

Prudent Use of Antimicrobials in Small Ruminants

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Antimicrobial resistance occurs when an antimicrobial agent is ineffective in the treatment of an illness or disease it previously treated. Antimicrobial resistance (AMR) can be acquired through spontaneous mutations in the genetic code of microorganisms making that microorganism resistant to the antimicrobial agent. Over-use or inappropriate use of antimicrobial drugs can lead to AMR by increasing the natural selection of resistant microorganism strains. Antimicrobial resistance is a major concern for public health as an increasing amount of virulent bacteria cannot be treated with conventional antibiotics.

In his 1945 Nobel prize acceptance speech (for the discovery of Penicillin), Sir. Alexander Fleming offered the following warning: *“It is not difficult to make microbes resistant to penicillin in the laboratory by exposing them to concentrations not sufficient to kill them, and the same thing has occasionally happened in the body”*¹.

Antimicrobial resistance can be passed along in a variety of methods: genes from resistant populations of microorganisms can be exchanged directly with genes in animals or humans, genes from resistant microorganisms can be passed to humans through the food we eat.

Extra-label or off-label use of veterinary drugs

If there are no approved products for a specific disease condition, or if approved products are deemed ineffective by the veterinarian, he or she can prescribe a non-approved drug or an approved drug at a different dose in effort to treat the disease. The veterinarian must have established a Veterinarian-Client-Patient relationship, be available for follow-up consultation, and must calculate a reasonable withdrawal time to ensure that residue contaminated meat does not enter the food chain.

Due to the few antibiotics approved

for use in sheep, extra-label or off-label use of antibiotics is common in the sheep industry. As described in the Food-Safe Farm Practices (FSFP) manual, **Extra Label Drug Use (ELDU)** occurs any time that a product is:

- Administered to species not listed on the label;
- Used to treat diseases and conditions that are not listed on the label;
- Used at a different dosage than those stated on the label;
- Administered using a route, frequency, duration or timing of treatment not listed on the label; *OR*
- Administered to animals being shipped for slaughter before the stated withdrawal period



Why is extra-label use of veterinary drugs a concern for AMR: especially for sheep producers?

As previously mentioned, antimicrobial resistance can be acquired if antimicrobial drugs are administered at a dosage too low to kill the bacteria, if the drug is not taken for a period of sufficient length, or if a drug is not administered for the right condition. Since many drugs used to treat common illnesses in sheep are used extra-label. The risk of acquiring AMR is higher for livestock treated with ELDU than for other livestock commodities, where medications have been tested in that

species and are indicated to treat a specific condition in that species.

More often than not sheep producers must rely on the expert opinion of their veterinarian who in turn is relying on research data that has been extrapolated from other species, most often cattle. Although veterinarians have access to a wealth of information on drug withdrawal periods through efforts such as the global Food Animal Residue Avoidance Databank (gFARAD <http://www.cffarad.usask.ca>), there is still a level of guesswork involved when prescribing extra-label.

In the US, it is estimated that \$45 million worth of sheep each year is lost from disease conditions for which therapeutic medicines are unavailable.

Extra-label use of veterinary drugs is unavoidable in the sheep industry. Prudent use of antimicrobials should therefore be further emphasized as our industry cannot afford to lose the efficacy of the few drugs it can currently use.

Role of the on-farm food safety program in managing the use of antimicrobials

While extra-label use of antimicrobials is difficult to avoid in the sheep industry, participating in the Food-Safe Farm Practices program can assure that prudent use and due diligence are exercised (Table 1).

TABLE 1. USING THE FSFP PROGRAM TO MANAGE ANTIMICROBIAL USE

FSFP Record	Information Required	How antimicrobial management is improved
1. Animal Health Product Treatment Record	<ul style="list-style-type: none"> • Treatment date, animal or pen ID., condition treated, product used, dose/frequency, route of administration, withdrawal date 	<ul style="list-style-type: none"> • By identifying and keeping records of animals treated we can assure that only affected animals are treated – not only reducing the risk of AMR but reducing the cost by not treating healthy animals • Keeping track of withdrawal dates assures that due diligence has been exercised in assuring that there are no residues in the meat
2. Sample Veterinary Prescription	<ul style="list-style-type: none"> • Patient ID, treatment, instructions for use, prescription expiry, withdrawal recommendations 	<ul style="list-style-type: none"> • By following the veterinarians recommendations for the length of treatment and dosage, the producer demonstrates due diligence especially extra-label use of medications
3. Problems and Corrective Actions	<ul style="list-style-type: none"> • What was the problem? How was the problem controlled? What can be done to prevent the problem from occurring again? 	<ul style="list-style-type: none"> • Implementing corrective actions can prevent further risk of AMR. Example: A medicated feed is accepted without the proper label AMR issue: healthy animals are exposed to antibiotics and may acquire resistance. Corrective action: Request proper label from the company and retrain personnel on acceptable labels for medicated feeds.
4A. Animal Health Products Inventory 4B. Medicated Feed Inventory	<ul style="list-style-type: none"> • Location of purchase, amount purchased, DIN#, expiry date, storage location, disposal comments 	<ul style="list-style-type: none"> • Keeping track of the expiry date of a medication is especially important. An expired drug can have reduced effectiveness and increase the risk of AMR by not eliminating the bacteria being treated. • Proper disposal is important. Disposing of drugs in the sink or garbage can result in drug exposure. Consult your veterinarian or pharmacist for proper disposal.
10. Record of Training	<ul style="list-style-type: none"> • Documents that personnel has been trained to perform tasks and that training has been verified 	<ul style="list-style-type: none"> • Assures that all personnel has been trained in: <ul style="list-style-type: none"> • drug administration • record keeping • corrective action protocols • medicated feed mixing • animal shipping protocols

For more information on the Canadian Sheep and Lamb Food-Safe Farm Practices call 1-888-684-7739, email france@cansheep.ca or visit the new FSFP website for online training @ <http://fsfp.cansheep.ca>

¹ <http://nobelprize.org/medicine/laureates/1945/fleming-lecture.pdf>