

CVMA Prudent Drug Use Guidelines for Beef Veterinarians

Veterinary oversight is a key element of antimicrobial stewardship. It encompasses the professional involvement of licensed veterinarians in providing guidance or direction for appropriate use of antimicrobials in animals with the objective of ensuring prudent use, minimizing the emergence or spread of antimicrobial resistance, maintaining access to effective antimicrobials for animal health, improving animal health and welfare, consumer confidence, and public safety and meeting of phytosanitary standards involving trade. Stewardship-related actions are those that conserve the effectiveness and longevity of antimicrobials by ensuring use of the most appropriate antimicrobial in each case, and by reducing unnecessary usage of antimicrobials in both humans and animals. Stewardship is an active, dynamic process of continuous improvement, involving a 5Rs approach of: responsibility, reduction, refinement, replacement and review.

- Veterinarians are responsible to promote public health, animal health and welfare, including identification, prevention, treatment, and control of animal diseases.
- Beef veterinarians should promote sound animal husbandry methods, including housing for protection from inclement weather and appropriate stocking densities, sound breeding programs, well-balanced nutritional programs, low stress weaning and cattle handling practices, biosecurity programs, risk-based vaccination strategies, preconditioning, evidence-based diagnostics, and low stress transportation practices to minimise the need for antimicrobial use in food-producing animals.
- Veterinarians should train their beef clients on the early and accurate diagnosis of common diseases and conditions in cattle and encourage the utilization of accurate, precise, and reliable diagnostic tools.
- Veterinarians should train their beef clients on the proper handling, storage, administration (indications, product, dosage, route, frequency, duration), precautions, withdrawal times, record keeping, and disposal of all cattle veterinary medical products (VMP), including expired products, to ensure their efficacy and reduce wastage and economic losses.
- Veterinarians should develop vaccination, parasiticide, and treatment protocols, including the use of efficacious antimicrobial alternatives, for their beef clients based on scientific evidence and disease risks specific to each cattle operation based on its production data.
- When developing treatment protocols, beef veterinarians should prescribe the correct treatment for each cattle disease/condition based on scientific evidence. Not all cattle disease conditions need antimicrobials e.g. injuries, retained placenta.
 - *The responsibility of the beef veterinarian when prescribing treatments may be summarized as: Right Drug, for the Right Reason, to the Right Cattle, at the Right Dose, by the Right Route, at the Right Time, for the Right Duration, and with the Right Records.*
- Decisions on whether or not to prescribe an antimicrobial for a specific disease/condition and then, which antimicrobial to prescribe, should be based on sound scientific evidence. The strongest scientific evidence available should be used when making therapeutic decisions. Listed below is the strongest (1) to the weakest (8) quality of evidence in making “evidence-based” decisions:
 1. Evidence from systematic review or meta-analysis of all **relevant RCTs** (randomized controlled trials)

2. Species-specific evidence from at least one large randomized and controlled trial (RCT) or multiple small RCTs
 3. Evidence from well-designed case-control or cohort studies
 4. Species-specific evidence from a small RCT, disease models, large case studies, pharmacokinetic studies using surrogate endpoints, or evidence from well-designed trials in a different species that is considered appropriate for comparison
 5. Dramatic results from either well-designed, species-specific trials without controls or small case studies
 6. Pharmacokinetic studies without surrogate endpoints
 7. In vitro studies
 8. Opinions of respected authorities on the basis of clinical experience or reports of expert committees
- Treatment protocols should describe how to treat common bovine diseases in the cattle operation and include the name of the disease, specific signs of the disease, medical need for a drug or nondrug, product if any, and dosage, route, frequency, duration of treatment for each drug for each occurrence of the disease/condition, and when to stop treatment.
 - Bovine veterinarians are responsible to:
 - prescribe or administer appropriate antimicrobials based on evidence, which includes a pertinent medical history and physical exam of the animal or group of cattle;
 - prescribe antimicrobial agents only when necessary, taking into consideration Health Canada – Veterinary Drug Directorate’s list of antimicrobial agents of human and veterinary importance.
 - use decision trees or algorithms, where feasible, to determine antimicrobial use (yes/no) and antimicrobial choice, taking into account disease risks, product efficacy based on scientific evidence (see above), and importance of antimicrobials to human and veterinary medicine.
 - The expected efficacy of the prescribed treatment should be evidence based, taking into account a:
 - review of scientific research, which should include controlled and randomized research trials in cattle, which may be in-house, that are valid and generalizable to the current situation;
 - review of beef production data, including treatment records;
 - diagnostic laboratory information (necropsies, pathogenic agent isolation, identification and antibiogram);
 - pharmacodynamics in cattle including the activity towards the pathogenic agents involved; the appropriate dosage regimen, and route of administration;
 - pharmacokinetics and tissue distribution in cattle to ensure that the selected therapeutic agent is effective at the site of infection;
 - the epidemiological history of the cattle operation, particularly in relation to the antimicrobial resistance profiles of the pathogenic agents involved;
 - the clinical experience of the beef veterinarian, their diagnostic insight and therapeutic judgement.
 - When prescribing antimicrobials, beef veterinarians should prescribe:
 - antimicrobials for as short a period of time as reasonable; that is, therapy should be discontinued when it is apparent that the immune system can manage the disease, reduce pathogen shedding, and minimize recurrence of clinical disease or development of the carrier state.

