News on PRRSV Transmission

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Introduction

Looking back over the past 4 years, we have made tremendous strides in the porcine reproductive and respiratory syndrome virus (PRRSV) knowledge base. Experiences from the field in combination with scientific data have brought forth a great deal of new information. While there still are many mysteries yet to solve, I am optimistic that we are making progress. My goal for this article is to summarize what is now factual information in the areas of transmission of PRRSV.

Transmission

It is important first to understand PRRSV transmission within a herd and then to evaluate its routes of transmission between herds.

Transmission within a herd

An understanding of PRRS virus persistence and transmission within the breeding herd is critical for successful eradication and/or control of the disease. The essential component of controlling PRRS is the production of pigs that are free of virus at the time of weaning.
In the vast majority of chronically infected farms, uncontrolled circulation of PRRS virus occurs in the breeding herd. These farms experience recurrent episodes of PRRS-related reproductive disease that is often specific to gilt parities, along with the respiratory form of PRRS in the weaned pig populations. PRRS virus infection of the nursery pig typically begins early in life, either by transplacental transmission (vertical transmission) or from sow-to-pig (horizontal

transmission) prior to weaning. Litters of infected pigs then provide a source of virus for older pigs in the nursery, leading to continuous cycling of virus throughout the population. Therefore, an understanding of factors that enhance spread of virus from sow-to-sow in gestation and sow-to-pig during lactation is essential for "stabilizing" the breeding herd.

Stability as it relates to PRRS is a frequently misunderstood concept and is often an improperly used term. The actual definition of a *stable*-breeding *herd* is defined as a population of adult swine and their offspring, within which there is no detectable evidence of sow-to-sow or sow-to–pig transmission of PRRS virus. Scientists have attempted to characterize the PRRS virus-infected breeding herd to better understand factors that enhance

Transmission between herds

The technology to eliminate PRRSV from individual farms is well documented; however, the re-infection of farms with unrelated strains of PRRSV is a frequent event. Previous studies have documented the role of pigs and semen as routes of PRRSV introduction to farms. Transmission of PRRSV by non-porcine vectors has also been documented by insects, migratory waterfowl and up to 1 meter by aerosols. Mechanical transmission of PRRSV can occur in warm and cold weather by contaminated transport vehicles and cargoes. In contrast, transmission has not been demonstrated via domestic and feral mammals, rodents, domestic or wild birds, or personnel.

Continued evaluation of insects as non-porcine vectors and fomites has indicated that PRRSV can remain viable in the GI tract of mosquitoes and houseflies for 6 and 12 hours, respectively. However, mosquitoes do not appear to be biological vectors of the virus. Field evaluations indicate that flies can serve as local vectors of PRRSV and can transport virus for up to 2.3 km. Further investigation of aerosol transmission of PRRSV indicates that viable PRRSV can be transported up to 150 meters. These aerosols proved to be infectious to pigs, and a 50%

reduction in PRRSV concentration was observed every 33 meters. Recent data on the role of transport vehicles have indicated that PRRSV-contaminated trailers can serve as sources of infection for naïve pigs and that doses of $\geq 10^3$ may be necessary to infect susceptible animals. Finally, it also appears that drying is an essential component of a sanitation program for transport vehicles.

Although we have learned a great deal about this subject, more information is needed. Basic information, such as the quantity of virus shed and the patterns of shedding at the individual pig level and at the population level, is still lacking in the area of aerosol transmission. Information on how to successfully intervene and decontaminate transport vehicles is also essential. Fortunately, these studies are underway and through collaborative efforts across Universities and industry, the answers are not far away!