D4 Medical Supplies: Use and Storage

D4.1 Introduction

Canada has earned a reputation for having the highest quality and safest pork in the world. During 1997-98, random testing in processing plants across Canada showed that 99.6% of the hogs tested were residue free. While this is impressive, it remains that some hogs are being marketed each year with detectable drug residues. This has the potential to destroy consumer confidence and markets.

Drug residues can be caused by human error, lack of knowledge or intentional misuse. Human error might result if someone treated the wrong animals, if they used the wrong dosages or if they failed to identify treated pigs. An uninformed farm worker, not knowledgeable about withdrawal times and proper drug use, could ship too soon. Intentional misuse occurs when pigs are deliberately shipped before the appropriate withdrawal period is over or when drugs are used in a way that is known to be inappropriate.

Needles broken off during treatment can sometimes make it through to the consumer in primal cuts, such as the ham. Each year, at least one broken needle is found in Canadian pork. Injection site damage and abscesses due to poor injection technique is a much bigger problem. This results in extra trim that is often marked on producer settlement statements as an abscess. The producer may never know that it was injection related.

D4.2 Needles and Injections

The likelihood of breaking a needle is reduced when the needle is sharp and the animal is adequately restrained. Dull and burred needles cause more pain, which makes it more likely for pigs to resist. A bent needle must not be straightened for reuse after it has been bent. Bending weakens it, making the needle more likely to break. Removing a broken needle from a live pig on the farm is not always possible since the needle fragment can move, making it difficult to find. If it cannot be done, the pig should be permanently identified so it can be handled appropriately at the processing plant.

The CQA® program requires the use of detectable needles. These needles have been designed to be detectable by current metal detectors in our slaughter plants. These needles have also been designed specifically for use in livestock and are less likely to bend and break than other disposable needles. Proper care still needs to be taken in their use, however, as they can still break and small fragments may not always be detectable. They are designed to be stronger, but caution and prevention are still needed. A needle in the food chain is an unacceptable result of inappropriate on-farm protocols or failure to contact the necessary people for proper handling of a hog with a suspected needle fragment.

Contact your packer or marketing agency to determine how animals should be identified and reported (different packing plants may have different requirements for identification and reporting of suspect animals) and to report suspect animals that are being shipped.

Proper injection technique is important. It ensures adequate absorption of the drug and minimizes risk of complications like broken needles, abscesses or scar tissue. The size of the animal determines what gauge and length of needle is appropriate. Size will also determine the maximum amount that can be injected at any one site, if large dosages are to be given.

For intramuscular injections:

Animal	*Gauge*	*Length*
Sows	16	1 1/2”
Grower/finisher	16 or 18	1”
Weaners	18	3/4” or 5/8”
Baby pigs	20	5/8” or 1/2”

- Only detectable needles may be used. These needles will be identified as detectable on their packaging. If you are uncertain whether your brand of needles is detectable, check with your supplier or provincial delivery agent. (On Farm Quality Assessment Form question #13c)
- Intramuscular injections may only be administered in the neck muscles or, for breeding stock, in the neck or at the hip injection site. (On-Farm Quality Assessment Form question #12)
- Ensure that injections administered at the neck location occur well ahead of the shoulder and close behind the ear. Hitting the shoulder bone can break or bend needles. (On-Farm Quality Assessment Form question #12b)
- The protocol for administering intramuscular injections in the hip is provided in detail on page D4-14. Remember that this injection site may only be used in animals committed to the breeding herd and that injection volumes may not exceed 5 cc. (On-Farm Quality Assessment Form question #12a)
- Reproductive hormones only may be administered via injection into the perineal injection site. Producers should consult with their veterinarians to ensure that they are using the appropriate technique to inject at this site and that they are observing the appropriate withdrawal times

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- Use sharp needles. It is recommended that you change them after every 10 pigs or after each litter. (On-Farm Quality Assessment Form question #13)
- Administer intramuscular injections at right angles to the skin. Injecting on an angle may place the drug in the fat under the skin, rather than deep in the muscle. Many vaccines and drugs are not effective if they are placed in the fat. If the needle is on an angle, it may also hit the shoulder bone and break, or hit the jugular vein and kill the pig if it is small.

