SECTION VI-3
AVOIDING RESIDUES OF DRUGS AND CHEMICALS IN MILK

3. AVOIDING RESIDUES OF DRUGS AND CHEMICALS IN MILK

There are many ways to avoid residues in milk, and the main factor is proper communication on-farm. It is important to ensure that all identification protocols are done correctly, and all employees on-farm are aware of these protocols so the milk is safe for human consumption.

3.1 VETERINARY PRESCRIPTION ONLY

Treat dairy ewes using only drugs that are prescribed by a licensed veterinarian with an appropriate VCPR. This is especially important for dairy sheep producers, as all drugs are used through ELDU.

With a prescription, veterinarians are required to indicate proper milk and meat withdrawal for each drug prescribed. This is also a requirement for the Canadian Sheep and Lamb Food Safe Farm Practices program.

3.2 ANIMAL IDENTIFICATION

3.2.1 IDENTIFY ANIMALS FOR MANAGEMENT PURPOSES

Animals should have permanent IDs to identify them from the flock at any time, not only to distinguish between treated animals, but also to help in day-to-day flock management (Fig. 3). The identification should be:

Fig. 1.

- Unique within the flock (e.g. no instance of 2 ewes with the same tag and colour)
- Useful for managing that animal and accurate recording keeping
- Easy to read from a distance – front, side and ideally back of the animal, or electronically
- Have longevity, i.e. not fade, not break and become unreadable
- Not cause infection of the ear
- Be redundant, e.g. if one tag falls out, there should be another ID on that animal that will allow accurate identification and retagging

TYPES OF PERMANENT AND UNIQUE ID SYSTEMS

Not only is proper identification essential in a flock for management purposes, it is also required by law (Canadian Sheep Identification program, CSIP[1]) to properly tag sheep before they leave a farm. The

[1] http://www.cansheep.ca/cms/en/Programs/CSIPrograms_new/CSIProgram_new.aspx

pink Ketchum Kurl-Lock metal tags can still be used but can no longer be purchased. They are not useful as a management tag.

Fig. 2. Approved CSIP tags

The CSIP radio frequency identification (RFID) tag will soon be the only type of tag allowed and is available as a button (Allflex) or folded (Shearwell) tag (Fig. 4). When combined with a panel tag, it can be read visually and by electronic scanners.

Similar panel tags can be purchased from agricultural stores, and each animal's unique ID, can be written on the tag, and inserted in the ear. This is not compliant with CSIP requirements, but is a good tool for managing a flock.

3.2.2 IDENTIFYING TREATED ANIMALS

Treated animals should also be identified so that the milker can quickly and accurately distinguish them prior to milking. The ID should be:

- Readable from the back / side of the ewe depending on how the ewe is milked
- Not be obscured with manure, mud, long wool, milking or other parlour equipment
- Be semi-permanent, i.e. should be readable for at least 2 months but should be removable after the withdrawal period has ended
- Be easy to interpret as indicating a treated animal

Additionally, treated animals should have a unique management tag so that written or electronic treatment records can be kept.

LEG BANDS

Leg bands are ideal systems in milking parlours, as milkers can easily identify animals when they arrive to be milked (Fig. 5). These bands should be colour coded to minimize confusion about why this animal is being flagged as a concern. E.g. red can mean treated as a lactating ewe; yellow can mean dry-treated; blue can mean a ewe infected with the contagious bacteria *Staphylococcus aureus* (i.e. a "staph" ewe).

Fig. 3. Examples of leg bands

This system is very useful; however there is a chance for bands to fall off the ewes, which is why backup recording in the parlour is essential to make sure treated animals are not being milked in the tank.

PAINT / LIVESTOCK MARKER

Another efficient way to identify treated ewes is using livestock markers. When keeping treated milk out of the bulk tank, livestock marker is not an ideal option: it is not removable when the withdrawal period has ended; if applied on the back it is difficult to see from the milking pit.

