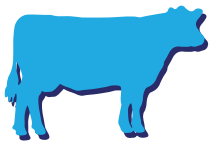
Reducing Antimicrobial Use in Adult Cattle

Why do we need to reduce use?

Antimicrobial resistance (AMR) is an issue that affects us all: AMR is a growing concern for both animal and human health. Resistance occurs when bacteria adapt to the drugs designed to kill them, making infections harder to treat.

As users of antimicrobials, we have a role to play in the problem AND the solution: Antimicrobial use (AMU) plays a significant role in the development of AMR.



Diseases facing adult cattle are an important area to focus on. The majority of antimicrobials in the dairy industry are used to treat udder health issues, mainly mastitis. Reducing AMU in adult cattle is essential to slow the development of resistance and protect the effectiveness of antimicrobials for decades to come.

The current picture of use and resistance in adult cattle

The highest amount of AMU on Canadian dairy farms is related to intramammary treatments. It is important to focus on mastitis management and refinement of dry cow therapy to reduce use.

Positive trends identified in AMU: We have already seen reductions in AMU on dairy farms in Canada, largely in intramammary use. This shows it can be done and our focus must continue on how we can reduce use without compromising health and welfare.

Scan to watch a short video about the study!

What Can Farms Do?

Tackling AMU on dairy farms starts with improving udder health and using antimicrobials more selectively. Veterinarians can work with farms to develop protocols, minimize risks, and help to improve a farm's antimicrobial stewardship practices.

Mastitis Prevention

Use consistent milking practices

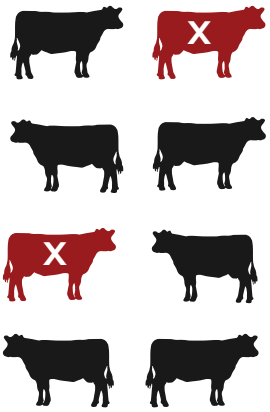
Implement pre- and post-milking teat disinfection. Ensure that teats are clean, dry, and well stimulated before attaching milking units to reduce the transfer of pathogens.

Maintain a clean and dry environment

Provide clean, dry bedding and make sure the udder and teats are clean and free from manure.

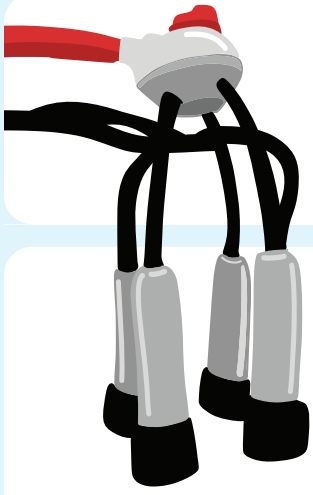
Cull chronically infected cows

Chronically infected cows with persistent infections that don't respond to treatment (especially with contagious pathogens like *Staphylococcus aureus*) can serve as a continuous source of infection for the rest of the herd.



Monitor high-risk cows

During the transition period, cows are vulnerable to mastitis due to immune suppression. Providing clean, dry areas for these cows (especially in calving pens and housing areas for transition cows) will reduce exposure to environmental pathogens. Regularly monitor these cows for early signs of infection to intervene if needed.



Regularly inspect and maintain milking equipment

Ensure that milking equipment is functioning properly, with the correct vacuum levels, and that equipment is regularly maintained to prevent teat damage and entry of bacteria into the udder.

Funding partners

Sustainable Canadian Agricultural Partnership

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Selective Dry Cow Therapy (SDCT)

When disease occurs and antimicrobials are needed, it's important to refine AMU while maintaining animal health and welfare. SDCT can cut AMU without harming udder health or milk production, as long as internal teat sealants are used. Without internal teat sealants, risk of infection during the dry period and at calving increases.

Which farms should use selective dry cow therapy?

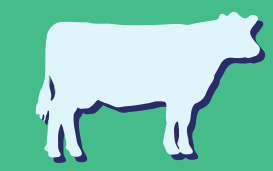
SDCT may not be for all farms, as several herd characteristics may affect success of selective dry cow therapy[1]. Your veterinarian can help you decide if this is a good fit for your farm. Farms that have the best success implementing SDCT include those with:

- ✓ Low incidence of clinical mastitis and bulk tank somatic cell count (e.g., < 250,000 cells/ml).
- ✓ Low prevalence of contagious mastitis (absence of *Streptococcus agalactiae* and controlled Staphylococcus aureus infections).
- ✓ Hygienic dry-off practices (e.g., minimizing bacterial introduction into the teat canal and ensuring clean, dry bedding post-dry-off).
- ✓ Good record keeping, veterinary support, and monitoring for unintended consequences.

How can selective dry cow therapy be implemented?

One option is to use **algorithm-guided selective dry cow therapy (SDCT)[2]**, where somatic cell counts and other factors help identify cows at higher risk of udder infections and guide treatment decisions. If somatic cell count data isn't available, **culture-based SDCT** can be used by testing milk from each quarter. A positive result means the quarter needs antibiotics and a teat sealant, while a negative result only requires the sealant. Both approaches are effective in reducing antibiotic use during dry-off.

An example algorithm-guided SDCT program



Somatic cell count <200,000 cells/ml for all tests during current lactation?

YES

Clinical mastitis in the last 14 days of lactation?

NO

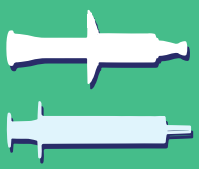
SDCT

Use internal teat sealant in all quarters.

