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# Considerations and recommendations for treating respiratory disease

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## Introduction

Respiratory diseases in the grower finisher area of production remain one of the biggest health challenges facing producers today. The complexity of etiological agents involved can be overwhelming to both growers and veterinarians. Interactions related to environment, housing type, pig flow, group size, pig age, and stocking density play critical roles in the severity of clinical signs seen with different respiratory agents. With the increased emphasis on food safety and specifically antimicrobial resistance and residues, swine practitioners have an ever increasing responsibility to manage respiratory treatment regimes in a prudent and judicious manner. The global perspective of therapeutic management as it relates to respiratory disease cannot be overlooked as seen with the recent new Japanese Maximum Residue Levels (MRL's) for imported pork.

The swine industry and veterinarians in particular face the challenge of selecting the appropriate treatment program that meets the following requirements <sup>(1)</sup>:

- Most efficiently manages the diagnosed respiratory condition
- Proper route of administration that assures the right pigs receive the correct dosage
- Follows FDA guidelines and AMDUCA
- Takes into consideration measures that ensures human food safety
- And is the best economic decision for the production system

The judicious use guidelines of the American Association of Swine Practitioners states that: "When a condition exists that threatens or impairs animal health and well being, it is essential that an accurate clinical diagnosis be obtained. Once the decision is reached to use antimicrobials for therapy, veterinarians strive to optimize therapeutic efficacy, minimize resistance to antimicrobials, and protect public and animal health."<sup>(2)</sup>

## Respiratory disease risk factors

On grower finisher farms and production systems with on going respiratory issues, identifying and controlling the risk factors associated with the health challenges is criti-

cal to a favorable outcome with treatment programs. In many cases, antimicrobial therapy alone will not resolve the respiratory issues that exist.

- Pig flow is the one of the largest risk factors in controlling respiratory disease. A grower finisher site that is all in all out by site will reduce risk tremendously over sites that are only all in all out by barn. The second component to pig flow is the age distribution of the population of pigs on individual sites. As a general rule, the wider the age distribution, the more likely for non responsive respiratory problems to exist. Finally, the number of pigs of pigs within an air space and the square footage given individual pigs can have an impact on respiratory disease
- The relative distance between grower finisher sites has an impact on transmission of respiratory pathogens from one site to another. *Mycoplasma hyopneumoniae* and Swine Influenza Virus (SIV) have both shown the capability of airborne transmission over longer distances. Factors that influence transfer of respiratory pathogens between sites include prevailing wind patterns, topography, cloud cover, and relative humidity
- Identifying a single source of pigs (from one nursery and/or sow farm) reduces the chance of developing non responsive respiratory problems tremendously. In today's large production systems this becomes difficult to do in many cases. Understanding the health status of the source farm(s) of pigs is critical to effective control and treatment. Utilizing communication networks of veterinarians and field production staff from source farms to identify potential problems should be done routinely. Recording information for future reference is essential
- Environmental conditions play a key role in swine respiratory disease. Maintaining a thermoneutral temperature for pigs of varying ages reduces risk of pneumonia. Appropriate air flow is also critical. It has been observed that in the case of certain infectious outbreaks such as *Actinobacillus pleuropneumoniae* (APP) that the severity of spread of infection is reduced with increased air exchanges. Any environmental factor that lowers the effective environmental temperature the pig feels needs to be accounted for.

This includes drafts, floor types, and moisture. High concentrations of ammonia have a negative effect on respiratory disease. Levels above 50 ppm of ammonia have been shown to impact lung function. Seasonal patterns have been seen in the past for certain respiratory conditions such as SIV, but are becoming less predictable with the ever changing nature of this virus and the intensity of production systems

- Concurrent infections within the population of pigs can lead to reduced resistance to respiratory pathogens. Enteric disease seems to predispose some groups of pigs to more respiratory problems. Groups of pigs are much more susceptible to showing clinical disease from secondary bacterial pathogens such as APP when first infected with SIV or *Mycoplasma hyopneumoniae*
- Effective standard operating procedures (SOPs) for maintaining a high level of biosecurity lowers the risk of indirect transmission of respiratory disease between groups of pigs. Unfortunately, in many cases, biosecurity protocols established in the industry today are not carefully followed

