

## Diagnostic approach to respiratory disease in swine: a practitioner's perspective

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**R**espiratory disease is a common problem in swine practice. In the past 10 years, we have seen many changes in the way pigs are raised, including production system alterations such as three-site production. While production system changes created many challenges for both producers and veterinarians, emerging pathogens created challenges of their own. These include PRRS virus, new strains of swine influenza virus, and circovirus.

Our practice is located in southwest Minnesota, and we see a variety of different health profiles. We work with several different pig production systems, with different pig flow types, and with varying health status. The following paper describes our general clinical approach to respiratory disease in the pig.

### History taking

Respiratory disease usually affects growing pigs. We occasionally see respiratory disease in adult animals, but not nearly as frequently as in the nursery and finishing phases of growth. To determine the initial action to be taken, a good history is required. I attempt to determine whether the concerned producer has called when he hears the first cough, or after he has lost 5% of his pigs. A good description of the clinical signs in conjunction with a good herd history helps me determine if a farm visit is necessary. The questions that need to be asked are listed in Table 1.

If losses are not significant, if I am aware of the unit's health history, and if I have confidence in the producer's ability to correctly describe the clinical findings, I can make a tentative diagnosis at this point and

give an appropriate recommendation for treatment. However, the producer will still be encouraged to bring a pig to the veterinary clinic for a postmortem to confirm the diagnosis. A farm visit will be made if losses are significant and it is clear that the producer is not confident with their description, or if the health history of the farm is unknown.

### Farm visits

Farm visits allow the veterinarian to see the clinical signs firsthand. In addition, most producers keep barn logs of important measures such as high-low temperature readings, daily and weekly mortality rates, daily and weekly pig treatments, and daily water consumption. These are valuable in determining the time of onset of the primary respiratory disease.

To assess morbidity, I count the number of sick pigs in 10% of the pens, randomly selected throughout the barn. Morbidity can be helpful in determining the respiratory pathogen pressure (does it cause 90% morbidity?) and the stage of the disease process (are animals acutely or chronically infected?). Pigs that have died within 24 hours should be necropsied. These post-mortems often prove very valuable for making an initial diagnosis of the respiratory problem, even if the dead pig does not accurately represent the producer's description of the problem — that alone is valuable information. Post the pigs!

It is important to evaluate the environment. Critical environmental aspects are listed in Table 2. Assess the facility for ventilation shortfalls and other environmental stress factors that might have initiated the

disease outbreak. Often the onset of respiratory disease is the result of environmental stress, which might be caused by equipment failure or improper settings on equipment. Some respiratory disease outbreaks can be prevented with good ventilation management, and in most cases, significant losses can be avoided if ventilation is well managed during the outbreak.

### Diagnostic laboratory submission

We frequently use diagnostic laboratory services at our practice, and can have valuable information within 24 hours of submitting tissue. There are two primary reasons that we send either live animals or fresh and fixed tissues to the diagnostic laboratory. The first is to assist us in the diagnosis of specific or multiple respiratory pathogens when information from the history, on-farm postmortems, or the farm visit is inadequate. Secondly, we want to confirm and document the field diagnosis with laboratory work.

If we are on the farm, we mark the pigs that we want sent to the laboratory; otherwise, we describe very specifically the pigs to send. Producers tend to send a chronic cull pig of little or no diagnostic value. The pigs selected must not have been injected with an antibiotic, and must be in good body condition while showing clinical signs typical of the sick pigs in the group. Early in the disease process, when the primary pathogen is unknown, an acutely infected pig is selected. If the disease process has been going on for some time, a pig that has been sick for a few days is selected, to try to identify the secondary bacterial infections and get antibiotic sensitivity reports.

If possible, we prefer to have three live pigs delivered to the diagnostic laboratory within 24 hours of the farm visit. This is frequently possible because of the proximity of several quality diagnostic laboratories to the clients we service. If delivery of live

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**Table 1:** Questions to ask when taking a respiratory disease history.

- What is the age of the affected pigs?
- What is the farm history of respiratory disease problems?
- When was respiratory disease first noticed?
- What is the mortality?
- What is the morbidity?
- Are there any other clinical signs?
- Do the pigs have fevers? If so, what is the high range?
- Have necropsies been performed by the producer or veterinarian? Results?
- What is the treatment history?
- What is the vaccination history?

pigs is not an option, fresh and fixed tissues are submitted using an overnight delivery service. Diagnostic laboratory services are cost effective to the producer and we receive confirmation of the tentative field diagnosis.