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- Always discard bent needles into a “sharps” container rather than try to straighten them. These containers can be purchased, but an old plastic bleach or milk jug will make a ready and inexpensive substitute. (On-Farm Quality Assessment Form question #13a)
- Consider “needle counts”. What goes in, must come out. In this case, all needles going into the barn must come back to the office and be counted before disposal.
- It is recommended that you carry extra needles. When your only needle bends and it is a long walk back to the office, it is tempting to use it anyway. Make sure that extra needles are close by when treating animals.

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- Always inspect needles for damage following each injection.
- Set a farm target of zero broken needles in all production areas, even sows. When needles break frequently, it is a warning that something is wrong. Review injection technique, staff training and choice of needles (length and gauge).
- Consider the use of slap shot or similar attachments which use a flexible hose that connects to the syringe. This allows your hand to move more easily if the animal moves, reducing stress on needles and hubs.
- Consider the use of stronger needles and hubs. Many needles break at the hubs. Stainless steel hubs are stronger than aluminum hub, which are stronger than plastic hubs. Plastic hub needles should only be used in baby pigs, never in larger animals.
- Some needles are only made for single use

and are not strong enough to be used multiple times.

- It is recommended that you do not use 18 gauge 1.5 inch needles. These needles are weak due to their length and small gauge. It is recommended that you use 16 gauge 1.5 inch in sows and 18 gauge 1 inch needles in growing pigs.
- Consider a no needle policy in your grower/finisher areas. High health pigs rarely become ill and many who do will recover without antibiotics, especially if the animal is placed in a separate pen to rest and recover. Some drugs can be given through the water. Consult your veterinarian about reducing or eliminating needle use.
- If you break a needle, determine if the fragment can be retrieved.
- Permanently identify all hogs with broken needles or suspect broken needles. Record the incident including, if possible, the location of the broken needle. (On-Farm Quality Assessment Form question #14)
- Notify your marketing agency and/or packer prior to shipping an animal with a broken needle or suspect broken needle. Be aware that different packers and different provinces may have different requirements for identification and for notification. Familiarize yourself with the procedures for your province and packers.
- Ensure that staff members understand that it is important to record and report a broken needle incident. (On-Farm Quality Assessment Form question #14)
- Detectable needles still must be reported prior to shipping hogs. The metal used in these needles can be detected by a metal detector. Most processors use a metal detector on all finished cuts of pork to check for broken needles or other metal fragments in the meat. A detectable needle could still be missed in the plant, so your processor must be notified.
- Inject small amounts at each site. No more than 10cc per site in adults in the neck, no more than 5cc in the hip (this option is only available for breeding animals), and no more than 2 cc in baby pigs. (On-Farm Quality Assessment form question #13b)
- Store drugs at proper temperatures and in correct locations. Product labels will indicate temperature ranges and whether the product should be protected from light. Protect all medications from freezing. Always follow the manufacturer's instructions for storage.
- Transport medications at proper temperatures. Avoid transporting or leaving products requiring refrigeration sitting in hot vehicles. Similarly, protect products that should be stored at room temperature from freezing.
- Dust from barns may contain enough bacteria to contaminate unwashed syringe barrels and partial bottles of stored product. Be aware of this risk when injecting air to make withdrawal from bottles easier. For the same reason, you should never store needles in the caps of injectable medication bottles.
- Always visually inspect medications prior to use. Bacteria can colonize a bottle of antibiotic. Any change in colour, clarity or consistency may indicate a problem with the medication, in which case it must be discarded or returned to the supplier. (On-Farm Quality Assessment Form question #13b)
- Needles and syringes should be washed in very hot water and, if possible, sterilized. Be sure to thoroughly rinse needles and syringes prior to next use. Some detergents and disinfectants can neutralize the effects of some medications. Similarly, residual medications may result in an adverse reaction when one syringe is used to administer more than one medication. (On-Farm Quality Assessment Form question #13b)
- If equipment is designed to withstand high temperatures or boiling, injection equipment can be boiled in water for thirty minutes to sterilize it. This is the safest method to use in order to avoid affecting medications and vaccines with disinfectant residues. (On-Farm Quality Assessment Form question #13b)
- Discuss disinfectant options with your veterinarian. A closed container of "cold" sterilizing

