

Using Feedlot Records to Control Antimicrobial Resistance

Joyce Van Donkersgoed, DVM, MVS

Veterinary Services, 11 Bruns Road, Lacombe, Alberta T4L 1P1, Canada

Summary

Records are an essential component of herd health programs and beef quality assurance programs. They are used to optimize production efficiency and monitor and verify procedures for beef quality and food safety. Recently, health organizations around the world have stated that production records required to show prudent drug use by veterinarians and producers. The development of resistance in zoonotic organisms may be promoted by the inappropriate use of antimicrobials in animals. Therefore, treatment records are required to show the public that antimicrobials are used judiciously in food animal production for clinical and production efficacy, while minimizing antimicrobial resistance impacts on human health.

Introduction

In a recent review by the National Research Council,¹ the use of drugs in food animals was discussed because of the possibility that drugs used in animals may result in the development of antimicrobial-resistant pathogens which could make difficult treatment of human disease. Various health organizations around the world, including the World Health Organization (WHO)² and Health Canada (personnel communication, Dr. Rebecca Irwin), have discussed what veterinarians and producers can do to reduce the risk of antimicrobial resistance development. A common recommendation is the development of beef quality assurance plans, which include the maintenance and proper use of treatment records on all treated animals.¹

Health organizations also are interested in resistance monitoring programs to promote the prudent and judicious use of antimicrobials in livestock production, while maximizing the efficacy and useful life of existing and new antimicrobials. The resistance monitoring programs are being developed to help health professionals make informed decisions, to guide prescription practices, to identify areas for further investigation, and to promote collaboration among all stakeholders.² These monitoring programs may include collection of information

from veterinarians and producers on the supply, consumption, and use of antimicrobial agents, as well as the results of antimicrobial sensitivity testing to determine prevalence and spread of resistance. This information can be used to try and identify practices with the greatest risk of antimicrobial resistance (type of antimicrobial, dosage, length of treatment, drug rotations, organism), as well as potential alternatives and intervention strategies at the least cost.

Value of Records

Animal health and feed records traditionally have been used to monitor occurrence and severity of disease, effectiveness of processing, treatment, vaccination and feeding programs, performance efficiency, and costs of production. In beef quality assurance programs based on Hazard Analysis and Critical Control Points (HACCP) principles, records are used to document feedlot procedures and monitor critical management processes where problems can occur. They are used to develop action plans should critical thresholds be exceeded, and verify that practices are being followed. Feedlot records that are used in total quality management programs verify that good nutrition, animal husbandry, and hygiene are practiced.

Treatment records show the value of antimicrobials for disease prevention and control and growth promotion, while protecting human health. Additionally, treatment records (processing, individual, mass, feed) show compliance with recommended animal health practices and laws. Documentation provides proof of good management practices that may reduce the risk of antimicrobial resistance, such as: 1) a valid veterinary-client-patient relationship, 2) use of drugs at label recommendations (species, dosage, treatment interval and duration, withdrawal times), 3) use of narrow-spectrum, efficacious drugs for the shortest duration, 4) treatment of high-risk animals only or those that can respond, 5) avoidance of multiple drug use simultaneously, and 6) the avoidance of numerous drug rotations.

If animal health products are used extra-label, then written veterinary prescriptions and treatment records are mandatory. Treatment records provide ac-

countability of drug use and show that due diligence has been practiced to prevent liability. If practitioners regularly and timely evaluate treatment records, they can validate the efficacy of their recommended treatment regimes; determine the optimum antimicrobial, dosage, dosage interval, and length of treatment; identify cases where treatment is not required or of little value; and suggest alternatives to the current drug use.

Treatment, processing, feed and drug inventory records also can provide information on the consumption and use of drugs, whether for treatment, prevention, control of disease or for growth promotion. On a national and international basis, this information is lacking and is being requested by health organizations, such as the WHO, FDA, and Health Canada. This information most likely would be correlated with trends in the prevalence of antimicrobial-resistant pathogens. Records on the results of feed testing for chemical residues, LAST testing on chronic animals, and culture and sensitivity testing of clinical bacterial isolates can provide some information on the successfulness of residue avoidance programs and resistance surveillance.

