

Value Chain Alliance for Livestock Upgrading and Empowerment



Training Manual on Pig Diseases and Control



Zimbabwe
**AGRICULTURAL
GROWTH
Programme**



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Value Chain Alliance for Livestock Upgrading and Empowerment



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Why the Training Manual on Pig Diseases and Control was Designed

Preventing diseases from occurring is the cheapest way to reduce unnecessary animal health cost. As with all other types of farming pigs are farmed for profit. Profit is derived from the margin between the price received for the finished carcass and the costs incurred to produce that carcass. Presence of disease adversely affects feed intakes and efficient utilisation of feed. This makes it necessary that farmers and relevant stakeholders be equipped with necessary skills and knowledge on how to look after their pigs that is health management which this manual is going to do. This is because health management is at the core of a successful pig enterprise because disease in pigs is a culmination of the interaction of three factors, namely the host- in this case the pig, the environment in which the pig stays and the pathogen which is the disease-causing organism. Well-kept animals are likely to be more productive than those poorly kept.

Pigs on a good plane of nutrition are more immunocompetent and have the capacity to fight pathogens than those on a poor diet. The environment in which the pig lives in should not expose the animals to pathogens. Stressful conditions such as extremes of high temperature, rain, dirty/muddy pens and hunger to mention just a few promote the development of diseases in pigs. The use of disinfectants at farm level lowers pathogen density reducing the chances of animals developing disease. If all steps that lower the chances of disease developing are taken at farm level, productivity and hence profitability are highly likely to improve.

This training manual is intended to serve as a guide for the trainers so that they provide the necessary and relevant training methodologies and techniques to enable the pig farmers to understand how to control the three important factors that either promote or reduce the chance of disease occurrence. Most pig farmers are struggling to keep mortality rates low because some are not implementing the necessary disease prevention and control methods. This has severely affected the growth and profitability of their business.

This module is a training tool for developing the capacities of enterprises in practices of good disease prevention and control. The target group is the small to medium farmers (including young and women farmers), lead farmers (anchor, champion), farmer groups, Business Management Unit (BMU), syndicate or cooperatives and integrators, who will be trained in this program to enhance their skills at individual and organizational levels. The trainees are expected to utilize the skills in their respective activities in the Pig Value Chains. Improved disease prevention and control strategies will enhance and contribute to the overall growth and development of pig value chains in the country.

Information and Instructions to the Trainer

This manual should be used purely as a facilitator's guide. The sessions under each unit are presented with an outcome(s) to facilitate the assessment of participants' understanding and depth of knowledge at the end of each session. Following the outcomes(s) are the topics to be covered and facilitating methodology. However, the facilitator should feel free to adapt the methodology suggested to the needs of participants. To enhance a participatory learning process, some methods of presentation and the steps to follow are therefore outlined. The manual also provides some background information on each session. The information is also meant to aid the facilitator in the preparation for the session. Like all participatory methods, the involvement of the participants in all stages of the learning process is vital. However, all users of this manual must study and research into the content of each module before the presentation. Start each sub-topic and group activity by explaining the objective and learning outcomes expected of them, and ensure they are met. Though contents for each sub-topic are provided, lead the participants into giving their points, copy them in the flip chart/whiteboard/chalkboard, some of their points will or may coincide with the contents in this Module, and then mention to them the items of sub-topics that were not pointed out by them.

The session should be interactive, participatory, lively and interesting. Let the participants express themselves in vernacular language for them to understand the concepts. Encourage them to ask questions especially on concepts that they don't understand. Switch to either English or vernacular language when you find some or all of them not understanding.

Start the session with greetings, welcoming remarks, and introduce yourself. Ensure you have the necessary stationeries for the trainees and equipment and materials: projector, flip charts or whiteboard, whiteboard markers, marking pens, and handouts. Be time conscious as you facilitate the Session

This Manual is organised around aspect of disease control and prevention such as environmental health issues, biosecurity, cleaning animal houses, injection sites, preweaning disease of piglet, post weaning disease and general piggy unit disease control strategies.

Users of the Manual

The manual is intended to be used by facilitators at various levels of the pork value chains in Zimbabwe.

Presentation Methodology

The methods of presentation outlined in the manual are suggested as a guide to the facilitator.

The facilitator is expected to use his or her judgement in selecting the appropriate method or combination of methods in presenting each session.

Assessment

At the end of each session, the facilitator is expected to assess/evaluate the participants' understanding and level of knowledge by using a simple question and answer session as appropriate. In some of the sessions, assessment questions are suggested as activities whilst in some, the facilitator is given a free hand in determining the kind of questions to be asked. However, all assessments must relate to the session.

Prevention of Diseases at Farm Level

1. Objective

- To help learners define disease and their causes.
- To help learners develop models for disease control.
- To help learners to set up a road map to achieve performance targets.

2. Outcomes

- Learners should define disease and what causes disease.
- Learners to set their disease control and prevention models at farm level
- Learners should identify disease pre-exposing conditions.

3. What is disease?

- A disease is a condition that affects normal body function.
- Disease is the major problem that causes death and loss of condition in pig production.
- Therefore, all pig farmers should regard disease as a potential economic threat
- They have to:
 - Monitor and observe animals on a daily basis for signs of disease
 - Keep close contact with the veterinary personnel for guidance
 - Report disease conditions as early as possible for quick diagnosis and application of appropriate control measures.

4. Significance of disease in pigs

- Animal disease outbreaks pose significant threats to the profitability of a pig enterprise due to:
 - Economic impacts of the disease itself associated with for example mortality, treatment cost
 - Measures taken to mitigate the risk of disease introduction
 - Control measures applied in the event of an outbreak
 - Energy and protein required to mount an immune response are directed away from muscle growth leading to either weight loss or lowered rate of weight gain plus reduced feed conversion efficiency leads to lowered productivity.

5. Disease controls and prevention

- Clinical disease is usually the interaction of a pathogen with errors in management and a variety of contributing influences such as environment and host factors as shown in (Figure 6-1).

5.1 Keeping pigs healthy

- Farmers and stockmen should know how to prevent, control and treat animal diseases through farm health planning and close working with vets.
- As a farmer should know how to prevent the spread of disease - between animals, from animals to humans, and from humans to animals.
- The general strategy to prevent outbreaks of clinical disease is to minimize the level of pathogen challenge while maximizing herd and individual immunity.
- Poor management might result in a population of animals with naive immune systems encountering novel pathogens or in stress leading to a weakened immune system in vulnerable animals.
- Alternatively, management errors might result in an overwhelming pathogen challenge in the case of an endemic disease or the entry of a new pathogen into a population of pigs without specific immunity.

5.2 Health strategies

Health strategies can be divided into three categories.

- **First**, those designed to live with endemic diseases caused by pathogens that survive in the environment and are too difficult to eliminate, or they are ubiquitous organisms that generally cause little problem.
 - Endemic pathogens are handled by maximizing immunity and minimizing the challenge.
 - Ubiquitous organisms cause disease flare-ups that are often triggered by environmental-management deficiencies, which if corrected will restore the healthy state in the herd.
- **Second**, some pathogens can be eliminated e.g., mange, *Sarcoptes scabiei* var *suis* can be eliminated from a herd.
 - It is usually desirable in the long-term to eliminate the diseases, if possible and if it results in savings from reduced routine medication or vaccination.

- **Third**, include strategies to prevent pathogens from entering the herd.
 - As herd size has increased, the emphasis on maintaining the population of animals free of certain diseases has increased in importance.