solution may be an option for your farm.
- Avoid giving injections through skin that is obviously wet and dirty. (On-Farm Quality Assessment Form question #13b)
- Discard partial vials of vaccine, if not used within the restricted time period defined by your veterinarian.
- It is recommended that you use transfer needles. Needles that have been used in an animal should never be returned to a medication bottle. Following this procedure eliminates the transfer of microorganisms from an injection site back into a bottle of medication. (On-Farm Quality Assessment Form question #13b)
- Animals must be inspected at least weekly for any occurrences of abscesses requiring treatment. (On-Farm Quality Assessment Form questions #20e, #20f)
- Review injection procedures and medication handling with your staff and your veterinarian annually at the very least, and any time an increase in the incidence of injection site abscesses occurs. (On-Farm Quality Assessment Form question #20e)
- Treatment records must be reviewed at least once annually(verification), but more frequently if possible, and must be reviewed by someone other than the person normally responsible for keeping treatment records. The records must be signed and dated, to indicate that they have been reviewed. (On-Farm Quality Assessment Form question #20e)

D4.3 Establishing a Medication Usage Plan

The purchase of healthy stock, modified pig flow, biosecurity and vaccination programs have reduced the need for antibiotics. Reduced drug use reduces the likelihood of residue problems and also reduces the cost of production. Many producers sit down with their veterinarians at least once per year to critically review the protocols they have in place.

Establishing protocols and keeping records takes time. But because the process jogs memories and establishes a means of ensuring effectiveness, it is a necessary part of any quality assurance program.

Pig production is full of change — new employees, new disease diagnosis by the herd's veterinarian and new products. Protocols tell any new employee why a medication is used, the type of pig it is used on, the dosage to be used, the way it is administered and how to make sure the pig does not get sent to slaughter before it is time. Records should show when the vet made his/her diagnosis and when the protocol was changed. Written communications allow someone who is not familiar with the operation to take over during the absence of the person who normally does that job.

- Establish a Medication and Vaccine Usage Plan with your veterinarian. Review the plan at least once annually. Also review the plan with your staff and ensure that it is being followed. (On-Farm Quality Assessment Form question #18)
- Create a plan to identify what will be done in case an error occurs in the use of medications, including feed medications. This plan must include:
  - a description of how affected animals will be identified;
  - what records will be kept concerning the incident and how it was corrected; and
  - who will be contacted (management, veterinarian, processor).

  (On-Farm Quality Assessment Form question #11e, 17d, 20f)
- The use of antimicrobials, whether administered by injection, in the water or in the feed, could lead to antimicrobial resistance. To minimize the impact of this, review your Medication and Vaccine usage plan to ensure that all antimicrobials are being used appropriately.
- All prescription medications are marked with a Pr symbol on the label. These products

may only be purchased from veterinarians with whom you have a veterinary-client-patient relationship.

- Over-the-counter (OTC) medications will not bear the Pr symbol but will be marked "For Veterinary Use Only". These medications may be purchased from veterinary offices or other livestock medicine outlets.

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- Repackaged product (repackaged by your veterinarian) must be appropriately labelled and must only be provided under a valid veterinary-client-patient relationship. Be aware that when materials are repackaged, that there is a risk of contamination, and they must be handled with care.
- If your veterinarian supplies you with a generalized drug use plan that has been developed for all of his/her clients, highlight the products that you use or transfer the information on the products you use to your own personalized drug use plan. (On-Farm Quality Assessment Form question #18)
- Familiarize yourself with the type of information contained on package labels and inserts.
- Make label reading a habit. Pharmaceutical companies periodically make changes to dosage rates or withdrawal times. Comparing the label to your drug use plan will allow you to identify when these changes have been made.
- Establish identification procedures for animals that receive treatment by any treatment route (e.g. in the feed, in the water, injection, topical, etc.). Firstly, you must be able to identify individuals, because many drugs require treatment to be repeated over several days. Once treatment is complete, you may either continue to identify the individual or extend the withdrawal hold time to the entire pen, room or lot. The decision is yours, and will depend on the production stage of the animal being treated as well as your normal shipping practices. (On-Farm Quality Assessment Form questions #20b, 20c)
- Maintain treatment records for all pigs over 25 kg bodyweight. These records must include the date of treatment, identification of the animal, product and dosage used and withdrawal time information. If a needle has been broken, that information should also be noted in the record. However, there is no need to complete that particular column of the treatment record if no needle has been broken. All treatments, whether by injection, through the water, or via a topical or oral medication must be recorded. If animals less than 25 kg bodyweight are being sold or transferred from the production unit, the outgoing pig treatment record may reflect any treatments that the lot of animals has received and does not necessarily need to reflect individual treatments. (On-Farm Quality Assessment Form question #20d)