3.3 KEEPING GOOD RECORDS

When treating animals, it is imperative that good records are maintained to inform all employees of drug use on-farm. The type of record may vary for each flock, however the important component is to make them

Fig. 4. Record 1. Canadian Sheep & Lamb Food Safe Farm Practices Program

Record 1: Animal Health Product Treatments*

Must Do

Animal or Pen ID	Treatment Date		Reason Treated	Product Name	Prescription (P) or Non-prescription (NP)	Estimated Animal Weight/Number of Animals Treated	Dose	**Route (See Abbreviation Codes below)	Withdrawal Date		Treated by (Initials)
	First Trt	Final Trt							Meat	Milk	
Pen 2	*05/02/10*		*Pneumonia*	*Drug A*	*NP*	*70 kg (8 ewes)*	*(3cc/45kg*70kg) =4.7 cc/animal*	*IM*	*05/16/10*	-	*JD*

**Route Codes: IW – In the water; IF – In the feed; TT – Topical Treatment (e.g. pour-on); OR – Oral; SQ – Subcutaneous; IM – Intramuscular; IV – Intravenous; IMM – Intramammary

Note: If a needle breaks in an animal during an injection, record the animal's identification, location of the needle, and date it occurred, in the comments section.

Comments: _____

Auditor's Initials: _____ Audit Date: _____

* Includes medicated feed or water.

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consistent and easily understood by all employees. There are many reasons that record keeping is imperative, i.e. to ensure that:

- Treated milk does not enter the milk tank
- Milking equipment is washed properly so that no residues remain in the milking claw
- Animals receive subsequent treatment after milking, if required

For all treatments, it is important that all records contain the following:

- Animal name or number
- Drug administered
- Date of first administration, and each follow administration, if required
- Date that the milk can return to the bulk tank, after the milk withdrawal is met

There are a variety of ways that drug use can be recorded, such as the following, and should be consistent on-farm:

- Binder containing up-to-date treatment records. The treatment records provided through the Canadian Sheep and Lamb Food Safe Farm Practices program are ideal for this purpose (Fig. 6).

- Electronic record management software, such as Ewebyte[2], to easily record treatments, and allows for monitoring previous health records in one animal.
- A whiteboard or chalkboard that is placed in the parlour

3.4 COMMUNICATING THE INFORMATION TO PREVENT ACCIDENTS

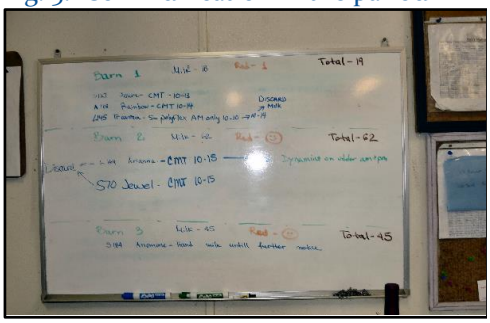
One of the primary reasons to have good communication between employees during milking is to avoid accidents, mainly milking a treated animal into the bulk tank. There are a variety of ways to improve communication between employees, and it is imperative that they are consistent.

3.4.1 COMMUNICATING IN THE MILKING PARLOUR

Many treatment decisions are made in the parlour, whether to treat mastitis or dry a ewe off. Ways to make sure these decisions are properly recorded and communicated in the parlour:

- A whiteboard / chalkboard in the parlour can be used to quickly write down treatment events as they are done
- The treatment records (written or on the computer) should be kept near-by (e.g. barn office) so they can be kept up-to-date at the end of each milking and can be quickly referenced if there is a question about an animal during milking
- Veterinary prescriptions which include information on how and when to administer a drug, and on withdrawal times – should be stored with the treatment records for quick reference
- The methods of identifying a treated ewe (e.g. leg bands) should be kept in the parlour and information on what each colour means

Fig. 5. Communication in the parlour



3.4.2 MILKING TREATED ANIMALS SEPARATELY

Treated animals can be housed in a separate pen so they can be milked after milking the rest of the flock. The pipelines should be first removed from the bulk tank, and treated milk can be emptied directly down a drain. This group should be milked last in the flock to avoid contamination of the milking units and the pipeline with treated milk.