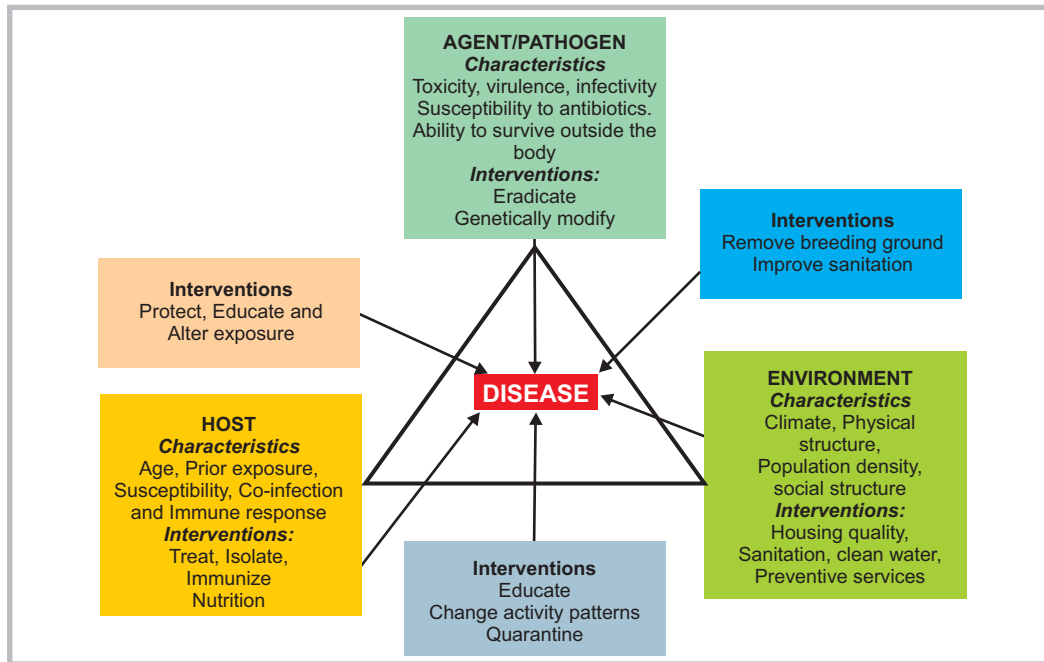


Figure 1: The interaction between host, environment and pathogen to produce disease in a pig.

6. Biosecurity

- Biosecurity refers to practices used to prevent both the introduction and of the spread of diseases within a farm.
- Disease control through biosecurity focuses on controlling and reducing movements of animals, people and vehicles to and from areas where livestock is kept.

6.1 On-farm biosecurity measures

- Good biosecurity should be practiced at all times, not just during an outbreak, to help you minimise the risk of any disease affecting your pigs.
- The key to good biosecurity is reducing and controlling the movements of people, vehicles, or equipment into areas where your farm animals are kept.
- You should check the health status of livestock before buying or selling animals.
- Disinfectants should be applied under low pressure, for example from a backpack sprayer. Disinfectants can also be used as biosecurity barriers for vehicles and people at farm entrances.
- Before disinfecting structures such as sheds, you should clean them with detergents to remove organic matter and oily films.

6.2 Risk factors

Humans; Goods/equipment; Animals; Insects/rodents/wildlife; Water; Feed.

6.3 Biosecurity elements

Sanitation

- Routine cleaning and disinfection of pens, equipment, vehicles or personnel who enter and exit the farm area or the incident site. Cleaning or disposal of equipment used during and post-investigation activities such as syringes, test kits and so on.

Isolation

- Creating and maintaining an environment where animals are separated from disease agents or potential carriers such as animals, humans, contaminated clothes and equipment, contaminated air, water and feed.
- Protection from vectors - for example ticks, flies, mosquitos may be a consideration for some diseases.

Movement control

- Controlling humans, animals, equipment and vehicles that move in and out of a farm as well as restricting unauthorized people and vehicles from entry to the farm area.

Zoning

- Biosecurity zoning depends on risk factors of disease transmission, transmission to other animals or officers (zoonosis). Infection risks can be high or low.

6.4. Examples of biosecurity implementation

- Washing hands with soap, taking bath and washing clothes after handling animals
- Cleaning and disinfecting (spraying, dipping) all goods, particularly vehicles that will enter farm area
- Spraying pens with insecticide, acaricide or disinfectant were indicated
- Disposing and burning medical waste after investigating the incident site.
- Limiting disease transmission caused by employee mobility and restricting people from freely entering the farm as it may cause disease transmission.
- Burning or burying carcass of livestock that died after suffering from diseases, infectious diseases in particular
- Removing dead pigs from the pen immediately to be buried or eliminated by the authorized officers
- Using a quarantine pen to monitor pigs that just arrived on a farm
- Separating sick animals from healthy; rearing species separately, separate age cohorts.
- Treating sick animals
- Regular cleaning and manure/litter removal
- Good husbandry, low stress, good nutrition, clean water
- Vaccinating animals - Vaccination is a key health management tool to enhance individual and herd immunity.
- It is a good idea to work with a veterinarian because the decision to use a vaccine depends on several factors and needs to be assessed and frequently reassessed on an individual herd basis.
- It is important to remember that even in healthy and well-nourished young animals, some just do not respond to vaccinations.
- Young animals that are sick, stressed, wormy or poorly nourished will respond poorly to a vaccination program.

6.5. Disinfection facilities/procedure(s)

Disinfection

- As animal husbandry housing grows so does the risk of the outbreak of contagious diseases.
- Disinfectant can be used to disinfect animal housing, transport trucks, transport equipment, trailers, storage rooms, processing rooms and boot dips.
- Appropriate broad spectrum disinfectant for surfaces and equipment is ideal.
- Directions of use:
 - Clean the surfaces with a proper detergent first, rinse and allow to dry.
 - Disinfect with a contact time of at least 20 minutes
 - Areas should be rinsed thoroughly and allowed to dry before animals are returned to the area.
 - Animal husbandry housing: After rinsing and drying, apply appropriate broad spectrum disinfectant.
 - Storage and processing rooms for feed and food: After rinsing and drying, apply
 - Foot dips: Dilute according to the guidelines of the manufacturer.

Table 6-1: Characteristics of different disinfectants for cleaning and disinfecting pig pens.

THE CHARACTERISTICS OF THE DIFFERENT DISINFECTANT CHEMICALS						
	Chlorine Based	Peroxygen Compounds	Phenols Unchlorinated	Phenols Chlorinated	Iodophors	QAC Compounds
Can be used in aerosols	A Few	Yes	No	A Few	Yes	Yes
Corrosive to metal/rubber	No	No	Yes	Yes	No	No
Detergent action	No	Yes	No	Some	Yes	Yes
Effectiveness in presence of organic matter	Moderate	Yes	Yes	Yes	Moderate	No
Good action against bacteria	Moderate	Yes	Yes	Yes	Yes	Moderate
Good action against viruses	Yes	Yes	Poor	Poor	Yes	No
Persistent residues	No	No	Yes	No	Poor	Yes
Speed of action	Quick	Quick	Moderate	Moderate	Quick	Moderate
Staining	Some	No	Yes	Yes	Some	No
Suitable for foot baths	No	Yes	Yes	No	Yes	No
Toxic or irritant	Yes	No	Yes	Yes	Some	No

Biosafety (Self-protection)

- Refers to precautions/steps taken to protect oneself from getting exposure to a disease-causing (zoonotic) agent(s).
- Protective equipment that meets the desired conditions should be used.
- Full PPE is only necessary when high risk and zoonotic agents are reasonably suspected.
- Disease agent contamination and operator risk can be minimized using simple precautions.

