN DE FIRMA DE VCPR

Las normas de la versión 4 del Programa de Cuidado Animal FARM indican que la VCPR debe firmarse al menos una vez al año. Este documento puede utilizarse para varios años.

AÑO _____

Firma del propietario/administrador _____ Fecha de revisión _____

Firma del veterinario _____ Fecha de revisión _____

AÑO _____

Firma del propietario/administrador _____ Fecha de revisión _____

Firma del veterinario _____ Fecha de revisión _____

AÑO _____

Firma del propietario/administrador _____ Fecha de revisión _____

Firma del veterinario _____ Fecha de revisión _____

AÑO _____

Firma del propietario/administrador _____ Fecha de revisión _____

Firma del veterinario _____ Fecha de revisión _____

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Firma del propietario/administrador _____ Fecha de revisión _____

Firma del veterinario _____ Fecha de revisión _____

AÑO _____

Firma del propietario/administrador _____ Fecha de revisión _____

Firma del veterinario _____ Fecha de revisión _____

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Figure 1. National Dairy FARM Program Veterinarian-Client-Patient-Relationship (VCPR) Forms. English and Spanish.

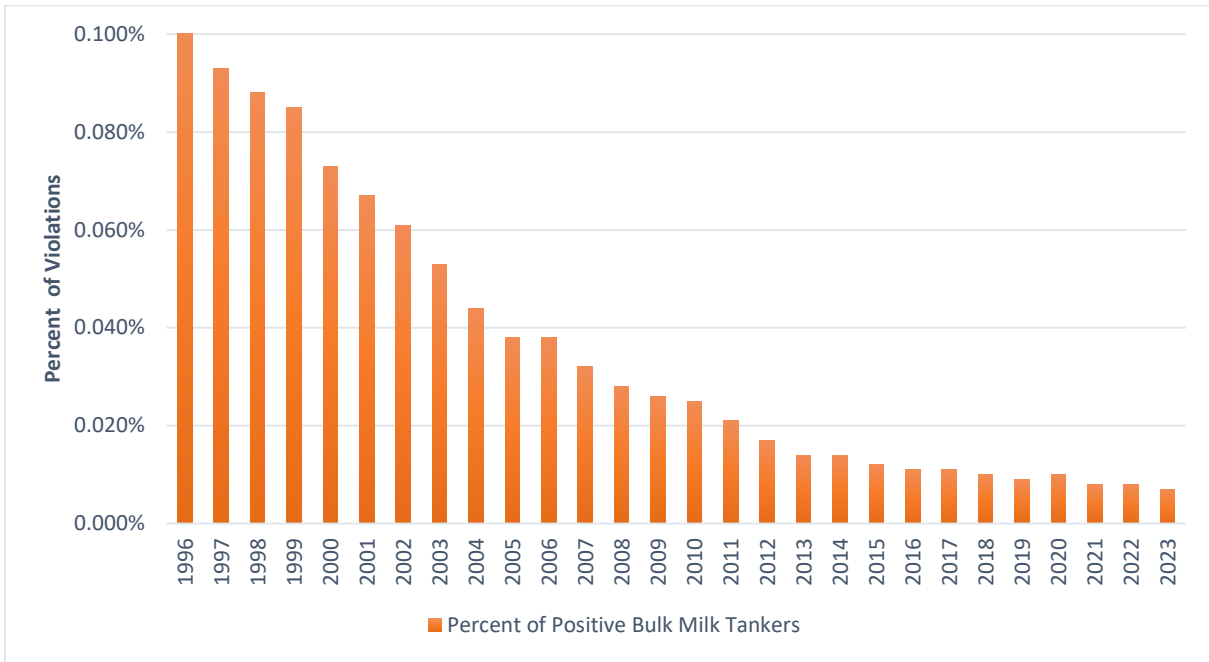


Figure 2. U.S. Milk Tanker Truck Residue Violations. 1996-2023

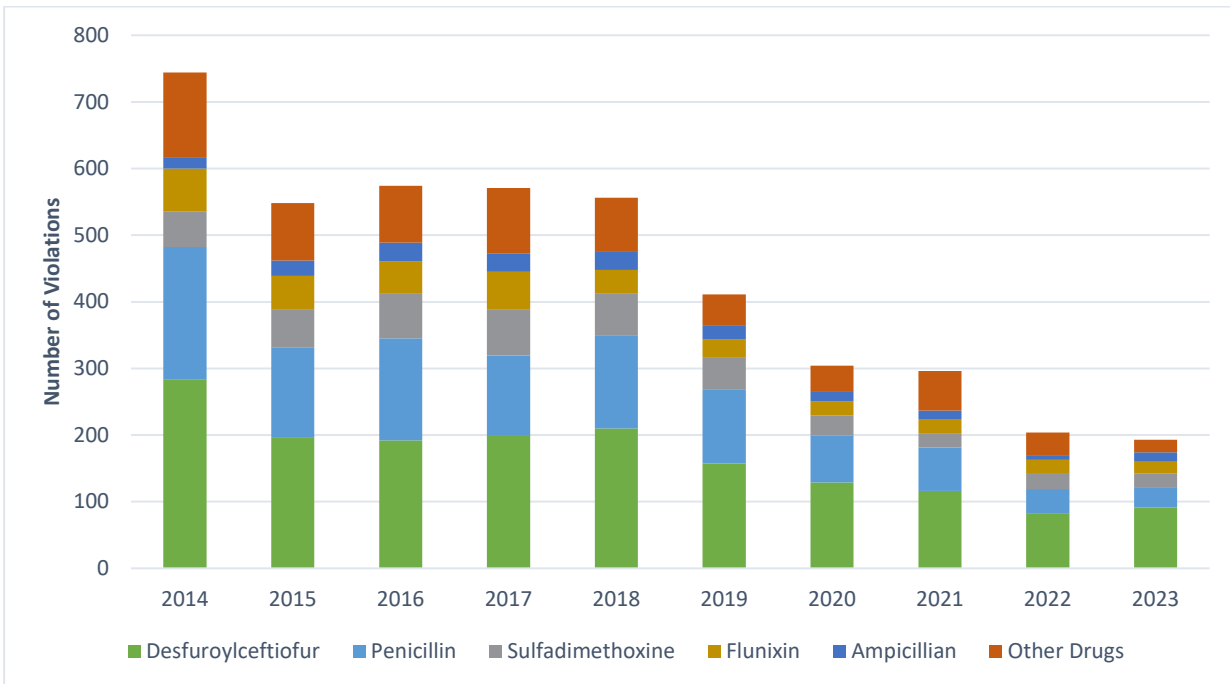


Figure 3. U.S. Dairy Cull Cow Tissue Residue Violations. 2014-2023

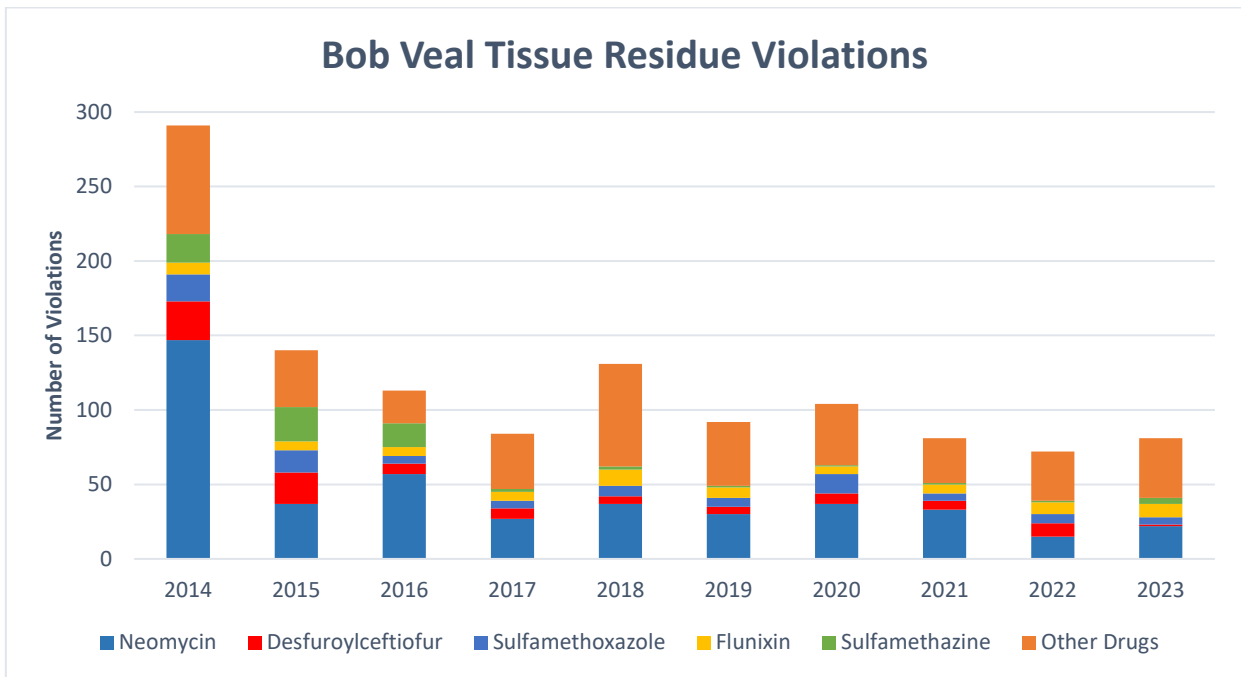


Figure 4. U.S. Bob Veal Tissue Residue Violations. 2014-2023

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DENMARK

ENOVAT PROJECT - WORKING ON EVIDENCE-BASED GUIDELINES FOR THE ANTIBIOTIC TREATMENT OF ANIMAL DISEASES - BOVINE MASTITIS

EUROPEAN GUIDELINES FOR THE TREATMENT OF MASTITIS

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GATHERING EXPERT INSIGHTS ON HOW TO USE ANTIMICROBIALS TO TREAT MASTITIS CAN HELP LIMIT AMR

The development of antimicrobial resistance is one of the greatest challenges facing public health today. To combat this threat effectively, a more judicious approach to antibiotic use in all sectors is essential. In dairy cows, mastitis remains one of the most common diseases and accounts for the majority of antibiotic use. It is therefore important to map, adapt and improve current treatment strategies in different European countries. This process should include gathering expert knowledge and relevant literature to formulate comprehensive treatment guidelines that are accessible to all stakeholders.

The aim of the initiative is to develop guidelines for the antibiotic treatment of mastitis in dairy cows using a multidisciplinary and evidence-based approach. These guidelines will be refined through interaction with other relevant stakeholders (farmers, veterinarians) to ensure their practicality and widespread implementation.

KNOWLEDGE GATHERING AND SHARING FOR MORE THAN 5 YEARS

Optimizing the antibiotic treatment of mastitis is unrealistic without the development and application of guidelines and scientific evidence. The European Network for Optimization of Veterinary Antimicrobial Treatment (ENOVAT) project was approved on June 4, 2019. Following its approval, expert group 4 was formed and the most important research questions, known as PICO (Population,

”I really like the idea of this kind of presentation and exchange of different situations with different countries. I think we need to have more information and more possibilities to work together.”

Paolo Moroni (Webinar, 29.09.2021)

Intervention, Comparison, Outcome) were discussed and defined. This phase included a thorough literature analysis, and discussions with stakeholders in various countries.

On September 29, 2021, a webinar titled “Mastitis Treatment in Lactation” was held, marking a significant step towards sharing knowledge and discussing treatment methods. The next milestone was on August 16, 2022, with the publication of the article “Different European Perspectives on the Treatment of Clinical Mastitis in Lactation”. Concurrently, work commenced on a review titled “Antibiotic Treatment vs. Non-Antibiotic Treatment in Bovine Clinical Mastitis During Lactation with Mild and Moderate Severity”.

