1. INTENSIVE PIG PRODUCTION – VACCINATION PROGRAMS

INTRODUCTION:
Pig production requires managers and staff to have good animal husbandry and animal health skills to make it into a profitable business. Skills in both areas are needed to stay in pig production in the 21st century. Most veterinary consultants recommend at least an annual review of your pig health and vaccination protocols or review them every time a significant health challenge occurs in your pig herd.

HERD HEALTH:
Vaccinations.
Most vaccines are killed, and are injected into the muscle or subcutaneously. Some newer vaccines are live, and these are given orally (Enterisol® Ileitis) or into the nose (APPalive®).

- Vaccination is low-cost insurance against disease.
- **Erysipelas, Leptospirosis, Parvovirus and E. coli infections.**
  The major diseases that can cause infectious reproductive failure in gilts and sows are erysipelas, leptospirosis and porcine parvovirus. The vaccination program starts with an injection soon after gilt selection. Full protection comes only 2 weeks after a booster shot. Routine vaccination against erysipelas, leptospirosis, parvovirus and also vaccination against E. coli infections should be considered when introducing young gilts to the herd.
- **Leptospirosis, parvovirus and erysipelas boosters** should be given before mating so the foetuses are protected. Booster vaccinations should then be given for erysipelas and leptospirosis about 3-4 weeks before farrowing. This will boost antibody levels in the sow’s colostrum, giving additional protection to the litter.
- **E. coli infections with enterotoxigenic E. coli.** When doing E. coli vaccinations, the aim is to produce maximum antibodies in the gilt’s colostrum at her first farrowing. The booster for E. coli vaccination must be given 3-4 weeks before farrowing. The primary injection can be given at gilt selection, or even at 4 weeks before the booster shot is due (for late vaccination of gilts, this first E. coli vaccination would be given at 8 weeks before farrowing is due).
- Vaccination of older sows against E. coli and parvovirus may not be necessary and will depend on the immune status of the herd.
- Boar vaccination is important and boosters should be regularly given. Boars should be vaccinated every 6 months against Erysipelas, Leptospirosis and also Parvovirus (to prevent its spread to gilts).
- Maintain good vaccination protection of all boars used for AI programs, as donor boars have the potential to cause wide dispersal of some disease organisms.

Disease Information, Some Available Vaccines & Vaccination protocols:
- **Erysipelas.** Pigs affected with Erysipelas will have a high temperature, will often have ‘diamond-shaped’ skin lesions and may abort as a result. 3 vaccine shots are needed. Vaccinate gilts at selection. Give 2nd shot after 4 to 6 weeks. Then vaccinate gilts and sows 3-4 weeks before farrowing.
- Eryvac® vaccine is used to control both acute and chronic disease caused by *Erysipelothrix rhusiopathiae (insidiosa)* infection. Inject 1mL subcutaneously in the loose connective tissue at the base of the ear.
  In the event of an outbreak of erysipelas, give 1 dose to all pigs on the property, followed by a further dose in 4 - 6 weeks. Piglets born to vaccinated sows should then be protected during the first 10 to 12 weeks of life.
- **Leptospirosis** – Leptospirosis typically causes late-term abortions and occasionally stillbirths.
- 3 vaccine shots are needed. Vaccinate gilts at selection. Give 2nd shot after 4 to 6 weeks. Then vaccinate gilts and sows 3-4 weeks before farrowing.
- Lepto-Eryvac® is used prevent Leptospirosis in pigs and to control Erysipelas.
- As well as controlling swine erysipelas, Lepto-Eryvac® prevents Leptospirosis in pigs caused by *Leptospira interrogans* serovars *pomona* and *tarassovi*.
- Inject 2.5mL of Lepto-Eryvac® subcutaneously at the base of and immediately behind the ear.