7. Causes of diseases in pigs

- There are many causes of ill health in pigs. The following list covers most if not all causes of pig diseases.
- Viruses
- Protozoa.
- Bacteria.
- Fungi.
- Helminthes
- External parasites
- Toxins
- Physical injuries
- Nutritional disorders.
- Nutritional deficiencies.
- Stress due to adverse environment
- Genetic defects

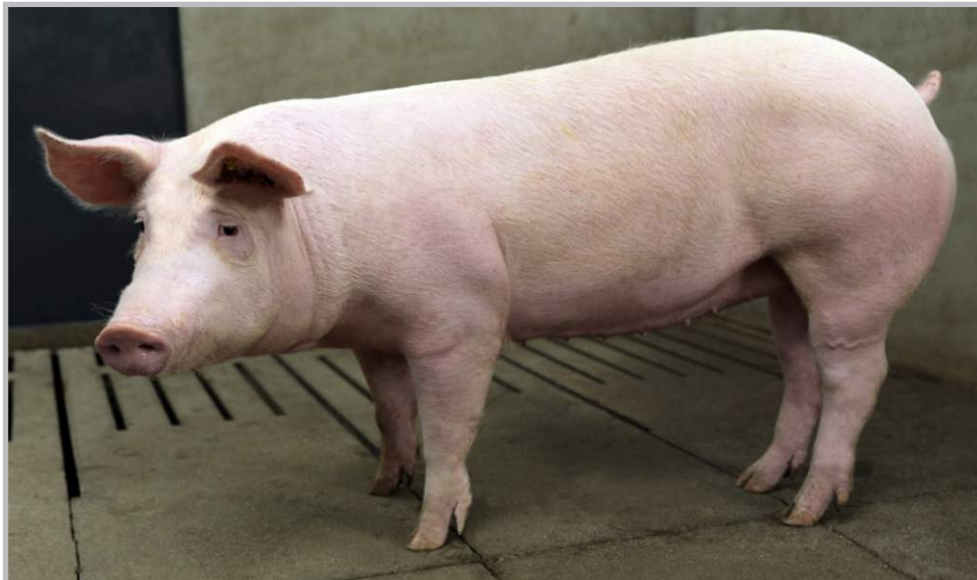


Figure 6-2: A healthy looking pig

8. Signs of ill health in pigs

- There are many signs and symptoms of ill health in pigs, some of the signs are as follows:
- Loss of appetite
- Difficult and abnormal breathing +/- coughing, nasal discharge.
- Dull appearance
- Passes excessively hard or watery faeces (diarrhoea)
- Sometimes faeces may be blood stained or contaminated with worms
- Fever, may abort if pregnant
- Loss of condition, and rough hair coat (Figure 6-3)
- Rubbing against hard objects showing sign of irritation or itching.



Figure 6-3: Pigs in poor condition

9. Principles of drug use in pigs



Figure 6-4: Syringes and needles commonly used in giving injectable medications

9.1 Storage of medication, administration, expiry dates and withdrawal periods

- Read the instructions that come with the product you purchase, they contain important information about using it such as dosing rates, whether it is safe for pregnant animals as well as how it should be stored.
- Plastic needles and syringes are disposable – in other words, meant to be used only once. Syringes and needles come in different sizes.
- 10ml syringe is suitable for an adult pig; 5ml syringe for adult pigs, and a 2,5ml syringe for piglets.
- Smaller syringes are used for vaccination.
- When vaccinating, you can use a syringe more than once, but you must fill it using a new needle so as not to contaminate the vaccine in the bottle.
- **Needle size is also important.** For pig, use a brown **19-gauge** needle, and for piglets, a yellow **20-gauge** needle.

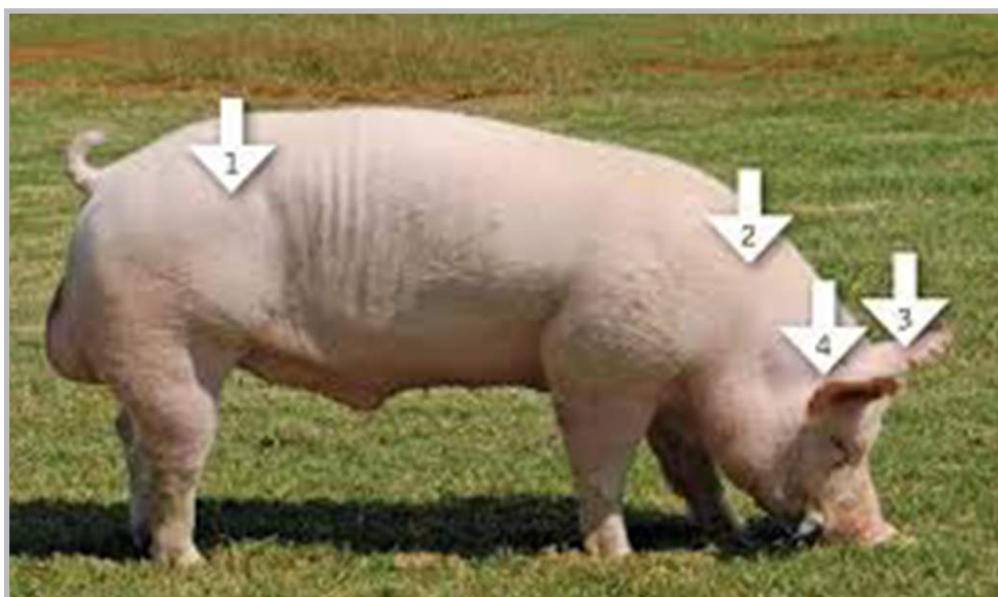


Figure 6-5: Injection sites for pigs

- 1 = Intramuscular for piglets only;
- 2 = subcutaneous and intramuscular injection site;
- 3 = Site for ear vein for intravenous injection;
- 4 = Intravenous jugular vein site

10. Most common pig health problems

The following tables (Table 6-2; Table 6-3; Table 6-4; Table 6-5) show the commonly encountered diseases/conditions in different categories/classes of pigs. Some of them have been explained further.

Table 2: Diseases of pre-weaning period in pigs.

DISEASE	MAJOR SIGNS	TREATMENT	PREVENTION	COMMENT(S)
Colibacillosis (<i>E. coli</i>)	Diarrhoea (scours); sudden death	Fluid therapy; antibiotics (I,O,W); warmth	Improve hygiene; vaccinate sow/gilts; provide a warm clean creep area	Coccidiosis may be involved
Coccidiosis	Diarrhoea at 10-21 days of age	Fluid therapy; coccidiostats	Improve hygiene; provide a warm, clean creep area	-
Overlay / trauma	Sudden death	None	Provide a warm, clean creep area; check farrowing crate design	-
Starvation (hypoglycaemia)	Weakness; death	Dextrose solutions; supplementary feeding	Improve sow's milk supply	Ensure gilts have adequate functional teats
Stillbirths	Born dead	None	Various methods	Many causes; consult a veterinarian
Miscellaneous infections	Lameness; sudden death	Antibiotics (I)	Improve hygiene; repair flooring	Infection due to bacteria; swollen joints commonly seen
Exudative epidermitis (greasy pig)	Skin lesions; death	Antibiotics; skin protectant; vitamins	Improve hygiene; provide a dry, warm, clean creep area; prevent skin abrasions	<i>Staphylococcus hyicus</i> infection

I – injectable; O – oral; W - in-water medication; F - in-feed medication.