## Serological testing

When respiratory disease occurs across a population of animals coming from a specific sow system, rather than being limited to one grow-finish barn, serology becomes a useful tool. Serology can be useful to help determine

- Whether a specific respiratory pathogen is present in the population,

**Table 2:** Environmental factors to check in an outbreak of respiratory disease.

- Temperature set points
- Fan staging
- Air inlet settings
- Curtain settings
- Sensor placement
- Heater capacity
- Drafts
- Building maintenance

- The timing of infection (by measuring seroconversion),
- When maternal antibody is waning, and
- The level of exposure to the pathogen.

## Case study

A nursery manager, who tended a nursery that held 4800 pigs in four 1200-head rooms, reported that, over a period of 5 days, the number of treatments in one room went up approximately 80% (from 6 head to 50 head). For the previous five days, water consumption had not increased by the typical 1% to 2% per day that was usually seen in the first 3 weeks post placement in the nursery. There were three dead pigs that morning, while there had been only five dead pigs during the previous 3 weeks. The pigs were not responding to antibiotics administered in the water or by injection. That day, the nursery manager felt that she should inject more than 100 pigs.

This was the fourth week these pigs had been in the nursery. The nursery barn had been filled in approximately 2 weeks, with this particular room being filled in 1 day. The piglets were from a sow system that was serologically PRRSV positive, but had not shown clinical signs of PRRS for 14 months and had been producing serologically PRRSV-negative pigs for 6 months. In addition, weaned pigs and adult animals were serologically negative for *Mycoplasma hyopneumoniae*, and the sow farm was negative for all types of *Actinobacillus pleuropneumoniae* (APP). The sow system was serologically positive for both strains of swine influenza, but was not showing clinical

signs of influenza.

After receiving a description of the group of pigs, we decided that the nursery should be visited. Prior to entering the room with the sick pigs, we examined the other three nursery rooms and found very active pigs and good environmental air quality.

There were no obvious ventilation problems in the room with the sick pigs. Morbidity was nearly 40%, equally distributed throughout the room, and 5% of the pigs showed severe respiratory distress. A few pigs (less than 2%) had diarrhea. Fevers ranged from 40.0°C to 40.5°C (104°F to 105°F). Postmortem examinations were performed on the three pigs that had died that day. All had ruby-colored, collapsed lungs, and one pig had lesions suggesting chronic *Haemophilus parasuis* or *Streptococcus suis* infection.

The following instructions were given to the client:

- Send three live pigs (that I selected) to the diagnostic laboratory.
- Treat with broad-spectrum antibiotics in the drinking water.
- Inject the sickest pigs with broad-spectrum antibiotics.
- Treat with tetracycline in the feed at 22 mg per kg (10 mg per lb).
- Attempt to prevent contamination of the other three rooms by doing the chores in the affected room last, and washing hands and changing coveralls and boots before entering the healthy rooms from the affected room.

Laboratory reports revealed that the pigs were infected with PRRSV, and with *Haemophilus parasuis* as a secondary bacterial pathogen.

Four days after the initial visit, mortality continued to increase, with three to five dead pigs each day. Another farm visit was made. Pigs in the three healthy rooms continued to do very well. Pigs in the affected room showed nearly 100% morbidity, with more than 120 pigs in the sort pens looking very rough and emaciated. Coughing had increased dramatically. The pigs were huddling in the corners, despite this room being 1.1 to 1.6 degrees C warmer than the three healthy rooms. Five pigs that had died that day were posted, and the lungs of three of them appeared similar to those previously described. However, lungs from two pigs

were nearly 100% fibrinonecrotic, with adhesions to the thoracic cavity. Fresh and fixed tissues from these two pigs were sent to the diagnostic laboratory to rule out APP.

The following instructions were given to the client:

- Continue the broad-spectrum antibiotics in feed and water,
- Inject all pigs with 4 ml of penicillin, and
- Continue to try to isolate the three healthy rooms of pigs.

Some minor ventilation adjustments were made to try to improve the comfort of the sick pigs.

Laboratory results confirmed *Actinobacillus suis*. Once again, the tissues were positive for PRRSV, and, in addition, tested positive for *Mycoplasma hyopneumoniae* and swine influenza virus (H1N1).

Pigs were treated with antibiotics in the feed throughout the nursery period, and individual treatments were administered aggressively. Pigs continued to die at a rate of one to six pigs per day for the last 2 weeks in the nursery. Postmortems were performed on most of the dead pigs, and the cause of death was usually *Actinobacillus suis*. When pigs were moved to the finisher, mortality decreased considerably.

This group of nursery pigs did suffer considerably in nursery barn performance:

- Mortality rate 7.14%
- Average daily gain 0.337 kg (0.742 lb)
- Feed conversion 1.78
- Feed consumption 0.60 kg (1.32 lb) per day

Severe losses did not occur in the other three nursery rooms although the pigs seroconverted to PRRSV. Losses may have been minimized because, on the basis of serologic profiles, neither swine influenza nor *Mycoplasma hyopneumoniae* had been introduced into these groups.

