

Antibiotic Stewardship Training

*Ensuring judicious antibiotic use and mitigating
the impact of antibiotic resistance*

*Developed in partnership with The Ohio State University
College of Veterinary Medicine*



THE OHIO STATE UNIVERSITY
COLLEGE OF VETERINARY MEDICINE

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Overview

Program Goal: For farm personnel to accurately identify calves for treatment using veterinary-written treatment protocols which will lead to improvements in responsible antibiotic use.

Program Outline

- Module 1 –Antibiotics and Antibiotic Resistance
- Module 2 –Clinical Evaluations
- Module 3 –Decision-tree Protocols

This training series is a new addition to the Veal Quality Assurance (VQA) program and was developed in partnership with The Ohio State University College of Veterinary Medicine. The VQA program is funded by the Beef Checkoff.



Funded by Beef Farmers and Ranchers



POLL

MODULE 1

Antibiotic Use and Resistance

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Poll Question #1

- Demographics question

Poll Question #2

- What type of infections are antibiotics are used to treat? **(Circle one)**
 - A. Bacterial infections
 - B. Parasite infections
 - C. Fungal infections
 - D. Viral infections

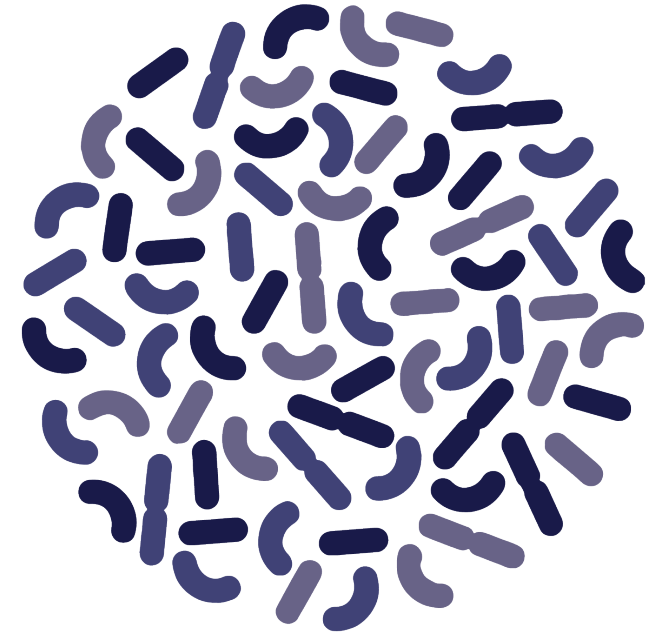
By the end of Module 1, you will be able to...

1. Describe why antibiotic stewardship programs are important
2. Define antibiotic resistance, and how this impacts animal health and our use of antibiotics
3. Describe the key differences between bacteria and viruses
4. Differentiate between common uses for antibiotics, vaccines, and other supportive therapies



Bacteria

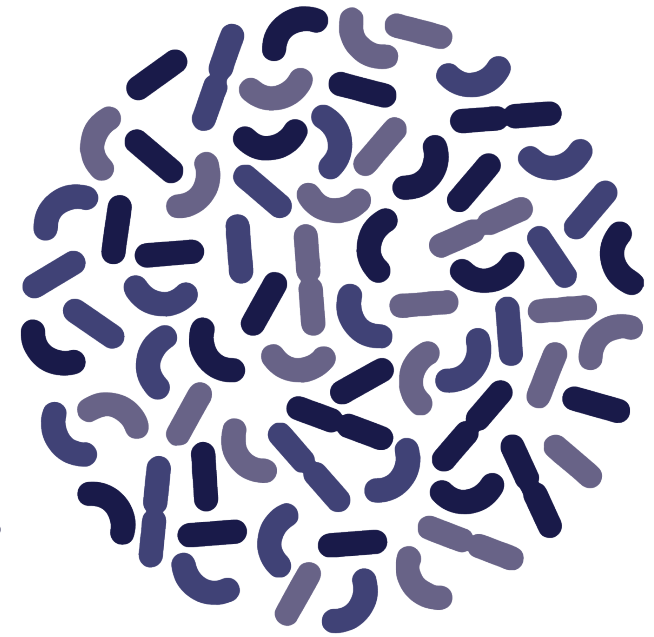
- Single-celled microorganisms that are many different shapes and sizes
- Exist in communities of millions
- Survive and grow outside the host
- They exist *everywhere*: on countertops, doorknobs, floors, walls, in the gastrointestinal tracts of humans and animals



Important: Bacteria can be spread between animals and between animals and humans.