Table 3: Disease of the post weaning period

DISEASE	MAJOR SIGNS	TREATMENT	PREVENTION	COMMENT(S)
Colibacillosis (<i>E. coli</i>)	Diarrhoea; sudden death	Fluid therapy; antibiotics	Vaccinate; improve hygiene; provide warmth for weaners; reduce stress at weaning	A common and expensive problem
Respiratory disease	Coughing; sneezing; reduced growth rate; sometimes death	Antibiotics (I,W,F); improved ventilation and environment	Improve ventilation; reduce stocking density; reduce stress; antibiotics; vaccinate	-
Swine dysentery	Diarrhoea with blood; diarrhoea; reduced growth rates; death	Antibiotics (I,W,F); reduced stocking density	Improve hygiene; antibiotics (F)	Avoid purchasing infected pigs; control rodents
Proliferative enteropathy (PE)(ileitis)	Diarrhoea with blood; diarrhoea; reduced growth rate; sudden death	Antibiotics (I,W,F); iron; vitamin B	Antibiotics (F)	Three main syndromes affecting different aged pigs
Sarcoptic mange	Itching; dermatitis; rubbing; scratching; reduced growth rate	Mitocidal sprays; pour-ons; injection and in-feed premix	Strategically treat breeder pigs and weaners/growers	May go unnoticed in a herd; may add to pneumonia problems; pigs of all ages can be affected
Intestinal torsion	Sudden death	Diet manipulation	None	A common cause of death in some herds
Gastric ulceration	Loss of appetite; vomiting; death	Rarely effective	Manipulate diet, including feed coarseness; reduce stress; reduce disease	Probably feed and disease - related; can affect pigs of any age
Erysipelas	Arthritis; skin lesions; reduced growth rate; condemnations at slaughter	Antibiotics (I)	Vaccinate	Most losses occur between two and six months of age
Internal parasites (worms)	Diarrhoea; reduced growth rate; pneumonia	Parasiticides in-feed or injection	Parasiticides	Roundworm; whipworm; kidney worm
Exudative epidermitis (greasy pig)	Skin lesions; death	Antibiotics; skin protectant; vitamins	Improve hygiene; provide a dry, warm, clean weaner pen; prevent skin abrasions	<i>Staphylococcus hyicus</i> infection

I – injectable; O – oral; W - in-water medication; F - in-feed medication.

Table 4: Diseases of breeder pigs

DISEASE	MAJOR SIGNS	TREATMENT	PREVENTION	COMMENT(S)
Farrowing sickness (mastitis, metritis, agalactia - MMA)	Reduced milk production; loss of appetite; higher body temperature	Antibiotics (I,W,F); oxytocin; anti-inflammatory drugs	Reduce feeding before farrowing; ensure good hygiene in a farrowing crate; reduce stress on sows	Reduces the number of pigs weaned per sow; infection due to bacteria
Lameness	Premature culling; reduced herd fertility	Rarely effective	Improve floor design; control erysipelas; prevent injuries; reduce conformation defects	Regularly check breeder pigs for leg lesions
Vaginal discharge syndrome	Reproductive tract infections	Antibiotics (I,W,F); antibiotic treatment of boar's prepuce	Cull affected animals; improve the hygiene of mating pens and dry-sow shed	Caused by bacteria and poor hygiene
Bladder infection (cystitis) Kidney infection	Blood - stained urine Reluctance to stand; sudden death	Antibiotics (I,W,F) Antibiotic infection of boar's prepuce	Antibiotics Increase water intake; improve hygiene in dry sow shed	Boars transmit bacteria to sows and gilts at mating
Leptospirosis	Stillborn or weakborn pigs; abortion; returns to service	Antibiotics (I,W,F)	Vaccinate	Can also affect humans
Erysipelas	Abortions; reproductive failure	Antibiotics (I,W,F)	Vaccinate	Can also cause arthritis and skin lesions
Gastric torsion (see intestinal torsion)	Sudden death	None	Feed twice or three times per day; do not overfeed hungry pigs	Commonly seen when the level of feeding is increased
Gastric ulcers	Loss of appetite; vomiting; depraved appetite; blood in dung; sudden death	Antibiotics (I); wet feed	Investigate feed, fineness, crude fibre and vitamin E/selenium; reduce stress	Can occur in pigs of any age
Mastitis	The udder is congested, hot and painful when touched. Sow may not allow piglets to suckle due to pain. There may be no milk secretions or milk let down	Antibiotic injection in the case of fever.	Control by keeping the pen clean	
Post-partum metritis	<i>The signs which are usually observed 2-5 days after farrowing</i> Fever. Sticky, white-yellow discharges from vulva with foul smell. Arched back due to pain when walking. Slow and uncoordinated movement.	Remove placentas or dead fetus. Flush the genitalia with a mild antiseptic. Insertion of uterine tablets of antibiotics (pessaries). Injection with antibiotics.	Provide a clean environment.	

I – injectable; O – oral; W - in-water medication; F - in-feed medication.

10.1 Pre-weaning period (Piglets) – ranking perhaps start with the most important disease that is E. coli scours, overlay, hypoglycaemia...

Exudative dermatitis (greasy pig)

- The symptoms of this disease are skin lesions (see Figure 6-6.), caused by an infection of the bacteria *Staphylococcus hyicus*.
- The bacteria damage the liver and kidneys.
- Improving hygiene in piglet housing is key to preventing this condition, along with teat dipping of sows pre- and post-farrowing.
- It is also important to reduce the potential for skin abrasions, as this is how the infection enters the body.
- Abrasions are caused by rough floors, jagged teeth, sharp equipment or even mange mites bites.



Figure 6-6 Pig with exudative epidermitis (greasy pig disease).

Coccidiosis

- This disease is very common in suckling piglets and is caused by three types of the intracellular parasite coccidia.
- It causes diarrhoea, which can be bloody, often between 10 and 21 days of age (see Figure 6-7) and up to 15 weeks of age (see Figure 6-8).
- Secondary infections can result from damage to the intestinal wall.
- Depending on the level of occurrence on the farm, preventative treatment of sows with coccidiostats may be appropriate.
- Hygiene should be improved to end the cycle of infection; sow faeces are a major source, and flies can spread infection.
- Providing a warm, dry, clean creep area will help to reduce the parasite load and the likelihood of coccidial infection.



Figure 6-7: Coccidiosis in piglets



Figure 6-8: Coccidiosis in pigs

11. Diarrhoea in piglets

Table 5: Piglets diarrhoea causes and most susceptible growth stage of piglets

THE MAIN CAUSES OF PIGLET DIARRHOEA					
	Early period days		Late period days		Mortality level
	0-3	3-7	7-14	15-21	
Agalactia	✓	✓	✓	✓	Moderate
Clostridia	✓	✓	✓		High
Coccidiosis		✓	✓	✓	Low
Colibacillosis (<i>E. coli</i>)	✓	✓	✓		Moderate
PED	✓	✓	✓	✓	Low
PRRS	✓	✓	✓	✓	Variable
Rotavirus			✓	✓	Low
TGE	✓	✓	✓	✓	High

11.1 Importance of controlling diarrhoea in piglets

- Of all the diseases in the suckling piglet, diarrhoea is the most common and probably the most important (see Figure 6-9).
- In some outbreaks it is responsible for high morbidity and mortality.
- In a well-run herd there should be less than 3% of litters at any one time requiring treatment and piglet mortality from diarrhoea should be less than 0.5%.
- In severe outbreaks levels of mortality can rise to 7% or more and in individual untreated litters up to 100% (in TGE it may reach 100% overall).
- The causes of diarrhoea are shown in Table 6-1.
- Four of the agents listed in Table 6-1 are viruses, transmittable gastro-enteritis (TGE), rotavirus, porcine epidemic diarrhoea (PED) virus and PRRS virus.
- The main bacterial causes are *E. coli* and clostridia and the main parasite is coccidia.



