MANAGEMENT FACTORS TO REDUCE YOUR MEDICINE USE

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In order to understand and characterise the impact of management factors on your medicine use, the argument can be divided into ten specific areas:

- Biosecurity
- Pig Flow
- Medicine control
- Environmental factors:
  - Water supply, Feeding system, Floor space and hygiene, Air quality and ventilation systems
  - Stock movements
- Level of stockmanship

Each of these areas are examined.

**Biosecurity**

Biosecurity is obviously vital to prevent the introduction of new pathogens into the farm. Table 1 illustrates the major areas of concern. Most producers give biosecurity lip service at best. Just because you live in a pig dense area does not mean you can scrap biosecurity.

<table>
<thead>
<tr>
<th>Other pigs</th>
<th>Pork products (ham, salami, sausage, pizza)</th>
<th>Rendering truck (placement of dead pig disposal area)</th>
<th>Transportation systems</th>
<th>Locality of neighbouring pig units</th>
<th>Presence of a major road</th>
<th>Purchased second-hand equipment</th>
<th>Clothing from another unit</th>
<th>Birds, Rodents, Cats, Dogs, Flies</th>
<th>AI and Embryo transfer</th>
<th>Feed and water</th>
<th>Bedding and straw (note source of manure for straw)</th>
<th>Staff owning their own pigs</th>
<th>Staff visiting pig markets, shows, other pig units and slaughterhouses</th>
<th>Veterinarians and other pig advisors</th>
<th>Visitors (note electricity and gas service people)</th>
<th>New utensils</th>
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Table 1
Threat to a pig unit

Biosecurity requirements?
Pig flow

Most farms have limited real understanding of the needs of pig flow. Table 2 records the performance of a 250 sow unit. When the unit practiced poor pig flow disease problems were common, associated with over and understocking and poor all-in/all-out. Once a good pig flow model was adopted post-weaning mortality was halved (6 to 3%), the pigs grew 3 weeks faster and the medicine bill was reduced by 70%!. Which farm would you rather farm?

Table 2

<table>
<thead>
<tr>
<th>Pre Pig Flow</th>
<th>Post Pig Flow</th>
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<tr>
<td>Week</td>
<td>Number bred</td>
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<td>1</td>
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Averages 12 bred per week 83% farrowing rate 10 weaned/ sow Averages 12 bred per week 83% farrowing rate 10 weaned/ sow

Medicine and the environment

The effect of medicine ad environment is discussed with the backdrop of respiratory disease control, as these account for a lot of medicine use on farms.
**Medicine control**

Medicines are used to both prevent and treat pigs with respiratory disease. It is vitally important that all medicines are stored and utilised appropriately. Producers need to be fully versed in all the uses, limitations and requirements of vaccines.

**Vaccines** – For example if *Mycoplasma hyopneumoniae* vaccines freeze these vaccines will be inactivated. Likewise if the vaccines are stored above 8°C (note the fridge door area may run at 10°C) the effectiveness of the vaccine rapidly reduces.

**Management of injections** includes both the management of the medicine bottle and the management of syringes and needles. Poorly stored antimicrobial medical products can become inactivated and if other diseases are introduced into the bottle, the bottle can act as a medium for transmission. Poor needle hygiene management may also infect the pig with diseases from the skin or inside the body, for instance PRRSV and Greasy Pig disease.

**Feed medication** has to be managed well. Note that medicated feed placed on the top of unmedicated feed will not provide expected levels of medication and dilution of the medication will occur. If the bin is not completely emptied extended treatment periods will occur. This can result in unexpected feed residues when medicated feed is still present in the bin after the ‘expected’ use by date. An added problem is that sick pigs often do not eat.

**Water medication** also has to be carried out with care ensuring that the water supply is working adequately. Note many pigs which become sick with respiratory diseases, in particular with Actinobacillus pleuropneumonia they may stop or reduce their daily water intake. Also be aware that in many antibiotics used in water medication, the availability varies depending on water quality, for example, calcium salts in hard water can deactivate (by precipitation) many tetracycline products. Other products are not necessarily very soluble.

**Environmental factors**

**Water supplies**

Any restriction in the water supply not only limits feed intake and increases stress factors on the unit but a restriction can result in a thickening of the mucus lining the upper and middle respiratory tract. This reduces the mucociliary escalator’s speed and therefore the ability of the pig to clear it’s respiratory tract resulting in an increased chance of respiratory disease.

