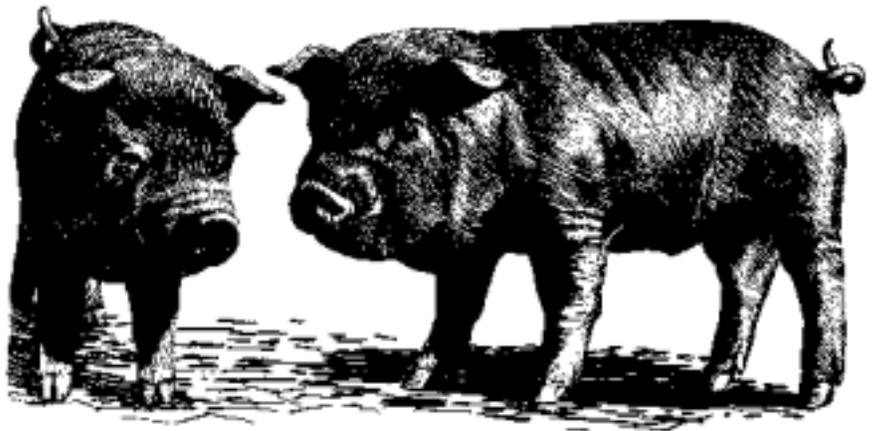


# Atrophic Rhinitis

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**R**hinitis is an inflammation of the upper respiratory tract and is present to some degree in almost every commercial swine herd. This kind of inflammation can be caused by bacteria, viruses, chemicals (manure gas), dust, pollen, temperature fluctuations, and other irritants in the environment, and can have a negative impact on the affected pig's feed-conversion efficiency and rate of gain.

Atrophic rhinitis (AR) is the term commonly used to refer to the condition of a sneezing pig with a crooked, bleeding snout and tear-stained face. The term "atrophic" means that the turbinate bones inside the snout are shrunken and distorted. These bones are lined with mucous membranes and filter the air the pig inhales, and so they are vulnerable to irritation and infection by changes and contaminants in the environment. Atrophy of the turbinate bones without external signs, like a crooked nose, is called "turbinate atrophy." Producers and veterinarians often refer to any or all of these conditions as atrophic rhinitis.



## Bacterial Causes

*Bordetella bronchioseptica* was the first bacterium discovered to cause AR. More recently, *Pasteurella multocida* type D and type A, particularly those that produce type D and A toxins, respectively, have been identified as common causes of AR. When combinations of these bacteria infect a pig's turbinate bones, severe AR can result.

## Economic Losses

The economic effect of rhinitis, AR, and/or turbinate atrophy varies. Producers selling show or feeder pigs lose business or receive reduced prices when pigs have crooked or shortened snouts due to AR. In farrow-to-finish or finishing operations, producers report affected pigs grow at the same rate or more slowly than their penmates.

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A mild amount of turbinate atrophy, with or without snout deformity, may not affect performance. Moderate to severe turbinate atrophy may cause an increased number of days for the hog to reach market weight (from several days up to several weeks). Feed-conversion efficiency in the affected pigs also varies. As the degree of severity increases, feed-conversion efficiency tends to worsen. Atrophic rhinitis pigs are not discriminated against in price at slaughter, but by that time any economic loss, in terms of feed-conversion efficiency and pig growth performance, has already occurred.

### Atrophic Rhinitis-Pneumonia Relationship

The idea that AR predisposes pigs to develop pneumonia is not necessarily true, and, in most slaughter checks conducted by veterinarians, the opposite is seen. However, this is probably related to the severity of AR and the pig's environment. The effect of humidity on the size of water droplets in the air determines whether inhaled droplets stop in the upper respiratory tract and cause rhinitis or reach the lungs to cause pneumonia. These droplets can carry bacteria, viruses, chemicals, and dust that aggravate or cause rhinitis or pneumonia. As the environment worsens, the effect becomes more severe.

### Diagnosis at Slaughter

A veterinarian can diagnose AR at slaughter by sawing across the snout and measuring from the bottom of each lower turbinate to the top of each inner-nasal cavity bone. Several evaluation methods can be used, but measurements of less than 5 to 6 mm (depending on the AR scoring system) on each side are considered normal. In most evaluation systems, scores ranging from 6 to 12 mm on each side indicate increasingly severe AR. Nasal septal deviation or asym-

metry of the nasal cavity worsens an AR score. After a group of snouts is measured, the average score is calculated to indicate approximate herd involvement. Some data on group performance (average daily gain, average days to market, feed efficiency, and/or the percentage of poor-doer pigs) are necessary for proper evaluation of AR-related economic loss.