Figure 6-9: Perineum of neonatal piglet suffering from *Escherichia coli* enteritis

11.2 Critical importance of providing adequate colostrum and milk in piglets

- At birth the intestinal tract is micro-biologically sterile and it has little immunity to disease producing organisms.
- Organisms begin to colonise the tract quickly after birth, among them potentially pathogenic strains of *E. coli* and *Clostridium perfringens*.
- Immunity is initially provided by the high levels of antibodies in colostrum (IgG, IgM, IgA).
- After the colostrum antibodies have been absorbed into the blood stream, the immunity is maintained by the antibody (IgA) which is present in milk.
- IgA is absorbed into the mucous lining of the intestines.
- It is essential that the newborn piglet drinks sufficient colostrum soon after birth to prevent potentially pathogenic organisms multiplying against the intestinal wall and causing diarrhoea.
- It is also essential that the piglet continues to drink milk regularly after the colostrum has gone so that its intestines continue to be lined by protective antibodies.
- The antibodies acquired passively from the colostrum and milk are finite and can be overwhelmed by large doses of bacteria present in the environment.
- The higher the number of organisms taken in, the greater the risk of disease.
- Environmental stress such as chilling also plays a role because it lowers the piglets' resistance.
- There is thus a delicate balance between the antibody level on the one hand and the weight of infection and stress on the other.

12. Major signs and consequences of diarrhoea or scours in piglets and weaners

12.1 Piglets

In acute disease:

- The only sign may be a previously good pig found dead.
- Huddle together shivering or lie in a corner.
- The skin around the rectum and tail is wet.
- Watery to salad cream consistency scour - distinctive smell.
- Vomiting.

As the diarrhoea progresses:

- Dehydration
- Sunken eyes
- Leathery skin
- The scour often sticks to the skin of other piglets giving them an orange to white colour.
- Prior to death piglets may be found on their sides paddling and frothing at the mouth.

In sub-acute disease:

- Signs are similar but the effects on the piglet are less dramatic, more prolonged and mortality tends to be lower.
- This type of scour is often seen between 7 to 14 days of age.
- Watery to salad cream consistency diarrhoea, often white to yellow in colour.

12.2 Weaners

- The first signs are often slight loss of condition, dehydration, and a watery diarrhoea.
- In some cases, blood or black tarry faeces may be seen or they may be like paste with a wide range of colour: grey, white, yellow and green. The colour is not significant.
- Poor pigs - wasting, hairy.
- Sloppy faeces and often dirty wet pens.
- Sunken eyes.
- Dehydration results in rapid loss of weight.
- Pigs may be found dead with sunken eyes and slight blueing of the extremities.
- Good pigs may also be just found dead with no external symptoms.
- Occasional vomiting.

12.3 Post-weaning period (Weaners)

Respiratory diseases

- The following are signs of respiratory diseases (see Figure 6-10)
 - Coughing,
 - Sneezing,
 - Abdominal breathing,
 - Reduced growth rates and
 - Potentially mortality.
- Poor ventilation or environmental conditions can exacerbate respiratory conditions.
- For example, high levels of ammonia can damage the respiratory tract, making pigs more susceptible to infection.
- Infective agents include *Streptococcus suis* and *Pasteurella*.
- Vaccines are available for some forms of pneumonia, although the strain affecting a farm should be identified to ensure a successful outcome.
- Pleuropneumonia, caused by *Actinobacillus pleuropneumoniae*, can result in significant mortality, and those that do recover have impaired growth rates and lung damage.
- Overcrowded and dusty housing are predisposing factors for respiratory disease, along with the presence of porcine reproductive and respiratory syndrome (PRRS) virus.



Figure 6-10: Pig with cyanotic ears indicative of a respiratory disturbance.

Swine dysentery

- It is caused by the bacteria *Brachyspira hyodysenteriae*.
- Animals with this disease suffer from diarrhoea, with or without the presence of blood (see Figure 6-11).
- Growth rates of post-weaning pigs are reduced, and, in some cases, sudden death can occur.
- Antibiotics are used to treat the disease, either in feed, water or as an injectable.
- Reducing stocking density can be an effective way of reducing infection pressure and stress in the herd.
- As well as improving hygiene levels, rodent control is a high priority; rodents are a vector for this disease.
- The strategy for buying and introducing replacement stock should be reviewed, as this a major route of disease introduction.



Figure 11: Swine dysentery in pigs

Bowel oedema (oedema disease)

- Caused by certain serotypes of *E. coli* bacteria that produce a powerful toxin (verotoxin).
 - These toxins damage the walls of small blood vessels including those in the brain and cause fluid or oedema to accumulate in the tissues of the stomach and the large bowel.
- Damage to the blood vessels in the brain results in some of the characteristic signs.

Clinical signs

Acute disease

- Sometimes the only sign is a good pig found dead 1 to 4 weeks post weaning.
- Recovery in the few pigs that do not die takes up to 2 to 3 weeks.
- Certain breeds of pigs may be associated with disease suggesting a genetic predisposition. The temperature is usually normal.
- Typically, live affected pigs show: A staggering gate; Incoordination; Puffy eyelids giving a sleepy appearance; An abnormal high pitched squeak; Pigs stop eating.
- In the later stages become partially paralysed and go off their legs; Sometimes with nervous symptoms. Muscle twitching, fits; Diarrhoea is not a feature; Breathing difficulties become evident; The damage to the brain is irreversible and most pigs die; Lameness.

Prevention

- Reduce piglet exposure to the *E. coli* during suckling. Adopt all the procedures in the farrowing house for the control of scour in the suckling pig.
- Consider the use of an autogenous vaccine in sows to raise colostral antibodies and block out infection in the suckling pig.
- Assess the effects of no creep feeding pre-weaning.
- Restrict feed intake post-weaning.
- Assess the effects of different diets and feeding routines.
- If the problem is a major one and it continues, consider a change of genotype. Some strains of pig are more resistant than others.

- Lower or alter the age of weaning.
- Alter the environment at weaning time.
- Assess the effects of adding 3% of milk powder to the diet.
- Assess the effects of zinc oxide to the diet at a level of 2500ppm zinc.

Treatment

- By the time the clinical signs are seen it is often too late and most pigs die. Treatment routines are aimed at preventing the organism establishing itself and also reducing the weight of infection. The general principles of controlling coliform infections and post-weaning diarrhoea should be followed.
- Isolate the organism and determine the antibiotic sensitivity.
- Identify the stage (e.g. 10 days post-weaning) when disease first appears and apply either in-feed or water medication 3 to 5 days before this.
- In-feed antibiotics of value include apramycin 100g/tonne, framycetin 100g/tonne, neomycin 163g/tonne. Alternatively apramycin, neomycin or trimethoprim/sulpha can be used in the water.
- Individual treatments give a poor response but flunixin will help to reduce the effects of toxins and diuretics can be used to remove fluid.

NB: However, it must be admitted that the disease is the most difficult to deal with and often preventative medication and treatment are unsuccessful.

