

<b>Policy Document</b>			
<b>Pig Veterinary Society of the South African Veterinary Association</b>			
<b>Document No.:</b>	<b>Guidelines for the use of antimicrobials in the South African pig industry</b>		
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## Introduction

Antimicrobial resistance (AMR) poses a serious threat to human, animal and environmental health. Implementing ethical practice guidelines on how to use antimicrobials effectively and responsibly within the pig industry will contribute in reducing and preventing antimicrobial resistance within the pig industry of South Africa. Members of Pig Vet Society (PVS) SA hereby commit themselves to put these guidelines into good use in order to preserve the future and effectiveness of antimicrobials. PVS aims to be the leader in prevention of antimicrobial resistance and to encourage the pig industry to work together in achieving this.

## Objectives

Responsible and prudent use of antimicrobials includes implementing practical measures and recommendations intended to improve pig health and welfare while preventing or reducing the selection for, emergence of and spread of antimicrobial-resistant bacteria in pigs and humans.

Responsible measures include:

1. Ensuring the responsible use of antimicrobial agents in pigs with the purpose of optimising both their efficacy and safety and to comply with the ethical obligation and economic need to keep pigs in good health.
2. Preventing or reducing the transfer of resistant micro-organisms or resistance determinants within pig populations, the environment and between pigs and humans, either directly or as the result of product contamination.
3. Encouraging prudent use of antimicrobials to ensure that they remain effective taking into consideration diagnosis, antibiogram /MIC surveillance data, pharmacokinetics and pharmacodynamics.
4. Protecting consumer health by ensuring the safety of pork with respect to residues of antimicrobial agents.
5. Protect the environment through safe disposal of empty containers or expired products.

## Definitions pertinent to this document

The **Clinical and Laboratory Standards Institute (CLSI)**, has defined terms to describe herd or flock antimicrobial use.

- **Therapy** is the administration of an antimicrobial to an animal, or group of animals, which exhibit frank clinical disease.
- **Control** is the administration of an antimicrobial to animals, usually as a herd or flock, in which morbidity and/or mortality has exceeded baseline norms.
- **Prevention/prophylaxis** is the administration of an antimicrobial to exposed healthy animals considered to be at risk, but before expected onset of disease and for which no aetiological agent has yet been cultured.
- **Metaphylaxis** is a term sometimes used when there is clinical disease in some animals, but all are treated.
- **Growth promotion** is the administration of an antimicrobial, usually as a feed additive, over a period of time, to growing animals that results in improved physiological performance.
- **Medically important antimicrobial**- means an antimicrobial drug that is composed wholly or partly of any drug or derivative of a drug from an antimicrobial class that is listed as “Highly Important” or “Critically Important” by the World Health Organization (WHO) in the latest edition of its publication entitled “Critically Important Antimicrobials for Human Medicine”.

## Principles for sound antimicrobial usage

### 1. Reduction of antimicrobial use by focusing on disease prevention

To ensure strategic, proper use of antimicrobials in pigs, a holistic approach should be adopted for disease control which includes **biosecurity, vaccination, environmental control and management**.

Good biosecurity will include but is not restricted to the following: access control strategies for all people and vehicles; the use of all-in-all-out systems to allow for effective cleaning and prevention of pathogen build up; effective pest control systems; effective disinfection procedures and effective water treatment.

It is essential for appropriate vaccination programs to be instituted to prevent clinical disease outbreaks from occurring. Vaccination is always to be the preferred method of preventative control.

The environment should be managed to reduce morbidity and mortality rates. The environment should be optimised at all times. Non-infectious factors that predispose pigs to disease include chilling, heat stress, inappropriate ventilation, poor air quality, and unpalatable or unsanitary feed or water. The removal of sick pigs to a hospital pen is recommended to curtail the spread of disease. Hospital pens must cater for effective treatment taking into account diagnosis, treatment plan, dose, duration and meat withdrawal periods which should be recorded so as to ensure safe meat production. If treatment fails pigs should be culled and disposed of in a responsible manner.

