



**INTRODUCTION TO ANTIBIOTIC AND
EDC USE. WHY ARE WE CONCERNED:
CURRENT USE AND PRACTICES:
CURRENT REVIEW PROCESS FOR
PROTECTING HUMAN HEALTH AND
ENVIRONMENT.**



Steve Ensley DVM, PhD
Veterinary Diagnostic Laboratory
Iowa State University

Antibiotic and EDC Use

- My perspective is going to be from a veterinary point of view as a diagnostic toxicologist in a veterinary diagnostic laboratory.

Antibiotic and EDC Use

- I don't want to make the use of antibiotics or endocrine disrupting compounds a human versus veterinary use issue.
- We both share the responsibility to use these products wisely, the "One Medicine" concept is valid.

Antibiotic Use in Food Animals

- Antibiotics can be given by injection, fed orally or used in drinking water.
- The same classes of antibiotics are used in animals and humans.
- Antibiotic use in small animals and companion animals are more like human use.
- Antimicrobial resistance continues to be an issue of concern for humans and animals.

Antibiotic Use in Food Animals

- The individual use of antibiotics in food animals may be a concern when used prophylactically or for metaphylaxis.
- Subtherapeutic and therapeutic use in feed or water is a concern.

Antibiotic Use in Food Animals

- Metaphylaxis
- the timely mass medication of a group of animals to eliminate or minimize an expected outbreak of disease.
- Used when there are large groups of animals, large numbers of potentially sick animals and a minimal labor supply.

Antibiotic Use in Food Animals

- FDA has continually restricted the use of antibiotics in animals mainly due to antimicrobial resistance issues.
- Antibiotics are more properly called antimicrobials.

Antimicrobials

- Following the ban of all food animal **growth-promoting antibiotics** by Sweden in 1986, the European Union banned avoparcin in 1997 and bacitracin, spiramycin, tylosin and virginiamycin in 1999.
- The only effect in humans has been fewer cases of acquired resistance in enterococci isolated from human faecal carriers (Casewell, 2003).

Antimicrobials

- The ban of **growth** promoting antibiotics is now associated with a deterioration in animal health.
- This includes increased diarrhea, weight loss and mortality due to *Escherichia coli* and *Lawsonia intracellularis* in early post-weaning pigs, and clostridial necrotic enteritis in broilers.
- A direct effect of these infections is an increase in usage of therapeutic **antibiotics** in food animals, including that of tetracycline, aminoglycosides, trimethoprim/sulfonamide, macrolides and lincosamides, all of which are of direct importance in human medicine.
- The theoretical and political benefit of the widespread ban of **growth** promoting antibiotics needs to be more carefully weighed against the increasingly apparent adverse consequences.

Antimicrobials

- **McDonald's Seeking Cut In Antibiotics In Its Meat (New York Times)**
- **By DAVID BARBOZA WITH SHERRI DAY**
- **Published: June 20, 2003**
- **Responding to public health concerns about the overuse of antibiotics in farm animals, the McDonald's Corporation said today that it would ask its meat suppliers around the world to reduce their dependence on antibiotics.**

EDU Use in Food Animals

- An area of concern with endocrine disruptors and production animals is growth promotant implants.

EDC's

- Synovex-C
Component E-C
Compudose
Synovex-S
Component
Synovex- H
- Component E-H
Revalor – IS
Revalor – IH
Synovex –
Synovex –
Finaplix-H
Revalor –
Revalor-S

EDC's

- These growth promoting implants consist of estradiol benzoate, trenbolone acetate, progesterone, testosterone and zeranol.

Implants can contain up to 200 mg testosterone propionate, 200 mg of trenbolone acetate, 28 mg of estradiol benzoate or 36 mg of zeranol.

EDC's

- Progesterone is given orally to heifer's to suppress estrous and synchronize estrous.
- Melengestrol acetate (MGA) is given at the rate of 0.25 mg to 0.50 mg per head per day



Current Review Process for Protecting human health and environment.

- The next speaker, Dr Snow from Nebraska will demonstrate how he is monitoring selected EDC's in the environment.
- There are several excellent analytical approaches.

Review Processes

- FDA is trying to define acceptable methods to measure EDC's.
- In 1996, EPA's Office of Research and Development identified endocrine disruption as one of its top six research priorities and developed a risk-based research approach to address some of these uncertainties



Review Processes

- EPA is developing acceptable assays.
- Tier one assays
- Tier one battery assays
- Tier two assays

Review Processes

- **August 28, 2008 -- Status of EPA's Endocrine Disruptor Screening Program**
- Additional time is needed to complete the necessary steps before it can begin issuing orders. EPA expects to begin issuing test orders for Tier 1 screening of the initial list of chemicals under the EDSP in early 2009.



Review Processes

- ELISA
 - HPLC
 - LC/MS/MS
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Review Processes

- ELISA-July 9, 2008
- **Faster, cheaper search for antibiotics in the field**
- **A new field kit developed by the U.S. Agricultural Research Service and its partners allows for near real-time water monitoring.**



Review Processes

- ELISA detection of sulfonamides at very low concentrations.



Review Processes

- HPLC/MS/MS
- Occurrence of ionophore antibiotics in water and sediments of a mixed-landscape watershed (Kim, 2006).

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Review Processes

- **Determination of the Persistence of Tetracycline Antibiotics and Their Degradates in Manure-Amended Soil Using Enzyme-Linked Immunosorbent Assay and Liquid Chromatography-Mass Spectrometry**
- **Diana S. Aga,* Seamus O'Connor, Steve Ensley, José O. Payero, Daniel Snow and David Tarkalson**

Review Processes

- September 10, 2008
- **Antibiotics down on the dairy farm**
- **New research shows that monensin can travel short distances in groundwater downstream of dairy operations (*Environ. Sci. Technol.* 2007).**



Protecting Human Health and the Environment

- Much work is being done in evaluating our impact on human health and the environment.
- New analytical tools and field based analysis will allow us to improve our monitoring capabilities.



Questions?