**Parvovirus** – Porcine Parvovirus usually infects unborn piglets, causing their death and resulting in a high proportion of mummies. 2 vaccine shots are needed. Vaccinate gilts at selection. Give 2nd shot after 4 to 6 weeks.
- Porcine Parvac® is an inactivated parvovirus vaccine. Inject 2mL subcutaneously at the base of and immediately behind the ear.
- Ideally, in previously unvaccinated herds, all breeding females and boars should be vaccinated twice. Boar vaccination prevents spread of Porcine Parvovirus by the boar at mating or other times.

- **E. coli Infections with enterotoxigenic E. coli** – cause disease and scours in piglets. 2 vaccine shots are needed. Vaccinate gilts at selection. Then re-vaccinate 3-4 weeks before farrowing.
- Neovac® vaccine is used to control the neonatal scouring in newborn piglets caused by enterotoxigenic *E. coli*. Inject 2mL intramuscularly i/m at the base of and immediately behind the gilt’s ear. To be protected, newborn piglets must also obtain adequate quantities of colostrum from the sow as soon as possible after birth.
- ECOvac is another inactivated adjuvanted vaccine for sows and gilts that provides protection against *E. coli* scour in neonatal piglets. Inject intramuscularly i/m.
- ECOvacLE is an inactivated adjuvanted vaccine. It provides protection against *E. coli* scour in neonatal piglets, as well as against Erysipelas and *Leptospira pomona* infections in pigs. Inject intramuscularly i/m.

**Porcine Circovirus and PCV vaccination.** With disease associated with porcine circovirus type 2 (PCV2), the majority of pigs often show no clinical signs of the disease (this is called subclinical disease). However, there are clear production benefits which far outweigh vaccination costs. Porcine circovirus associated diseases (PCVAD) are the different diseases attributed to porcine circovirus 2. PCV2 is found in most pig herds. It is transmitted by direct contact via oral and nasal routes, and possibly by aerosol.

Most piglets are born from immune sows and receive maternal antibodies from colostrum, which protects them until about 6 weeks of age.

- A registered PCV2 vaccine is available in Australia. Active immunisation of pigs can be done from 2 weeks of age and older, and this will aid in the prevention and control of diseases associated with PCV2.
- An initial outbreak of PCVAD can result in up to 30% mortality. Common clinical signs include:
  - Coughing
  - Breathing difficulties
  - Diarrhoea
  - Poor body condition and rapid weight loss
  - Skin discolouration
- If you suspect PCVAD on your farm, contact your veterinarian.
- Farms with PCVAD diagnosed in the pig herd will need to have their entire herd health program reviewed in consultation with the farm veterinarian.
- Vaccines are Relsure PCV (new Zoetis vaccine) and Ingelvac CircoFLEX PCV vaccine.

**OTHER VACCINATION OPTIONS** for WEANER, GROWER AND FINISHER PIGS.
There are off-the-shelf vaccines available for weaner, grower and finisher pigs to prevent Enzootic Pneumonia, Porcine Pleuropneumonia, Glassers Disease (caused by *Haemophilus parasuis*), Porcine Proliferative Enteropathy (PPE or ‘ileitis’) and post-weaning Colibacillosis, as well as any acute or chronic Erysipelas outbreaks in younger pigs. The Swine Influenza strain ‘Pandemic (H1N1) 2009” which can be transmitted from people to pigs, can also cause disease in pigs.

**Enzootic (Mycoplasma) Pneumonia** Protect using RespiSure® One or M+PAC® vaccine.
- **RespiSure® One** is a bacterin (killed bacterial vaccine) for vaccination of healthy grower pigs, at approximately three weeks of age, as an aid in the prevention of chronic Enzootic Pneumonia caused by *Mycoplasma hyopneumoniae* for a period of 25 weeks following a single vaccination.
- **RespiSure® One** also contains chemically inactivated whole cell culture of *M. hyopneumoniae*, coupled with the unique oil adjuvant Amphigen.
- **Inject 2mL RespiSure® One per pig, by intramuscular injection at approximately 3 weeks of age.**
- **M+PAC®** is another inactivated whole cell vaccine for the vaccination of healthy pigs, as an aid in the prevention of pneumonia caused by *Mycoplasma hyopneumoniae* infection.