3.4.3 MILKING TREATED ANIMALS INTO A BUCKET

If separate housing for treated ewes is not an option, treated animals can be milked into a separate bucket. When doing this, the milking units are unhooked from the main pipeline, and hooked into the bucket, which prevents treated milk from being mixed in the bulk tank.

When an identified ewe is found in the parlour, the unit should be changed over to the bucket, and all routine

Fig. 6. Hand or bucket milk treated animals

[2] http://ewebyte.com/

milking procedures should remain consistent with what is normally done.

After milking this ewe is complete, the milking claws should rinsed thoroughly with a hose, to make sure any residue is removed from the unit. Keeping a spare claw reserved just for treated animals is recommended. The milking unit should be reattached to the main pipeline after it has been completely rinsed for the next ewe. Treated milk from the bucket should be poured out, and the bucket rinsed thoroughly. Treated ewes can also be hand-milked into a bucket (Fig. 8). Wash hands before and after milking.

3.5 STORAGE OF LIVESTOCK MEDICINES

The storage of drugs is imperative to maintain the efficacy of these treatments. If they are damaged in any way due to poor storage, these drugs may not treat the animal properly, and will not cure the disease, as intended.

In general, livestock medicines should be stored in an accessible place in the barn, such as the office or milk house (Fig. 9). Ideally, it should be kept in a shelving unit to keep them organized, and a door should be on the unit to keep the livestock medicines protected. In addition, a log of these drugs is a beneficial to maintain proper inventory. The Canadian Sheep and Lamb Food Safe Farm Practices program provides these records (Fig. 10) and guidelines for drug storage. Make sure that the Lot number is recorded from each Animal Health Product so that proper tracking can be done.

Fig. 7. Store medicines correctly

3.5.1 LACTATING VERSUS DRY

Drugs that cannot be used in lactating dairy ewes should be stored separately from those for which a veterinary prescription exists for use in lactating ewes. They should be stored in a separate cupboard which is clearly marked on the outside as to which class of medicine it contains (See Section V.5) It is not uncommon (for example) for a lactating animal to be accidently treated with a an intramammary "dry cow" product. If this happens, the milk may need to be discarded for up to a month!

3.5.2 BOXES, INSERTS AND LABELS

As outlined in Section VI.1.1.4, there is very important information required by law present on the label, box or insert in which the drug was purchased. That information should be kept in the binder with the treatment records where it can be quickly referenced and not discarded.

Never use a drug that is not properly labelled. Never "repackage" a drug into an unmarked or inadequately marked container.

3.5.3 KEEP DRUGS AT THE PROPER TEMPERATURE

Drugs are required to either be at room temperature (e.g. 15 to 28° C), or refrigerated at approximately 4°C. Check the label to determine which is required. Do not keep drugs in the door of the refrigerator as it can be much warmer than the rest of the fridge. If the drug must be frozen (e.g. reconstituted PMSG, see Section I.2.5), make sure the freezer temperature is as cold as or colder than -20° C.

The refrigerator should be kept in an accessible room, such as the office or milk house of a barn, and only drugs should be stored in this refrigerator, not food or drink. Keep a thermometer in the fridge and routinely check the temperature. Keep the fridge in a clean environment. Dust and dirt may harm its operation. The refrigerator should be maintained (e.g. defrosted) regularly so the drugs do not freeze.

Fig. 8. Refrigerate drugs properly

3.5.4 HEAT

Much like freezing, excessive heat exposure to a drug can have can affect its overall efficacy. This is a common concern with drugs that are maintained at room temperature, especially during the summer months. It is important that drugs are stored in a cool area, such as an enclosed shelving unit, to shield the drug from heat. NEVER keep drugs on a window shelf!

3.5.5 LIGHT

For many medications, it is important to keep them away from direct light or sunlight, as this could damage the drug. These drugs should be stored in a storage unit equipped with a door, so they can be shut out from the sun (Fig. 9). If stored on a shelf, keep in the box.