Pipe line blocked with lime
Feed supplies

The respiratory tract’s defence mechanism can be overwhelmed by the presence of dust from the feed supplies. Pigs with atrophic rhinitis for instance will perform very poorly on meal, whereas if they are wet fed, near expected growth rates/feed conversion efficient rates can be realised. The presence of mold and mycotoxins can have significant negative effects on the immune system. If the feeders are not managed well variable feed intakes can occur and if the pig fails to eat properly for 24 hours, stomach/gastric ulceration starts.

The gastric ulcer chronically hemorrhages into the stomach resulting in anemia and loss of ability to fight disease. Several cases of ‘respiratory disease’ have been misdiagnosed as the real cause was gastric ulceration and chronic anemia with resulting coughing, pulmonary edema, heart failure and ultimately death.

Floor

A major factor in the pathogenesis (cause) of respiratory disease in pigs is the stocking rate. Overstocked (hot) and under stocked pigs (cold) place pigs under stress and liable to breakdown with respiratory disease. With Overstocking it is important to consider stocking both in terms of square feet of floor space and cubic feet of the house. There are now NPPC restrictions on stocking rates which if kept to will help reduce respiratory disease. However, to meet NPPC requirements of 8 sq feet per finishing pig over 150lbs, requires good pig flow.

Hygiene and floor damage

Hygiene achieved in buildings is often grossly inadequate. It is not generally appreciated that poor quality and dirty floors can have a significant impact on respiratory diseases. If the floor is rough and causes trauma to the feet, disease agents (in particular streptococci) gain access to the pig. They are then transported via the blood straight to the depths of the lung where they can result in pulmonary abscesses.
**Bedding**

Bedding may be used to cover and insulate the floor, especially in hoop structures. While some of these materials can provide good environmental control, poor use of bedding contaminated with mould spores can be seriously detrimental to health. The in-proper use of bedding and cleaning routines can result in pigs being forced to sleep on wet bedding which has serious consequences to respiratory health.

**Air quality and ventilation systems**

Because 5 pints of air are moved in and out of the respiratory tract of the average 120 lbs pig per minute, the air quality has a major impact on the respiratory tract. In this article only examples are given but it is essential that all producers who have pigs with respiratory problems maximise air quality. Also note the air is also breathed by the stock people working within the house.

**Gases**

Ammonia has an effect by slowing the mucociliary escalator thus reducing the pig’s ability to clear the lungs. The management of the slurry system can have significant impact on the gases in the room. Many ventilation systems fail by allowing air to move from the slurry pit back into the room. Note the pig’s nose is closer to the floor than the stockpersons’.

**Humidity**

Low humidity less than 50% results in a reduction in particle size and therefore more particles enter the lungs and these can carry disease agents. Dry air also causes injury to the mucociliary escalator. Moisture over 75% results in a damp environment which overwhelms the respiratory defences. Only at 100% humidity is the air actually ‘cleaned’ by the large droplets falling out of the air. However, such systems are generally illegal throughout the world.

**Dust**

There are three aspects to dust; majority of dust fall in the particle size greater than 3.6 \( \mu \)m. Assuming the respiratory tract is not damaged these particles are removed before entering the alveolus. Particles less than 1.6 \( \mu \)m will not settle in the alveolus and will move in and out of the respiratory tract. Only particles between 3 and 1.6 \( \mu \)m will enter the lung alveolae tissues. This is important as it means viruses require a piggy back to gain entry into the lung tissues.
Temperature
Pigs require to live within their thermo neutral zone and producers need to be aware of the temperature requirements of pigs. On many farms pigs are too hot in the summer time due to lack of an adequate cooling system. This places the pig under severe stress and can affect feed intake. When applied, it is essential to follow agreed temperature curves, in particular in the first stage nursery.

Draughts
Draughts are possibly the number one environmental factor that affects the pig’s ability to fight respiratory disease. Draughts are a serious stress factor affecting the animal’s ability to sleep properly, it is vital that producers provide pigs with zones and in particular a draught free sleeping area. A cold draught can be defined as any air movement in the sleeping area in excess of 50 feet per minute. Note holes in curtains/walls can result in unexpected draughts.