- antimicrobials that have the narrowest spectrum of activity and known efficacy in vivo against the pathogen in cattle causing the disease problem.
 - local over systemic therapy, when appropriate.
- Should a first-line antimicrobial treatment fail or should the disease recur, a second line treatment should be based on the results of research or diagnostic tests. In the absence of such results, an appropriate antimicrobial agent belonging to a different class or sub-class approved for use in beef cattle should be used (note: this recommendation is from OIE but new research is questioning this and also questioning switching from a bactericidal to a bacteriostatic drug and vice versa – suggests increases AMR).
- In emergencies, a beef veterinarian may prescribe treatment for cattle without recourse to an accurate diagnosis and antimicrobial susceptibility testing, to prevent the development of clinical disease and for reasons of animal welfare.
- Beef veterinarians should not prescribe extra-label drug use (ELDU) of antimicrobials other than to limited circumstances where an appropriate registered efficacious product is not available. It is the veterinarian's responsibility to provide **evidence** and define the conditions of responsible use in such a case, including the dosage regimen, the route of administration, and the withdrawal period. **Evidence** is based on knowledge of the disease condition, its epidemiology, clinical signs and pathology in cattle, supported by culture and sensitivity results or scientific data confirming the drug's efficacy for that disease condition in cattle, and an expectation that the animal has a reasonable chance of recovery.
 - Beef veterinarians should contact CgFARAD for advice on drug withdrawal periods for all ELDU to avoid drug residues in beef because the prescribing veterinarian is legally responsible for preventing violative drug residues. This is prudent even when prescribing ELDU for diseases not on the label yet using label dosage, route and frequency, because different disease conditions may impact drug depletion.
 - Beef veterinarians may not prescribe the ELDU of medicated feed additives for growth promotion.
 - Drugs or classes of Very High Importance in human medicine which are listed as class I Antimicrobials by Health Canada, such as cephalosporins and fluoroquinolones, should not be used in an extra-label manner in cattle destined for the food chain except if all alternatives have been exhausted and evidence, as described above, is available.
- Beef veterinarians may not prescribe or use API (active pharmaceutical ingredients) in the dose form.
- Beef veterinarians may not prescribe or use drugs prohibited (banned) by Health Canada – Veterinary Drug Directorate for food animals.
- When no appropriate approved products (veterinary or human) exist, beef veterinarians may prescribe that drugs be compounded for use for a specific animal or group of cattle provided the veterinarian has adequate medical justification for the prescription.
 - When dispensing any compounded drug, the veterinarian is responsible for the quality of the ingredients used.
 - Veterinarians must use veterinary or human approved pharmaceutical products as the basis for compounding when available.
 - Veterinarians must not prescribe or use active pharmaceutical ingredients (API) of medically important antimicrobials.

