

## SWINE SOLUTIONS

### It's the start of PRRS season: Managing PRRS in swine herds

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For those closely associated with the swine industry, it comes as no surprise that a recent monitoring project done by the [Swine Health Information Center](#) (SHIC) has shown an increased incidence of Porcine Reproductive and Respiratory Syndrome (PRRS), signaling the start of the annually dreaded season when the disease is most prevalent.

PRRS costs the industry an average of US\$664 million per year. On a farrow-to-finish operation, financial losses can amount to approximately \$75 to \$150 per sow in inventory, depending on severity, previous exposure and how long the virus persists in the herd. This cost is an accumulation of reproductive losses, diagnostic costs and increased mortality across pre-wean, nursery and finisher pigs, as well as increased treatment costs.

The virus is a small enveloped RNA virus whose make-up gives it the ability to rapidly mutate and bypass any previous immunity to it a pig may once have had. The virus specifically infects pulmonary alveolar macrophages, also known as PAM cells, which are the white blood cells found in the lungs. A PRRS infection results in a compromised respiratory immune system, which can lead to the increased severity of any secondary infections. Coupled with other infections, such as *Mycoplasma hyopneumoniae* (a species of bacteria known to cause porcine enzootic pneumonia, a highly contagious and chronic disease), severe respiratory infections that are very difficult to treat can flourish.

Abortions can also occur, either from the fever induced by infection of the dam or by the actual infection of the PAM cells within the fetus itself. Piglets begin developing PAM cells in approximately the third trimester of gestation and depend on colostrum intake to give their immune system a head start — but when infected in utero, the piglet has little to no defense of their own against infection.

Many diagnostic options exist, since the PRRS virus can be found in blood, saliva, semen, milk, urine and feces. The key is to focus on the goal of the investigation. One common test is the Polymerase Chain Reaction (PCR), which is used to evaluate the presence of the virus but will not determine if the virus is alive or viable. Another test, called Enzyme-Linked Immunosorbent Assay (ELISA), looks for antibodies, which show that the animal has been exposed to the virus for more than two weeks. Virus Isolation (VI) tests can be used to determine if there is any viable virus present in the sample. Histopathology tests look at the tissues on a cellular level in order to understand any damage that may exist relative to the diagnosed pathogens.

A number of control strategies have developed over the nearly 30 years that the PRRS virus has been present in the industry. Among those strategies are a number of tools that veterinarians and producers can utilize to control infection and accomplish their goals, whether they are looking either to control the disease or they intend to fully eradicate the virus from the herd. The following is a list of the tools available to accomplish the goal of controlling a PRRS break, which is exposure to the PRRS virus to build herd immunity. These various options can be mixed and matched to develop a program suited to each individual farm. Be sure to discuss any changes with your primary veterinarian before implementation.

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## 1. Live Virus Inoculation (LVI), also known as “serum therapy” or “mass exposure”

- a. Involves exposing the entire sow herd to a serum prepared from samples from infected animals. Farms will typically quantify the amount of virus per milliliter of serum to gain some exposure control. The serum can be given intranasally or injected. The advantage to this process is that it can be rapidly applied to the whole herd simultaneously, meaning the resident virus cannot continue to move and mutate within the sows. If done well, it can give a rapid clearance time. However, following exposure to the serum, farms sometimes experience high reproductive losses and even increased sow mortality. This essentially compresses the exposure window within the herd. Piglet quality seems to start to improve as the animals exposed in their second trimester of pregnancy begin farrowing, but this will vary depending on the previous exposure of the virus to the herd and by controlling the virus’ movement throughout the farm.

## 2. Modified Live Virus (MLV) vaccination with a commercial product

- a. Advantages to using commercially produced MLV vaccines are that they are usually readily available; they have been prepared in a safe manner, so as not to contain other contaminants; and they can be safely implemented in multiple farms simultaneously.
- b. One thing to remember with MLV vaccines is that they are stimulating the body’s innate immunity. There are non-specific components of the body that can recognize a problem and give some early response, but they will not be able to clear the infection nearly as effectively as acquired immunity, which includes antibody production. Think of MLV vaccines as a first responder, triaging the problem until the body has had time to identify and produce specific antibodies against the virus, which typically takes around two weeks.
- c. These products work best when used in conjunction with a larger control strategy; reversion to virulence has been experienced on farms leaving portions of their herds unvaccinated (i.e., vaccinating piglets but not sows, or vice-versa). A planned step-down process is required to take a farm negative from the modified live vaccines, since they are still live viruses, albeit in a weakened state.
- d. Successful strategies for use of MLV include periodic (e.g., quarterly) whole-herd vaccination with ongoing piglet vaccination, or vaccination of piglets post-weaning.
- e. Five products presently exist in the U.S. market. Before implementing or switching between any of these vaccines, take careful consideration and do some planning with your herd’s veterinarian, as these are all uniquely different live viruses that have been modified to be safely used within your herd. Each has its own unique advantage, such as the ability to mix with other vaccinations to ease labor needs or a reportedly lower reversion to virulence. You may even be interested in utilizing the same program within a “neighborhood” of farms to build a stronger regional immunity profile. Talk with your veterinarian if you’d like to learn more about these products.

## 3. Killed virus vaccination with an autogenous product

- a. These vaccines generally take 2-3 months to produce after identification of the virus, but this waiting period is justified, as the antibodies stimulated by this vaccine are exactly what is needed to fight off the existing infection in the herd. They are good for maintaining immunity within a herd against chronic infections, especially if there is reason to keep the live virus out of the control program. Ongoing surveillance is necessary to evaluate the herd’s PRRS status, however, since this vaccine type will give poor protection against a new strain of PRRS entering the farm.
- b. Within the industry, there exist a number of different technologies to develop these vaccines. These include a traditional killed vaccine, which utilizes the specific virus to the herd; a “grouped” vaccine, which looks at strain similarities to allow for a faster turnaround time; and, most recently, vector-type vaccines, which utilize DNA sequences to artificially replicate the surface antigens of the targeted PRRS virus.

It is not uncommon to use a killed product in conjunction with LVI or MLV herd stability strategies. However, herd-level control strategies must be implemented along with these options to truly gain some control over the virus.

## Antibiotics and ancillary therapy

Since PRRS is a virus, antibiotics are generally considered unsuccessful in treating the primary infection. However, using antibiotics correctly can reduce the presence of other pathogens in the herd. Recent research utilizing oral or injectable antibiotics from the Macrolide class has shown a reduction in the severity of a PRRS break, during either primary or serum exposure. There are theories as to why this may occur, but what is already known is that macrolide-class antibiotics concentrate in PAM cells in the lungs. The common practice of running anti-inflammatories like aspirin or ibuprofen in the drinking water does carry some merit, given the high fevers that typically result from a PRRS break, but these should be used judiciously.