Another important event took place on September 21, 2022, with another webinar focusing on “Different European Perspectives on the Treatment of Subclinical Mastitis in Lactation”. Finally, on March 22, 2024, the article “Different European Perspectives on the Treatment of Subclinical Mastitis in Dairy Cows”.

These two webinars brought together over

than 500 participants, in which experts presented different aspects of mastitis treatment in their countries. The scientists, practicing veterinarians and farmers throughout Europe were brought together and exchanged views on antibiotic treatment and treatment behavior. Based on the available scientific evidence and the expectations of all parties involved, guidelines can be formulated that are accepted and optimize the use of antibiotics.

THE KEY TO SUCCESSFUL CHANGE: MULTI-STAKEHOLDER COLLABORATION

Change is needed to reduce the use of antibiotics. The key to successful implementation of change is collaboration between different relevant groups of stakeholders. This cooperation must take place at various levels, e.g. at national and European level. Within the framework of this initiative, knowledge from different areas was compiled and practical guidelines were jointly developed to help both scientists and practitioners to take the next step towards targeted mastitis therapy.

The next steps in the project are the completion and publication of the systematic reviews and the creation of guidelines that can then be used for national guidelines all over Europe

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WOAH

UPDATE ON WOAHS COMPREHENSIVE INITIATIVES TO MONITORING AND MITIGATING ANTIMICROBIAL RESISTANCE IN ANIMAL HEALTH

WOAH'S SURVEILLANCE SYSTEMS AND STANDARD-SETTING INITIATIVES ARE PIVOTAL IN THE GLOBAL ACTION TO CONTAIN ANTIMICROBIAL RESISTANCE.

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WOAH IN THE FOREFRONT OF THE FIGHT AGAINST AMR

Antimicrobial resistance (AMR) represents a critical challenge across human, animal, plant, and environmental health sectors. Misuse of antimicrobials has accelerated the spread of resistant pathogens, posing severe threats to global health. The World Organisation for Animal Health (WOAH) is at the forefront of mitigating this crisis in the animal health sector through its robust standards setting system and different surveillance tools. The recent updates to WOAHS Standard on responsible use (Ch.6.10 of the Terrestrial Animal Health Code) and recommendations of WOAHS List of antimicrobials of veterinary importance, reflect a commitment to a comprehensive One Health approach. Tools like [ANIMUSE](#) for monitoring and better informing on antimicrobial use (AMU) in animals, and VSAFE for appraising the presence of low-quality or falsified veterinary products fortify the global framework for managing AMR.

THE WEAPONS IN THE ARSENAL OF WOAHS

WOAH aims to strengthen the global response to AMR by keeping up-to-date its international standards, encompassing all aspects of animal health and ensuring that tools like [ANIMUSE](#) and VSAFE support countries in monitoring and managing antimicrobial use, as well as the quality and access of veterinary products effectively.

"WOAH's global strategy on the prudent use of antimicrobials guides our Members in their action against AMR."

WOAH Director General
Dr Monique Eloit.

GUIDANCE, DATA COLLECTION AND A REPORTING SYSTEM FACILITATED BY WOAHS.

Our standards and online systems provide a framework for surveillance of use of antimicrobials while also promoting the responsible use of safe and effective antimicrobial products in animals. To address the complexities of AMR, WOAHS revised its standards (chapter 6.10), adopted unanimously by all Member countries, to include for example environmental considerations and appropriately cover veterinary considerations specific to companion animals. Furthermore, tools like [ANIMUSE](#) have proven to facilitate data collection on antimicrobial use and provide detailed analysis for the public, while the recently launched system, VSAFE supports countries in monitoring and reporting incidents of falsified and substandard veterinary products. The combination of these systems enable countries to collect, analyse, and report data, providing a

