



Practical Guide to Responsible Use of Antibiotics on Pig Farms

These guidelines offer advice on using antibiotics when your veterinary surgeon recommends them to be appropriate for your farm and the current health situation in your pigs. Antibiotic treatment should only be initiated after consultation with your veterinary surgeon.

Pig farmers must ensure fundamentals such as ventilation, nutrition, water supply, housing, hygiene and biosecurity are well managed as these are crucial in controlling disease and reducing the need for antibiotics.

Where antibiotics are necessary, the advice in this guide recommends how to use them responsibly, to safeguard animal health and welfare. When used in conjunction with optimum management on farm, these measures aim to preserve the effectiveness of antibiotics for use in human and animal medicine.

While this guide describes general on farm use of antibiotics in pigs, it is recognised that in specific farm situations the prescribing veterinary surgeon may advise alternative good practice solutions based on their knowledge of the disease profile, pig flow and infrastructure of the farm. Specific advice from your veterinary surgeon must take precedence over this guide and you should always follow their advice.

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1. Guidance for all forms of antibiotic

Deciding whether to treat

- Antibiotics must only be used on prescription and under instruction of a veterinary surgeon who has the pig(s) to be treated under his/her care and should follow a veterinary visit or consultation.
- The welfare and likely recovery of the animal(s) to be treated must be considered before starting treatment and regularly reassessed during its course.
- If animals are not responding to antibiotic treatment, veterinary advice should be sought as soon as possible.
- Antibiotics should only be used in line with the guidance provided in the Veterinary Health Plan for specific clinical signs and disease conditions. If any other disease signs are observed, a veterinary surgeon should be consulted before antibiotics are administered and antibiotics prescribed for one condition should never be used for a different condition without authorisation from your vet.
- It may be appropriate for samples to be tested to identify the bacteria responsible for the disease signs. This can be discussed with your veterinary surgeon and may assist in choosing the most suitable antibiotic.
- Antibiotics should only be used for disease control until alternative methods are fully implemented or where there are no effective alternative ways to control disease. For example, changing the vaccination schedule or making management changes may allow disease to be controlled without the need for antibiotics.
- The number of pigs receiving antibiotics should be kept to the **minimum required**. The smallest possible number of animals should be treated, ideally on an individual or pen/room basis rather than a whole building. However, this should be based on advice from your veterinary surgeon and the health and welfare of at-risk animals should not be compromised.
- Early isolation (in a hospital pen) of pigs showing signs of disease can reduce its spread, minimising the number of pigs requiring antibiotic treatment.

Dosage and administration

- Farms using antibiotics and other medicines must abide by the Control of Substances Hazardous to Health regulations 2002 (as amended) (COSHH). Practical advice on how to apply COSHH on farm can be found in the [Health and Safety Executive's Veterinary Medicine guide](#).
- Individuals handling antibiotics must follow the guidance on the label and package insert, and check they are not allergic to the product ingredients.
- All stock people must be sufficiently trained in administering antibiotics. For example, this could be through AHDB Pork Stockman training, QMS Stockman training, internal training or specific medicines use training through veterinary practices or AHDB Pork.
- To calculate dosage, an accurate weight of the pig(s) requiring treatment should be based on regular recorded weights from the same age category on the farm, those specified in the veterinary health plan or an average from weighing the pig(s) in the treatment group.
- Antibiotics should be administered at the correct dose and for the full course, as directed by the veterinary surgeon. It is essential to calculate and administer the correct dose and to use the correct number of doses to achieve the best response.

- To ensure antibiotic residues are not found in meat, the withdrawal period shown on the medicine label and product leaflet and you must always adhere to the Veterinary Health Plan. In some circumstances, your vet may advise you of a different withdrawal period for example if an antibiotic is used to treat a condition where it is not licenced for that condition. You must adhere to the advice given to you by your vet.