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- Establish protocols to ensure that water medication is delivered at the correct dosage and to targeted animals only. (On-Farm Quality Assessment Form question # 17)
- Plan who makes the decisions, calibrates medicators, places and sets valves, flushes water lines, assesses the risk of non-medicated swine eating feces or drinking from gutters of treated pigs, listing those responsible for staff training, the chain of command and testing. (On-Farm Quality Assessment form question #17).
- Create a plan that describes what you will do if something goes wrong during the use of water medications. The plan must include:
  - who will be notified of the error and/or contacted for consultation;
  - how equipment will be handled (drained, flushed);
  - how animals will be identified and handled; and
  - what records of the incident will be kept and where they will be stored.

  (On-Farm Quality Assessment Form question #17d)
- If you do not normally ship pigs prior to commercial market weight, you may want to consider a strict protocol that prohibits the sale of animals for slaughter prior to a defined size/weight. This will assist you in planning your

pig identification system. (On-Farm Quality Assessment Form questions #11c, 20, 22)
- Consider introducing a policy of not treating any animal (though feed, water or by injection) during the finishing phase.

D4.4 Dosages and Withdrawal Periods

Drugs manufactured and sold in Canada are required by law to include specific information on their labels. Most manufacturers also include a product insert which provides information that does not fit on the label. Labels can become soiled and stained. Consider keeping a file of package inserts that describe how the product is to be properly used.

Extra-label (or off-label) drug usage exists anytime you differ from the directions the label gives for the following parameters:
- Dosage
- Route of Administration
- Duration or frequency of treatment
- Species of animal
- Purpose of treatment

When extra-label drug use happens, the withdrawal time for the product will be different. Be sure to handle treated animals appropriately, and pay careful attention to the directions provided by your veterinarian.

Using either prescription or over-the-counter medications other than as described on the label constitutes extra-label usage of the product.
- Another form of extra-label drug use is the use of drugs in the form of bulk active pharmaceutical ingredients or compounded products.
- An Active Pharmaceutical Ingredient (API) is a substance that is intended to be used in the manufacture of a medicinal product, and, when used to manufacture a drug, becomes an active ingredient in that drug. API may not be used in bulk form on the CQA® program. Compounded API that meet the criteria of the CQA® Drug Use Policy may be used. See page D4-13 of the Producer Manual for the Policy.
- Compounding is the combining of two or more ingredients, at least one of which is a drug or active ingredient to create a product in a form appropriate for dosing. Compounding is an activity regulated at the provincial level and, generally, only pharmacists and other practitioners (doctors, dentists, veterinarians) are permitted to compound products. Mixing two or more medications in syringe for delivery to animals is a form of compounding and is not permitted.
- Compounding differs from the manufacture of drugs in that it is intended for a specific patient or diagnosed disease condition while the manufacture of drugs is the large scale production carried out by pharmaceutical companies.

The CQA® Program Does Not Permit Extra-Label Drug Use unless:
- There is written veterinary direction, including recommended withdrawal time ;
- No approved products exist for a particular use; and
- A valid veterinary-client relationship exists.

A valid veterinarian-client-patient relationship must meet certain criteria. The registered veterinarian must assume responsibility for making medical judgements regarding the health of a person's animal or animals and the need for treatment. The client must agree to follow the veterinarian's instructions. The veterinarian must have sufficient knowledge of the person's animal or animals to initiate a general or preliminary diagnosis at the very least. This can be done either by examination or by timely visits to the premises. The registered veterinarian must be readily available for follow-up care, in case of adverse reactions or failure of the treatment regime. Each province's Acts, Regulations or

Veterinary Association by-laws specifically define the nature of veterinary-client relationships for that province.

Cutting a withdrawal time short, even by a day, puts the producer at risk of putting a residue-containing pig into the marketplace. Doubling a dosage does not necessarily mean that doubling the withdrawal period will be adequate. The higher dosage may, in fact, triple it. Producers and stockpersons must not initiate any form of extra-label usage, unless acting under the direction of the veterinarian who sold the product.