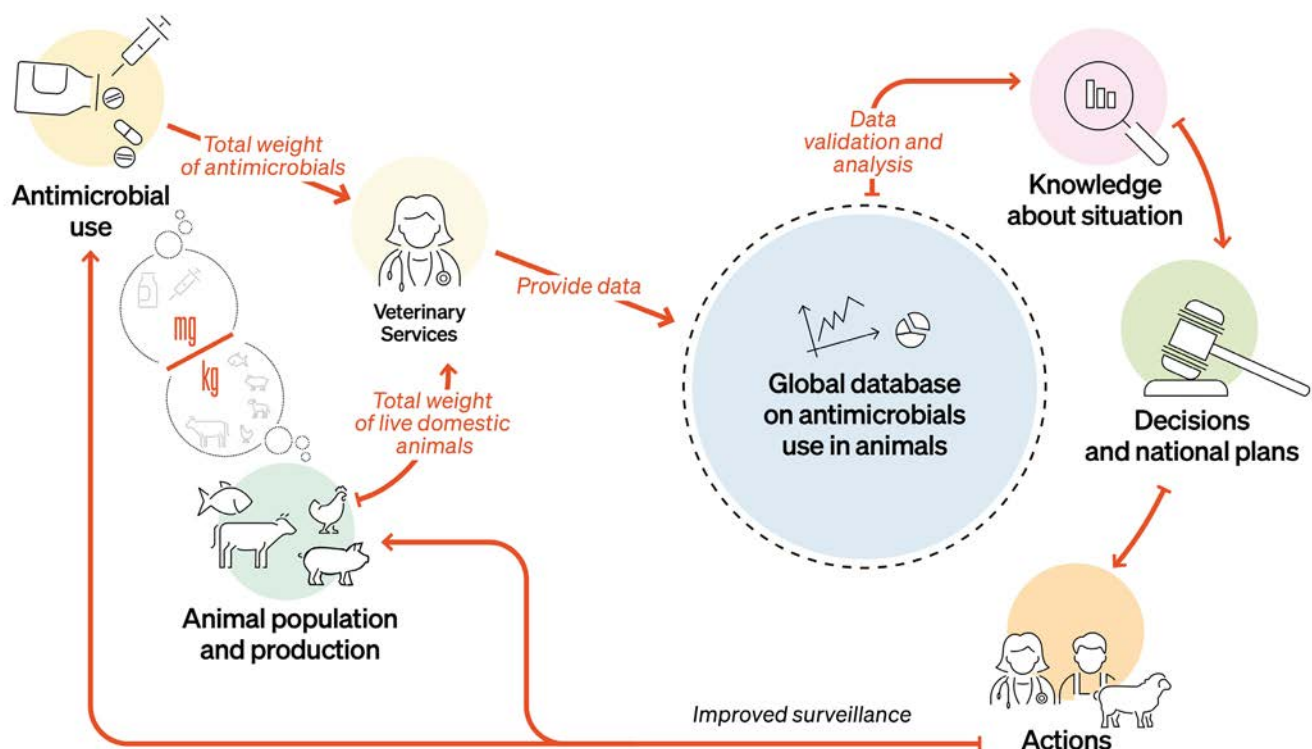
comprehensive view of the situation and fortifying global efforts to ensure effective and responsible antimicrobial use.

THE NEED TO CONTINUE THE EFFORTS TOWARDS MORE RESPONSIBLE USE

The successful and unanimous adoption of WOAHS revised standard on AMR, during its 91st General Session in May 2024, has significantly broadened the scope of AMR management. We have come a long way as the [ANIMUSE](#) Global Database has tripled the number of countries with robust antimicrobial use surveillance systems over the past decade. From which the latest AMU annual report indicated a concerning 2% increase in global antimicrobial use in animals from 2019 to 2021, highlighting the need to continue the efforts towards more responsible use. In parallel, the piloting of VSAFE with 61 Members (and increasing), has already enabled the reporting of 103 incidents involving 195 veterinary products, with antiparasitics, antimicrobials, and vaccines being the most affected. Thus, the commitment to One Health of WOAHS standards and improved surveillance systems enhances the capacity of countries to mitigate AMR effectively.

THE INFLUENCE OF WOAHS ACTIONS

The updated standards ensure that all aspects of animal health are considered, promoting responsible antimicrobial use across various contexts and recognising the responsibility of all, from the competent authority, to the veterinarians,



and the breeders, owners, and keepers of food-producing animals. [ANIMUSE](#) provides to the competent authorities' validation and analysis of their AMU data for their own use in national policies and other epidemiological analyses. VSAFE enhances the safety of veterinary products by facilitating the detection, alert and removal of substandard items from the market. These combined efforts benefit veterinary professionals and the broader public by providing factual evidence on the situation and preserving the efficacy of these critical veterinary products.

FUTURE STEPS IN THE BATTLE

Looking ahead, WOAHP plans to expand the scope and impact of

[ANIMUSE](#) and VSAFE. Future steps include understanding the drivers of the presence of low-quality veterinary products (including antimicrobials) in the field based on the information provided with both tools, as well as supporting countries for the prevention, detection and response to these products by an increased cross-sectoral and multidisciplinary coordination. WOAHP will continue supporting countries to develop ownership and control over their data collection systems, management and analysis while promoting greater transparency. WOAHP will also continue updating its standards to reflect the latest scientific advancements and global health priorities.

FURTHER READING

1. [Press release Revised standards: strengthened actions to contain AMR](#)
2. [ANIMUSE Global Database](#)
3. [Factsheet : Accelerating action against antimicrobial resistance: closing the gaps in the animal health sector](#)
4. [Factsheet: Enhanced surveillance systems to support responsible antimicrobial use in animals](#)
5. [WOAHP Annual Report on Antimicrobial Use in Animals](#)
6. [WOAHP's List of antimicrobials of veterinary importance](#)
7. [VSAFE Terms of Reference](#)
8. [Call for participation VSAFE](#)

AUSTRALIA

A MACHINE-LEARNING DRIVEN CLINICAL MASTITIS DECISION SUPPORT TOOL

THE AUSTRALIAN DAIRY INDUSTRY'S CLINICAL MASTITIS APP IS AN IOS AND ANDROID SMARTPHONE APP THAT USES MODEL-DRIVEN ARTIFICIAL INTELLIGENCE TO DELIVER PERSONALISED MANAGEMENT RECOMMENDATIONS TO FARMERS AND VETERINARIANS BASED ON INDIVIDUAL COW AND PATHOGEN DATA.

AUTHOR

Bullen S. • Dairy Australia

✉ stephanie.bullen@dairyaustralia.com.au**SUPPORTING MASTITIS MANAGEMENT FOR BETTER DAIRY FARMING**

Mastitis ranks as Australia's foremost animal health concern, incurring an annual industry cost of approximately AU\$150 million, with its control constituting around two-thirds of antibiotic courses administered to dairy cows in the country. The Clinical Mastitis App was developed by a multidisciplinary team including veterinarians, technologists, retailers, and farmers with the aim of assisting farmers and veterinarians in making informed decisions regarding the management of cows with clinical mastitis, thereby reducing antibiotic usage and enhancing animal health and welfare. It combines data on individual cow history and the causative pathogen, employs model-driven artificial intelligence, then delivers a personalised management recommendation for that animal.

USING THE CLINICAL MASTITIS APP BENEFITS FARMERS

The Clinical Mastitis App offers Australian dairy farmers a user-friendly solution to improve antimicrobial use and cow welfare outcomes in the management of clinical mastitis.

Utilising lifetime data from over 26 000 cows across 34 distinct herds and integrating point-of-care pathogen test results, the tool generates personalised treatment outcomes and recommendations for farmers based on comprehensive data analysis, including options for antibiotic treatment, anti-inflammatory treatment (without antibiotics), or culling/drying off the affected quarter.

"The Clinical Mastitis App reaffirms the importance of decision support in mastitis management."

Stephanie Bullen, Dairy Australia

The app's accessibility, being free to download and compatible with both Android and iOS devices, ensures that farmers can easily incorporate this valuable tool into their daily management practices, thereby enhancing cow health and welfare, minimising antibiotic usage, and optimising management outcomes. Initial findings reveal that 81% of participating farmers recognise the potential usefulness of a treatment decision support app on their farms and adopting the Clinical Mastitis Tool could potentially decrease antibiotic usage for clinical mastitis treatment by 20% in pasture-based herds and up to 80% in contained housing systems.