Proper intramammary infusion technique is critical. Cleanliness is key to preventing introduction of pathogens.

YES

NO



Blanket dry cow therapy

Treat all four quarters with antibiotics and internal teat sealant.

Proper intramammary infusion technique is critical. Cleanliness is key to preventing introduction of pathogens.

Selective Mastitis Therapy

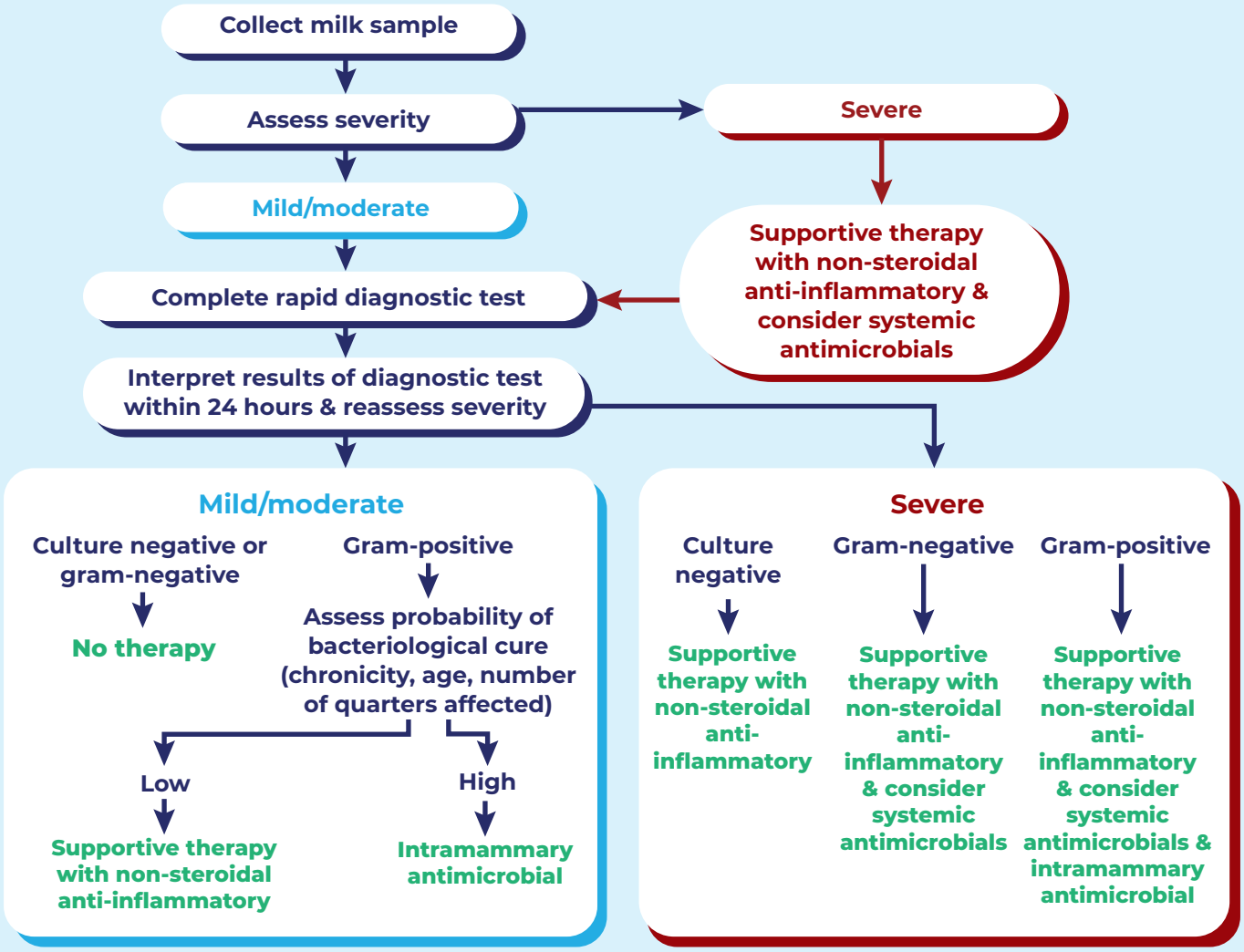
Not all cases of clinical mastitis need antimicrobials. Selective treatment, guided by culture results, can be effective for non-severe cases. Selective therapy has shown no negative impacts compared to blanket treatment on outcomes including:

✓ Cure rates ✓ Somatic cell count ✓ Milk yield ✓ Mastitis recurrence or culling due to mastitis

How do I implement selective mastitis therapy on my farm?

To use selective therapy, it is essential to perform rapid diagnostic tests within 24 hours of identifying mastitis. Testing can be done on-farm, at a veterinary clinic, or via a diagnostic lab. A veterinarian can help to create a plan for your farm.

An example flow chart, shown below, guides treatment based on mastitis severity: "**mild**" (changes only in milk), "**moderate**" (changes in milk and inflammation in the quarter), and "**severe**" (systemic illness plus the other signs).



Proposed approach to selective therapy of clinical mastitis in dairy cows. Adapted from de Jong et al. (2023a).

References: 1. McCubbin, K. D., et al. "Invited review: Selective use of antimicrobials in dairy cattle at drying-off." Journal of Dairy Science 105.9 (2022): 7161-7189. **2.** Rowe, S. M., et al. "Randomized controlled non-inferiority trial investigating the effect of 2 selective dry-cow therapy protocols on antibiotic use at dry-off and dry period intramammary infection dynamics." Journal of Dairy Science 103.7 (2020): 6473-6492.