**Porcine Pleuropneumonia caused by Actinobacillus pleuropneumoniae (APP)**
- **Serovars 1, 5, 7 and 15** are the most common types of APP found in Australia.
- In the peracute form, pigs die within 24-36 hours of showing clinical signs. Pigs will 'dog-sit’ with obvious breathing difficulties. Pigs stop eating, develop a fever, and show a bloodstained frothy discharge from the nose and mouth. Infected pigs are reluctant to move and, if forced to do so, will collapse. Many peracute cases are found as sudden deaths.
- In the acute form, the onset of clinical signs is less rapid. Symptoms include lethargy, loss of appetite, and difficulty in breathing with some coughing. Pigs may take a few days to die, while some will appear to recover completely.
- In the chronic form, pigs survive acute disease, but they maintain a permanent cough and grow slowly.
- **Predisposing factors such as overcrowding and poor ventilation** should be identified and corrected.
- **Treatment - APP** can develop antibiotic resistance and antibiotic therapy does not eliminate infection in a herd.
- **Killed and live APP vaccines** are available in Australia.
- **PLEURAvac** is an Intervet (MSD Animal Health) killed vaccine containing *Actinobacillus pleuropneumoniae* serovars 1 and 15. It is indicated as an aid in the control of *Actinobacillus pleuropneumoniae* infection in growing pigs. Inject s/c.
- **Porcilis APPvac®** is another inactivated adjuvanted whole cell vaccine that will aid in the control of pleuropneumonia in pigs caused by *Actinobacillus pleuropneumoniae* serotypes 1, 7 and 15. Inject s/c.
- **APPalive®** is a live vaccine given into the nose. The Pork CRC in Australia developed the APPalive vaccine and it is given as a single dose to piglets prior to weaning.

**Glassers Disease - caused by Haemophilus parasuis**
- Glaßser’s Disease is a polyserositis and arthritis of pigs caused by the bacterium *Haemophilus parasuis*. The disease is an emerging disease in Australia.
- *H. parasuis* is endemic in the majority of pig herds and is frequently isolated from the nasal cavities of healthy pigs. It can also be the cause of secondary bacterial infections in other diseases, particularly with Enzootic Pneumonia (caused by *M. hyopneumoniae*).
• Typical clinical signs of Glassers Disease include: sudden death, neurological signs, lateral recumbency, prostration, reluctance to move, cyanosis (bluish or purplish tinge to skin), difficulty breathing (dyspnoea), coughing, nasal discharge, anorexia, lameness, swollen joints, fever, and abortion.

• In conventional herds, the disease is often sporadic and generally outbreaks are linked with stress factors. In high-health status pigs, outbreaks can be devastating and are often linked with the introduction of pigs with the organism.

• Predisposing stress factors, such as overcrowding and poor ventilation, should be identified and corrected.

• Vaccines are also available and are generally effective. The serovar of the strain present on a farm should be identified by organism culture of samples from a diseased pig. The samples need to be sent to an accredited veterinary laboratory, to ensure that the appropriate vaccine is being used.

Porcine Proliferative Enteropathy (PPE) or ‘ileitis’ – caused by the bacteria *Lawsonia intracellularis*.

• PPE or ileitis takes four different forms: porcine intestinal adenopathy (PIA) which is an abnormal proliferation of the cells that line the intestines; necrotic enteritis (NE) where the proliferated cells of the small intestine die and slough off with a gross thickening of the small intestine, regional ileitis (RI) which is inflammation of the terminal part of the small intestine, and proliferative haemorrhagic enteropathy (PHE). In the latter, there is massive bleeding into the small intestine, hence the common name for PHE is “bloody gut”, and this is the commonest form of PPE in growing pigs.
  - PHE is more common in 60-90kg pigs and gilts.
  - Disease Spread: Infected faeces are the major vehicle for PPE spread around the farm.