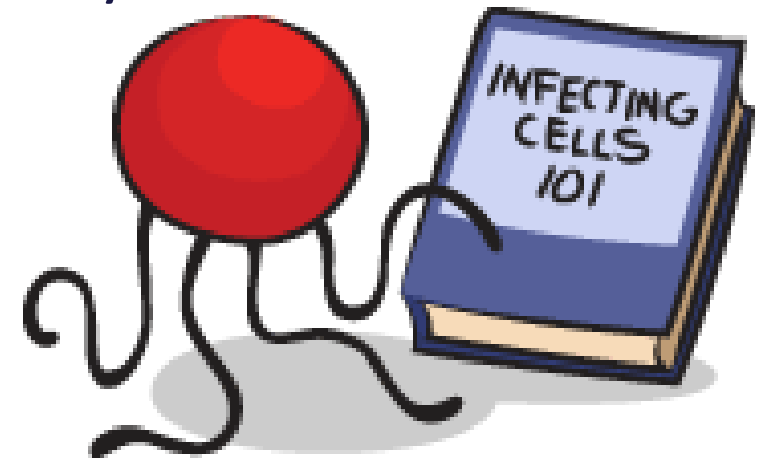
Bacteria

- Bacteria (i.e. the microbiome) are necessary for calf health.
- Some bacteria, called pathogens, do make calves sick.
- Common calf diseases caused by bacteria:
 - Navel infections
 - Pinkeye
 - Some types of pneumonia
 - Some types of diarrhea



Viruses

- About a thousand times smaller than bacteria.
- Viruses rely on the calf to survive – they cannot reproduce outside the body.
- Infect their host's cells and tell the cells to make more viruses, causing infections to spread quickly throughout the body.
- Common calf diseases caused by viruses:
 - Some types of diarrhea
 - Some types of pneumonia



What is an Antibiotic?

- Definition: A medicine that inhibits the growth or kills bacteria.
- When used properly, antibiotics save human and animal lives.
- Antibiotics ***do not*** fight viral infections or protozoal (e.g. Crypto) infections.



*Farm-specific drug recommendations should be made by a veterinarian with a valid veterinary client patient relationship.



What is a Vaccine?

- Definition: A medicine that primes the immune system against a particular pathogen (virus, bacteria).
- Vaccines are used to prevent rather than treat disease.



*. Farm-specific drug recommendations should be made by a veterinarian with a valid veterinary client patient relationship.

How Do Vaccines Work?

- By stimulating the immune system to make antibodies (immunoglobulins) like it would if exposed to a disease
 - Antibodies bind to bacteria, viruses, “marking” them for the immune system to destroy
- Calves develop immunity to that specific disease, without actually getting the disease first



Anti-Inflammatories

- Inflammation is the body's response to irritation or injury.
 - Signs include: redness, warmth, swelling, and pain
- Anti-inflammatories relieve inflammation, pain, and fever
 - Less stress with pain control
 - Maintained appetite
 - Quicker recovery



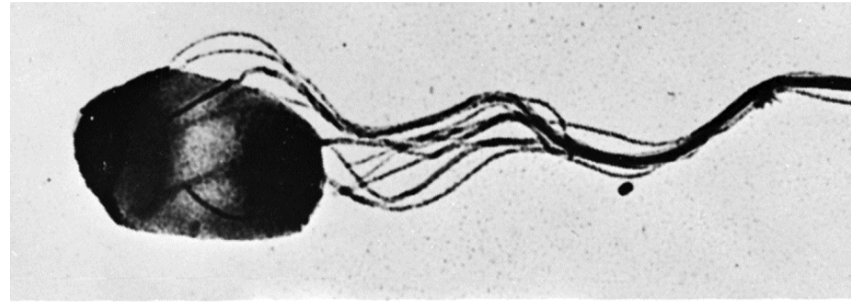
Anti-Inflammatories (IN)