3.5.6 EXPIRY DATE AND DRUG INVENTORY LOG

All drugs have an expiry date, and should not be used passed this time point. A log with an inventory of drugs and their corresponding expiry dates should be updated regularly so expired products can be disposed of and replaced with newer products (available from the Canadian Sheep and Lamb Food Safe Farm Practices program) (Fig. 10). This log should include **batch and lot number** as well in case of recall.

3.5.7 AVOID CONTAMINATION OF THE DRUG WITH BACTERIA

Drugs containing bacteria will not work and can be harmful to the animal. For injectable drugs in particular, it is critical to keep the drug sterile. **DO NOT EVER**:

- Insert a used needle into the bottle –use sterile needles to withdraw
- Leave a needle in the bottle between uses – it allows bacteria to enter
- Insert a syringe top into the bottle, the hole it makes is large and allows bacteria to enter
- Leave the bottle where flies and dust can contaminate the rubber stopper – next time you put the needle in, you will push bacteria in with it
- Remove the rubber stopper to withdraw the drug – the stopper is important in keeping the drug sterile
- Return unused drug in a syringe to the bottle – you cannot be sure that drug is still sterile

An open bottle should be stored properly. A clean cotton swab with isopropyl alcohol (same as you use to disinfect the teat to take milk samples) can be used to disinfect the rubber stopper. Some vaccines indicate to discard after opening. This is because bacteria readily grow in the vaccine. Follow directions!

Fig. 11. Site of intramuscular and subcutaneous

Fig. 9. Medications inventory record. Canadian Sheep & Lamb Food Safe Farm Practices program

Record 2A: Animal Health Product Inventory **Must Do**

Use Record 2B: Medicated Feed Inventory, for recording medicated feed purchases and maintaining an inventory of medicated feed.

Date Received	Purchased From	Product Name	Amount Purchased	DIN# or Batch Numbers	Expiry Date	Storage Location	Quantity Remaining at time of Review and Date of Review	Disposal Comments and Date	Initials
02/05/01	*Co-op*	*Drug A*	*(1) 500 mL bottle*	*00000345*	*05/10*	*Fridge in barn office*	*1/2 bottle (250 mL) on 05/05/03*	*05/05/10 set aside for vet pick-up*	*JD*

Comments: _____

Producer's Signature: _____ Date of Review: _____

Producers are to review record before signing.

Auditor's Initials: _____ Audit Date: _____

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3.6 ADMINISTRATION OF DRUGS

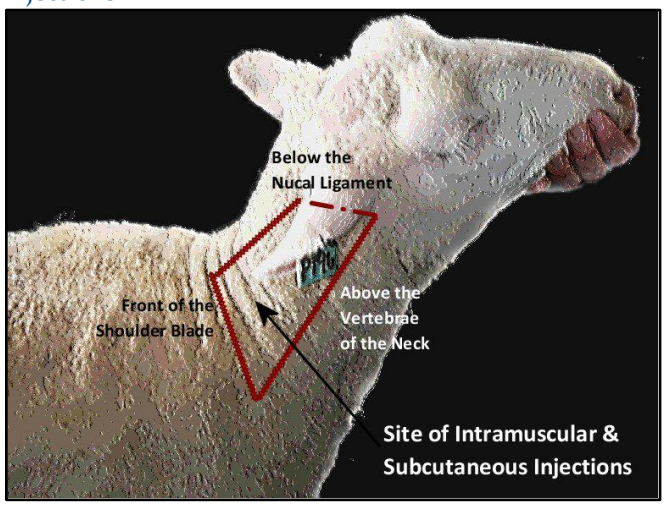
3.6.1 ROUTE OF ADMINISTRATION

It is important to follow labelled directions of each drug to ensure that it is being administered properly.

For treating pathogens in the udder specifically, antibiotics can be administered by intramammary route.