Regularly reviewing antibiotic usage

- Use of antibiotics must not become habitual, as this can increase the risk of resistance developing. This could limit treatment options in future disease outbreaks and have a negative effect on the health and welfare of the pig herd.
- Where antibiotics are being used in groups of pigs for longer periods of time, usage should be reviewed and refined every quarter. All changes should be documented every quarter in the Veterinary Health Plan.
- The following can be useful when reviewing with your vet whether to continue or discontinue antibiotic treatments:
 - Careful observation of the pigs by the producer, including any changes in feeding habits, water consumption, behaviour or other signs of disease. This should be supported by clinical examination and observation of pigs by the veterinary surgeon;
 - Records of productivity parameters kept on farm, such as mortality rates;
 - Medicine book and antibiotic usage records. Note, the electronic medicine book (eMB) can be used as a tool for collating and reviewing your antibiotic use;
 - Abattoir monitoring results;
 - Results of diagnostic investigations;
 - Where applicable, laboratory testing for antibiotic susceptibility should be repeated, as advised by your veterinary surgeon.

High Priority Critically Important Antibiotics

HP-CIAs are the fluoroquinolones, 3rd and 4th generation cephalosporins and the polymixins (colistin) and are considered 'last resort' antibiotics. The Pig Veterinary Society Prescribing Principles for Antimicrobials states *"HP CIAs are products of last resort; only to be used when no other options are available and supported by laboratory sensitivity tests or in extreme circumstances when all else has failed. The full PVS Prescribing Principles are available <http://www.pigvetsoc.org.uk/files/document/558/1705%20PVS%20AntiB%20Prescribing%2>*

2. Injectable antibiotics

Administering antibiotics by injection is an efficient way of delivering the correct dose of antibiotic to **individual or small numbers** of pigs. It has the advantage of being effective in pigs that are not eating or drinking enough to be medicated orally. However, consideration should be given to restraint of animals to ensure handler safety, reducing the chance of needle breakage and ensuring stress to the pigs is minimised. In acute outbreaks of bacterial disease where pigs are not eating or drinking, or ring-fencing of disease is required, injections may be the only suitable method of administration.

- The farm Veterinary Health Plan together with the antibiotic label and information leaflet should be used to calculate the correct dose of antibiotic each time it is used.
- All stock people must be sufficiently trained (as described in section 1) to administer antibiotics by injection.
- Great care must be taken to avoid needle stick injuries in people during injection preparation and administration. If this occurs, refer to the medicine package insert, seek medical advice immediately and report incident to the VMD.
- Needles should be changed as appropriate between different groups of pigs and as advised by your veterinary surgeon. This may be between litters of piglets, between pens, every 10 to 15 pigs and at the end of every day.
- Any used, blunt or broken needles should be discarded in a sharps bin and not re-used.
- Sows and pigs should be restrained in a way that minimises stress for the animal and ensures the stockperson is able to administer the injection as safely as possible.
- Procedures must be in place to deal with needles or part needles accidentally being left in livestock. A pig containing a broken needle is only sold for slaughter providing that:
 - The animal is identifiable up to the time of slaughter
 - It is accompanied by a Food Chain Information declaration form that includes date of incident, product being used and site of injection.

3. Antibiotics administered in water

Antibiotics can be administered through water with medication initiated promptly, which avoids delays while waiting for medicated feed to arrive. Equally, antibiotics can be removed immediately once the course has finished. In-water medication allows treatment of groups of animals (or individual animals that may require treatment) which may have poor appetites but are still drinking. However, it is crucial to ensure the water system, equipment and protocols are suitable in order to deliver the correct dose of antibiotic to every pig, as well as the required volume of water.

System requirements and water quality

- The water system must comply with the local Water Supply Regulations¹. For mains supplied water, this must include an air gap of sufficient size between the incoming and supply pipe to prevent potentially contaminated or medicated water flowing back into the public supply. In the case of water supplied from a private source such as a borehole, the same type of air gap should also be present, again to prevent contamination of the source by back flow. For more information, please refer to [AHDB's report on water systems](#), produced in conjunction with RAFT Solutions Ltd.
- It is essential that water systems are capable of delivering the required volumes to all pigs and are properly maintained to avoid preventable spillage of medicated water through leaky drinkers.
- It is important that drinker flow rates are correct for the weight range of pigs being treated.
- Drinkers must be placed at the correct height so that there is no spillage or loss. For nipple or valve drinkers pointing straight out of the wall at 90°, the correct height is pig shoulder

¹ Water Supply (Water Fittings) Regulations 1999, the Scottish Water Byelaws 2004 and the Water Supply (Water Fittings) Regulations (Northern Ireland) 2009.5

height. If the drinker points downwards at 45°, the drinker end should be 20% above shoulder height.