### Live-Animal Diagnosis

Veterinarians can diagnose bacterial rhinitis, AR, and turbinate atrophy in live animals by swabbing the turbinate bones through the snout and producing a bacterial culture. Testing several animals in a group provides better results than testing a single animal. Visual inspection is another method of live-animal diagnosis. Purchased breeding stock should be isolated before they are introduced into the herd so that obviously affected animals may be culled. Even so, the producer should be aware that even normal-appearing penmates could bring in AR. Purchased feeder and show pigs are also visually appraised for atrophic rhinitis. Because live-animal diagnosis of AR is indefinite, decisions on whether or not to allow slightly affected AR animals to enter a herd should be based more on performance and health in the seller's herd and knowledge of AR prevalence and performance in the buyer's herd.

The cardinal rule in swine production of minimizing sources of breeding animals is extremely important in limiting economic loss from AR and other diseases. Mixing swine from different sources also mixes infectious organisms, which act synergistically to cause clinical diseases. Atrophic rhinitis is more severe when various combinations of *Bordetella bronchiseptica*; *Pasteurella multocida* serotype D, toxin producer; and *Pasteurella multocida* serotype A, toxin producer, infect the turbinate bones.

## Treatment and Prevention

Elimination or prevention of all turbinate atrophy and/or AR in a commercial herd is neither cost-effective nor realistic. A good health program, however, can greatly reduce the effect of this disease. Antibacterials in the feed or water, injections of antibiotics, vaccination, and environment modification have been used separately or together to control the clinical signs of AR. An obvious decrease in clinical signs, such as sneezing, after the use of antibacterial therapy in young pigs may strongly suggest AR as the diagnosis.

Vaccination may be indicated to control AR in some herds. Vaccines containing killed *B. bronchioseptica*, *P. multocida* type D and type A, plus toxoids to *P. multocida* type D toxin or *P. multocida* types D and A toxins may be used. Vaccines containing killed bacteria and toxoids are called bacterin/toxoids. Excellent combination bacterin/toxoids that are now available include Score™ by Oxford Labs (available through a veterinarian, 1-800-328-0237) and NOBLVAC-DART® by NOBL Laboratories (may order direct 800-323-7527). Vaccinate sows pre-farrowing and pigs pre-weaning, according to label instructions. Vaccination of feeder pigs may be too late to be effective.

Live *B. bronchioseptica* vaccines are also available for use. MAXI/GUARD Nasal Vac by Addison Biological Laboratory (816-248-2215), a modified-live, intranasal *B. bronchioseptica* vaccine, is one example. It is approved to be administered intranasally to day-old piglets. The bacteria in Nasal Vac colonize the piglets' turbinate bones, blocking the attachment of harmful *B. bronchioseptica* and *P. multocida* bacteria. Antibacterials effective against *B. bronchioseptica* should **not** be used at the time of injection with live vaccine. One concern about the bacteria in live intranasal AR

vaccines is "reversion to virulence"—meaning that they may change back to a disease-causing state. Before using an intranasal AR vaccine, ask the company to provide research data indicating that reversion to virulence is unlikely.

Combination vaccines such as bacterin/toxoids may furnish superior protection in severely affected herds. Since each herd situation may vary considerably, consult a veterinarian for advice on vaccine use.

With uncorrected environmental problems, the effectiveness of AR vaccines is usually poor. In many cases, correcting the environment alone may give as good a response as vaccination with environment correction. For this reason, vaccination may not be cost-effective. But when vaccination gives a good response, a producer is not locked into continual vaccine use, because the breeding herd develops a natural immunity and, as a result, the number of organisms spreading from sow to pig decreases over time. When young pigs are exposed to fewer organisms, the severity of AR in the herd decreases.

## Summary

Atrophic rhinitis is a common and complex disease syndrome with varying terminology to describe varying degrees of severity. Mild AR may not affect pig performance, but moderate to severe AR is associated with reduced growth rate and worsened feed-conversion efficiency. Pneumonia is not usually the result of AR. Post-mortem diagnosis of AR is well defined, but must be interpreted in the context of herd performance. Swabbing the turbinates in the live animal and culturing are used to diagnose bacterial AR. Tests on several animals in a herd provide more accurate information than a test on an individual. Visual inspection is also used to diagnose AR in live animals. Many approaches to treatment and

prevention of AR are available, but proper management of the pig's environment is paramount to the success of any approach.

### **For More Information**

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Straw, B.E., Daniel, G.M. "Atrophic Rhinitis," PIH 50. Pork Industry Handbook, Purdue University, Cooperative Extension Service, West Lafayette, Indiana, 1992.

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