Format of Records

Records should be legible, permanent, and available for review for at least 2 years. They should be accessible and understandable to everyone who works with the cattle. Records can be kept manually on cards or in binders, but they should be computerized to increase the likelihood that the collected information is used on a regular basis to make informed decisions. There are many computerized programs available for animal health and feeding which contain information such as: 1) lot descriptions, including sales and purchases; 2) processing records with pre-defined processing and implant schedules; 3) drug inventories with cost analyses; 4) treatment records with predefined treatments and withdrawal times; 5) dead analyses; 6) pull reports; 7) cattle transfers and movements; 8) growth performance indices (average daily gain, feed consumption, feed efficiency...); and 9) close-out summaries.

Some of these programs manage data by groups (lots/pens), while others also manage information by individual animal. For beef quality and food safety reasons, including issues on antimicrobial resistance, it is recommended that all feedlot animals be identified with an eartag on arrival. In Canada, individual identification of all animals at the herd of origin, prior to feedlot entry, is being encouraged and will become mandatory in 2001, to allow for trace back in case of animal health or food safety concerns. Additional benefits of individual animal identification, with concurrent record keeping, include evaluation of production efficiency and costs, and development of value-based information systems to enhance end-product quality.

Types of Records

Health organizations have stated that treatment records should be kept by veterinarians and producers to show prudent and judicious drug use.^{1,2} Treatment records for individuals or groups (parenteral or oral (water/feed)), should include, as a minimum, the date(s) of treatment, animal identification (individual, pen, lot), reason for giving the drug (disease), drug, dosage, interval, duration, outcome, and withdrawal time. Additional information that can be collected includes the animal's weight, anatomical site and route of administration, rectal temperature, pen transfer, severity of disease and other comments. Treatment records should be signed by the crew to show accountability. Written standardized treatment regimes should be developed by herd health veterinarians to reduce guesswork and error; reduce the use of inappropriate (off-label) or useless pharmaceuticals; and allow for evaluation of the efficacy of various treatment regimes. Keeping a copy of all labels of animal health products used, including feed tags, in a binder or file, is of value to feedlot personnel who may need to access this information later for trace back.

Necropsy records should be kept to determine the cause(s) of death and to identify risk factors that require further management. Some of the causes of treatment failure that are related to antimicrobial resistance and should be monitored are: inappropriate treatment regimes (e.g. treatment of conditions that would not respond (wrong diagnosis, viral infection); drug not effective for condition; too-short or too-long therapy, inadequate dosage or treatment interval), and antimicrobial-resistant pathogens. Many feedlot veterinarians rank antimicrobial resistance low on the list of causes of treatment failure, but it is a possibility and, therefore, should be investigated when other causes of treatment failure have been ruled out. Necropsy records should include the date the animal died, identification (individual, pen, lot), cause of death, explanatory comments, and outcome of any further laboratory analyses, and should be signed by the person conducting the post-mortem. Necropsy records can be used to monitor events, decide what actions to take when excess losses occur, and verify the health management program is effective.

Processing records also should be kept, since animal health products are administered at this time. These records should show the arrival date(s), date(s) the animals were processed, eartag numbers and any other forms of identification (lot/pen/brand). They should note what animal health products were given, including all vaccines, antimicrobials, parasiticides, vitamins and implants, and any other procedures (e.g. dehorning, castrating, aborting). Injection site maps are useful for BQA. Processing forms should be signed by the person performing the task.

Drug inventory records, including feed medications, should be kept to show antimicrobial consumption and the use of approved products. In the case of some computerized animal health programs, drug inventories are included and the volume of products consumed is summarized in the pen/lot close-out. These running inventories should be kept up-to-date and checked regularly with the actual inventory on hand. Additional records that should be kept for chemical residue avoidance include procedure descriptions and checklists for building and equipment sanitation and maintenance (including mixer efficiency test and feed scale sensitivity); storage of animal health products, including feed medications; and feed receiving, preparation (recipes), processing, and feeding. Results of any feed testing, LAST testing, and culture and sensitivity testing should be kept on file in a safe place for further reference.

An area that has received little attention in record keeping is environmental management. The environment is one source of antimicrobial-resistant organisms, through farm effluent and manure spreading. These organisms may contaminate drinking or swimming water or produce, and thus infect humans. Nutrient management plans should be developed and documented. They should include results of soil and manure testing, nutrient-balancing worksheets, land application descriptions and techniques, and procedures for runoff, erosion, and leaching control.

References

1. The Use of Drugs in Food Animals: Benefits and Risk. Washington, DC, National Academy Press, 1999.
2. The Medical Impact of the Use of Antimicrobials in Food Animals. Report of a WHO Meeting, Berlin, Germany, 13-17 October 1997.