THE TOOL ADDRESSES FARMER PERSPECTIVES ON MASTITIS DECISION-MAKING

The Clinical Mastitis Tool facilitates increased engagement with dairy farmers and stakeholders by addressing critical factors related to animal health and

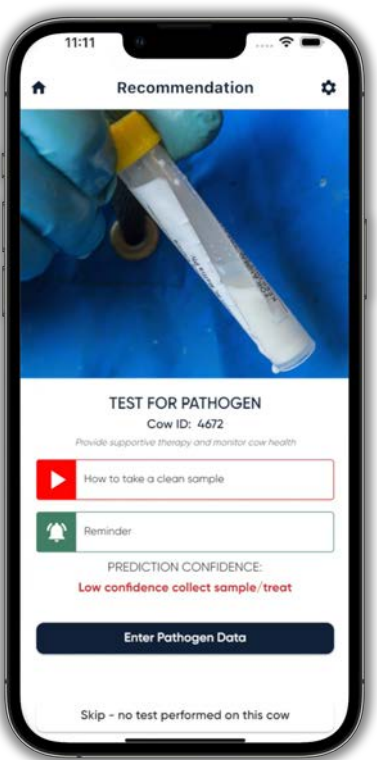
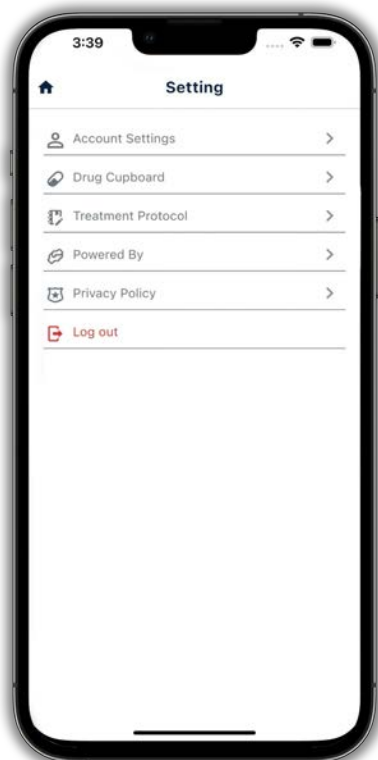
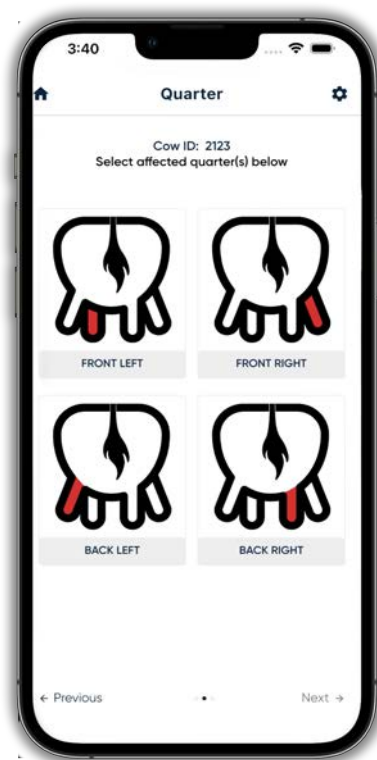
welfare. Through its user-centric design, informed by both design thinking and social science research, the tool addresses farmer perspectives on mastitis decision-making, identifies drivers and barriers for change in antibiotic use for clinical mastitis, and highlights the importance of decision support in mastitis management.

A STRATEGIC COMMUNICATION PLAN IS KEY TO ENSURING WIDESPREAD ADOPTION OF THE TOOL

Awareness campaigns, establishment of learning networks, and mobilisation of trusted advisors are a crucial factor to ensure widespread adoption of the tool, along with strategic collaboration with Australia's Countdown national mastitis control program, which comprises approximately 350 mastitis advisors located across all dairy regions of the country, including milk processor field officers and milking machine technicians.

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THE NETHERLANDS

THE DUTCH APPROACH OF ANTIMICROBIAL USE AND ANTIMICROBIAL RESISTANCE IN THE DAIRY SECTOR

REDUCING ANTIMICROBIAL USE IS A MATTER OF WANTING RATHER THAN OF BEING ABLE TO.

AUTHORLam T.¹, Voogd H.²¹Royal GD and Utrecht University²Hagri Advies, Leerdam✉ t.lam@gddeventer.com

A DECISION TO CONTROL THE AMR THREAT

Antimicrobials are crucial in both human and animal health. Since bacteria and antimicrobials are shared between species, antimicrobial resistance (AMR) is a shared challenge, leading to the One Health approach. Antimicrobial use (AMU) in livestock in the Netherlands was among the highest in Europe which, combined with low AMU and several AMR incidents in humans, made AMU in the livestock industry a political issue. It was decided that over the years, AMU in livestock had to be stepwise decreased up to 70%. This was to be realized by the livestock industry itself, and the dairy sector was part of that.

A TASKFORCE AGAINST THE THREAT

A taskforce (TF) on AMU in cattle was established in which all major stakeholders in the cattle sector in the Netherlands (farmers, milk processors, veterinarians) were represented. The TF aimed to realize the desirable reduction in AMU in (mainly dairy) cattle without having a negative impact on animal health and welfare.

SOME OF THE MEASURES TAKEN

The TF took several initiatives, such as the establishment of a national database on AMU in cattle (MediRund), and a herd health and treatment plan. MediRund provides farmers with an overview on their farm-specific AMU, including a national benchmark. The herd health and treatment plan helped to optimize health management as well as prudent AMU.

”Antibiotic reduction can be successful if all stakeholders want it and cooperate”

Theo Lam

Crucial for the success was the communication on the subject from all stakeholders and the multi-faceted approach where people were motivated in different ways. This led to reaching a tipping point where everyone, for different reasons, started to consider AMU an important topic.

ATTITUDE ADJUSTMENT FOR REDUCTION OF ANTIMICROBIAL USAGE

AMU in dairy cattle specifically decreased in udder health related applications, as well as in antimicrobials that are considered as critically important for human health. The independent Veterinary Medicines Institute (SDa) monitors national trends in AMU in all livestock sectors and confirms a decreased and nowadays stable low AMU in cattle.

In addition to the quantitative changes in AMU, the mindset towards the subject throughout the dairy value chain has changed considerably. Cattle veterinarians' attitudes to reducing AMU were generally positive, although farmers appeared to adapt to the new approach more easily than did veterinarians.

THE RESET MINDSET MODEL

Different activities combined changed the mindset towards AMU, as is described in the RESET Mindset Model. This model describes the potential of a multi-pronged communication strategy that engages people on different topics, such as the importance of AMR for health, regulations, economics, and convenience. Taken together, this led to a social pressure towards more prudent AMU and changed deeply ingrained behavioural patterns such as dry cow treatment, duration of antimicrobial treatment and waste milk handling. Overall, AMU in cattle in the Netherlands has decreased significantly and is now more prudent, based on intensive collaboration between key stakeholders in the sector.

AMR IN THE FUTURE OF DAIRY

AMU is of lasting importance and requires continued attention for both humans and animals. The challenge for the dairy sector here is twofold. On the one hand, there is a number of countries where insufficient attention is yet being paid to the subject, making AMR a serious problem, also in cattle. In countries where AMU did receive sufficient attention in recent years, however, the fact that AMR does not cause major problems in the dairy sector itself does not make it easy to keep the subject high on the agenda.