### 2. The use of antimicrobials for therapeutic use

Antimicrobials for therapeutic use can be administered either via inclusion in the feed or water or parenterally.

The use of antimicrobials should occur under the direction of a registered veterinarian in the context of a valid veterinarian-client-patient relationship, for the specific purpose of treating animals with a

documented microbial disease or infection diagnosed by the veterinarian. Once the infection is resolved and the antimicrobial course is completed, the application of the antimicrobial must cease.

A valid veterinarian-client-patient relationship is one in which a veterinarian has assumed the responsibility for making medical judgments regarding the pig herd and the need for medical treatment, and the client (the owner of the animal or animals or other caretaker) has agreed to follow the instructions of the veterinarian. The veterinarian must have sufficient knowledge about the specific pig or group of pigs to initiate at least a general or preliminary diagnosis of the medical condition of the pig or group of pigs; and the practicing veterinarian must be readily available (or must have arranged for emergency coverage) for follow-up in case of adverse reactions or failure of the regimen of therapy. Such a relationship can exist only when the veterinarian has recently seen and is personally acquainted with the herd by virtue of examination of the herd including mortalities, and/or by appropriate and timely visits to the premises.

Antimicrobials should be selected based on activity against a known pathogen and used at the correct dose and route for the correct period of time to avoid the development of resistance. Antimicrobials used for prophylaxis should be used with caution. Antimicrobial drugs used for therapy, metaphylaxis or prophylaxis should be regularly reassessed by a veterinarian using appropriate laboratory testing.

On farm records must be available to demonstrate that the drug was used according to instructions given by the consulting veterinarian regarding dose and duration. The use of all antimicrobials should be accounted for with detailed records of date of issue, the section it has been dispatched to and the person responsible for administration. Personnel that administer antimicrobials must be trained in their use by the consulting veterinarian. A list with withdrawal periods of each antimicrobial used on the farm must be readily available and in use.

Medically important antimicrobials (see Appendix A) are not to be used for growth promotion, feed efficiency, weight gain, routine disease prevention, or any other repeated or regular pattern of use. When farm history, results of in vitro antimicrobial susceptibility testing, or clinical judgment warrants the use of highly important antimicrobials, their use should be in accordance with labelled instructions before extra-label use is considered.

Extra-label therapy is when a drug is not used in accordance with labelled directions. This includes, but is not limited to: a different dosage, time interval, route/application method, clinical indication, or species. Extra-label therapy must be prescribed only after registered antimicrobial treatment options have been thoroughly evaluated. All antimicrobial usage must be prescribed in accordance with the most up-to-date laws and regulations that govern drug use.

Compounding therapy is when an antimicrobial active is compounded on prescription by the consulting veterinarian for the treatment of a specific group of pigs. This must only be considered if registered antimicrobial treatment option (including extra-label use) have been thoroughly exhausted. In this instance withdrawal periods must be established.

Records sufficient to identify antimicrobial usage patterns in a herd should be maintained. At a minimum this includes the following documentation which is to be kept on file:

a) In-feed antimicrobials: a record of in-feed antimicrobial usage on a farm must be maintained. The usage must comply with instructions of a valid signed prescription. The in-feed antimicrobial usage on the farm must be monitored by the consulting veterinarian.

b) Parenteral antimicrobials: for each bottle on farm the use must be described in a treatment plan (S.O.P) in terms of disease treated, age of pigs, dose for weight, duration and meat withdrawal periods. This treatment plan must be prescribed by the consulting veterinarian and training should be given by the consulting veterinarian to the responsible personnel on the farm administering the said antimicrobial.

c) Inventory: a detailed inventory of all antimicrobials should be kept on farm with records of date of use.