- The prescribing veterinarian remains responsible for the outcomes including adverse reactions, which may include lack of efficacy.
- A veterinarian shall not use cost as the sole reason for prescribing a compounded antimicrobial drug.
- Cost shall not be used as a basis for using an API instead of an approved pharmaceutical product when compounding.
- Beef veterinarians should counsel producers against treatment of chronic cases or cattle with a poor chances of recovery. Chronic cases should be removed or isolated from the remainder of the beef herd or euthanized if necessary for animal welfare reasons.
- Beef veterinarians should prescribe prophylactic or metaphylactic antimicrobials based on disease risks using decision trees/algorithms and anticipated therapeutic responses in that specific beef operation based on its production data, rather than as standard practice for all incoming animals in all beef operations.
- Beef veterinarians should only prescribe VMP (veterinary medical products) for cattle under their care. Beef veterinarians must have a valid Veterinary-Client-Patient-Relationship (VCPR) with any producer they prescribe VMP. A VCPR exists when **all** of the following conditions have been met:
 - *The veterinarian has assumed the responsibility for making clinical assessments and recommendations regarding the health of the animal(s) and the need for medical treatment,*
 - *The veterinarian has sufficient knowledge of the animal(s) on which to base the assessment, diagnosis, and treatment of the medical condition of the animal(s). This means that the veterinarian has recently seen and is personally acquainted with the keeping and care of the animal(s) by virtue of an examination of the animal(s) or by medically appropriate and timely visits to the premises where the animal(s) are kept.*
 - *The client has agreed to follow the veterinarian's recommendations and prescription.*
 - *The veterinarian is available or has arranged for follow-up evaluation, especially in the event of adverse reactions or failure of the treatment regimen.*
- Beef veterinarians must provide valid prescriptions for all VMP prescribed, including MFA and feed additives used in combination that are not approved for such combinations by the manufacturer's label.
 - *A prescription is an evidence-based or informed order by a veterinarian directing that a specific animal patient or group of animals, be administered a specified drug, via an appropriate route of administration, in a defined dosage for a limited time in order to treat or prevent an identified disease.*
 - Requirements to be met by the registered veterinarian in order to appropriately prescribe a drug include:
 - Establish and meet conditions of a valid Veterinarian Client Patient Relationship (VCPR) regarding the specific animal or group of animals,
 - Make an evidence-based investigation of the medical need,
 - Complete appropriate documentation in the medical record, and
 - Provide oversight of use and follow up.
- A prescription must be written, and the following information must be documented in the written prescription provided to the client and / or in the prescribing veterinarian's medical record.
 - Prescribing veterinarian and certified veterinary facility, and contact information,
 - Patient owner/agent (client),

- Date of prescription,
- Individual or group animal identification
- Disease diagnosed, or purpose of use
- Name of drug prescribed and concentration,
- Quantity of drug,
- Directions for Use, including Dose, Frequency, and Duration,
- Route of administration,
- Substitution (yes or no) of same drug (different brand name)²,
- Number of refills (implies zero if not indicated),
- Withdrawal time,
- Signature of the veterinarian.
- For prescriptions regarding medically important antimicrobials to be administered via feed, the following information is also required:
 - Animal production type e.g. heifer calf, yearling steer, cow
 - Weight or age (can use range)
 - Type of feed e.g. premix, supplement
 - Total Amount of feed or Feeding period (e.g. up to xxx tonnes)
 - Amount of drug used per tonne (should be in mg/kg if in feed or specific dosage by weight e.g. mg/kg body weight – must be on a Dry Matter basis per CFIA requirements)
 - Manufacturing instructions – include any clean-out procedures to prevent drug residue carryover
 - Cautions – e.g. species or stages of production to ensure do not consume this feed
 - Withdrawal period - CgFARAD # if applicable
- Veterinarians should prescribe or dispense drug quantities appropriate to the cattle production-unit size and expected need, so that stockpiling of antimicrobial drugs on the farm is avoided.
- When dispensing VMPs, veterinarians must:
 - confirm the identification of the producer and establish and maintain an appropriate dispensing record for each client/patient as part of the medical record,
 - obtain and confirm the accuracy of the original prescription and refill information,
 - maintain the original prescription in the dispensing record, (this may already be documented in the medical record),
 - confirm the identity and registration of the prescribing veterinarian,
 - confirm the validity or reasonableness of the prescription,
 - immediately transcribe to a written prescription any prescription taken over the phone,
 - reject the prescription and not dispense any medications if the prescription is not valid, not reasonable, or improper. The situation may be rectified by calling the prescribing veterinarian for clarification and confirmation of the prescription,
 - confirm any substitutions of a specific medication for a generic medication with the prescribing veterinarian and animal owner,
 - provide the client with all necessary information regarding the use, storage and safety of the product,
 - maintain a declining balance of refills,
 - forward available or remaining totals to other dispensing locations if requested by the producer,