Mange (Sarcoptic Mange)

- Mange in pigs is caused by the mite *Sarcoptes scabiei* var *suis* which is 0.5 mm in diameter and is barely visible.
- All ages are affected (especially sows, boars).

Mode of transmission

- Transmission is usually by direct contact between pigs and can be from the sow to piglets or after mixing (see Figure 12).
- Transmission between farms is usually by the introduction of infected pigs, but contaminated clothing or carriage of pigs from the farm in contaminated transport could also introduce infection.

Clinical signs

- Scratching, rubbing, red spots, scabs & thickened skin, dirty or blood-blistered ears, reduced growth.

Treatment and prevention

- Mange may be treated using a wide variety of insecticides, but those most commonly used at present are the avermectins.
- Ivermectin is given by subcutaneous injection or orally and kills mites in the ear and on skin.

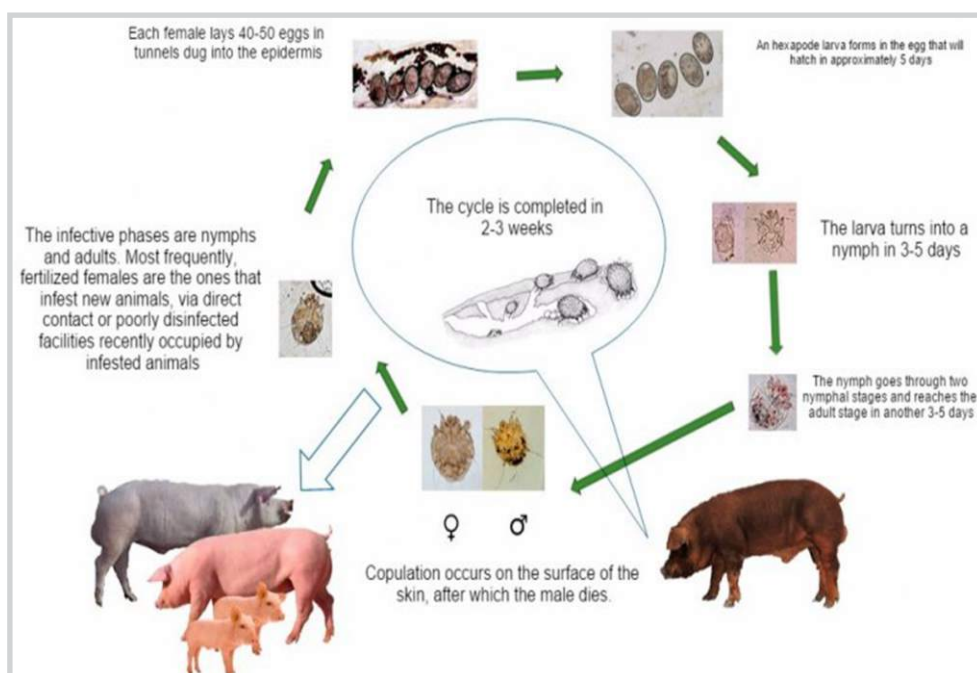


Figure 6-12: Sarcoptic mange cycle in pigs

12.4 Breeding stock

Swine erysipelas (Diamond Skin Disease)

- Swine erysipelas is caused by a bacterium, *Erysipelothrix rhusiopathiae*. (see Figure 6-13)
- The bacterium alone can cause the disease but concurrent virus infections, such as porcine reproductive and respiratory syndrome (PRRS) or swine influenza (SI), may trigger outbreaks.
- The organism enters the body through the tonsils, naturally occurring breaks in the integrity of the small intestine, or through wounds associated with fighting.
- The organism multiplies in the body and invades the bloodstream to produce a septicaemia.
- The rapidity of multiplication and the level of immunity in the pig then determines the clinical symptoms.

Clinical signs

- The onset is sudden.
- Usually, the disease is confined to two or three animals in any one outbreak although in the non-vaccinated herd 5 to 10 percent of animals could be affected any one time.
- Can be so mild that it goes unnoticed.

Diamond Skin Disease in sows

- Restricted blood supply causes small raised areas called diamonds in the skin.
- These are clearly defined become red and finally black, due to dead tissue but no abscesses.
- Often the only sign is death due to an acute septicaemia or heart failure;
- Most heal in 7–10 days;
- High temperatures 40°C (108°F; fever);
- Obviously ill (although some can appear normal);
- Often these lumps can be palpated in the early stages before anything can be seen;
- Stiffness or reluctance to rise indicating joint infection – arthritis; Inappetence; Infertility; Skin ulceration;
- The organism either affects the joints producing lameness or the heart valves producing growths.

Diamond Skin Disease in boars

- Boars infected with erysipelas develop high temperatures and sperm can be affected for the complete development period of five to six weeks.
- Infertility is demonstrated by returns, sows not in pig and poor litter sizes.

Treatment

- The erysipelas organism is very sensitive to penicillin.



Figure 6-13: A pig suffering from Swine erysipelas disease. Swine erysipelas presents in the acute form with the characteristic "diamond skin" lesions.

Mastitis, Metritis and Agalactia

- Mastitis, metritis and agalactia, commonly referred to as MMA, is a complex syndrome seen in sows shortly (12 hours to three days) after farrowing (see Figure 6-14)
- It is caused by a bacterial infection of the mammary glands (udder), where skin discoloration can be seen and/or the urogenital tract.
- MMA leads to increased piglet mortality and reduced weaning weights.
- Reduced milk production, loss of appetite and a higher body temperature are symptoms of mastitis in sows.
- Antibiotics, along with anti-inflammatory drugs are effective treatments.
- Oxytocin may be used to encourage let down of milk and corticosteroids can be prescribed.
- Hygiene in farrowing housing is important, along with nutrition during late pregnancy to promote immunity.
- Stress can also be a factor, and it is important to make sure that teats are not being damaged by sow housing facilities.
- This disease has a significant effect on productivity because of the potential effect of reducing the number of piglets weaned by sows.

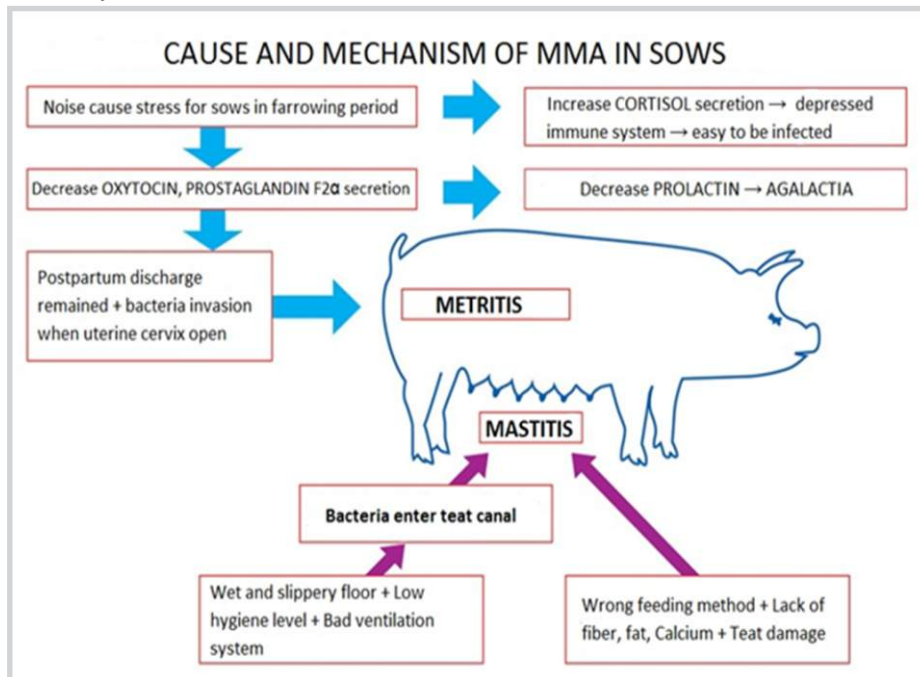


Figure 6-14: Causes and mechanism for development of MMA in sows

Porcine parvovirus

- If pregnant sows become infected with porcine parvovirus (PPV), reproductive disease can occur, but not in all cases.
- Porcine parvovirus is the major causes of Stillbirths Mummification Embryonic Death and Infertility (SMEDI) syndrome
- Mummification and stillbirths occur (see Figure 6-15), resulting in small litter sizes.
- If it does, most commonly in gilts, reproductive performance is significantly affected (see Figure 6-16.).
- The virus can survive outside the host for several months, making it endemic in most herds.
- Although it is only during pregnancy that PPV is a problem, other pigs can spread the virus.
- There are no treatments available; in order to prevent this disease routine vaccination of gilts is advisable.