• Pione Intestinal Adenopathy (PIA).
  Clinical signs of PIA, NE, RI are different from PHE.
  - The pig appears clinically normal.
  - Initially eats well.
  - Chronic watery diarrhea.
  - Necrosis in intestines.
  - Gradual wasting.
  - Loss of condition.
  - In some cases, a pot bellied bloated appearance.
  - Pigs with the chronic form of the PIA recover over a period of four to six weeks, however there can be considerable losses in feed efficiency and daily gain of up to 0.3 and 80g/day respectively. As a consequence there can be marked variations in sizes of pigs.
  - NE or RI follow on from PIA with similar signs

• Proliferative Haemorrhagic Enteropathy (PHE) or “bloody gut”
  - PHE is an acute disease. Clinical signs in growing pigs are: bloody scours, the pig may die suddenly, pigs appears very pale and pass black bloody faeces, and anaemic pigs.
  - Gilts with PHE have pale skins, appear weak, have bloody or black tarry diarrhoea, may suddenly die, and abortions occur.

• Risk Factors for PPE in pigs are:
  - The use of continually populated pens.
  - Lack of all-in, all-out production.
  - Naive animals.
  - Change of environment.
  - Changes in feed.
  - Carry over of infection between batches appears to be a main means of spread.
  - Associated with continual population of finishing pens.

• Diagnosis of PPE is based on the clinical picture, post-mortem examinations, histology of the gut wall and demonstrating the organism in faeces by an ELISA test. A serological test is also available. Only a few laboratories can do these tests. Tissue culture tests have been recently developed.

• Treatment of PPE affected pigs can be unrewarding. Prevention is best and can be done by antibiotic feed additive or by vaccination.
• Enterisol® Ileitis is an attenuated live bacterial vaccine for PPE given to grower pigs orally. The vaccine is used for vaccination of healthy, susceptible pigs, 3 weeks of age or older, as an aid in the prevention and control of Porcine Proliferative Enteropathy or PPE (ileitis) caused by *Lawsonia intracellularis*.

• Enterisol® Ileitis protects against diarrhea and mortality associated with ileitis. It significantly reduces gross and microscopic intestinal lesions of ileitis, and gut colonization by the bacteria *Lawsonia intracellularis* following challenge with virulent microorganisms from faeces of PPE infected pigs. Protective immunity lasts for at least 7 weeks.

**Dosage:** 2 ml per pig by oral drenching.

• Enterisol® Ileitis is licensed to improve weight gain and to reduce growth variability associated with PPE and it helps to reduce the total antimicrobial use in pork production.

• Do not use Enterisol® Ileitis in pregnant swine or breeding boars. Do not use it concurrently with antibiotics.

**Preventing other Infections in Grower pigs**

• **Erysipelas** - e.g. Eryvac® vaccine is used to control any acute or chronic Erysipelas outbreaks in weaner, grower and finisher pigs.

• **Post-weaning Colibacillosis** e.g. use an *E. coli* vaccine in sows & gilts, or a combination vaccine which will also protect against other diseases like Erysipelas and Leptospirosis infections.

• **Swine Influenza.** Swine Influenza of the strain ‘Pandemic (H1N1) 2009” has been shown to be directly transmitted from people to pigs by coughing and sneezing. Ensure that all piggery workers and anyone contacting your pigs has been vaccinated against “Pandemic (H1N1) 2009” flu and other influenza strains by having a Flu shot annually. Swine Influenza (H1N1), as it first occurred in Australia in 2009, was a mild respiratory disease of short duration (1 – 2 weeks), causing some fever as part of the viral respiratory infection, mainly in young pigs.

**VACCINE STORAGE AND HANDLING.**

• Always refer to the manufacturer’s instructions for handling vaccines.