- Develop a veterinary-client-patient relationship if there is not one already in place. (On-Farm Quality Assessment Form questions #11a, 17a, 18, 20a)
- Delay shipping and/or have the pigs tested before sending them to slaughter, if someone inadvertently gives an excessive dosage or loses track of when the withdrawal period should be adequate. (On-Farm Quality Assessment Form question #20f)
- Ensure that extra-label directions are available for the validation review (On-Farm Quality Assessment Form question # 19)
- Pay particular attention to withdrawal periods and drug usage in pigs that are to be processed young for barbecue or ethnic markets. (On-Farm Quality Assessment Form question #22).
- Dosages require that you know the recommended or prescribed dose of drug (how much), the route of administration, the weight of the animal, how often the animal needs to be treated and for how long. You should periodically weigh at least one animal on a scale to get an estimated body weight for a group of pigs. If you guess an animal's weight when determining the amount of medication to be administered, you will likely under- or overdose that animal. This is an important part of staff training, and managers should ensure that their staff understands how to properly calculate dosages and determine pig weights.

D4.5 Water Medication

(On-Farm Quality Assessment Form question #17)

- The use of water medication is a convenient way to deliver medication to a large group of animals. When animals are already sick, water consumption is also more likely to occur than feed consumption.
- Water medication must be included on your Medication and Vaccine Usage plan. (Sample form provided in the On-Farm Quality Assessment Form or use a similar form of your own or provided by your veterinarian) (On-Farm Quality Assessment Form question #18a)
- Read the manufacturer's directions for use of your water medicator and ensure that it is properly set up.
- Carefully read water medication labels for dosage rate as well as any product contraindications.
- When reading water medication labels, take note of whether there is any indication that the product is not suitable for use with a water medicator. Some products are not intended for use with a medicator and may either state this on the label or will offer no direction for use with a medicator.
- When calculating dosages for water medication, keep in mind that pigs consume a volume of water equal to approximately 6-10% of their body weight per day or from two to four times dry matter consumption. If necessary, weigh a sample of the pigs to be treated to estimate body weight.
- Water medicators must be calibrated on a regular basis. Calibration must be done according to the manufacturer's specifications and include collection of solution from the medicator to make sure it is delivering the volume it is set to deliver. Make any necessary adjustments. Keep a record of each time that medicators are calibrated. This record may be kept on your treatment record or another record of your own design. Be sure to indicate in your protocol where you write the record and the location where records are kept.

- If you are using a water meter, keep in mind that water disappearance, on average, exceeds consumption by 35% but the difference may be as great as 100%.
- Keep in mind that consumption will increase 15-50% when barn temperatures exceed the upper limit for the pigs' comfort level.
- Expect water intake to increase if pigs are experiencing diarrhea.
- Consider restricting access to water prior to providing medicated water. Do not restrict water access to dehydrated animals.
- It is recommended to mix only enough product for one day and to dose it over 8 hours.
- Remember to turn off the regular water supply, if necessary, when supplying medicated water and to turn the regular water supply back on when done.
- Stock solution is the first dilution of a concentrated water medication. It is made by mixing a concentrated drug product in water. Stock solutions help to ensure that medication is properly mixed. They are added to the water that pigs will drink to deliver the medication.

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- Visually inspect the mixed stock solution to ensure that the product has dissolved properly and that disappearance is as expected.
- Inspect flow rate settings prior to providing medicated water to ensure proper settings for size of pig and medication being used.
- Be sure to check valves prior to delivery of medicated water to ensure delivery to correct animals.
- Record treatment with medicated water in your Pen or Individual Treatment Records. (A sample form is provided in the On-Farm Quality Assessment Form)
- Treatment records must be reviewed at least once annually(verification), but more frequently if possible, and must be reviewed by someone other than the person normally responsible for keeping treatment records. The records must be signed and dated, to indicate that they have been reviewed. (On-Farm Quality Assessment Form question #17c)

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- Review water medication protocols on a routine basis (at least once per year) and observe staff responsible for mixing and delivering medicated water while performing their tasks for these protocols.
- If something goes wrong with the use of water medication (deviation), make a record of the error and how it was corrected in the Corrective Action Form or a similar form of your own design (On-Farm Quality Assessment Form #17d).
- It is not necessary to use a water medicator to distribute water medication. You may mix and deliver medicated water by hand to a trough. If you choose to deliver medicated water in this way, be sure to carefully read the label directions and keep in mind that you may not need a stock solution for this type of delivery. Calculate your dosages carefully.