- The medicated water must only be available to those pigs requiring treatment, as advised by your veterinary surgeon.
- Water systems used should be cleaned before and after the antibiotics are administered to remove any biofilms that may have built up before or during administration. Biofilms may absorb or inactivate antibiotics and can harbour pathogenic bacteria. Cleaning after administration is required to remove low levels of antibiotics that may remain.
- If other products, such as acids, are being added to the water, check they are compatible with the antibiotics prescribed. If in doubt, discuss this with your veterinary surgeon and/or seek advice from the medicine manufacturer.
- Some substances found in water, particularly from boreholes, inactivate some antibiotics. For example, oxytetracycline is inactivated by high levels of calcium, magnesium or iron. Similarly, some products may contain sugars that can promote yeast formation. Therefore, it is crucial to test the water quality, check the antibiotic product information sheet and, if in doubt, consult the medicine manufacturer.

Preparing solution

- Care must be taken to ensure soluble antibiotics are fully dissolved in order to allow accurate dosing and avoid blocking pipes with undissolved material.
- It may be helpful to dissolve the antibiotic in warm, cold, purified or distilled water first, as it may improve the rate of dissolving the particular medication – please read the product guidelines for further information or seek advice from your veterinary surgeon.
- In hard water regions, an agitator may be needed to keep the product adequately dispersed. Products are also available to aid solubility again, seek advice from your veterinary surgeon
- The quantity of stock solution to be prepared should be carefully calculated giving due consideration to the product guidelines on storage time. This means that usually a maximum of 24h stock solution should be prepared at a time and stored in line with the product guidelines. Fresh stock solution should be prepared regularly, and within the product guidelines, for the duration of the course period prescribed by the veterinary surgeon. Note, this may mean fresh stock solution needs to be prepared every 12 hours for the duration of treatment

Dosage and water wastage

- In-water antibiotics must be delivered at the dose specified by the prescribing veterinary surgeon and administered as specified by the manufacturer. Always read the product label and information leaflet.
- Pigs must be drinking sufficient water to receive the correct dose of antibiotic. If pigs are not drinking enough or their condition is making it difficult for them to access water then antibiotics must be administered by injection.
- Measurements of water intakes for pigs of the same weight on the same farm are useful to help accurately calculate the dose rate.
- The daily pattern of pigs' drinking behaviour should also be considered in the dosing regime, with water intake typically peaking during the afternoon. Again, specific farm recording of water usage is helpful in determining the most effective way to dose the pigs.

- The medicated water should be the only (non-feed) water source offered to pigs undergoing treatment.
- If your pigs are fed using a liquid feed system, consult your veterinary surgeon for advice, as water intakes may be insufficient for in-water medication.
- In hot weather, pigs tend to consume more water but will also waste water by using it to cool themselves. Ensure ventilation design and operation is adequate to minimise this. Spray cooling systems may be used alongside good ventilation to help further reduce wastage through drinkers.
- Cup-style drinkers tend to result in less wastage of water compared with nipple drinkers. This should be considered if new drinkers are being installed, in order to optimise the use of in-water antibiotic formulations.
- Dosage may need to be adjusted to account for any increased water intake or water wastage – any increases in water consumption or concerns about dosage should be discussed with your vet.
- The system should be primed with the medicated water, to avoid delays in antibiotics reaching the pigs at the beginning of treatment.