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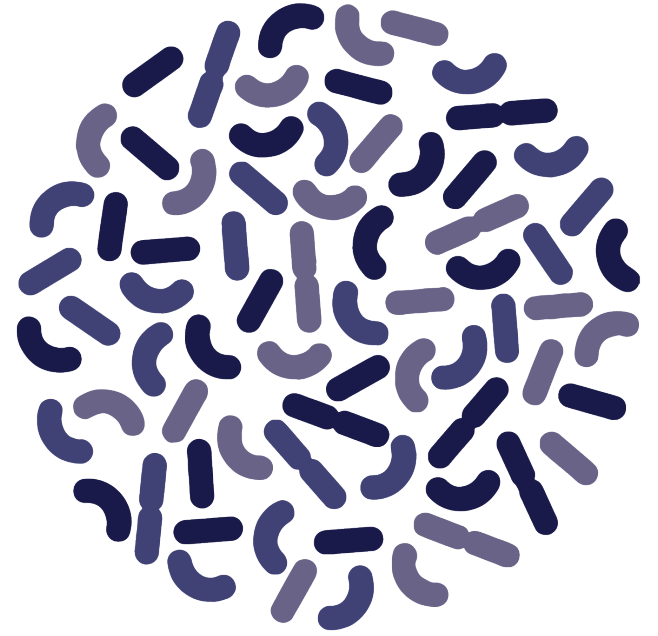
What is Antibiotic Resistance?



“Genetic changes in a bacterium that result in resistance to a previously effective drug”

Antibiotics can disrupt a healthy microbiome

- Antibiotic treatment kills good bacteria.
- Other types of bacteria have room to multiply and increase the risk of infection.
- Unnecessary treatments can also negatively impact human health



Why is antibiotic use in animals important?

- **ONE Health:** Pathogens AND the genes are shared between animals and humans



Why do we care about antibiotic use in animals?

- **ONE Health:** Antibiotics used to treat animals and humans are effectively the same



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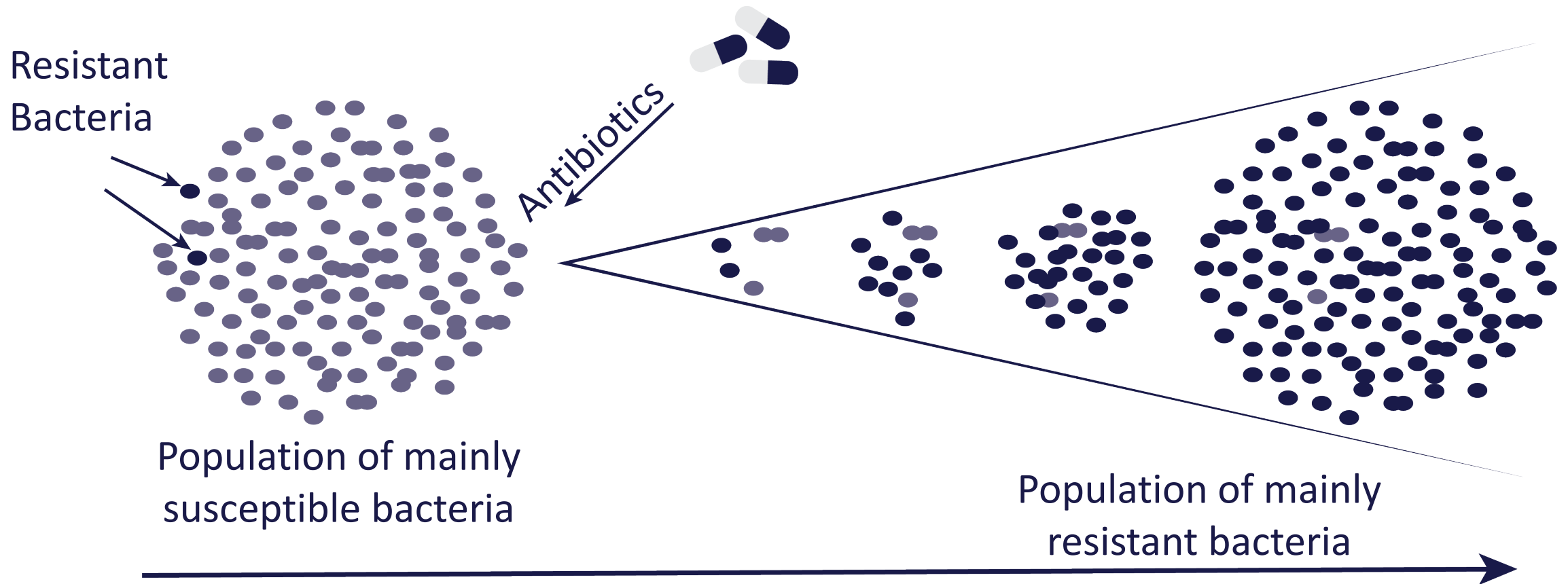
A Salmonella strain recovered from a calf that failed to recover.

