Target Residues
Do you want to be on the violator list?

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An ***animal drug residue*** is a trace of a substance present in a meat, milk, urine, or feces after administration to and metabolism by the animal. Drug residues become a concern when they are consumed in food products. Antibiotic residues are of most concern because of the concern of transferring resistance of antibiotics to humans. Bacteria can easily mutate, changing their genetic code to develop resistance patterns. In this manner, resident non-pathogenic bacteria normally found in human colon and intestines may become resistant from exposure to very small amounts of antibiotic drug residue in the foods consumed by humans. Unrelated bacteria strains are also very adept at transferring their genetic codes to other bacteria strains. For example, non-pathogenic E.coli present in human colons becomes resistant to an antibiotic it can pass its resistant genes onto a Salmonella pathogen, creating antibiotic resistant Salmonella, which is a food-borne pathogen. Pathogenic bacteria may also acquire resistance as a result of their contact with antibiotic residues in feed or from improper administration of antibiotics to the animal. The well-documented, primary cause of antibiotic resistant bacteria in people is due to the antibiotic treatment of people, not animals. Various efforts are underway to promote the more prudent use of antibiotics by human patients and their physicians.

There are also two ways in which food borne drug residues directly harm humans:

1. *Hypersensitivity to the drug or its metabolites*. For example, penicillin and its byproducts are most famous for their hypersensitivity reactions in people: which range from mild rashes and breathing difficulty to anaphylactic shock to death.

2. *Drug metabolites acting as intoxicants* (or carcinogens) to the liver, kidney or other organs. For example, flunixin meglumine (Banamine) causing fecal blood, gastrointestinal erosions, ulcers and kidney necrosis (death of tissue) in sensitive people.

Just how big of a problem are we talking about? The Animal Health Institute has been tracking the sale of antibiotics by its member companies. In 2006 (most currently available) they reported 26.4 million pounds of antibiotics were sold for use in food producing animals, horses and exotics in the US; 4.6% of this total was sold for growth promotion/nutritional use and 96% for therapeutic use. Of the 26 million pounds of antibiotic product sold, 42% were compounds not used in human medicine nor known to cross select for resistance to human antibiotics.

Human antibiotic sales are **not** readily available. It is estimated that the total volume is much less than that sold for animal use because there are 30 times more farm and companion animals in the United States than humans. Greater than half of the antibiotics produced in the United States are used for agricultural purposes. Seventy-eight percent of meat and meat products produced in the US is derived from animals that have received drugs, which require a withdrawal time. This is where the concern is raised; Animals are receiving more drugs and the potential for violative resides appears great to the public.

According to National Agriculture Statistics Service 2008 data, 33 million cattle (excluding veal) were slaughtered in federally inspected plants. Of these, 879 tested positive for violative residue, representing 0.003% of the cattle slaughtered, which is a very small percentage. Of the 879 cattle testing positive for violative residue, 791 (90%) were primarily Holstein, cull cattle. Of all the dairy cows slaughtered, 0.03% had violative residue. While the percent of violative resides detected in slaughtered dairy cows appears small, it is 30 times greater than the percentage of violative residue detected in slaughtered beef cows. This does however, represent a downward trend for culled dairy cattle; a decade ago culled dairy cattle had a 1.7% rate of antibiotic residue rate, more than double the rate of beef cows. ***When it comes to cattle, not only has residue been defined, it is also described by color: black & white.***

Edible tissues harvested from a carcass may contain a safe, tolerated level of drug residue. This tolerated level is usually reached when the withdrawal time has been met. Prohibited drugs have zero tolerance and therefore no amount of residue is allowed. Illegal residues result when the withdrawal time has not been met. Pharmaceutical companies conduct studies to determine a drug's metabolism from edible tissues, milk and eggs. The slowest rate of elimination from the slowest residue-depleting tissue is used for determining the **suggested** withdrawal time. Keep in mind; healthy animals are used in these studies. Drugs used in a sick animal that is not eating and drinking normally may result in a different duration for the drug to metabolize than suggested by the labeled withdrawal. Treatment using drug combinations often results in an unknown withdrawal time, because very little data is available to determine the withdrawal time. Label withdrawal time does not apply when using the drug in an animal or in a manner not listed on the label. The Food Animal Residue Avoidance and Depletion Program (FARAD) is a national, USDA-sponsored, cooperative project

that provides the best, most current advice to veterinarians regarding drug withdrawal times.

