

- ### Classes of Antimicrobial Use in Food Animals
- We get confused as to the reason for classification
    - Therapeutic intent?
    - Probability of selection for resistant bacteria?
    - Societal justification?

- ### Classes of Antimicrobial Use in Food Animals
- FDA/CVM approval classifications
    - Increase in rate of gain
    - Increase in feed efficiency
    - Prevention
    - Control
    - Therapy/Treatment
  - Classifications by bacteria
    - They don't care

- ### Feed Uses in Cattle
- For increased rate of gain and/or increased feed efficiency
    - Bacitracin Zinc
    - Bambermycins
    - Chlortetracycline<sup>1</sup>
    - Laidlomycin
    - Lasalocid
    - Neomycin/oxytetracycline<sup>1</sup>
    - Oxytetracycline<sup>1</sup>
    - Sulfamethazine/Chlortetracycline<sup>1</sup>
    - Virginiamycin<sup>2</sup>
- <sup>1</sup> Highly important in human medicine    <sup>2</sup> Critically important

## Feed Uses in Cattle

- ▣ Rate of gain or feed efficiency AND a prevention/control claim
  - Monensin
  - Chlortetracycline<sup>1</sup>
  - Neomycin/oxytetracycline<sup>1</sup>
  - Oxytetracycline<sup>1</sup>

<sup>1</sup> Highly important in human medicine    <sup>2</sup> Critically important

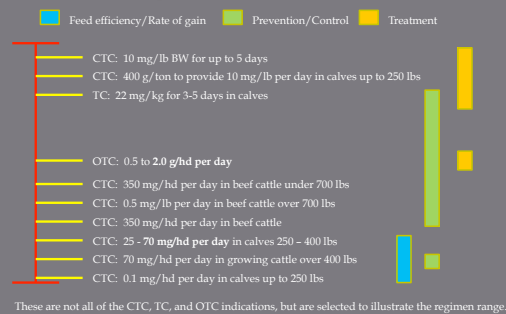
## Feed Uses in Cattle

- ▣ Treatment of disease only
  - Amprolium
  - Chlortetracycline<sup>1</sup>
  - Oxytetracycline<sup>1</sup>
  - Sulfachlorpyridazine
  - Sulfamethazine
  - Sulfadimethoxine

<sup>1</sup> Highly important in human medicine    <sup>2</sup> Critically important

## USING TETRACYCLINES AS AN EXAMPLE

## U. S. CTC, TC and OTC Cattle Approval Examples (Feed and Water)



## Take-Home Message on *in vivo* Antimicrobial Gut Activity

- ▣ Very complicated, but we do cause changes in enteric populations with oral antimicrobial use
- ▣ A definite dose-response relationship demonstrated in some studies.
- ▣ In some studies, the changes were transient in at least some of the categories.
- ▣ If we lop off the most politically acceptable category to "cut down use", then we end up with a precedent of the precautionary principle for addressing the much more important, and in my mind the more likely to have an effect, prevention and control claims.

## Let's not become fixated on the red light!

- ▣ We also have developing issues of resistance in certain classes of food animal pathogens.
  - *Salmonella newport*
  - *Mannheimia haemolytica*
  - *Pasteurella multocida*

## Hospital Acquired Infections

Antimicrobial-Resistant Pathogens Associated With Healthcare-Associated Infections: Annual Summary of Data Reported to the National Healthcare Safety Network at the Centers for Disease Control and Prevention, 2006-2007

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## HAIs

- As many as 16% of all HAIs were associated with the following multidrug-resistant pathogens:
  - methicillin-resistant *S. aureus* (8% of HAIs),
  - vancomycin-resistant *Enterococcus faecium* (4%),
  - carbapenem-resistant *P. aeruginosa* (2%),
  - extended-spectrum cephalosporin-resistant *K. pneumoniae* (1%),
  - extended-spectrum cephalosporin-resistant *E. coli* (0.5%),
  - and carbapenem-resistant *A. baumannii*, *K. pneumoniae*, *K. oxytoca*, and *E. coli* (0.5%).

## More Human Resistance

*Pseudomonas aeruginosa*  
*Mycobacterium tuberculosis*  
*Neisseria gonorrhoea*  
*Clostridium difficile*  
*Salmonella*  
*Shigella dysenteriae*  
*E. coli*  
*Malaria*

## In my opinion...

- The example of the tetracyclines illustrates the multifaceted interaction between antimicrobials and enteric organisms as well as food animal pathogens.
- In relation to antimicrobial resistance regulation and legislation, antimicrobial use classification as “subtherapeutic” or “therapeutic” across all antimicrobials is about societal justification, not about potential for resistance selection in enteric bacteria populations.

## Regulatory Activity

- “Guidance 209” from the FDA/CVM
  - **“Principle:** *The use of medically important antimicrobial drugs in food-producing animals should be limited to those uses that are considered necessary for assuring animal health.*”
  - **“Principle:** *The use of medically important antimicrobial drugs in food-producing animals should be limited to those uses that include veterinary oversight or consultation.*”
  -

## Legislative Activity

- HR 1549 Preservation of Antimicrobials for Medical Treatment Act (PAMTA).
  - Would essentially ban the “subtherapeutic” use of 7 classes of antimicrobials in food animals.
- New York State
  - Proposed amendment to the agriculture and markets law

## Our Message

- ▣ We utilize approved antibiotics in the production of beef cattle to improve efficiency and rate of growth, prevent and control disease, and treat disease.
- ▣ These are one of many tools we use to efficiently produce plentiful, safe, and nutritious food
- ▣ These tools should only be taken away based on sound scientific evidence that they cause an unacceptable risk to human health