Estimated Water Intake (adapted from Prairie Swine Centre Pork Production Reference Guide 2000)

Phase	*Weight (kg)*	*Intake (L/day)*
Gestation		Variable
Lactation		12 to 20
Piglets		Variable
Weanling	5	1.0 to 2.0
Weanling	7	1.5 to 2.5
Growout	15	2.5 to 3.5
Growout	20	3 to 4
Growout	25	3 to 4
Growout	50	5 to 7

D4.6 Other Herd Health Management Equipment

- If you use needle teeth nippers, ensure that they are kept sharp. Teeth nippers should shear the tooth off parallel to the gum line and not shatter the teeth. Shattering the teeth may allow the introduction of infection-causing bacteria resulting in swollen joins or abscesses later on. (On-Farm Quality Assessment Form question #15)
- Baby pig processing equipment, including ear notchers, tail clippers, teeth clippers and tattooers should all be kept clean and sharp. They should be sterilized using alcohol or iodine. You may discuss other options with your veterinarian. Sharp cutting instruments will reduce the amount of damage done to tissue at the sites where they are used. Inspect these pieces of equipment regularly to ensure that they are sharp and clean. (On-Farm Quality Assessment Form question #16)
- Ensure that livestock markers, spray markers and tattoo ink have all been approved for use in livestock intended to go to slaughter for food consumption.
- Ensure that tattooers are kept clean. After each use, they should be cleaned with soap and water to remove ink and dirt. Dry as thoroughly as possible.
- Ensure that tags and tagging guns arrive in intact packaging. Keep tagging guns clean.
- If you are using any other types of identification devices, such as microchips, ensure that these arrive in intact packaging and handle them appropriately.

Felsman, R.J. 2000. Needles for Swine Injections: Selection, Use and Care. Cooperative Extension Program. University of Arkansas at Pine Bluff, Arkansas, USA.

LeBlanc, D. 2002. Reading Medication Labels. Western Hog Journal. Summer 2002. Alberta, Canada.

Ontario Pork Producers' Marketing Board. 2000. Swine Medicines Manual. Ontario, Canada.

Pairie Swine Centre. 2000. Pork Production Reference Guide 2000. Prairie Swine Centre, Saskatoon, Saskatchewan, Canada.

Canadian Veterinary Medical Association. 2005. Canadian Veterinary Medical Association Guidelines for the Legitimate Use of Compounded Drugs in Veterinary Practice

Sample Dosage Calculation Table

The following table is presented to provide you with a guideline for calculating dosages. The doses presented are for 1ml/10kg and 1 ml/15 kg. Weights have been included both in pounds and in kilograms. This is a guideline only, and is intended to assist you in the calculation of dosage amounts for your animals. Medications are administered at various dosage rates. You must refer to label directions or, if applicable, veterinary instructions for the administration of medications.

		Dosages				Dosages	
Weight (kg)	**Weight (lbs)**	**1ml/10 kg**	**3ml/45 kg (1ml/15 kg)**	**Weight (kg)**	**Weight (lbs)**	**1ml/10 kg**	**3ml/45 kg (1ml/15 kg)**
5	11.3	0.5	0.3	120	270.0	12.0	8.0
10	22.5	1.0	0.7	125	281.3	12.5	8.3
15	33.8	1.5	1.0	160	360.0	16.0	10.7
20	45.0	2.0	1.3	165	371.3	16.5	11.0
25	56.3	2.5	1.7	170	382.5	17.0	11.3
30	67.5	3.0	2.0	175	393.8	17.5	11.7
35	78.8	3.5	2.3	180	405.0	18.0	12.0
40	90.0	4.0	2.7	185	416.3	18.5	12.3
45	101.3	4.5	3.0	190	427.5	19.0	12.7
50	112.5	5.0	3.3	195	438.8	19.5	13.0
55	123.8	5.5	3.7	200	450.0	20.0	13.3
60	135.0	6.0	4.0	205	461.3	20.5	13.7
65	146.3	6.5	4.3	210	472.5	21.0	14.0
70	157.5	7.0	4.7	215	483.8	21.5	14.3
75	168.8	7.5	5.0	220	495.0	22.0	14.7
80	180.0	8.0	5.3	225	506.3	22.5	15.0
85	191.3	8.5	5.7	230	517.5	23.0	15.3
90	202.5	9.0	6.0	235	528.8	23.5	15.7
95	213.8	9.5	6.3	240	540.0	24.0	16.0
100	225.0	10.0	6.7	245	551.3	24.5	16.3
105	236.3	10.5	7.0	250	562.5	25.0	16.7
110	247.5	11.0	7.3	255	573.8	25.5	17.0
115	258.8	11.5	7.7	260	585.0	26.0	17.3