- Intramammary (IMM): Only drugs labelled for IMM should be administered this way. See Section VI.4.2 for instructions on how to do this.
- Intramuscular injections (IM): For meat quality purposes, this injection is primarily

Fig. 10. Site of intramuscular and subcutaneous injections



done in an area of lesser value, such as in the neck (Fig. 12).

Fig. 12. SQ injection in the neck (left) or axilla (right)

- Subcutaneous injections (SQ): The drug is injected underneath the skin, in the neck or axilla (under the front leg) of the ewe (Fig. 13). Skin can be tented prior to injection to reduce risk of injecting too shallow or deep. If both SQ and IM are offered as choices to deliver the drug, select SQ, as it is less damaging.
- Intravenous injections (IV): It is rarely necessary to give a medication intravenously. It is important to be trained on how to give IV injections by a veterinarian to ensure that the drug is being administered properly.

3.6.2 EQUIPMENT USED FOR ADMINISTRATION

SINGLE – USE SYRINGES

Single-use syringes should always be used for treatments, unless treating a large number of animals at one time (e.g. vaccinating the flock against clostridial diseases, see Section I.2.1.1). By using these syringes only once, it decreases the chance of contamination of the drug, and infection of the ewe. Syringes come in many sizes: 1 mL; 3 mL; 6 mL; 12 mL; 20 mL; 35 mL; 60 mL. The size of the syringe used should match the volume to be administered. E.g. don't use a 12 mL syringe to administer 2 mL of a drug – it can't be done accurately.

Two different syringe tips are available; a regular tip syringe and a luer lock syringe. Needles are placed directly onto the regular tip syringes, while with luer lock syringes; needles are twisted onto the tip of the syringe to lock it in place so there is less chance the needle will fall off when administering drugs or vaccines.

AUTOMATIC SYRINGES

Fig. 13. Automatic syringe

This type of syringe is used when injecting a large number of animals with the same amount of drug or vaccine, within a short time-period (e.g. an hour). It is set up to deliver the same volume each time you squeeze the trigger. For this reason, it is difficult to change the volume easily between animals. The same needle is often used for several sheep in a row. Discard immediately in a sharps container if the needle becomes contaminated, bent or dull. Automatic syringes require careful washing and disinfection after use, and proper storage where it is dry and dust free. Regular maintenance is required to replace worn out parts.

Fig. 14. Disposable needle

SINGLE – USE NEEDLES

The type of needle used on a sheep depends on the size of the animal, and the viscosity (thickness) of the drug being injected. Higher gauge number = small bore size of the needle. For lambs,

needles should be a gauge of 20-22, and a length of ½ to 1 in. For ewes, a gauge of 20-18 and a length of ¾ to 1 in is generally used. If treating IM, the needle should be longer to properly penetrate the muscle, and for SQ (e.g. for vaccinating), the needle can be shorter. Using a longer needle increases the risk of breakage if the animal should move.

Usually the cap on the needle and sometimes its hub are colour coded but the colours may vary with the manufacturer. It is best to read the label on the box, or right on the cap to make sure you are using the correct gauge and length.

Don't reuse needles. It is very difficult to effectively clean the inside of a needle where there may be residual drug and bacteria. Resterilizing the needles will cause them to become dull and increases the risk of breakage. In the scheme of things, a sterile needle is a cheap investment.

HOW TO AVOID INJECTION SITE ABSCESSES

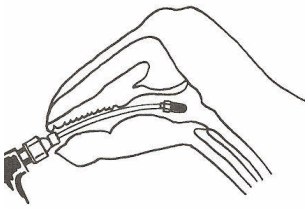
- Prevent contamination of the drug with bacteria as covered in Section VI.3.5.7.
- Always use sterile needles and syringes.
- Only inject sheep when they are dry. Wet wool and wet skin can easily contaminate the needle when making the injection. If you are planning to vaccinate (for example), keep the sheep indoors if the weather is wet.