FDA uses surveillance testing of veterinary medical products to determine inappropriate or illegal drug use in food producing animals. A statistical sample of carcasses is screened with highly sensitive, rapid result tests. In addition, inspected that indicate disease tissues samples are also sampled for testing. Confirmation of the positives is performed with slower, specific, more expensive, tests. The first sensitive screen results in many false positives, but confidence is high that a negative result is a true negative. The follow up confirmation gives a numeric value of the residue present, ruling out a false positive. Using both tests determines non-compliance beyond any reasonable doubt.

Slaughter plants handling dairy cows and bob veal are responsible for greater than 90% of the residues violations. Wisconsin currently leads the nation in slaughterhouse residue violations, ahead of California. If this continues, plants may be forced into no longer accepting cattle from producers who were past violators. The dairy industry is slow to recognize the ramifications of this; they are so focused on milk production that they deem the dairy cow's second career in beef sales as inconsequential.

The Food Safety Inspection Service, (inspectors that carry out FDA drug residue policies), is now keeping an online, public list of suppliers whose animals have residue violations at slaughter. This list is available so that slaughter plants can refuse to purchase animals from these suppliers. FSIS is not excusing those plants that can't always trace back all owners of an animal. FSIS will soon be requiring residue testing on 100% of the animals from suppliers that cannot identify the original sources of those animals. It stands to reason that suppliers of these animals will be paid less per pound, because the market is taking on additional testing expenses.

It is imperative that producers work with their veterinarians, who also keep educating themselves about the drugs they use, to establish prudent drug use on their farms. Adherence to responsible use guidelines prevents violative drug residues, minimizes the risk of antibiotic resistance, optimizes the effectiveness and maintains availability of drugs.

Prudent drug use in animals does not mean zero use. *It is our moral and ethical duty to provide drugs to limit the pain and suffering of the animals under our care.* By following withdrawal times, we can do so without creating a human health risk. In 1971, William G. Huber, of the Division of Pharmacologic Sciences, College of Veterinary Medicine, University of Illinois-Urbana stated, "adherence to withdrawal time is cumbersome, inconvenient and an additional expense for the livestock and poultry producer." This is a cost of production we must bear, especially when, as Huber goes on to state, "Withdrawal is essential if the consumer is to have pure and safe meat. Precaution is even more important if meat inspection procedures are not sufficiently sophisticated to routinely detect (all) meat that contains drug residues."

Residues result from a laundry list of reasons: general human error, employee error, problems marking treated cattle, incomplete or non-existent treatment records, error or failure of on-farm drug residue testing, vandalism or sabotage, calves consuming milk or colostrum from medicated cows (including dry cow therapies), insufficient knowledge about drug withdrawal periods, failure to observe withdrawal periods, failure to read the label, extra label drug use by laypersons, inadequate communication between the veterinarian and the producer, etc, etc.

Meat from calves less than 150 pounds is marketed as "bob veal" in the US. Young calves represent much of Wisconsin's drug residue problem. It is important when marketing calves to remember they may be immediately butchered for human consumption. Feeding antibiotic waste milk, colostrum from a dry cow that freshened early or medicated calf milk replacer may have the potential for violative residues.

Neomycin and oxytetracycline can no longer be fed at a 2 to 1 ratio in milk replacers. These two antibiotics may be fed 1) as a treatment level, in prepared formulations, with labeled withdrawal times. 2) At growth enhancer formulations (where the ratio is 1 to 1 neomycin/oxytetracycline); at this level the withdrawal time is 7-14 days.

In July, 2008, the FDA proposed an order prohibiting the extra-label use of cephalosporin in food-producing animals. Ceftiofur (Naxel®, Excenel®) is not used in human medicine; however, cross-resistance among the cephalosporin class of drugs caused FDA to consider its extra-label use. Opposition was overwhelming and FDA revoked its order. The prohibition order may be reissued at any time. Cephalosporin residues at slaughter strengthen FDA's concern of their inappropriate use and increased potential for resistance transference.

There is a bill before congress to restrict the use of antibiotics in food producing animals to reduce the risk of antibiotic resistance to medically important bacteria (bacteria of concern in human health). The Preservation of Antibiotics for Medical Treatment Act of 2009 seeks to withdraw the routine use of seven classes of antibiotics from food animal production (primarily antibiotics added to feed). Violative antibiotic residues strengthen the evidence for passing this bill.