Proportional dosing pumps and devices²

- Proportional dosing pumps are the method of choice for delivering medication via water. They must be correctly installed, following the manufacturer's directions and using the appropriate model for the required use. Particular attention should be paid to water flow rates and pressures.
- The water system must have adequate flow in order to deliver antibiotics accurately through a proportional dosing pump. Ensure the flow rate of your system is within the range recommended for your dosing pump. It may not be appropriate to use a proportional dosing pump to treat small numbers of young pigs due to the low flow rate.
- When a proportional dosing pump is used, the daily medication requirement needs to be calculated alongside the daily water requirement for the pigs being treated.
- The stock solution volume is calculated by multiplying the daily water requirement by the setting on the proportional dosing pump – follow the manufacturer's instructions for your specific pump. Step-by-step guidance on how to calculate dosages for in-water medication can also be found on pages 84-85 of [AHDB's water medication report](#).
The calculated amount of antibiotic should be fully dissolved in the appropriate stock solution volume before being administered through the dosing pump. Dose rates of some products mean it may not be possible for all the product to dissolve in the volume of water (over saturation level). In such cases, product will not be adequately mixed and will saturate out leading to possible under dosing.
- Proportional dosing pumps should be thoroughly cleaned and recalibrated regularly according to manufacturers' recommendations.

² From here on, these are simply referred to as proportional dosing pumps, but it is also intended to include other devices

Header tanks

- When medicating animals via water, consider the most appropriate method for the product to be used. A proportional dosing pump may be preferable to a header tank as they avoid some of the difficulties discussed below. In particular, in terms of making up sufficient stock solution and ensuring a continuous water supply to pigs being treated. However, some products may not be suitable for dosing pumps due to dilution rates/saturation levels or because the product tends to block the pump.
- Excellent hygiene levels need to be maintained in header tanks as the presence of bacteria and other contaminants can interfere with the effectiveness of antibiotics. Header tanks should be cleaned routinely, with extra care taken before starting and after completing a course of antibiotics.
- When adding antibiotics to a header tank, the total dose needed for the treatment group for a set time should be calculated. This should be no more than 24 hours' worth or a shorter time if the product is not stable. Check the product information. Consideration should also be given to the duration of the working day of stock people and the size of the header tank, so administration can be monitored
- The water supply to the header tank may need to be switched off for the period of time the antibiotics are being administered to prevent dilution of the antibiotic. It is imperative that it is turned back on once the dose has been delivered. **Where header tanks are switched off, consider using an alarm to ensure a reminder to switch back on.**
- The antibiotic should be fully dissolved in a bucket of water before being mixed into the header tank.
- Header tanks must be completely emptied after the course is completed to avoid antibiotic continuing to flow through the system.

4. Antibiotics administered in feed

Medicated compound feed

Medicated compound animal feed can be used to treat a **group** of pigs and has the advantage of being professionally mixed by the feed mill/farmer (if home mixed) to ensure medication is evenly distributed throughout the feed. Farmers who manufacture their own feed on the farm (home-mix) can also purchase a medicated premix to include at a specific rate in their home-mix to ensure the correct dosage is administered. **Farms mixing their own medicated feed must be approved by and registered with the Veterinary Medicines Directorate (VMD)** – for more information, visit the [VMD website](#). It is an efficient route of administering antibiotics for both indoor and outdoor production systems, which minimises stress and the requirement to handle individual animals.

- Pigs must have a healthy appetite before in-feed antibiotics are started, as those with poor appetites may be under-dosed. This will be a consideration for the prescribing vet and any reduction in appetite or concerns about dosing should be discussed with your vet.
- The amount of medicated feed required should be accurately calculated by your veterinary surgeon to ensure sufficient feed is ordered to complete the required course of antibiotics. This also helps to avoid ordering too much medicated feed, ensuring pigs do not unnecessarily receive an extended period of treatment.

- Feed must be stored in a manner that minimises the risk of contamination. Medicated feed must be kept in separate, clearly labelled, bulk storage or bags.
- Where possible, feed bins and hoppers should be cleaned out before and after treatment to avoid mixing of medicated and un-medicated feeds. Special attention should be given to hoppers where funnelling in the centre of hoppers can leave residual feed around the sides.
- Care must be taken to ensure only the pigs requiring treatment have access to the medicated feed.
- The medicated feed should be the only food source offered to pigs undergoing treatment.