Fig. 15. Injection site abscess

DRENCH GUNS

Drench guns are used to administer treatment orally to sheep. Only relatively small amounts of treatment can be used with a drench gun, with volumes of <30 mL. This liquid is inserted into the animal's mouth over the back of the tongue, and is then swallowed into the rumen (Fig. 17). Injectable products should not be administered as a drench! Generally anthelmintics (dewormers) are administered in this way. Oral antibiotics are NOT recommended for the treatment of mastitis or other bacterial infections in sheep.

Fig. 16. Tip of drench gun over back of tongue



3.7 THE CANADIAN SHEEP AND LAMB FOOD SAFE FARM PRACTICES PROGRAM

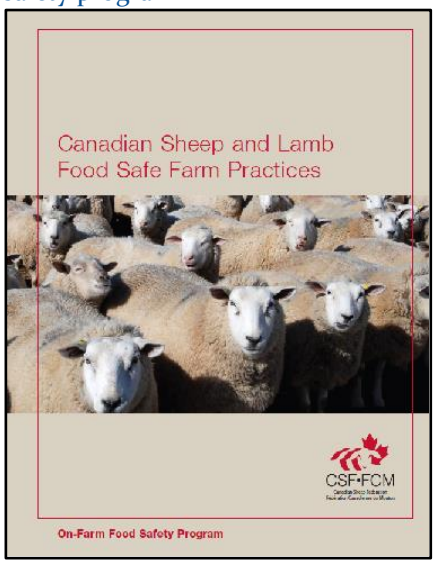
The Canadian Sheep and Lamb Food Safe Farm Practices (FSFP) program which has been mentioned many times in the document, provides rules and guidance for sheep producers to assure animals and their products are safe for the public. All documents are available for download from the web[3] or ordered from the office of the Canadian Sheep Federation[4].

[3] http://www.cansheep.ca/cms/en/Programs/FoodSafeFarmPractices/FoodSafetyFarmPractices.aspx

[4] Barb Caswell, National On-Farm Food Safety Coordinator. Phone: 519-824-6018 / 1-888-684-7739; Fax: 1-866-909-5360. barbara@cansheep.ca

This program identifies good production practices (GPPs) either as "must do's" or "recommended". To help with implementing these practices, record keeping is required to ensure that all GPPs are being conducted properly. The program includes dairy sheep production.

Fig. 17. Canadian sheep on-farm food safety program



3.7.1 ADVANTAGES

One of the major benefits of this program is improvement of consumer confidence in the product that they are buying. It can increase confidence between producers and processors, and product sales can be expanded within agricultural sectors, and internationally. In addition, flock management can improve dramatically with accurate record keeping of animal health events.

3.7.2 HOW TO BECOME TRAINED

There are three methods that are currently available for producers to take the FSFP training course. These include in-person training sessions, online training, as well as mail-out training. These training courses provide a comprehensive background on how to apply these practices to individual flocks to ensure that all is being done to minimize food safety hazards. The majority of this training focuses on GPP's, and how to maintain good record keeping.

3.7.3 HOW TO BECOME CERTIFIED

In order to be certified, your farm will need to successfully complete an audit. Complete the training course, and then implement good production practices and record keeping on-farm. Once one full cycle (from one lambing to the following lambing) has passed, complete the self-assessment form included in the program to determine if you are ready for an audit. Contact the CSF and the auditor will come to the farm to review the records. If the audit is passed, your farm is certified. Certification with the FSFP program is annually renewed in a four-year cycle: Year-1 is a complete audit; Year-3 is a review of on-farm records; and Year-2 and Year-4 are a "self-declared" assessment of the progress and compliance of the program.

3.8 IF TREATED MILK GETS INTO THE BULK TANK

There are some things that producers can do to avoid the chance of this milk being transported for processing.

- If milking into a tank. The most prudent action is to stop milking the remainder of the flock, take a sample for testing at the laboratory, and dump the suspect milk. Once the tank and equipment have been cleaned and sanitized, proceed with milking the rest of the flock.
- Using an on-farm milk testing kit may help make decisions as to whether the milk is safe, but these kits are only moderately accurate and so the risk is that the result may be a false negative (i.e. the milk is positive when the test kit is negative).