Rather than be legislated into them, available animal husbandry practices must implement management plans to minimize drug use on farms. The Beef Quality Assurance Program (BQA) is the industry's premier program for teaching best management practices in animal husbandry and drug use. Farmers Assuring Responsible Management is the new program required by all dairy processors of their producer patrons. Both these programs have a Veterinary Client Patient Relationship (VCPR) as their cornerstone for prudent drug use on farm.

Animal drugs are labeled "Over the Counter (OTC)", often labeled as Animal Use Only; or prescription only, labeled as "Under the Use or Direction of a Licensed Veterinarian". In either case, drugs are to be used as directed by the label: for the animal, condition, administration, dose, duration and withdrawal time listed. Only a licensed veterinarian may use certain drugs in an extra-label manner. Veterinarians are prohibited extra-label use of: medicated feeds, fluoroquinolones and sulfonamides in adult dairy cattle. It is illegal for a layperson to use any drug in an extra-label manner, unless directed to do so by the veterinarian under a VCPR.

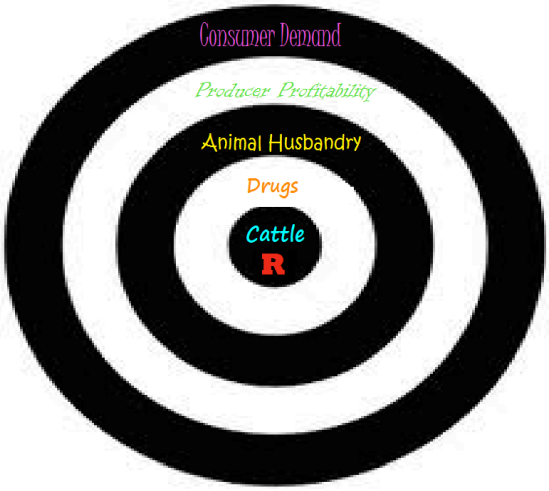
A VCPR is one in which a **RELATIONSHIP** exists:

- A veterinarian has assumed the responsibility for making medical judgments regarding the health of the animal and the need for medical treatment and the owner of the animal (or other caretaker) has agreed to follow the instructions of the veterinarian.
- There is sufficient knowledge of the animal by the veterinarian to initiate at least a general or preliminary diagnosis of the medical condition of the animal and the practicing veterinarian is readily available for follow-up in case of adverse reaction or failure of the therapy regiment.
- Such a relationship can exist only when the veterinarian has recently seen and is personally acquainted with the keeping and care of the animal by virtue of examination of the animal and/or by medically appropriate and timely visits to the premises where the animals are kept.

Penicillin continues to top the list for residue violations, with flunixin meglumine violations increasing. Flunixin is a non-steroidal anti-inflammatory drug approved for IV administration in cattle (excluding veal calves) and swine. Often, flunixin is given IM, in an extra-label manner. When using flunixin as labeled, the withdrawal time is 2 days. If the route is changed to SQ, metabolism becomes closer to a 30 days withdrawal and if given IM, it is not really known how long residue will remain in the muscle. In addition, when given IM, flunixin causes a large abscess in the muscle, which is large red flag for FSIS inspectors on the slaughter floor. Read the label of the drug you are using!! The label tells you everything you need to know in order to use the drug correctly and avoid a residue at market.

Prevention of disease is more profitable than treatment. Producers must first decide to use drugs only if a measurable benefit exists, otherwise opt for immediate slaughter or euthanasia. Producers must also have a plan to re-condition treated animals before marketing them. This process of rehabilitation or re-conditioning may require a 40 to 60 day feeding period. Feeding a high grain diet can yield a 3 lb per day gain, increasing the carcass value due to weight and quality, while reducing the risk of violative residues.

The black & white target is used to describe the overall residue problem. R in the center stands for "Residue". Certain classes of cattle are at greater risk for residues because of the drugs used and animal husbandry practices used. Producer profitability decides when cattle are treated and subsequently sold to market. The consumer envelops the entire food animal production cycle; without the consumer, we don't have a market. Consumers have the power to dictate our animal husbandry and drug use AND they demand safe, wholesome and drug-free food.



Any Level of Violative Residue is UNACCEPTABLE!