Top-dressing

‘Top-dressing’ of antibiotics is the mixing of oral powder into feed on-farm to treat **individual** pigs. It is a method of administering antibiotics to individuals in both indoor and outdoor production systems but must be done carefully to ensure correct dosing and in accordance with the SPC³.

- Top-dressing should only be done with products that are authorised specifically for this use in individual animals.
- Stock people must follow the directions on the product label/packaging when administering the antibiotic, including the use of appropriate Personal Protective Equipment.
- Great care must be taken to ensure the correct amount of antibiotic is used and it is carefully mixed for even distribution in the feed. This is crucial to avoid under or over-dosing the pig.
- Only the pig undergoing treatment should be allowed access to the top-dressed feed. The top-dressed feed should be the only food source offered to the pig undergoing treatment.

5. Storage and disposal of antibiotics

Storage

- Antibiotics should be stored in accordance with the instructions on the label and packaging – always check the product label. For example, storage temperature is critical for some medicines and exposure to light can damage others.
- Medicines must not be used after their expiry date, in order to maintain their effectiveness.
- Medicines must be stored securely, under lock and key. Keep medicines out of reach of children, animals and anyone not supposed to handle them.
- Medicated feed should be stored in rodent proof areas.

Disposal of unused antibiotics

- Dispose of all expired, partly used or unused antibiotics, containers and equipment properly and always follow any specific advice on the label with regards to disposal. It may be possible to return unused medicines to the prescribing veterinary surgeon or supplier for disposal. Your veterinary surgeon will be able to advise you on this.

³ Summaries of Product Characteristics (SPCs) which are a description of a medicinal product’s properties and the conditions attached to its use.

- Antibiotic labels contain information on how long after breaching the container it is safe to use the product. Do not use antibiotics after this date.
- Sharps must be disposed of in a purpose-made container and removed through an approved route. They should never be put in domestic waste.
- Do not hoard partly used medicines in case they may be useful later and never pass them on to anyone else; it is illegal to do so.

6. Record keeping

- There is a legal requirement to record all veterinary medicine use on farm, including antibiotics.
- In April 2016, AHDB Pork launched the electronic Medicines Book (eMB) for pigs to provide a convenient way to record and quantify usage so producers can review and optimise their on farm antibiotic use.
- Red Tractor Pigs standards (1st October 2017, version four) require each quarter's data must be collated and uploaded within six weeks from the last day of the quarter.
- In Scotland, QMS require total antibiotic usage data from 1st August 2016 onwards to be submitted to eMB. Data for each quarter must be submitted within one calendar month of the last day of the quarter.

Summary of medicine recording requirements for food producing animals

At a minimum, recording requirements must comply with The Veterinary Medicine Regulations 2013 and farmers are required to keep the following:

- The owner or keeper of food-producing animals must keep the documentation relating to the acquisition of all veterinary medicinal products acquired for those animals for **five years**.
- When a veterinary medicinal product is bought or otherwise acquired for a food-producing animal the keeper must, at the time, record:
 - Name of the product and the batch number
 - Date of acquisition
 - Quantity acquired
 - Name and address of the supplier.
- At the time of administration the keeper must record:
 - Name of the product
 - Date of administration
 - Quantity administered
 - Withdrawal period
 - Identity of the animal(s) treated.

If a veterinary surgeon administers a veterinary medicinal product, they must record the above information relating to administration, the batch number and their name in the keeper's records, or provide this information to the keeper in writing and the keeper must then enter it in their records.

- If the keeper disposes of a veterinary medicine other than by treating an animal, they must record:
 - Date of disposal
 - Quantity of product involved

- How and where they disposed of it.
- The regulations do not specify a set procedure or system needed to record medicines. However, all records must be durable, permanent and made available for inspection on request by a duly authorised person.
- Records may be kept electronically, such as through the eMB system.

Further requirements may be made for specific assurance schemes and you should check compliance regularly. Information that may be required includes the reason(s) for antibiotic use e.g. treatment (therapeutic)/, prevention (prophylaxis) or control in anticipation/early outbreak of disease (metaphylaxis).

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