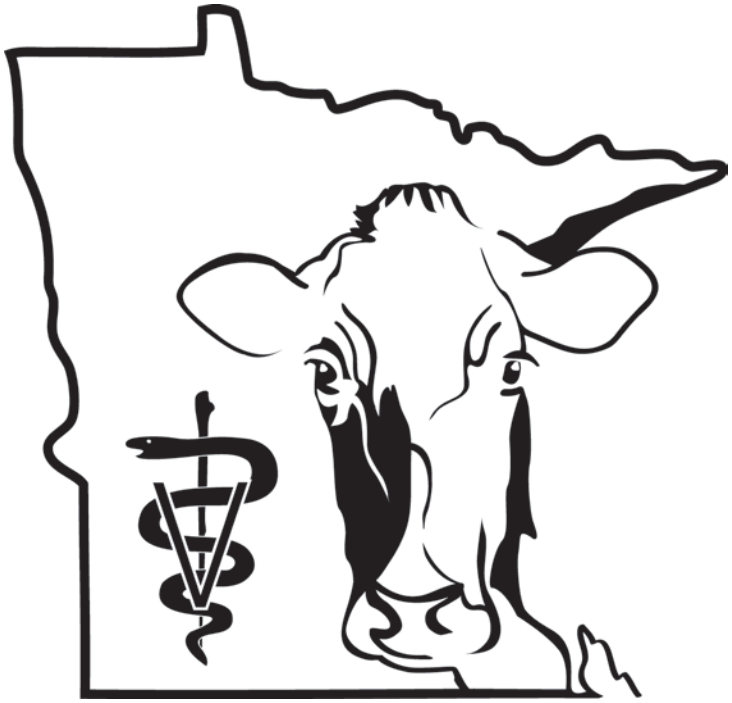
THIS ARTICLE IS SPONSORED BY THE
MINNESOTA DAIRY HEALTH CONFERENCE.

UNIVERSITY OF MINNESOTA

College of Veterinary Medicine

VETERINARY CONTINUING EDUCATION



ST. PAUL, MINNESOTA
UNITED STATES OF MINNESOTA

Drug Residue Montoring in Minnesota

Nicole Neeser, DVM, MPH
Minnesota Department of Agriculture

Most veterinarians can recall a time when a client treated a cow with an antibiotic or other drug and disregarded the meat or milk withdrawal time claiming "They don't test for it anyway." Often, without knowing exactly what is tested for, it seems hard to refute this claim. Contrary to this claim, drug residue testing in Minnesota is alive and well. Residue testing routinely occurs for both milk and meat residues and covers a wide array of drugs. Increased public concerns about drug residues have led to improved Federal enforcement efforts against veterinarians and producers that cause violative residues.

MILK RESIDUE TESTING

Milk residue screening is conducted on every bulk tanker of milk that is delivered to a plant. If smaller amounts of milk are delivered, as is often the case with goats and sheep, milk from each farm is usually screened. The dairy plant chooses which test it will use to screen the milk they receive, however, they must test for at least five of the following drugs: penicillin, ampicillin, amoxicillin, ceftiofur, cephapirin, hetacillin, or cloxacillin. While these are often the most common drugs used on dairy farms, other drugs can be used on-label or in an extralabel fashion. The dairy plants can test for other drugs and may run tests anytime they choose. This testing most often includes tetracyclines or sulfonamides. If the milk from a tanker is found positive, additional confirmatory testing is performed on milk from individual farms to determine which farm(s) caused the residue. The financial consequences of a residue are severe as the offending farm is usually required to pay for the entire load of milk.

In addition to screening of bulk tankers, milk from individual farms is screened for antibiotics on a monthly basis when the plants run their official monthly quality checks for somatic cell count and bacteria. The consequences of having a positive on this test are less as the milk has already been screened and passed for human consumption. However, the violation does count on the official record for the producer at the Minnesota Department of Agriculture.

Milk residues in Minnesota have been decreasing in recent years. Table 1 shows the amount of milk and number of loads discarded for drug residues in recent years. Despite this improvement, producers and veterinarians still need to take care to avoid drug residues, especially when drugs are used in an extra label manner. While most of the common causes of drug residues are fairly straightforward (Figure 1), residues are frequently caused by extra label use of drugs by producers. These uses may or may not have been authorized by a veterinarian, however, are likely to cause residue concerns as correct withholding times are often not followed or not well researched. By working with producers to determine the appropriate extra label use withholding times, veterinarians can help prevent unnecessary milk residues.

Table 1. Minnesota Drug Residues[1]

Year	Loads	Pounds
2000	273	7,735,731
2001	230	6,063,717
2002	178	5,794,447
2003	178	4,611,826
2004	136	3,643,363

Figure 2. Ten common causes of milk residues.[2]

Ten Common Causes of Milk Residues

1. Milk from a treated cow was accidentally routed into the pipeline.
2. An antibiotic-treated dry cow was unintentionally milked.
3. The same milking unit was used to milk an antibiotic-treated cow before milking untreated cows. The milking unit was not cleaned and sanitized between uses.
4. Lactating cows were purchased and the new owner was unaware of recent antibiotic treatments prior to sale.
5. One quarter of a cow was treated for mastitis and withheld from the bulk tank. However, milk from the other three quarters was NOT withheld and was permitted to enter the pipeline.
6. Equipment used to milk treated cows was handled carelessly; for example, vacuum from the milk pipeline was used to operate dump-milk buckets.
7. All antibiotic-treated dry cows were milked last, but the milk line was not diverted from the bulk tank.
8. Antibiotic residues remained in the milk of a cow that was treated in an extra-label fashion. These are the cows which should be tested individually.
9. Medicated feed was accidentally mixed into the lactating-cow feed.
10. Cows drank from a medicated footbath.