Figure 15: Stillbirth and mummified foetus in pigs



Figure 6-16: Still birth in piglets

Should have inserted a section of zoonotic and notifiable diseases African Swine Fever (ASF)

- African Swine Fever (ASF) is a highly contagious viral disease of pigs. In its acute form the disease generally results in high mortality.

Clinical signs

- The incubation period for ASF is variable but is usually between five and fifteen days.
- In the acute form pigs develop a high temperature (40.50C), then become dull and go off their food. Other symptoms can vary but will include some or all of the following: vomiting, diarrhoea (sometimes bloody), reddening or darkening of the skin, particularly ears and snout gummed up eyes, laboured breathing and coughing, abortion, still births and weak litters, weakness and unwillingness to stand.

The clinical signs of ASF are indistinguishable to those for Classical Swine Fever

Transmission

- African Swine Fever can be spread through:
- Direct contact with infected pigs, faeces or body fluids;
- Indirect contact via fomites such as equipment, vehicles or people who work with pigs between pig farms with ineffective biosecurity;
- Pigs eating infected pig meat or meat products;
- Biological vectors - ticks of the species Ornithodoros.

Prevention

- Good biosecurity is essential.

Foot and Mouth disease

- Foot-and-mouth disease (FMD) is an acute infectious disease caused by a virus.

Transmission

- The virus is present in great quantity in the fluid from the blisters, and it can also occur in saliva, milk and dung and respired air.
- Contamination of any objects with any of these discharges is a danger to other stock. At the height of the disease, virus is present in the blood.
- Infected animals begin by excreting the virus a few days before signs of the disease develop.
- Pigs in particular produce large numbers of virus particles.
- Animals pick up the virus either by direct contact with an infected animal or by contact with foodstuffs or other things which have been contaminated by such an animal, or by eating or coming into contact with some part of an infected carcass.
- The disease is spread mechanically by the movement of animals, persons, vehicles and other things which have been contaminated by the virus.

Signs

- Sudden lameness, the pig prefers to lie down and when made to move it squeals loudly and hobbles painfully.
- Blisters form on the upper edge of the hoof, where the skin and horn meet, and on the heels and in the cleft; may extend right round the top of the hoof with the result that the horn becomes separated.
- Blisters may develop on the snout or on the tongue.

Prevention

- Good biosecurity should be practised at all times, not just during an outbreak.
- Hence it is mandatory to have a perimeter fence around the pig pens.
- High tensile fence, woven wire, and hog wire can all be used for perimeter fencing of hogs. Fence height should be at least 100 cm.
- Bottom wires should be close enough together (1.5-2 inches) to prevent baby pigs from getting their heads between wires.

Anyone suspecting FMD must immediately inform their local Division of Veterinary Field Services (DVS).

Anthrax

- An uncommon disease of pigs in most parts of the world.
- Pigs are highly resistant to the infection.

Clinical signs

- Acute illness; Bloody faeces; Haemorrhage from the nose; Fever; Respiratory distress; Sudden death; Swollen discoloured neck; Blue skin; Unusual in piglets.

Prevention

- Vaccination

Treatment

- The anthrax bacillus is sensitive to penicillin.

Rabies

- Rabies is a rare viral disease in pigs.

Symptoms

- Twitching of facial muscles;
- Rapid chewing;
- Salivation;
- They can have muscle spasms;
- Subsequent paralysis may occur;
- Death usually occurs within three days.

Control/Prevention

- There is no treatment.

Porcine cysticercosis

- Animals on pasture can sometimes ingest contaminants with forage.
- If they ingest tapeworm eggs or segments from humans with *Taenia solium* infection, cysticercosis can affect their carcass (see Figure 6-17).
- Humans are the definitive host, which means they are the species in which the parasite completes its life cycle, reaches adulthood and is able to produce eggs.
- Should swine ingest human tapeworm eggs or segments, tapeworm cysts can develop in pork muscle and be detected at slaughter.
- Cysticercosis is generally identified during slaughter when cysts can be seen in muscle or organs.

Prevention and Control Measures

- Standard quality assurance practices, recommended sanitation/hygiene and routine safe food handling
- Do not let human waste come into contact with swine
- Deworm routinely
- Provide human sanitation stations.



Figure 17: The white spots are the cysticercosis on raw pork.

13. Hereditary Conditions

- Hereditary (genetic) and congenital diseases are quite common in swine and include a range of conditions.

Porcine Stress Syndrome (PSS)

- PSS is caused by a defect in the gate of the Ca release channel that prevents it from closing, allowing Ca to continue to leak causing a high rate of metabolism leading to the prolonged acidosis and fatal collapse characteristic of this disorder.

Signs

- Characterized by a progressive increase in body temperature, muscle rigidity, and metabolic acidosis leading to sudden death of heavy muscled pigs.

Postmortem findings

- PSS also can lead to the production of pale, soft, and exudative (PSE) meat.
- PSS is inherited as an autosomal recessive.
- Pigs that are heterozygous or homozygous positive are superior to homozygous negative pigs in muscling.
- This superiority may cause the producer to select carriers or reactors when the opportunity arises, thus increasing the frequency of the gene for PSS.

Prevention/Control measures

- To reduce incidence of PSS and PSE, all PSS animals, their parents, and littermates should be eliminated from the breeding herd.
- The presence or absence of this mutated gene is readily detected by the use of a DNA test.

Scrotal Hernia

- Believed to result from a weakness of the musculature surrounding the inguinal canal, permitting the intestines to drop into the scrotum (see Figure 18).
- It occurs much more frequently on the left side.
- Extreme care in castration generally will prevent great economic loss.



Figure 18: Pig showing scrotal hernia

Umbilical Hernia

- Due to weakened supportive musculature in the navel area resulting in intestines protruding through the belly wall (see Figure 6-19).
- Some affected individuals may die during growth due to strangulation of the intestine, but most reach market weight with no apparent adverse effects.
- Surgical correction is seldom recommended.



Figure 19: A pig with Umbilical hernia

Prevention/Control measures

- This defect may have a genetic liability that is magnified by adverse environmental conditions, such as crowding to conserve heat during cold weather.
- Under no circumstances should a surgically corrected animal be used for breeding.

Atresia Ani

- A condition where piglets are born without rectal opening.
- This a genetic defect that can occur in pigs



Figure 20: Piglet born without an anus or rectal opening

Signs

- Piglets born without a rectal opening.
- Male piglets die within a few days unless an opening is made surgically to permit him to void faeces.
- Females with no anal opening can commonly defecate through the vulva (via an opening from the rectum into the vagina) and grow normally.

