Swine influenza: New challenges with old disease

Influenza virus has become a complicated disease.

New vaccine technologies, filtration may aid future control efforts.

By BRAD LEUWERKE and TIM LOULA*

*Drs. Brad Leuwerke and Tim Loula are veterinarians with the Swine Vet Center in St. Peter, Minn.

SWINE influenza virus, which, in recent years, has had a major impact on swine respiratory health, continues to challenge and frustrate swine producers and veterinarians worldwide.

Prior to 1998, in North America, disease caused by influenza was relatively straightforward. Viruses that infected herds were part of the H1N1 subtype, and disease was most often isolated to growing pigs, affecting a group for a short period of time without a lot of lingering impact on health.

In 1998, the emergence of the H3N2 subtype caused an increase in disease among sow herds that manifested itself as sows going off feed, dramatic fevering, coughing and, in some cases, abortions.

Since that time, influenza has become increasingly complicated due to the vast number of viral strains and the ability of the virus to rapidly change within swine populations.

Influenza virus has the potential to cause disease among all ages of swine. In growing and finishing pigs, influenza can be a primary cause of disease leading to a wide range of clinical signs, including: inappetence, a deep, barking cough, respiratory difficulty, lethargy and fever. In growing pigs, influenza commonly occurs in combination with other viruses and/or bacteria as part of a swine respiratory disease complex that can increase the severity of clinical signs and complicate treatment strategies.

Among sow herds, influenza is often recognized as a mild cough heard among sows as well as pigs prior to weaning. Influenza virus can actively circulate within a sow farm over a period of time. The virus remains in many of these pigs at weaning and causes problems for getting them off to a good start in the nursery.

More than 70% of our client herds deal with influenza-associated disease at some point in their production systems. When treating herds infected with influenza, we focus on reducing fever, lessening pig discomfort and limiting secondary bacterial infections. This is routinely accomplished through the use of oral and/or injectable anti-inflammatory products, monitoring barn environments and administering antibiotics through the feed and/or water along with injectable treatments when necessary.

Viral changes

Changes that occur with the influenza virus can be subtle and without a lot of impact on health. Alternatively, changes can be dramatic and lead to a new influenza virus that can cause clinical signs even in well-vaccinated herds.

Viral change is associated with two unique situations, the first being the virus itself, which, because of its
structural make-up, is prone to rapid genetic changes that lead to variants of the original virus. This process of change can occur when an individual virus mutates or when multiple viruses infect a group of pigs and an exchange of genetic material takes place.

A second factor that leads to change among influenza viruses is the impact of immune pressures that put on the virus by large groups of pigs. Groups that have developed a natural immunity over time or have vaccine-induced immunity can actively select for new and different viruses as those viruses that their immune systems are geared toward are eliminated (Gramer, 2008).

Control

Currently, the most common practices implemented for the control of influenza include the routine vaccination of sow herds to protect sows against infection as well as to elicit a maternal antibody response that will lead to antibody transfer to piglets through colostrum at birth. Typically, among pigs, these antibody levels within well-vaccinated herds last 8-12 weeks, providing a level of protection through the nursery phase of production.

Protection against influenza provided through maternal antibodies can be variable, and the antibodies may not protect well in situations in which there are large differences between the vaccine virus and the circulating field viruses, when there is a high level of influenza pressure on a group or when there are additional respiratory disease co-factors already affecting a group's health.

Vaccination of growing pigs has been less common for producers, often due to questions regarding similarity between vaccine and field strains as well as the impact that maternal antibodies have on the timing of vaccination.

Historically, the vaccines used for controlling swine influenza virus have been commercially produced, killed products that usually have included two or three strains. As viral evolution has occurred, a movement toward autogenously produced influenza vaccines has become common.

Autogenous technology allows for customization through the selection of viruses that are found to be circulating and causing disease within a given herd or system. Autogenous vaccines, which are also killed products, have allowed producers to stay current with the strains that affect the health of their herd. Recently, manufacturers of commercial swine influenza vaccines have been allowed to update their vaccines with the more current/prevalent strains.

With variation in the success of control practices that are currently implemented among swine populations for influenza, new strategies are needed to enhance or modify the immune response generated in the pig by influenza vaccination. Additionally, methods to limit the spread or movement of a virus among susceptible groups of pigs will be important in reducing the effect of this virus.

Several new technologies have been studied and may be on the horizon for swine influenza control. Included are possible vaccines that contain purified portions of the swine influenza virus that are thought to be important generators of protective immunity in pigs (Kitikoon, 2007).

Additionally, recombinant vaccines that utilize a non-influenza host virus to actively replicate protective proteins inside the pig following vaccination have been suggested (Wesley, 2004).

Modified live influenza vaccines have also shown promise in experimental models (Vincent, 2007) and should be further explored.

Filtration will also be an important part of influenza control. Many farms have already shown the success filtration can have for the control of porcine reproductive and respiratory syndrome (PRRS) virus. Intuitively, filtration can work for limiting the movement of influenza virus among groups of pigs.
Influenza virus has become a complicated disease of swine. It is one of the three major viruses -- including PRRS and, to a lesser extent, circovirus -- that despite the availability of effective vaccine, still affects swine respiratory health. No longer will it be the typical flu that moves quickly through a group of pigs and is gone. New strategies will be important in reducing the impact this virus has on swine health.

References