- refuse to provide additional refills when the prescription is finished, and
- ensure the producer knows how to use the product properly.
- Beef veterinarians should label all VMP in accordance with their provincial veterinary licensing body's guidelines and the CVMA Veterinary Oversight Pan-Canada Framework for Veterinarians.
 - The following information must appear on the label affixed to dispensed products. If units of medication are dispensed by the bottle, each bottle must have a label. If units are dispensed in a case lot, each case must display the label. The information may be provided on the dispensing label and/or the manufacturer's label.
 - The words "Veterinary Use Only" must appear on the main panel of both inner and outer package labels, immediately following or preceding the proprietary or brand name, proper name or common name, in type not less than one half as large as the largest type on the label.
 - The name of the client (producer or owner of cattle),
 - The names of the facility and the veterinarian prescribing the drug,
 - The names of the facility and the veterinarian dispensing the drug,
 - Identification of the animal or group of cattle,
 - The name of the drug dispensed and its concentration,
 - The Drug Identification Number (DIN),
 - The quantity of the drug dispensed,
 - Directions for Use in the identified animal or group of cattle, including Dose, Frequency, and Duration as prescribed,
 - Minimal withdrawal time (where applicable) as prescribed,
 - Storage precautions,
 - Any toxic warnings or other precautions appearing on the original label, and
 - Any other information required by legislation.
- Beef veterinarians should encourage cattle producers to document all VMP use, including feed additives, and reasons for such use; ideally on an individual animal basis by CCIA tag; else on a group basis if products given to a "group" e.g. vaccines and medicated feed additives (MFA), and ensure animal health records include drug withdrawal periods.
- Beef veterinarians should regularly monitor VMP usage and disease and mortality rates in their beef clients' operations and identify ways for continual improvement.
- Where possible, beef veterinarians should perform necropsies on farm to accurately determine causes of mortality to better monitor disease rates and determine appropriate preventive, therapeutic, and control strategies.
- Beef veterinarians must maintain medical records, including dispensing and prescribing records with supporting evidence, as per provincial veterinary body licensing guidelines.
- Medical records on VMP should be kept in conformity with national legislation and the CVMA Veterinary Oversight Pan-Canada Framework for Veterinarians. Records should include the following:
 - evidence supporting the medical need;
 - laboratory tests;
 - treatment records with animal identification (may be on farm but vet must have access);
 - mortality records with animal identification (may be on farm but vet should have a copy if conducting necropsies);
 - quantities of VMP used per animal species;

- a list of all VMP supplied to each beef operation (if multiple sites e.g. feedlots, owned by one producer, then by each site);
 - antimicrobial susceptibility data if available;
 - comments concerning the response of cattle to treatment, including treatment failures (reoccurrences of disease or death);
 - the investigation of any adverse reactions to antimicrobial treatment, including lack of response due to possible antimicrobial resistance. Suspected adverse reactions should be reported to the appropriate regulatory authorities.
- Beef veterinarians should periodically review the beef operations medical records on the use of VMP to ensure compliance with their directions or prescriptions and use these records to evaluate the efficacy of treatments for continual improvement.
 - Beef veterinarians should participate in continuing education on antimicrobial stewardship and antimicrobial resistance related to beef cattle.
 - Beef veterinarians should participate in national, provincial, or regional beef cattle surveillance programs for disease and AMU/AMR whilst maintaining client confidentiality.
 - Where feasible and appropriate, beef veterinarians should participate in research related to diagnostics, clinical efficacy of vaccines, antimicrobials, alternate products, and ways to reduce antimicrobial usage and reliance on antimicrobials in beef cattle to preserve their long-term use.

References: OIE Prudent Drug Use Guidelines, Veterinary Oversight Pan-Canadian Framework for Veterinarians, Canadian Beef Code of Practice.