Treatment/Control measures

- The incidence can be reduced by culling all affected individuals, their parents, and their littermates from the breeding herd.

Cryptorchidism

- Cryptorchids are male pigs with one or both testicles retained in the body cavity.
- Animals with both testicles retained are sterile.

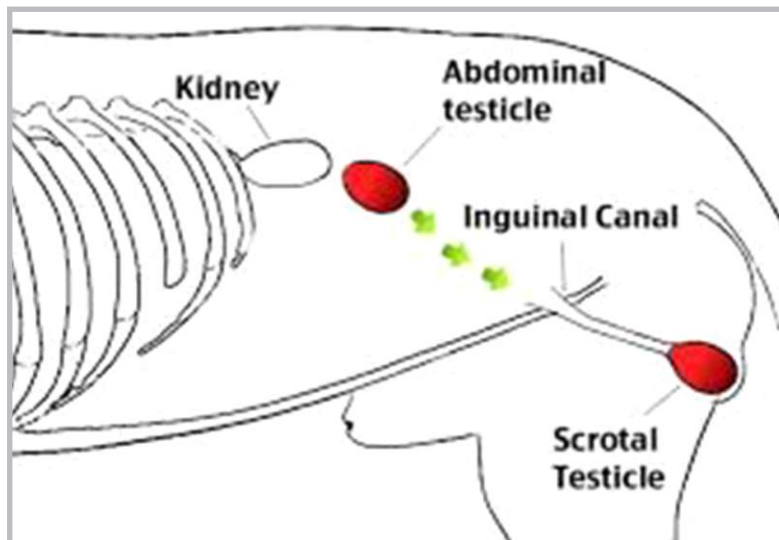


Figure 21: Pictorial presentation of how cryptorchidism occurs

Treatment/Control

- Parents and littermates of afflicted individuals should be culled from the breeding herd.

Nipple Abnormalities

- Failure of nipples to protrude from the udder surface. The teat canal is held inward, forming a small crater so that normal milk flow is prevented.
- Individuals with a high proportion of inverted nipples should not be placed in the breeding herd.

Leg Defects

Splayleg

- This condition, also known as spraddle legs, is probably the most common of the leg disorders (see Figure 6-22).
- The rear legs are most often affected but the forelegs are sometimes involved.

Clinical signs

- The back legs splay out sideways and forward causing the pig great difficulty in standing on its hind end.
- Many will 'dog sit' and shuffle around on their backsides.
- This can lead to considerable trauma to the skin and secondary infection.
- Histological examination often reveals incomplete development of muscle fibres in the front and rear legs.
- These muscles are responsible for pulling the hind legs and forelegs toward the body.

Treatment

- Survival of front leg splays and 'stars' is very poor and, in general, early euthanasia may be the best option.



Figure 22: A piglet with splay legs, the hindlimbs have been affected

Polydactyly

- Extra toes and/or dewclaws are quite common in pigs.

Clinical signs

- Shortening of the step, knock and buck knees and swaying of the forelimbs.

Treatment/Control

- Culling of affected individuals is recommended.

14. General health management strategies in pig production

- Prevention is always and obviously better than cure, and having a herd health plan will help to minimize disease incidence
- Most important strategies that ensures disease prevention are:
 - Maintaining correct hygiene levels
 - Provide adequate ventilation and
 - Reducing stress.
- Pig producers need to provide an environment that is optimal for the animal and inhospitable for disease-causing agents.
- Reducing infection pressure, immunity must be promoted by measures such as optimal nutrition and good husbandry.
- Maintaining good biosecurity through every part of the production cycle will go a long way to preventing disease outbreaks.
- Managers should also ensure that breeding stock are purchased from high health status herds and suitably quarantined before introduction.
- Producers should remain vigilant and make sure that all stockmen on the farm know the signs and symptoms of common diseases.

14.1 Control and treatment of internal parasites

- The use of recommended dewormers (anti-helminthic) is ideal especially those effective against the parasite
- Sometimes it is important to have your animals inspected, faecal sample and pen swabs collected by Veterinary personnel for parasites profile analysis.
- Identification of the actual parasites will ensure the use of the correct antihelminthic or dewormer.
- Commonly used dewormers for pigs which are on the market are:
 - Nilvam
 - Wormicid
 - Bimectin
- Routinely deworming pigs as follows is recommended;
 - Boars and sows- every six months
 - Piglets – one week after weaning
 - Growers/Finisher every four months

14.2 Control and treatment of external parasites

- Mange, jiggers, fleas and lice can easily be controlled by breaking the life cycle (see Figure 6-14) through caring out the following activities;
 - Constructing pig pens without cracks in the floors and walls.
 - Regular cleaning with detergent and disinfectants. The use of boiling water during cleaning is also recommended and can be effective.
 - Regular and correct use of acaricides, spraying of walls and floors
 - Before moving, the sow to the farrowing house, the house should be disinfected, sow cleaned and sprayed
 - Also after weaning, the pens should be disinfected and sprayed with an acaricide
 - Pigs with common signs of infection should be treated by injecting a systemic drug such as Ivomectin or get a prescription from a veterinary personnel.

14.3 Control of diseases caused by pathogen

- Standard sow/gilt vaccination should be followed as most of these causes of disease are not easily treated.
- There is need to vaccinate the entire sow herd against
 - Parvovirus and Erysipelas
 - Influenza
 - PRRS
 - Gilts vaccinated against

- Parvovirus and Erysipelas
- Influenza
- PRRS
- Pregnant sows are vaccinated against
- E. coli 3 weeks before farrowing
- Pregnant first litter sows are vaccinated against E. coli 6 and 3 weeks before farrowing

15. Consequences of ill health in pigs

- Reduced production or weight.
 - In most cases, ill health pigs will not grow instead they lose weight.
 - They fail to attain market weights within the recommended time frame
 - Low productivity, number of piglets per litter is reduced
 - Very low birth weight, weaning weight and increased frequencies of having rants on the farm
 - Production cycle length is increased with high chances of sows failing to conceive soon after weaning.
- Reduced milk production in nursing sows.
 - Nursing sows may fail wean their piglets or may wean very small and underweight weaners and most of them may die before the age of weaning
 - Underweight weaners are likely to experience stunted growth and thus affecting age of puberty and subsequent reproductive cycles
- Emaciation
 - They are usually very thin and have a very poor body condition score.
 - Rebreeding is affected by body condition score thus affecting sow productivity per year
- Infertility.
 - Experience nutritional anoestrus
 - May fail to conceive
- Death
 - In most case ill health animal die
 - They have a very poor immunity system hence succumb easily to outbreak of diseases.

16. Activity

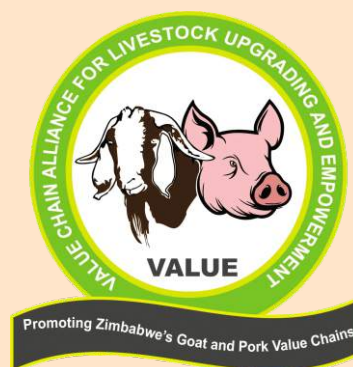
- ✓ Task 1: Farmers should clean a pig stay as a group under training
- ✓ Task 2: Discuss experiences with regards to biosecurity
- ✓ Task 3: Demonstrator to help farmers under training to identify the site of injecting different drugs and antibiotics

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Training Manual

on Pig Diseases and Control



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