These records should be kept on the farm and feed-mill where applicable. The records should be preserved for 5 years

### 3. The use of antimicrobials for growth promotion

A healthy gut is essential for the conversion of feed substances into basic components for optimal nutrient absorption. The gut microbiota (gut flora) inhabiting the gastro-intestinal tract play a crucial role in digestion. Imbalances of gut flora may lead to dysbacteriosis or enteritis, resulting in less efficient digestion and absorption of nutrients and pig performance and welfare will be negatively affected. Many factors can influence the normal microbiota balance including: feed, environmental conditions, management practices, vaccinations, infections, mycotoxins etc. Producers must constantly strive to avoid conditions that adversely affect gut health. In practice this is not always achievable and the use of antimicrobial growth promoters (AGP) may be indicated. Where the use of these products is advised, narrow spectrum antimicrobials that are not important in human medicine shall be used (current registered AGP). Only registered products may be used as growth promoters and strict adherence to meat withdrawal periods should be kept.

The following are acceptable for AGP usage

Active	Antimicrobial group
Zinc Bacitracin	Cyclic peptide
Bacitracin methylenedisalicylate	Cyclic peptide
Flavophospholipol	Glycolipid
Olaquinox	Quinoxaline
Avilamycin	Orthosomycin
Virginiamycin	Streptogramin

Where available, alternatives to AGPs should be considered.

### 4. Environmental contamination

Every effort should be made to avoid environmental contamination with antimicrobials. This can be as the result of improper disposal of the antimicrobials themselves (including feed which contains antimicrobials), improper disposal of mortalities previously treated with antimicrobials, and improper treatment of manure contaminated with antimicrobials.

Antimicrobials must be used specifically in the diseased herd and not introduced into the environment unnecessarily. Unused, expired or empty antimicrobial containers should be disposed of according to relevant legislation.

*Antimicrobials are detected in manure, soil, and water but at concentrations below levels that cause toxic effects on non-target organisms including humans. However, these concentrations may increase the development of antimicrobial resistance. Manure storage and treatment options may provide additional means for reducing antimicrobial risk in manure.*

## **5. Residues**

Antimicrobial residues can occur in pork when certain antimicrobials are used. We support the development of a comprehensive government residue programme with regular reporting and penalties for repeat offenders.

Residues of antimicrobials may occur:

- a) When antimicrobial use is not according to label instructions, with higher than prescribed doses being used for longer than recommended periods or meat withdrawal periods are not adhered to.
- b) When compounded or extra-label antimicrobials are used and no meat withdrawal period has been established.
- c) When there is cross contamination in the feed mixing process.

## **6. Monitoring of antimicrobial usage in pigs**

There should be a system supported by the pig industry, to monitor antimicrobial quantities being used in the country.

We support the development of a comprehensive government programme for the monitoring of AMR

## **7. Research and Development**

We support research into alternatives to antimicrobial therapy in pigs as well as research into development of new antimicrobial drugs and vaccines that can be used to control disease.

In addition, certain diseases which are prevalent and which result in high antimicrobial usage should be identified and prioritised for research and for the establishment of national improvement schemes.

## **8. Conclusion**

The consulting veterinarian has the responsibility to ensure, support and oversee the correct use of prescription antimicrobials in his/her herds with regular visits to the herd on-farm and appropriate training to responsible personnel. In case of non-compliance by the producer in the application of the prescribed antimicrobials the consulting veterinarian has to take action to rectify the situation via appropriate training and implementation. In case the producer still does not comply then the consulting veterinarian should cease the client relationship and cease providing or prescribing any antimicrobials to the herd.

We support the development of uniform comprehensive control of antimicrobials under one regulatory body under veterinary control.

## Appendix A

**Critically important, highly important and important swine-veterinary and human-swine-veterinary antimicrobials (adapted from 3rd WHO 2011 human medicine tables and OIE 2015 veterinary tables)**

### Definitions:

**Criterion 1 (CR1):** An antimicrobial agent which is the sole or one of limited available therapy to treat serious human disease

**Criterion 2 (CR2):** Antimicrobial agent is used to treat diseases caused by either: (1) organisms that may be transmitted to humans from non-human sources or (2) human diseases caused by organisms that may acquire resistance genes from non-human sources.