Air patterns
(a) In the room
Excessive air is similar to draughts, total air movement is important to understand as this should determine the pig’s behaviour patterns. It is very disappointing that on many farms the air patterns within the room are very poor.

(b) Between rooms/buildings
Many farms aim to carry out all-in/all-out but fail to realise that this simple concept can be very difficult to achieve and an awareness that poor siting of buildings and inlets/exhausts of ventilation systems can contribute to the spread of disease. Note air movement via slurry channels can destroy all-in/all-out between adjacent rooms.

(c) Fan maintenance
Most farms have very poor fan maintenance programmes. Producers must be aware that a dirty fan can be 40% less efficient than a clean fan. This results in poor air quality and variable air patterns throughout the building (as fans can have different levels of dust on their blades affecting their performance). It also costs more money to run a dirty fan. On one unit we have seen a reduction of 25% on the electricity bill to maintain the same environment of the 1st stage nursery merely by cleaning the fans.
(d) Curtains
Curtain sided buildings need good management. Used properly they can provide good air pattern through cross flow ventilation. However, it is important to ensure the curtains do not result in draughts. Raise the curtain completely regularly to remove any mice nests. Mice can eat through the curtain and results in a hole which can lead to draughts onto the pigs. Curtain controls also need to be reviewed, several systems move the curtain too many times a day.

(e) Building siting
It is very difficult to ideally site a building either due to outside air patterns and the presence of other buildings and ventilation around the building. However, adequate care should be applied before buildings are set up. This is critical in natural cross flow ventilated buildings.

(f) Vegetation between buildings and in ventilation systems
Having vegetation growing up the edge of buildings pose a serious vermin risk for the building as it allows rodents protection prior to entering the buildings. On many farms vegetation even enters the ventilation system disturbing the inlet or outlet. Rubbish/old equipment being discarded along the side of buildings can pose a similar risk and increases the risk of rodent infestation.

(g) Insulation
Many pigs who live in old buildings suffer severe temperature variation associated with insufficient or damaged insulation panels. Insulation is important both to maintain the temperature in the winter and keep the building cool in the summer.

(h) Ventilation maintenance programme
All farms should have a written and complied with program to check and maintain the ventilation system on the farm.
**Stock movements**

Many pigs are exposed to excessive stress because they are placed in buildings unsuitable for them. Many buildings are inadequately prepared for pigs prior to entry. Individual pigs or even whole groups may be too small for the building design and are subjected to environmental variations which are in excess of their ability to cope. Compromised pigs should be removed to hospital pens and not moved to pens with younger pigs.

As discussed poor pig flow, which results from inadequate breeding programmes result in repeated over and under production. Animals are moved around the farm to stabilise the production and the end result is a failure in all-in/all-out and a break down of herd health. It is essential to optimise the efficient production of pig meat which, for example, is not necessarily achieved by breeding all of the gilts who are in oestrus this week. Plan the production system and then farm the plan. Few producers grasp that good control of respiratory disease relies ultimately on the management of the gilt pool which controls breeding output.

Adequate introduction programmes for replacement gilts and boars are an important prerequisite for protecting the unit from new respiratory diseases, in particular the viral diseases. On many farms the units health can be dramatically improved if a 6 week introduction program is followed together with a well constructed veterinary health plan governing the introduction rules.

**Level of stockmanship**

Well trained, dedicated, enthusiastic stockpeople are essential to the efficient running of a pig farm. The good stockman must have sufficient time to look after the animals and not spend all time just running around maintaining the building. Many stockpeople fail to provide sufficient care primarily associated with a lack of organisation and prioritising ability.

**Summary**

To reduce the use of medicines on farms involves the production of good pig health. A health maintenance team is therefore, required which involves all members of the farm team, from owner, manager, stockperson, veterinarian, nutritionist, geneticists and environmental advisors for example. Irrespective of the disease agent(s) associated with the
respiratory disease currently on the farm, to maintain the health of the pigs the farm team must ensure that medicines storage; water supplies; feed supplies; flooring space and hygiene; air quality and ventilation systems; the movement of stock around the farm and the level of stockmanship are all at a standard which will help the pig’s immune system not interfere with its ability to fight any potential disease agent it meets.

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