MEAT RESIDUE TESTING

In contrast to milk residue testing, the list of drugs tested for in meat is extensive. This list includes, but is not limited to: tetracyclines (chlortetracycline, oxytetracycline, tetracycline), beta lactams (penicillins and cephalosporins), gentamicin, spectinomycin/streptomycin, erythromycin, tilmicosin, tylosin, neomycin, novobiocin, lincomycin, pirlimycin, chloramphenicol, flouroquinolones, arsenicals (arsenic), avermectins (like ivermectin, moxidectin), clenbuterol, ractopamine (Paylean©), DES/zeranol/tenbolone (hormones), MGA (hormone), phenylbutazone, sulfonamides, flunixin meglumine, dexamethasone, and florfenicol.[3]

A small percentage of testing is done on animals selected randomly at slaughter. The majority of drug residue testing in meat is done on animals suspected of having a residue at slaughter. Cull cows are a frequent offender for residue violations, and are often targeted for testing. Factors such as injection site lesions, specific pathology, or signs of disease on ante mortem inspection are usually used to determine which animals to test. However, in some very small plants, every cull cow that is slaughtered is tested for a residue.[4]

While some residues are the result of simply sending an animal to slaughter prior to the expiration of the withdrawal time, extra label use of drugs accounts for many of the drug residues detected as well. Flunixin, tilmicosin, gentamicin, penicillin, sulfadimethoxine, sulfamethazine, neomycin and tetracyclines are all drugs that are commonly found in suspect animals. Clearly, some of these drugs are being used in an extra label fashion in adult dairy cows.

The consequences of a meat residue violation, while not as economically damaging as milk violations, can be extensive. Any animal found with a residue is condemned so the value of the animal is lost. In the past, a random selection of farms with residue violations was visited by the FDA to review treatment records and investigate the cause. This occurred infrequently and was not a significant deterrent for residues. Currently, in Minnesota, FDA is contracting with Minnesota Department of Agriculture to perform the residue investigations. Every farm with a residue violation is visited after the first violation. During these visits, treatment protocols and records are reviewed to determine the cause of the violation. Repeat violations with inadequate recordkeeping can result in significant penalties for the producer.

VETERINARIANS AND DRUG RESIDUES

If the investigation of a drug residue reveals wrongdoing on the part of the veterinarian, such as improper labeling or drug use, penalties can be levied on the veterinarian. FDA has been increasing its enforcement efforts in the veterinary area and is increasingly holding veterinarians responsible for residues found in their client's animals. Consider the following case:

In 2003, a veterinarian received a warning letter for administering flunixin to two cows on a farm. The flunixin was administered to the first lactating cow in addition to sulfadimethoxine for the treatment of pneumonia. At the time, flunixin was not approved for the treatment of lactating dairy cows; therefore its use in the treatment of a lactating cow is considered extra label usage. The identity of the cow was not maintained and no follow-up examination was performed. The veterinarian failed to institute the procedures necessary to maintain the identity of the treated cow (in conjunction with the farm), establish a substantially extended withdrawal period that was supported by appropriate scientific information and take appropriate measures to assure that assigned withdrawal times were satisfied. The second residue resulted from a similar situation, in which flunixin was administered with oxytetracycline, for pneumonia in a lactating cow. In these cases the veterinarian was held responsible for the inappropriate extra label drug use and the resulting veterinarian. The veterinarian was expected to make a written response to FDA on how these items were to be corrected. Failure to address the issue could have resulted in an injunction against the veterinarian.[5]

Even though the veterinarian did not personally sell the cows for slaughter prior to the appropriate withdrawal time, he was held responsible for selling the cows just as the dairy producer was. His failure to adequately keep records and take measures to insure that withdrawal periods were followed resulted in action against him as well. This is not an isolated incident. From the FDA's position, veterinarians not only have the responsibility to follow the regulations, they must educate their clients to be sure they are compliant.[6]

In order to adequately address these issues in practice, practitioners need to maintain an awareness of food animal drug regulations as well as an understanding of when and what drugs are tested for in meat and milk. Avoiding drug residues is the responsibility of both dairy producers and their veterinarians. While the producer holds the responsibility of actually marketing a treated animal for slaughter at the appropriate time, the responsibility to educate clients on proper withdrawal times for specific drugs, especially for drugs used in an extra label manner, lies with the prescribing veterinarian.

REFERENCES

1. Minnesota Department of Agriculture. Milk drug residue data. January 2005.

2. Minnesota Department of Agriculture website. Ten common reasons antibiotic contamination occurs in bulk tank milk. Available at http://www.mda.state.mn.us/dairyfood/tenreasons.html. Accessed April 15, 2005.

3. United States Department of Agriculture Food Safety Inspection Service. 2002 National Residue Program Blue Book. Available at http://www.fsis.usda.gov/Science/2002_National_Residue_Program_Blue_Book. Accessed April 15, 2005.

4. Minnesota Department of Agriculture. Meat residue testing data. January 27, 2005.

5. Food and Drug Administration Website. Warning letters. Available at http://www.fda.gov/foi/warning_letters/g3720d.htm. Accessed April 15, 2005.

6. American Veterinary Medical Association website. JAVMA news: FDA warns veterinarians about violative residues. Available at http://www.avma.org/onlnews/javma/oct03/031001e.asp. Accessed April 15, 2005.