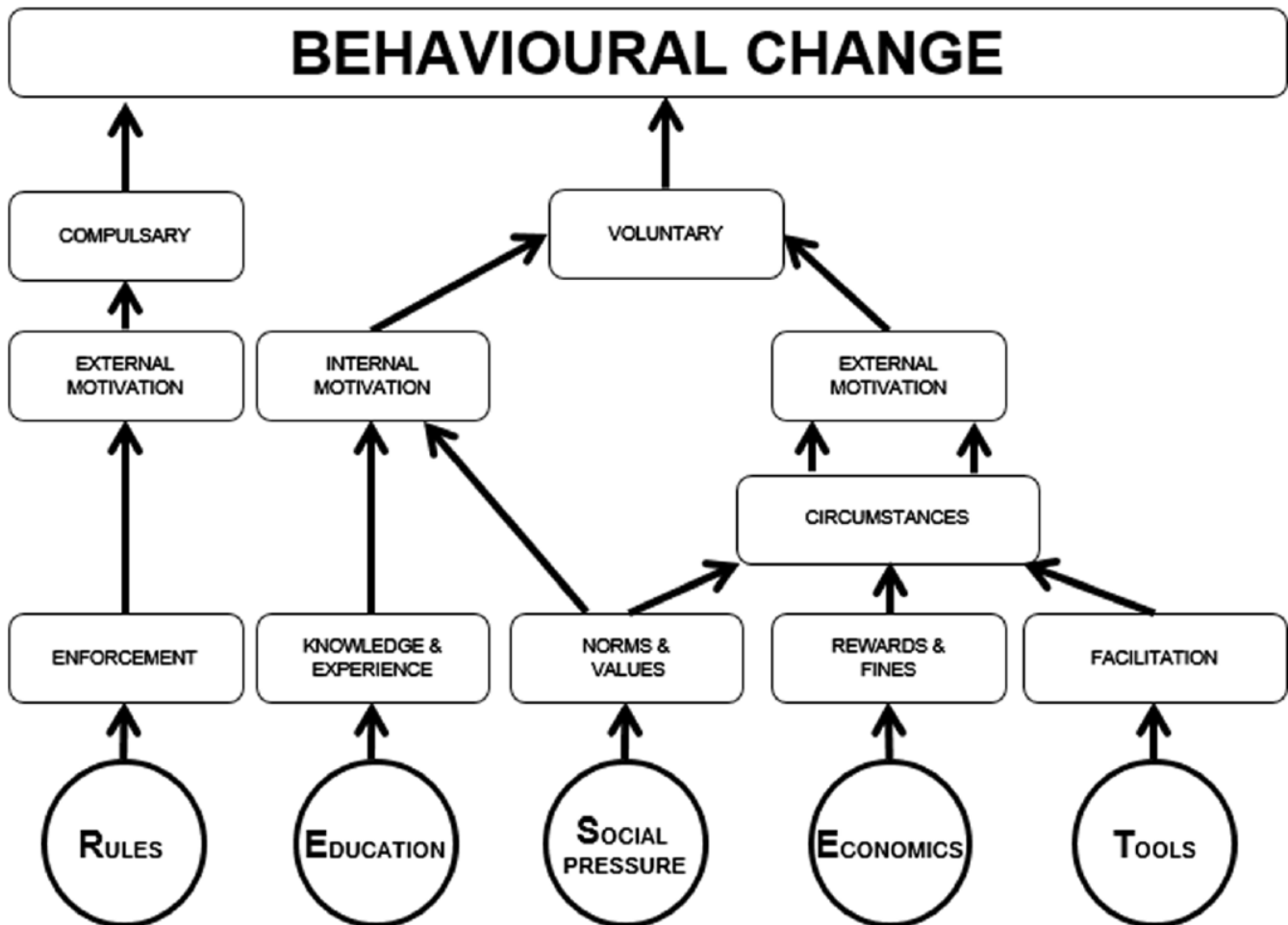


Figure 1 The RESET mindset model (Lam et al., 2017)

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THE NETHERLANDS

SELECTIVE DRY COW TREATMENT IN THE NETHERLANDS: CHALLENGES AND SUCCESSES

IN FIVE YEARS TIME, BLANKET WAS REPLACED BY SELECTIVE DRY COW TREATMENT IN THE NETHERLANDS, AND ANTIMICROBIAL USAGE HALVED, WITHOUT SIGNIFICANT CONSEQUENCES FOR UDDER HEALTH.

AUTHOR

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REDUCTION IN USAGE THROUGH THE SWIFT FROM BLANKET TO SELECTIVE DRY COW TREATMENT

Antimicrobial use (AMU) is quantitatively associated with antimicrobial resistance (AMR) in bacteria leading to infections that become difficult or impossible to treat, in both humans and animals. A changed approach and legislation in The Netherlands led to, amongst others, a ban on the preventive use of antimicrobials in livestock. In the dairy industry, the highest AMU is related to udder health, with high preventive usage in blanket dry cow treatment (BDCT). BDCT was highly advocated and applied since the 1960s. In the new situation BDCT was no longer allowed and had to be replaced by selective dry cow treatment (SDCT).

THE TARGET OF THE PROTOCOLS

The aim of this work was to develop and evaluate a practically feasible methodology for SDCT, that led to a decrease in AMU with as few negative consequences as possible for udder health. Development, implementation, and evaluation were described.

SPLIT-UDDER DESIGN AND SCENARIO-STUDY WERE USED

In a split-udder design the effect of SDCT was evaluated in 1 657 cows in 97 herds, with a somatic cell count (SCC) < 250 000 (cows) or < 150 000 (heifers) cells/mL at the last milk recording before drying off. In a scenario-study, the effect of different scenarios for selecting animals for DCT based on parity and SCC at drying off, on udder health, AMU, and economics at the herd level were evaluated. Based on the

”Selective dry cow treatment the new standard? Easy question: sure!”

Theo Lam

results of this study a guideline on SDCT was developed and implemented in the country and the results on national level were evaluated.

THE GUIDELINE WITH ITS EFFECT

The incidence rate of (sub)clinical mastitis after calving increased significantly in quarters that were left untreated. In a modelling study, the effect of using lower SCC thresholds to select cows for DCT was evaluated at the herd level. This ultimately led to a guideline that advised to treat heifers and cows with dry cow antimicrobials when cow-level SCC was > 150 000 respectively > 50 000. This approach was implemented nationwide which, during the first five years, led to a reduction of AMU for DCT of 36%, while at the same time AMU for clinical mastitis also decreased (15%). After that results stabilized.

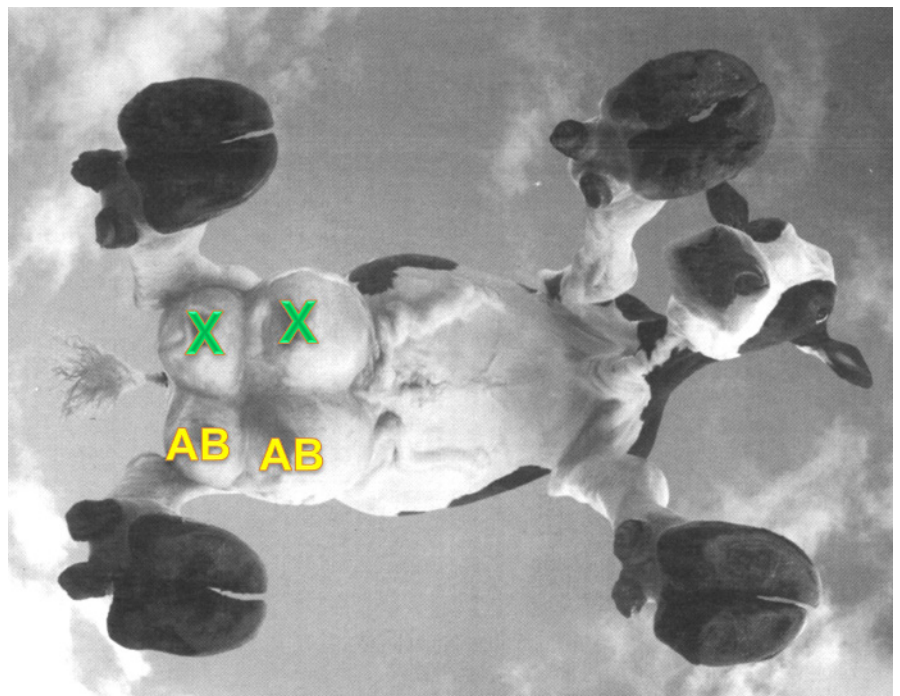


Figure 1: cow in trial (photo from internet)

A REDUCTION ON AMU WITH NO UDDER HEALTH WORSENING

The initial spilt-udder study results showed a discouraging 1.7 times increased incidence rate of clinical mastitis in quarters that were left untreated. Adapting threshold levels and evaluating the effect at herd level, however, revealed promising results, ultimately leading to a practical guideline that was applied in 99% of herds. Subsequently AMU considerably decreased, while apart from some individual herds, the udder health situation in The Netherlands did not worsen. Decreasing AMU in a responsible and practical way leads to economic savings for dairy farmers, a decreased risk of development of AMR, and a positive effect on the image of the dairy sector.