Sample Water Medication Calculations (from the Ontario Pork Producers' Marketing Board Swine Medicines Manual, 2000)

Example 1

Bacterial Pneumonia in Pigs

The directions for treating respiratory disease with a brand of oxytetracycline, HCl, and neomycin that comes in 100-g pouches are:

200 g (2 pouches) per 225 L of drinking water for 4 or 5 days.

The precautions state:

Prepare fresh solutions each day.

The 100 pigs in the pen average 20 kg and each should drink between 1.2 and 2 L a day (6-10% of its body weight). If we use 10% as our estimate, the whole group would require about 200 L of water a day.

Calculate the amount of product required for 200 L of water:

225 L should contain 200 g of product (according to label directions).

At that rate, 200 L should contain (200/225)*200 = 180 g of product.

If the product is very expensive, it might be worthwhile weighing the exact amount of product needed for 200 L of water; but the volume of water intake is only an estimate and some water may be wasted, especially when water nipples are used. The cost of most drugs does not warrant the extra time and trouble to sue a different method than that given in the directions.

As the proportioner is set for 1:100, calculate how much stock solution is needed for that setting.

With the proportioner set for 1:100, 1% of the 200 L of water the pigs will drink comes from the stock solution, which must contain all of the tetracycline and neomycin.

One per cent of 200 L is 2.00 L. However, to avoid having to weigh out 180 grams of powder, make the stock solution for 225 L with 2 pouches of medication, as directed. This requires 2.25 L of stock solution (1% of 225 L). This extra medication (200 g versus 180 g of product) may result in preparation of slightly over 24 hours' worth of medicated water at one time, provided no water is wasted by the pigs.

Add water to two 100 g pouches of drug, up to the 2.25 L mark of a graduated pail, to make the right concentration.

The medicated water contains 200 g of powder in every 225 L of water. This is the same dose suggested for medicating tank water.

Example 2

Treating *Strep. suis* in nursery pigs

You have 100 nursery pigs. Several of them are showing signs of Strep. suis meningitis. Your veterinarian writes a prescription for penicillin to put in the drinking water. The directions on the prescription say to add 0.6 L of water to one-fifth of the contents of a pouch of penicillin G potassium powder to make up the stock solution, and to set the proportioner for 1:100.

Calculations:

Each pig weighs approximately 17 pounds or 17/2.2 = 7.7 kg (round off to 8 kg), and would drink about 640 mL of water a day (8% of the 8 kg body weight).

The whole group of pigs would drink 100 * 640 mL = 64 000 mL or 64 L of water a day. All of the penicillin must be in that 64 L of water.

Penicillin comes as 100 000 000 IU per pouch, meant to be dissolved in 336 L of water.

It has to be made up fresh daily because penicillin loses potency quickly when mixed with water and exposed to air, so the pouch should be divided.

The pouch treats 336 L of water, and you only need enough for 64 L per day, which is about one-fifth as much as the directions call for.

64/336 = 0.19 or about one-fifth.

You need about one-fifth as much penicillin as is in the pouch in order to medicate enough water for 100 pigs.

One-fifth of the pouch contains about 20 000 000 IU of penicillin. If the pigs drink all of the 64 L of water, each pig will get:

20 000 000/100 pigs = 200 000 IU/pig or 200 000/8 kg = 25 000 IU/kg body weight.

