

Antimicrobials: Use, Resistance and Stewardship

It has been a little while since we focused on antimicrobials in the newsletter! Back in 2020, we touched on highlighting ceftiofur (Excenel) and selective dry cow therapy. In the meantime, awareness around antimicrobial resistance (AMR) has spread as it has come to the forefront as one of the largest problems facing the health of humans, animals and the environment.

A refresher: what is antimicrobial resistance?

Antimicrobials (including **antibiotics**, antivirals, antifungals, and antiparasitics) are medicines used to prevent and treat infections in humans, animals and plants. **Antimicrobial resistance (AMR)** occurs when bacteria, viruses, fungi and parasites change over time and no longer respond to medicines, making infections harder to treat. This increases the risk of disease spread, severe illness, and death. AMR occurs naturally, but its development and spread have been accelerated by overuse and misuse of antimicrobials in both humans and animals. The main concern with AMR is the loss of effective antimicrobials, which would drastically reduce our ability to protect humans and animals from infectious diseases. It is estimated, that if no action is taken, AMR could be the cause of 10 million human deaths each year by 2050.

Categorization of antimicrobial drugs indicated for use in cattle (by trade name) based on the Health Canada categorization of importance in human medicine

Importance in human medicine			
Category I	Category II	Category III	
(Very high importance in human medicine)	(High importance in human medicine)	(Medium importance in human medicine)	
<ul style="list-style-type: none">- Excenel- Excede 200- Spectramast (LC and DC)- Eficur- Cevaxel - A180- Baytril- Baytril oral- Forcyl	<ul style="list-style-type: none">- Depocillin- Dry Clox- Novodry- Polyflex- Procaine- Procillin- Duplocillin - Borgal- Trimidox- Norovet TMPS- Super Booster - Draxxin- Micotil	<ul style="list-style-type: none">- Tylan- Zactran- Zuprevo - Cocci Scour Bolus- Calf scour bolus- Neo sulfalyte - Metricure- Cefa-Lak- Cefa-Dri	<ul style="list-style-type: none">- Cyclospray- Tetra-250- Onycin- Oxymycin LA- Oxymycin LP- Oxyvet 100- Oxyvet 200- Bio-mycin- Kelamycin- Liquamycin - Nuflor- Resflor- Florkem - After calf bolus- Calfspan- Sustain bolus

Categorization explained

Because many of the same classes of antimicrobials are used to treat and prevent infections in human medicine and animals, Health Canada has categorized them based on two criteria:

1. The antimicrobial must be identified as essential for the treatment of serious bacterial infections in humans and
2. It must have no other available treatment alternatives if resistance to these antimicrobials develop

Medically important antimicrobials are considered Categories I, II, and III. A lot of attention has been given to Category I antimicrobials (very high importance), as they fulfill both criteria set out by Health Canada.

Situation in Québec and beyond

As the highest user of antimicrobials by weight across Canada, the agricultural sector has come under increasing scrutiny by consumers. In response to this, several industry and regulatory groups have been paying close attention and instituting regulations.

From a dairy perspective, in 2019 the Québec dairy industry adopted a new regulation to restrict usage of Category I antimicrobials in production animals. The regulation prohibits the use of these antimicrobials for preventive purposes in food-producing animals and restricts their use for treatment purposes unless it has been justified that no other effective alternative drugs of lower importance are available for treatment (e.g. with bacterial culturing and susceptibility testing). This means that Category I antimicrobials (like Excenel or A-180) can only be used to treat a sick food animal if it is **PROVEN** to be the only effective product (with testing). Use of Category I antimicrobials is not allowed for preventative purposes.

Since this regulation was implemented, research has shown that in as little as two years, there was a **significant decrease** in multi-drug resistance in certain classes of antimicrobials across the Québec dairy industry. These results indicate that regulations like this can be expected in other provinces (including Ontario) in the future.

What is the role of antimicrobial stewardship?

Antimicrobial stewardship promotes the judicious use of antimicrobials to limit the development of antimicrobial resistant organisms. Judicious use means using antimicrobial drugs appropriately and only when necessary, which will maximize their efficacy and minimize the selection of resistant organisms. As the “gatekeepers” of antimicrobial use in livestock, veterinarians and producers are responsible for balancing production, animal welfare, economics and prudent use of antimicrobials. This can be a very challenging job, with many difficult decisions to make along the way.

As the old adage goes, “an ounce of prevention is worth a pound of cure.” In this case, it could not be more true, as adequate vaccination programs, management in the form of good biosecurity, dry cow therapy, hygiene, colostrum management, and ventilation can prevent many cases of infectious disease.

Take-Home Message:

Antimicrobial resistance is a serious issue that is gaining traction with consumers, industry, and regulatory groups. It is important to think about how antimicrobials are being used in your herd, and to seek guidance if you have doubts about the appropriateness of using certain antimicrobials (especially Category I) in a given protocol or case. The veterinarians at Heartland are committed to providing evidence based and helpful advice to our clients about antimicrobial use in their animals, and promoting good stewardship to preserve the effectiveness of antimicrobials for future generations.

*** All studies mentioned in this newsletter are available upon request***

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Fly Control

Have you heard the buzz? Large animal technicians are now offering fly prevention in combination with dehorning services. Ask your large animal tech for more information!



Upcoming stat holidays

The clinic will be closed Civic weekend, July 30-August 1. As always, veterinarians will be available 24-7 for emergency service. The Saturday fee schedule will remain unchanged from non-stat weekends.