Specimen	Test Name	Drug	Interpretation	MIC
83 - BOVINE - Cattle - Male - 14 Days				
Salmonella species - 1	MIC - Bovine/Ovine/Porcine Plate	Ampicillin	Resistant	>16.0000
		Chlortetracycline	Resistant	>8.0000
		Clindamycin	Resistant	>16.0000
		Florfenicol	Resistant	>8.0000
		Gentamicin	Susceptible	≤ 1.0000
		Neomycin	Resistant	>32.0000
		Oxytetracycline	Resistant	>8.0000
		Penicillin	Resistant	>8.0000
		Sulphadimethoxime	Resistant	>256.0000
		Tiamulin	Resistant	>32.0000
		Tilmicosin	Resistant	64.0000
		Trimethoprim/ Sulphamethoxazole	Resistant	>2.0000

Antibiotic resistance impacts animal health and decreases our ability to treat future infections.



Selection of Resistant Bacteria by Antibiotics



How can we stop Antibiotic Resistance?

1. Targeted antibiotic use

- Calves with bacterial infections should be treated with antibiotics....***We should avoid antibiotic use when it's not necessary.***

2. Alternatives to antibiotics

- Many cases can be managed without medically important antibiotics.

3. Disease Prevention

- Management practices that prevent disease reduce bacterial infections and the need for antibiotics.



Antibiotic Stewardship?

- Important strategy focused on reducing the need and better targeting the use of antibiotics in human and veterinary medicine
- Benefits
 1. Fewer new cases of disease
 2. Better treatment outcomes
 3. Less unnecessary antibiotic use and resistance



Antibiotic Stewardship

- Fewer new cases of disease
 - a. Adherence to prevention or vaccination protocols
 - b. Decrease the spread of infections from farm to farm and calf to calf
 - c. Improved nutrition
- Improved treatment outcomes
 - a. Training on calf health assessments
 - b. Education on common calf medicines
- Less antibiotic use and resistance
 - a. Training on recognition of diseases where antibiotics are useful and not useful
 - b. Training on the appropriate dose and duration of antibiotic use



Let's Review

- Antibiotics are necessary to treat bacterial infections
- ... but antibiotic resistance negatively impacts calf and human health
- Antibiotic Stewardship programs work to minimize antibiotic use through disease prevention and targeted antibiotic use



POLL

Let's test your knowledge...



Poll Question #3

**What type of infections are antibiotics are used to treat?
(Choose one)**

- A. Bacterial infections
- B. Parasite infections
- C. Fungal infections
- D. Viral infections

Poll Question #4

Anti-inflammatory drugs are used in animals to: (Choose all that apply)

1. Kill bacteria making calves sick
2. Reduce pain
3. Reduce fever
4. Prevent calves from getting sick

Poll Question #5

Vaccines should be used on healthy animals to help prevent disease. (True/False)



**Questions?
Please share them using
the Q&A box.**

This concludes MODULE 1

MODULE 1

Antibiotic Use And Resistance