25 000 IU/kg is a safe and effective dose of penicillin for pigs

You can measure one-fifth of the pouch if you put the contents of a whole pouch into a clear [straight-sided] glass or plastic container, measure the height, and divide it into fifths. Remove the top fifth and put it into a smaller container. Put a mark on the smaller container to make a measure that you can use every time you need to mix this amount of penicillin. Seal the opened pouch well, or put it inside a container with a tight-fitting lid, and store it in a dry, cool place out of the light.

CQA® Drug Use Policy

Effective January 1, 2007
Accepted by the CPC Board of Directors,
July 6, 2006-08-09

The following products only may be used on CQA® registered farms:

- Medication licensed for use in food producing animals in Canada
- Active Pharmaceutical Ingredients provided that they are the active ingredient in a product approved for food animal use in Canada and have been compounded and are being used under the direction and supervision of a veterinarian with whom the producer has a valid veterinary-client-patient-relationship.
  - — All Active Pharmaceutical Ingredients compounded for use on CQA® registered farms must be tested for identity according to the protocol outlined by the Canadian Association of Swine Veterinarians.
  - — The use of bulk Active Pharmaceutical Ingredients that have not been further compounded is strictly prohibited on the CQA® program.
- Products approved for use by a veterinary practitioner under the Emergency Drug Release (EDR) program
- Products approved for use by a veterinarian under an Investigational New Drug (IND) certificate

Products that may not be used on CQA® registered farms include:

- Products obtained under the Own-Use Provision of the Food and Drugs Act (drug products imported from another country)
- Feed medications that have not been approved for use in Canada. It is illegal to use any medication in livestock feed that has not been approved for use in Canada. All approved products will bear a Drug Identification Number (DIN), assigned by Health Canada, and will appear in the Compendium of Medicating Ingredients Brochure (available through the Canadian Food Inspection Agency and on their web site, www.inspection.gc.ca)

Approved Hip Injection Protocol for the CQA® Program

1. The use of the hip injection site is strictly limited to use in breeding herd animals, defined as boars that have been entered into the breeding herd and those animals that are in their first gestation. The producer's deviation protocols (What would you do if something went wrong?) must reflect how those animals receiving intramuscular injections at this site will be handled if they are removed from the breeding herd.
2. Due to concerns related to broken needles and a potential negative impact to meat quality, all sows and boars that have received IM injections at the hip site must only be sold for processing at cull animal processing facilities.
3. Only intramuscular injections may be administered at this site.
4. Only **vaccines** and **reproductive hormones** requiring a single injection of 5 cc or less may be administered at this site.
5. Injections may be made with an 18 or 16 gauge needle, 1.5 inches in length. It is recommended, though not required, that a flexible hose extension device such as a Slap Shot® be used. Needles must be inserted at a 90 degree angle to the surface of the skin.
6. Detectable needles must be used.
7. All staff members responsible for the administration of medication using this injection site/technique must be properly trained.

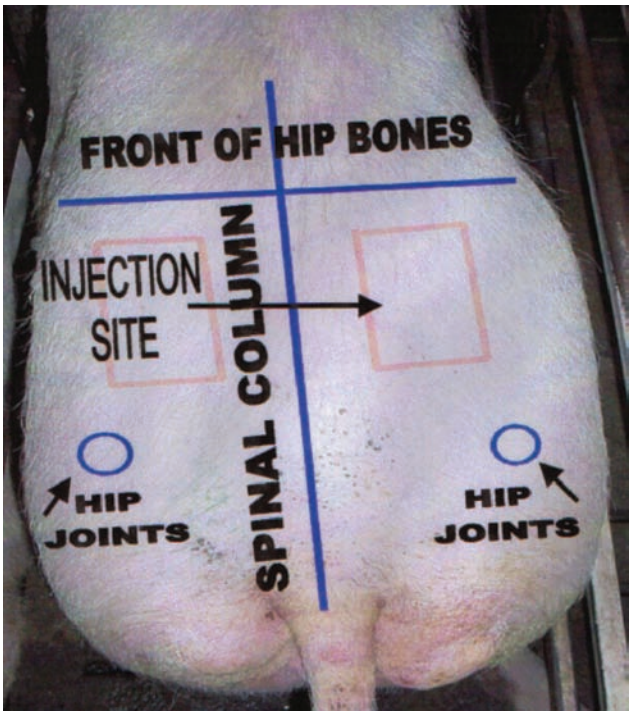

Diagram courtesy of the Puratone Corporation, as developed by Dr. Claude Mason