SDCT PASSED THE HURDLE OF DISDAIN TO CHANGE

People, including the dairy community, generally do not like changes, especially not when they are enforced by outsiders, such as the public or politics. Our SDCT work showed, however, that even a thoroughly evaluated, effective, and long-time accepted management measure such as BDCT, may not be the ultimate answer. Given our results and those of others, nowadays SDCT is the new standard, being profitable for everybody. This shows that, also in the dairy industry, paradigm shifts are possible, and encourages us to approach other challenges brought to us by outsiders, such as calf with cow and other issues, open minded.

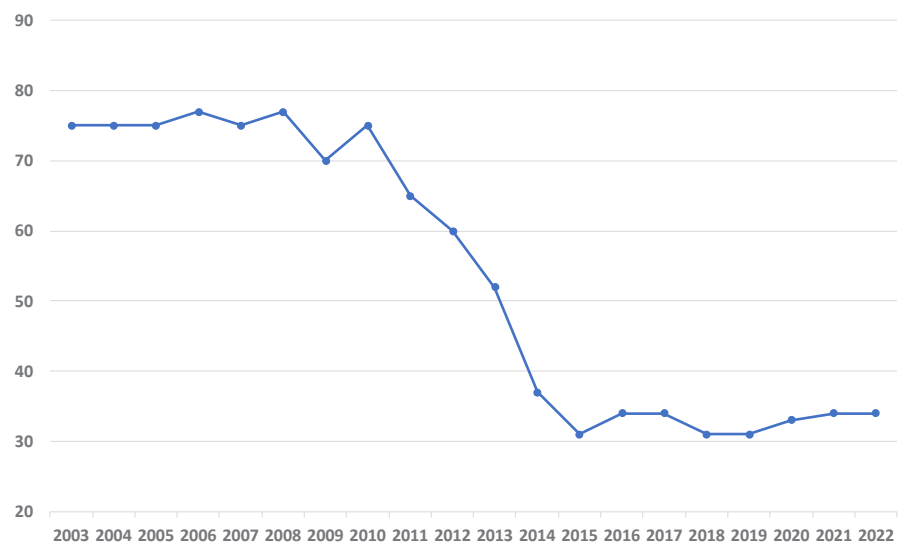


Figure 2: Percentage of cows dried off with antimicrobials in the Netherlands (based on Scherpenzeel 2017, supplemented from 2017 onward with data from the Dutch Veterinary Medicines Institute)

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ANTIMICROBIAL RESISTANCE MONITORING PROGRAMME

A programme to determine impact of antimicrobial use
in dairy cattle on AMR in susceptible organisms.





NORWAY

SURVEILLANCE OF ANTIMICROBIAL USE AND RESISTANCE IN THE NORWEGIAN MILK PRODUCTION

NORWEGIAN LIVESTOCK PRODUCTION IS IN A UNIQUE SITUATION WITH LOW ANTIMICROBIAL USE AND, FOR THE TIME BEING, LOW LEVELS OF ANTIMICROBIAL RESISTANCE.

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THE SITUATION IN NORWAY

Norway has the lowest antimicrobial use (AMU) in livestock production among the countries reporting to the European Medicines Agency (Figure 1, EMA, 2023). Mainly narrow spectrum antimicrobials are prescribed for production animals. Of the prescriptions of antibacterial products for cattle in 2022, 90% were penicillins (NORM/NORM-VET, 2022).

The Norwegian milk production consists of approximately 6 500 cow farms with an average herd size of 30 cows, and 240 goat farms with an average herd size of 138 goats (TINE, 2024). Most of the farmers are organized in co-operatives. Health is prioritized in the breeding goal of the main breed, the Norwegian Red Cattle. Farmer-owned nationwide co-operatives make implementation of national strategies possible through a close collaboration between the industry, research institutions, and authorities. The following sections provide examples of success stories initiated by the industry.

THE NORWEGIAN DAIRY HERD RECORDING SYSTEM

A complete disease recording system for dairy cattle was established in 1975. The implementation of disease recording in the Norwegian Dairy Herd Recording System (NDHRS) made national surveillance of diseases possible, and prevention campaigns could be targeted towards diseases contributing to high AMU. As an example, a campaign initiated by the industry regarding optimized AMU for mastitis contributed to a reduction of 60% between 1993 and 2015 (Animalia, 2017). The NDHRS provides the basis of farm

“The Norwegian livestock industry will work to prevent the occurrence of antimicrobial resistant bacteria in Norwegian livestock, by actively engaging in preventive veterinary medicine, organised control and eradication of infectious disease and prudent and correct treatment of diseased animals”

Norwegian Livestock industry

management tools, genetic improvement, and national surveillance dairy animal health today.

TINE LABORATORY ASSISTING IN SURVEILLANCE

A dairy-run veterinary diagnostic laboratory, the TINE mastitis laboratory, was established in 1951. The laboratory has expanded from doing bacterial diagnostics in milk samples to a broader diagnostic. Since the laboratory analyses samples from across the country, the routine AMR testing provides nationwide surveillance of the occurrence of AMR in udder pathogens. Investment in precise mastitis diagnostics makes it possible to reserve AMU for “treatment-worthy” infections as well as introducing on-farm pathogen-specific preventive measures.

Strict regulations apply for prescriptions of medicines to food producing animals. Only veterinarians can prescribe antimicrobial treatments, and the reporting of veterinary treatments has been mandatory since 2012 (Norwegian Ministry of Agriculture, 2010). When the mandatory reporting of veterinary medical use was introduced, the industry joined forces to maintain the up-to-date information about health events by establishing the reporting platform the Animal Health Portal (Figure 2).

THE CREATION OF RECOMMENDATIONS FOR ANTIMICROBIAL TREATMENT

The health recordings in NDHRS are used to monitor disease occurrence on herd and national level. However, a weakness is that this data does not include the type of medications used. Table 1 shows the recorded prevalence of the most common causes of antimicrobial use in Norwegian dairy cattle in 2023, based on figures from the NDHRS.

Mastitis is the most common cause of AMU in dairy cows, followed by respiratory disease, diarrhea and joint infections in calves. A certain proportion of reported infectious health events in the NDHRS does not include antimicrobial treatment. In the research project Moove (Norwegian University of Life Sciences, n.d.a), VetReg data are utilized to investigate the prescription patterns for all health events in Norwegian dairy cattle. Further, the validity and data quality of the different databases will be investigated. In the future, data from the Animal Health Portal may be used for benchmarking AMU in farms and veterinary practices.

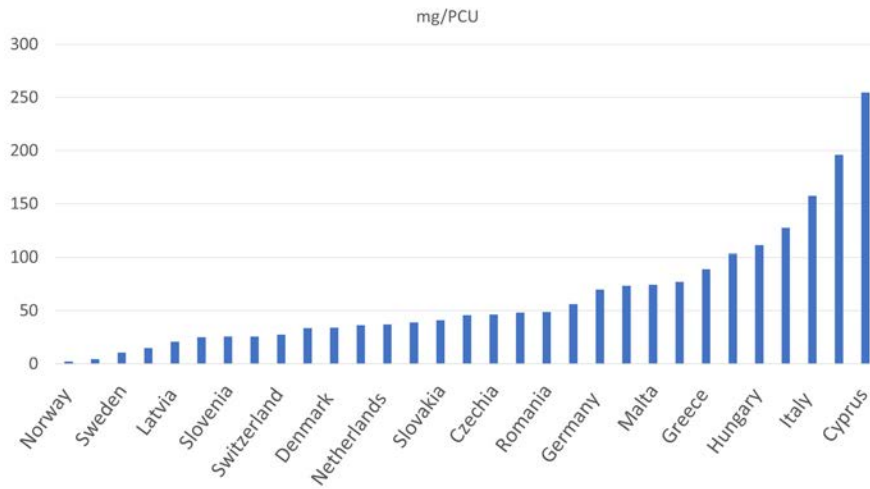


Figure 1 • Consumption of veterinary antibiotics is milligram of active substance normalised by the population correction unit (mg/PCU). European medicines agency, 2022

AMR IN THE MILK-PRODUCING SECTOR

Antimicrobial resistance monitoring of indicator bacteria and clinical isolates from cattle have been done regularly by the Norwegian Veterinary Institute in the NORM-VET program since 2000 (NORM/NORM-VET, 2022). Additionally, all *Staphylococcus aureus* and clinical isolates of Enterobacteriaceae sp from milk samples submitted to the TINE mastitis laboratory are routinely tested for AMR (Smistad et al., 2023). The low level of resistance in *S. aureus* from clinical mastitis was confirmed in AMR surveillance in the NORM-VET the same year, with 87% of *S. aureus* from mastitis being susceptible to all antimicrobial agents included in the test panel (NORM/NORM-VET, 2022).

