ANTIMICROBIAL AND ANTIBIOTIC BACKGROUNDER FOR FEEDLOT CATTLE

Antimicrobials are drugs that include antibiotics, antifungals, and parasiticides that are used to prevent and treat infections in animals.

Antibiotics are subsets of antimicrobial drugs used to prevent and treat bacterial infections.

Antimicrobial resistance (AMR) happens when microbes, such as bacteria, have evolved so that antimicrobials are not able to control or kill them.
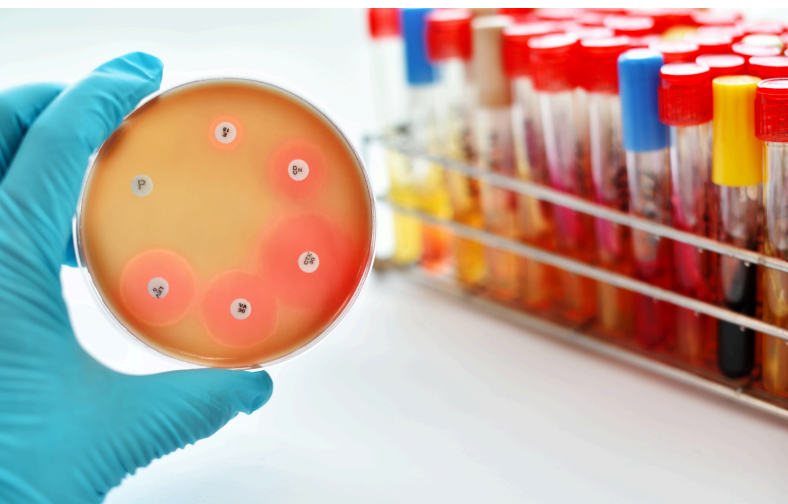
Antimicrobial Sensitivity testing determines which specific antimicrobial a particular microbe, such as bacteria, is sensitive to. This information helps your veterinarian find the most effective and appropriate antimicrobial to prevent, treat, and control infectious disease.

Class of Antimicrobials - the most used antimicrobials in Canadian feedlot cattle are:

- Tetracyclines
- Macrolides
- Amphenicols
- Beta lactams
- Sulphonamides
- Fluoroquinolones
- Streptogramins

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**Pathogenic bacteria** are bacteria that can cause disease in an animal under the right conditions.

BRD Bacterial Pathogens include *Mannheimia haemolytica, Pasteurella multocida, Histophilus somni,* and *Mycoplasma bovis/dispar.* Theses bacterial pathogens can cause bovine respiratory disease (BRD).

ANTIMICROBIALS ARE IMPORTANT FOR BOTH HUMANS AND ANIMALS. PRUDENT USE IS EVERYONES RESPONSIBILITY!

HOW DOES ANTIMICROBIAL RESISTANCE HAPPEN?

- **Antimicrobial resistance (AMR)** occurs when antimicrobials are not able to control or kill bacteria.

- **Antimicrobial use (AMU) is a primary driver of AMR**. When antimicrobials are used, some bacteria will die but resistant bacteria may survive and multiply.

- **Inappropriate use or overuse of antimicrobials** contributes to the development of resistant bacteria that cause disease.

- Rising rates of AMR across the globe make it **harder to treat infections** and increase the risk of disease spread, illness, and death in people and animals. There is increasing international demand and regulatory pressure for livestock industries and countries to make commitments to antimicrobial stewardship and reductions in AMU in people and animals.
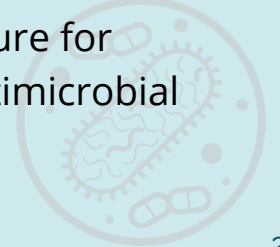
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WHY SHOULD WE CARE ABOUT ANTIMICROBIAL STEWARDSHIP?

- **Antimicrobial stewardship** is **optimal decision-making** with respect to when, what, how long, how much, and by what route antimicrobials are used, with the goals of:
  - Supporting the health and welfare of people and animals; and
  - Ensuring continued access to effective antimicrobial drugs for all.

- **Antimicrobial stewardship** is a **shared concern**. Everyone has a shared responsibility and stands to benefit from protecting the health of people, animals, and the environment, consistent with a "**One Health**" approach.

- **Antimicrobial stewardship** means ensuring that antimicrobials are provided to an animal appropriately - *Antimicrobials need to be used in the right cattle for the right reason, at the right time, dosage, route, frequency, and duration.*

WHAT DOES AMU AND AMR SURVEILLANCE LOOK LIKE?

- **AMU surveillance** collects and summarizes the amounts and types of antimicrobials used from various sources (e.g., feedlot cattle treatment and feed records, veterinary antimicrobial dispensing records) to provide representative estimates of AMU and demonstrate changes in AMU over time.

- **AMR surveillance** documents, measures, and summarizes AMR from collected samples (e.g., animals, meat, water, soil etc.). In the absence of these data, it is not possible to provide representative estimates of AMR and demonstrate changes in AMR levels over time.

- **Together, AMU and AMR surveillance** provide data to identify patterns and trends, target areas for research, provide guidance for improvements in antimicrobial stewardship practices on farm, and demonstrate transparency for Canadian beef industry stakeholders, including consumers and international agencies.