• Most should be stored at 4°C - in the body of a refrigerator, not in fridge door shelves.

• Never use vaccines that have been frozen or heated as they will not work.

• Take care to discard any leftover vaccines that may be contaminated – it is often false economy to keep partly-used vaccine packs.

**PIGGERY BIOSECURITY PLAN and ANIMAL HEALTH RISKS.**

Producers who consult an experienced pig veterinarian can get good dividends in return. It is cost effective to implement Piggery Biosecurity and Herd Health Programs which can be tailored to your individual piggery operation.

**Piggery Biosecurity and Animal Health Program**

Some of main parts of a good Piggery Biosecurity and Animal Health Program are listed below.

• Piggery Biosecurity is the protection of your pigs from harmful biological agents (bacteria, viruses, parasites.) Most of the biosecurity threat to your pigs comes from disease agents that are in other pigs: for example, from breeding stock additions, from neighbouring pig sites, and from pigs that were carried by a contaminated pig transporter, or from new pigs which were transported near another piggery.

• Strict piggery and property biosecurity rules are needed to isolate your pigs from exposure to disease organisms from other pigs, from visitors, and even from your own piggery staff if they have contact with outside pigs.

• Pig transport drivers (more so drivers who are not from your property) are very high risk visitors, who can often bring in pig disease organisms from outside pigs, on their hands, on their clothes and on their footwear. Ideally, transport drivers delivering or removing pigs should stay outside your piggery.
“Piggery Visitor Book”. Have and maintain this book in a daily dairy format so as to record all piggery visitors. All visitors even visiting veterinarians should be asked to read and abide by your piggery biosecurity rules. Veterinarians in particular should be provided with piggery overalls and boots to wear.

Limit visitors to essential ones only, and apart from the piggery vet, allow piggery entry only to those visitors with no previous pig contact for at least 48 hours. Ensure all approved visitors perform hand disinfection on arrival, change into provided overalls and boots, and then use the entry antiseptic footbath, before entering the piggery proper. Ideally, the piggery should have a formal change room.

Piggery biosecurity must a 24/7 operation to succeed.

To a lesser extent, other vectors like vermin or wildlife can pose pig health risks, and need to have their risk control programs in place. Wild pigs especially boars carry high levels of Swine Brucellosis infection and so can be a big piggery disease risk. Brucella suis bacteria from infected feral pigs also cause the very dangerous disease brucellosis in people. Serious infections of exposed people like pig hunters happen every year in Qld, NSW and anywhere with feral pig populations. Even on the Darling Downs, if feral pigs visit your property, it is wise to have a pig-proof perimeter fence around your piggery.

While some diseases can be carried on people or on equipment, other diseases like the Swine Influenza strain “Pandemic (H1N1) 2009”, can be directly given by people to your pigs. Ensure that workers and anyone else who contacts your pigs has been vaccinated against “Pandemic (H1N1) 2009” flu and the other seasonal influenza strains by having an annual Flu vaccination from their doctor. It is good practice to prevent people who have the flu from contacting your pigs. Given that most infected animals and people will shed influenza virus for 7–10 days, people who have had any type of influenza should wait at least 14 days after the onset of symptoms before contacting pigs again.

Good breeding, health and husbandry records and management programs are also essential. It is good business management to keep an up-to-date “Piggery Book”, and to record the dates and details of all piggery matters, such as:
- planned health and vaccination programs for gilts and sows,
- planned oestrus synchronisation and Al programs,
- grower pig turnoffs,
- strategic culling of any diseased, problem or aged sows,
- culling of aged or problem boars.

With well-kept records, they will highlight any declines in production figures. This could be due to a subclinical disease such as one associated with PCV2. Records will enable you to pinpoint such problems earlier and take remedial action.

Get prompt disease diagnosis to ensure timely and effective preventive measures are adopted.

Consult your consultant piggery veterinarian, or the NFW vet in Toowoomba if you would like any further advice and assistance.

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