The low levels of AMR in isolates from the milk producing animals in Norway may change rapidly. The biggest threat for the animals is probably the introduction of resistant bacterial isolates from humans. The number of animal movements between farms in Norway is extensive, making the potential for spread high. Increased attention to external biosecurity is a priority.

THE CAUSE OF THE NORWEGIAN SUCCESS

The beneficial situation in the Norwegian livestock industry has been realized through high focus and awareness on optimized AMU in several decades, with a proactive industry working together with the authorities and research institutions. Reliable and accurate recordings and documentation of health events and medical use, precise diagnostics and a strict regulation have been important. The structure of the Norwegian agriculture, and breeding goals balancing health with production also deserve part of the honor.

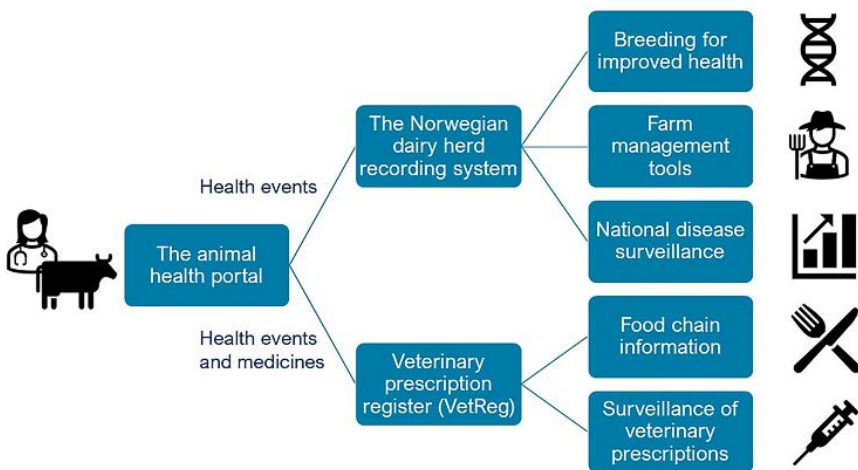


Figure 2 • The reporting platform the Animal Health Portal, operated by the meat organization Animalia, communicates with both the animal recording systems and the veterinary prescription register of the food safety authorities (VetReg).

Comprehensive national recommendations regarding antimicrobial treatments for food producing animals are available in Norway (Norwegian Medical Products Agency, 2022). Preliminary results from research projects utilizing data from the Animal Health Portal show that the compliance with the treatment recommendations vary with geographical regions in mastitis treatments (Norwegian University of Life Sciences, n.d.b). The NAMASTE project (Norwegian University of Life Sciences, n.d.b) will investigate further the possible explanations for

different attitudes towards diagnostics and treatment of mastitis in Norway. The research project “Norwegian airways” (Norwegian Veterinary Institute, n.d.) investigates medical use in respiratory disease in cattle, and preliminary results show that pneumonia in calves, an increasing problem in the Norwegian milk production is an important cause of use of broad-spectrum antimicrobials in dairy cattle. Prevention, better diagnostics, and optimized treatment of pneumonia are prioritized areas for the industry (Norwegian Veterinary Institute, n.d.).

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1797

1797

COMMUNICATIONS

Educational programmes designed to communicate antimicrobial use and antimicrobial resistance to dairy farmers, veterinarians, customers, or consumers.





CHILE

CHILEAN DAIRY SECTOR ADVANCES IN PRUDENT ANTIMICROBIAL USE

THE DAIRY CONSORTIUM ANTIMICROBIAL STEWARDSHIP COMMITTEE SPEARHEADS EFFORTS IN MONITORING AND COMMUNICATION

AUTHOR

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On behalf of the Chilean Dairy Consortium's Antimicrobial Stewardship Committee

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THE NEED FOR THE PRUDENT USE OF ANTIMICROBIALS

Dairy products are essential to human nutrition, but the dairy sector is often under public scrutiny. On-farm dairy production focuses on rearing healthy calves, ensuring they reach reproductive weight early, reducing infectious diseases and promoting cow productivity and longevity. This often involves the use of antimicrobials to maintain health. Over the past decade, however, their use in animal agriculture has been increasingly linked to the rise of antimicrobial resistance in human bacterial infections, posing significant health challenges. Addressing these concerns requires prudent use of antimicrobials in dairy systems, which requires a comprehensive programme involving collaboration between farmers, veterinarians and policy makers.

A MULTI-STAKEHOLDER TECHNICAL COMMITTEE FOR BETTER ANTIMICROBIAL USE

The establishment of a multi-stakeholder technical committee for antimicrobial stewardship in the dairy sector aims to implement stewardship programmes, establish good practices for antimicrobial use on farms and contribute to the monitoring of antimicrobial use and resistance trends on Chilean dairy farms.

Created on 22 November 2022 under the leadership of the Chilean Dairy Consortium, which coordinates the country's dairy chain, the committee is a collaborative effort. It includes government regulators,

"Antimicrobial resistance stewardship is an endeavour of many"

Marcos Muñoz D.

leading academic specialists in dairy science from Chile's major universities, government agricultural researchers, the dairy processing industry and the Chilean Association of Buiatrics. Initial activities have included seminars on antimicrobial use and therapeutics, and training on a new mandatory electronic prescription system. Ongoing annual seminars will target the three main dairy regions of Chile, ensuring continuous education and improvement of antimicrobial practices across the sector.

A PLETHORA OF COMMUNICATION ACTIVITIES ON ANTIMICROBIAL STEWARDSHIP ISSUES

As a multi-party committee, we addressed key challenges in antimicrobial use and stewardship in the dairy sector.

- We organised a seminar on antimicrobial resistance, which received a final score of 6.9 out of 7.0.
- We conducted a survey of veterinarians on antimicrobials with a focus on dairy, receiving 110 responses. Of the respondents, 16% specialised in mammary health, 18% in reproductive

health and 18% in general medicine. The use of antibiotics was reported for the treatment of mastitis (23%), pneumonia (26%) and diarrhoea (20%).

- Two columns were published by members of the committee.

BETTER FOR DAIRY FARMERS, VETERINARIANS AND THE WHOLE SECTOR

Our project aims to improve the use of antimicrobials in the Chilean dairy sector, a priority for the Antimicrobial Committee. The value of this project lies in promoting responsible use of antibiotics, reducing resistance and improving animal health. The main beneficiaries are dairy farms, which will gain sustainable practices; veterinarians involved in dairy practice, who will receive better guidelines; veterinary students, who will receive valuable training; and the entire dairy sector, which will benefit from both improved productivity and public health. This initiative fosters collaboration between all stakeholders, creating a more resilient, healthy and efficient dairy industry in Chile.

The Committee will strengthen its participation in the prudent use of antibiotics by:

- The publication of the first manual on antimicrobial use for the Chilean dairy sector to update microbiological, pharmacological and epidemiological concepts for professionals, technicians, farmers, industry representatives, academics, students



Picture 1 • 1° Seminar 2023

and policy makers.

- Outreach to farmers through regional seminars to present the manual with technical and awareness lectures.
- The opportunity to evaluate and monitor both the use of antimicrobials and antimicrobial resistance in the Chilean primary dairy sector, in order to contribute with updated scientific information to the development of policies and regulations.