- **Preserving access and effectiveness to antimicrobials** to treat bacterial diseases is critical for cattle health and welfare.

ANTIMICROBIAL STEWARDSHIP IS A ONE HEALTH APPROACH WHERE WE AIM TO PROTECT THE HEALTH OF PEOPLE, ANIMALS, AND THE ENVIRONMENT.

TABLE 1: CATEGORIZATION OF ANTIMICROBIAL DRUGS USED IN CATTLE BASED ON IMPORTANCE IN HUMAN MEDICINE

IMPORTANCE IN HUMAN MEDICINE	DRUG CLASS	ACTIVE INGREDIENT	TRADE NAME EXAMPLES
I	Cephalosporin	Ceftiofur	Excede 200®, Excenel®, Ceftiofur®, Ceftiocyl®, Cevaxel®, Eficur®
I	Fluoroquinolone	Danofloxacin	A180®
I	Fluoroquinolone	Enrofloxacin	Baytril 100®
I	Fluoroquinolone	Marbofloxacin	Forcyl®
II	Broad spectrum Penicillin	Ampicillin	Polyflex®
II	Macrolide	Gamithromycin	Zactran®
II	Macrolide	Tildipirosin	Zuprevo®
II	Macrolide	Tilmicosin	Micotil®, TilcoMed®, Hymatil®, Pulmotil® Premix, Tilmicosin 200®, Tilmovet® Premix
II	Macrolide	Tulathromycin	Draxxin®, Draxxin®KP, Increxxa® Lydaxx®, , Macrosyn®, Rexxolide®, Tulaven®, Tulinovet®, Tulissin 100®
II	Penicillin	Penicillin	Depocillin®, Duplocillin® LA, Procaine Penicillin G®, Procillin®, Vet Pen 300
II	Potentiated Sulfonamide	Trimethoprim Sulfadoxine	Borgal®, Trimidox
II	Streptogramin	Virginiamycin	V-MAX™ 44, V-MAX™ 500
III	Florfenicol	Florfenicol	Nuflor®, Fenicyl®, Florkem®, Resflor®, Zeleris®
III	Tetracycline	Oxytetracycline	Bio-Mycin 200®, Cyclosol® 200 LA, Liquamycin® LA-200 Neotet Soluble Concentrate, Oxy 1000, Oxy Tetra-A, Oxytetracycline® 200 Granular Premix, Oxytetracycline HCL Soluble Powder, Oxy Tetra Forte®, Oxytetramycin® 100, Oxyvet® 200 LA, Oxyvet 300 LA, Terracyine-100® Premix
III	Tetracycline	Chlortetracycline	Aureomycin® 220 G, Chlor 50® Premix, Chlor 100® Premix, Cyclospray®
III	Tetracycline	Tetracycline	Kanadom® Tetracycline Hydrochloride, Neo-Tetramed®, Tetra 1000, Tetra-Bac 1000, Tetracycline hydrochloride, Tetramed 250, Tetramed 1000
III	Sulfonamide	Sulfaguanidine, Sulfanilamide, Sulfamethazine, Sulfamerazine, Sulfathiazole	2 Sulfamed, After-Calf Bolus, Calfspan Tablets, Calf Scour Bolus, Cocci Bolus, NSE Bolus, Powder 21, Scour Bolus, Sodium Sulfamethazine Solution 12.5%, Sodium Sulfamethazine Solution 25%, Sulfa 2 Soluble Powder, Sulfa Urea Cream, Sulfamethazine 25% Concentrate Solution, Sulfamethazine Bolus, Sulfavite, Triple Sulfa Bolus, Triple Sulfa Bolus

IMPORTANCE IN HUMAN MEDICINE	DRUG CLASS	ACTIVE INGREDIENT	TRADE NAME EXAMPLES
IV	Ionophore	Monensin sodium	Coban™ Premix, Monensin Premix, Monvet®, Rumensin™ Premix
IV	Ionophore	Lasalocid sodium	Bovatec® 20 Medicated Premix, Avatec® 20 Medicated Premix
IV	Ionophore	Salinomycin	Posistac® 6% Premix

TABLE 2: APPLICATION OF HEALTH CANADA'S CRITERIA FOR ANTIMICROBIAL CATEGORIZATION

HEALTH CANADA CATEGORY	PREFERRED OPTION FOR TREATMENT OF SERIOUS HUMAN INFECTIONS*	LIMITED OR NO ALTERNATIVES AVAILABLE
I – Very High Importance	Yes	Yes
II – High Importance	Yes	No
III – Medium Importance	No	Yes for some antimicrobials
IV – Low Importance**	Not applicable	Not applicable

*Serious infections are considered those which if left untreated would lead to significant morbidity requiring emergency care including hospitalization and/or mortality.

**Category IV (four) antimicrobials are rarely used in human medicine.

Source: https://www.canada.ca/en/health-canada/services/drugs-health-products/veterinary-drugs/antimicrobial-resistance/categorization-antimicrobial-drugs-based-importance-human-medicine.html

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QUESTIONS? EMAIL US!

INFO@CFAASP.CA

CANADIAN FEEDLOT ANTIMICROBIAL USE AND ANTIMICROBIAL RESISTANCE SURVEILLANCE PROGRAM (CFAASP)

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