**Human critically important (CI):** Antimicrobials which meet both Criterion 1 and Criterion 2 are termed critically important for human medicine.

**Human highly important (HI):** Antimicrobials which meet either Criterion 1 or Criterion 2 are termed highly important for human medicine.

Human and veterinary (HV): Antibiotics used in both humans and pigs

Antimicrobial Class	Substances used for pigs	HV	CI	HI
<b>Aminoglycosides</b>	Spectinomycin			
	Streptomycin	X	X	
	Dihydrostreptomycin	X	X	
	Kanamycin	X	X	
	Neomycin	X	X	
	Paromomycin			
	Apramycin		X	
	Fortimycin			
	Gentamicin	X	X	
<b>Amphenicols</b>	Florphenicol			
	Thiamphenicol			
<b>Cephalosporins First Generation</b>	Cefalexin	X		X
<b>Cephalosporins Third Generation</b>	Cetiofur	X	X	
	Ceftriaxone	X	X	
<b>Cephalosporins Fourth Generation</b>	Cefquinome		X	
<b>Ionophores</b>	Salinomycin			
<b>Lincosamides</b>	Pirlimycin			X
	Lincomycin	X		X
<b>Macrolides</b>	Erythromycin	X	X	
	Tulathromycin		X	

Antimicrobial Class	Substances used for pigs	HV	CI	HI
	Josamycin	X	X	
	Kitasamycin		X	
	Tilmicosin		X	
	Tylosin		X	
	Miocamycin	X	X	
	Terdecamycin			
	Tildipirosin		X	
	Tylvalosin		X	
	Sedecamycin			
<b>Penicillins</b>	Benzylpenicillin	X	X	
	Benzylpenicillin procaine	X	X	
	Mecillinam			
	Amoxicillin	X	X	
	Ampicillin	X	X	
	Amoxicillin + Clavulanic acid	X	X	
	Ampicillin + Sulbactam	X	X	
	Aspoxicillin			
	Phenoxymethylpenicillin	X	X	
	Cloxacillin	X		X
	Dicloxacillin	X		X
	Oxacillin	X		X
<b>Phosphonic Acid</b>	Fosfomycin	X	X	
<b>Pleuromutilins</b>	<b>Tiamulin</b>	<b>X?</b>	<b>X?</b>	
	Valnemulin			
<b>Polypeptides</b>	Enramycin			
	Bacitracin			
<b>Polypeptides Cyclic / Polymixins</b>	Colistin	X	X	
<b>Quinolones</b>	Flumequin	X	X	
	Oxolinic acid	X	X	
	Ciprofloxacin	X	X	
	Danofloxacin		X	
	Difloxacin		X	
	Enrofloxacin		X	
	Marbofloxacin		X	
	Norfloxacin	X	X	
	Ofloxacin	X	X	

<b>Antimicrobial Class</b>	<b>Substances used for pigs</b>	<b>HV</b>	<b>CI</b>	<b>HI</b>
	Orbifloxacin		X	
<b>Quinoxalines</b>	Carbadox			
	Olaquinox			
<b>Sulfonamides</b>	Sulfachlorpyridazine			
	Sulfadiazine			
	Sulfadimethoxine			
	Sulfamidine	X		X
	Sulfamerazine	X		X
	Sulfadimethoxazole			
	Sulfamethoxine			
	Sulfamonomethoxine			
	Sulfapyridine	X		X
	Phthalylsulfathiazole			X
<b>Sulfonamides + Diaminopyrimidines</b>	Sulfamethoxypyridazine			
	Trimethoprim + Sulfonamide			
<b>Diaminopyrimidines</b>	Baquiloprim			
	Trimethoprim			
<b>Streptogramins</b>	Virginiamycin			X
<b>Tertracyclines</b>	Chlortetracycline	X		X
	Doxycycline	X		X
	Oxytetracycline			
	Tetracycline	X		X
<b>Thiostrepton</b>	Nosipetide			