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Columns for veterinarians:

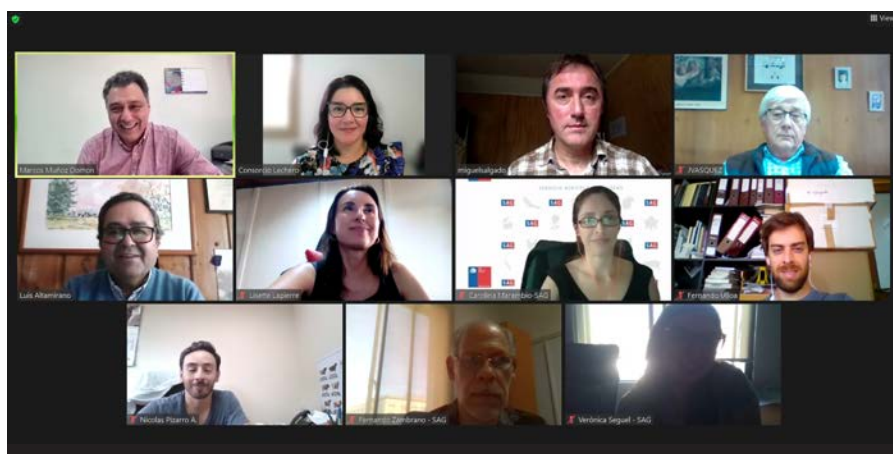
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Picture 2 • Committe members



Picture 3 • First meeting 14 dic 2022

OTHER

Other topics which reduce the use of antimicrobials and/or mitigate the risk of antimicrobial resistance.





INDIA

REDUCING ANTIBIOTIC USAGE THROUGH ETHNO-VETERINARY MEDICINE (EVM) IN A MILK UNION

PROPAGATION OF ETHNOVETERINARY MEDICINE IN ANIMAL DISEASE MANAGEMENT ENSURES REDUCTION IN USE OF ANTIBIOTICS

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THE NATIONAL DAIRY DEVELOPMENT BOARD PROMOTES THE USE OF ETHNOVETERINARY MEDICINE

Antimicrobial agents play a very significant role in animal health management. At the same time, prudent use of these available antimicrobials is also of utmost importance to ensure food safety and public health. The mismanagement of antibiotics in animal disease management could lead to emergence of antimicrobial resistance (AMR) which is now being construed as a silent global pandemic. The National Dairy Development Board (NDDB), India is promoting a cost-effective and efficacious alternative approach through use of ethnoveterinary medicine (EVM) for managing around 30 common ailments in bovines, in collaboration with various milk producing institutions and universities. Empirical data of about a million cases, which includes over 100 000 individual cases have been recorded with overall recovery rate of above 80%. These EVM formulations are easy to prepare and help the farmers manage many common ailments in their animals at their homesteads, thereby helping to reduce drug usage, and stalling the emergence of AMR. The Sabarkantha District Cooperative Milk Producers' Union (Sabarkantha Milk Union), has been propagating EVM in its milk shed area since 2017-18.

EVM: A WEAPON AGAINST AMR LOCATED AT THE HOMESTEADS

The small and marginal farmers are the quintessential milk producers of our country and own around 80% of the bovines. With limited resources

”Ethnoveterinary medicine has the potential to be a game changer in reducing AMU and AMR.”

A V Harikumar

and liquidity at their disposal, the conventional treatment options available are usually beyond their means. Moreover, indiscriminate and irrational use of drugs, especially antibiotics, is leading to the emergence of AMR, both in animals and humans. By using EVM, the farmer is equipped with a basket of formulations for managing many common ailments in bovines. Since EVM is very cost-effective and can be formulated with ingredients usually available at the farmers' homesteads, the likelihood of adoption are far more than if left with only the option of costly conventional treatment. This approach therefore helps to reduce the use of drugs and antibiotics, thereby addressing the issue of AMR.

The propagation of EVM aims at providing the dairy farmer with a cost-effective and efficacious alternate option to manage common ailments in bovines that result in productivity losses. EVM also provides the farmer with an immediate option to limit their losses. It is also easy to prepare, non-invasive and has no milk withdrawal periods. Educating livestock owners about the use of EVM for management of common bovine ailments also helps to drastically reduce the treatment costs.

SEEDING KNOWLEDGE THROUGH THE NDDB'S MASTITIS CONTROL FIELD PROJECT

As part of the NDDB's Mastitis Control Field Project, the Sabarkantha Milk Union implemented the use of EVM in 50 villages initially. Various awareness materials, like posters, brochures, videos and a smartphone application, in the local language, developed for livestock owners. A core team of veterinarians was trained on EVM at Transdisciplinary University, Bengaluru, who later trained animal health workers for field execution. A demonstration plot with medicinal plants was established to facilitate easy. Later, an EVM production plant was set up with technical and financial support of NDDB for providing ready-to-use formulations to all village-level dairy cooperative societies in the milk union, at minimal cost.

THE USE OF EVM HAS LED TO A SIGNIFICANT REDUCTION IN ANTIMICROBIAL AND VETERINARY COSTS FOR THE FARMER

Sabarkantha Milk Union has strong system of data recording for veterinary services. In 2017-18, before implementing the EVM concept, the Milk Union purchased antibiotics worth Rs. 19 million, which has now reduced to Rs. 9 million in 2023-24, a commendable 44% reduction due to extensive propagation and use of EVM. Similarly, the cost of antibiotic used per visit by the union veterinarian also reduced by around 52% during the same period. (Figure -1: Reduction in antibiotic purchase and cost per visit). Furthermore, the number of veterinary visits for treating mastitis, fever and diarrhoea, has been



© Animal Health Group, NDDB

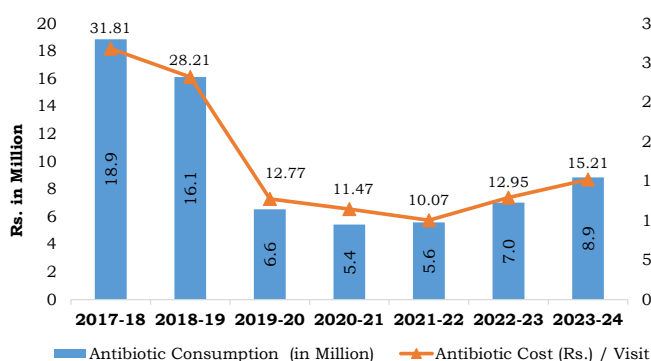


Figure 1 • Reduction in antibiotic purchase and cost per visit

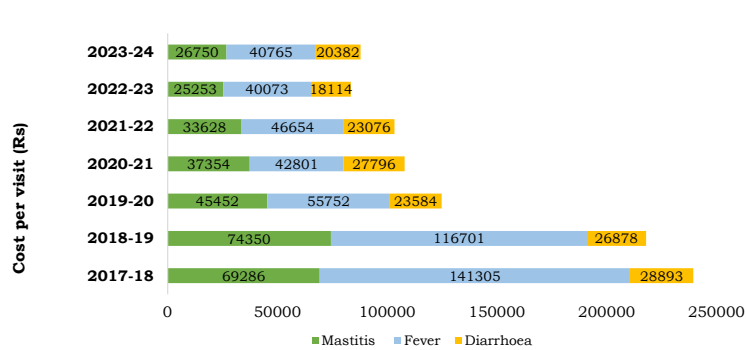


Figure 2 • Reduction in cases recorded

reduced by around 61%, 71% and 30% respectively in 2023-24 in comparison to 2017-18. (Figure 2: Reduction in cases recorded)

AN EASILY TRANSFERABLE SKILL FOR THE BENEFIT OF DAIRY FARMERS

EVM is easily scalable since it mainly involves only transfer of knowledge to the farmer. It also helps preserve the Critically Important Antibiotics (CIAs) for use in humans. The main beneficiaries were the dairy farmers.

FURTHER RESEARCH INTO EVM CONTINUES

In addition to field validation, scientific studies of EVM formulations are being undertaken with reputed institutes such as the Indian Institute of Science, Bangalore. Educational materials on the preparation

and use of EVM for various ailments are available in 12 major Indian vernacular languages, including English. Efforts are also being made to include the basics of EVM in the veterinary curriculum so that graduates are exposed to Indian systems of medicine. The creation of a robust and reliable database through the online reporting system, coupled with scientific validation, will provide a plausible rationale for wider adoption.

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