## Methods of treatment for respiratory disease

Supportive care through the use of products such as anti-pyretics and electrolytes should always be considered as an alternative to antimicrobial therapy. When appropriate, there are three basic methods for treating respiratory disease problems with antimicrobials, mass medication of a group of pigs through feed, mass medication of a group of pigs through water, and individual injection of pigs.

- Mass medication of pigs through feed has been used both as a prophylactic and therapeutic approach. Predicting when respiratory outbreaks are going to occur and using pulse medications in the appropriate window has been effective in limiting clinical signs for certain respiratory pathogens in the past. Unfortunately there are some inherent short falls to this approach.
- A complete set of diagnostics needs to be done to find the correct window to apply the medication to. This may involve serological profiling of different age groups and necropsies. Typically, a 4-7 day window of pulse medication is needed to try and control the infection.
- Arriving at an appropriate level of medication in the feed to deliver adequate concentrations at the tissue level. Having accurate historic records to understand feed intake patterns is critical. For instance the tetracyclines have been widely used in the industry. The dosage is set at 10 mg/lb body weight. Levels of medication per ton of feed can

vary tremendously depending on daily feed consumption and the pigs' weight.

- Mass medicating through the feed in the face of an outbreak may not get the medication to the pigs fast enough depending on levels of preexisting feed in the bins and feeders.
- Sick pigs do not eat as well as healthy pigs. The pigs that need the medication may not receive the correct levels because of poor or no feed intake.
- In certain groups, if the percentage of sick pigs is not very high, the average medication cost per pig will go up. Using partial budgeting to look at cost: benefit ratios can help in the decision making process.
- Water medications are used quite frequently to treat groups of pigs because of ease of delivery and the tendency of respiratory diseases to effect large percentages of a group of pigs. Many of the same inherent pitfalls that can happen with mass feed medication applies to mass water medications.
- The spectrum of drugs available that legally can be applied to groups of pigs through the drinking water for respiratory disease is quite limited.
- Water wastage can be quite high especially in nipple waterer configurations. This will lead to higher medication costs per pig.
- Correct daily dosage of medication can be difficult to obtain and needs to be monitored daily. Proportioner medicators may not accurately deliver the appropriate level of water medication.
- While injectable medication is the most labor intensive, it offers the best possible solution for antimicrobial therapy of respiratory conditions in most cases.
- Identifying appropriate pigs to be treated requires a level of expertise in animal husbandry that many of the current grower finisher workers do not have.
- Making decisions on which injectable antibiotics to use needs to be based on attacking specific diagnosed bacterial problems. The widespread use of antibiotics to attack respiratory conditions such as SIV and other viral diseases is inappropriate in most if not all cases. Bacterial sensitivities and clinical experience are critical to applying the correct antimicrobials.
- In most cases, a minimum of 2-3 days treatment is appropriate. Long acting injectable antibiotics offer some opportunity for more efficient and effective delivery to the sick pigs.

## Summary

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Experience has shown that an aggressive proactive approach to treatment of individual pigs, once the correct course of action has been determined, is much more effective than a reactive approach. Mortality rates, percent of good pigs sold, and average daily gain can all be effectively changed by the appropriate course of action in treating a respiratory condition.

In the current global market that is becoming more and more safety conscious, we must continue to find ways to decrease the unnecessary use of antibiotics. A sound prevention protocol for certain respiratory agents based on applying good diagnostics and vaccines can help decrease the need for treatment of respiratory disease in groups of pigs. Attacking the associated risk factors can also reduce the need for using medications tremendously. Following the Good Production Practices (GPPs) outlined in the Pork Quality Assurance program is critical to having an effective, safe solution to the respiratory problems that exist.

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