

## **Sero-prevalence of Senecavirus A and risk factors among a convenience sample of sow farms in the United States**

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### **Statement of the problem:**

In the summer of 2015, there was an increased incidence in reported cases of vesicular lesions on the snouts and feet of sows and growing pigs in the US. Foreign Animal Disease (FAD) investigations in all of these cases confirmed the presence of Senecavirus A (SVA), which until this time had not been routinely diagnosed in the United States (US) for many years. In several cases, the presentation of clinical signs was dramatic, and the lesions were readily identified by veterinarians and farm staff. In a few particularly notable sow farm cases, however, presentation of the disease was non-specific and only after ruling out other disease causing organisms was SVA identified.

This was of interest to the veterinary community because, these un-identified cases of SVA in sow herds may have posed a risk of being a reservoir for producing and weaning SVA piglets that could be widely disseminated into the pork production chain. Given the nature of the vesicular lesions, and the inability to differentiate them visually from other reportable vesicular diseases such as Foot and Mouth Disease, the potential implication of unknown numbers piglets being weaned with SVA was concerning.

Therefore, this project set out to determine the sero-prevalence of SVA among a convenience sample of sow farms in the upper Midwest. It was hoped that data from this study would not only help inform state and federal animal health agencies of the potential amount of FAD investigations that would be forthcoming, but also to help inform veterinarians in the field about the need for control and elimination programs.

### **Objectives:**

The objectives of this trial were to, 1) identify the sero-prevalence of SVA among a convenience sample of sow farms in the Upper-Midwest region of the US that have never shown clinical signs of SVA or had a FAD investigation conducted on farm through the use of recently developed and validated VP2 ELISA (Dvorak et al., 2017), and 2) conduct a risk factor study among any SVA sero-positive farms identified.

### **Data collected:**

Sow farms were included in the study if they had never reported any vesicular lesions consistent with SVA, or had a FAD investigation conducted on the farm. 10 serum samples were collected from a cross section of gilts (n=4), parity 1-3 (n=3), and parity 4 or greater (n=3), and submitted to the University of Minnesota Veterinary Diagnostic Laboratory (UMVDL) to be tested by ELISA (Dvorak et al., 2017) that has a test sensitivity of 94.2%, and a test specificity of nearly 89.7%. Any positive ELISA tests were confirmed by IFA which has a sensitivity of 90.3% and specificity of nearly 100%.

We set out to originally collect samples from 65 sow farms. Between July and October of 2016, a total of 96 sow farms have been tested from 20 states. Of the 781 individual serum samples tested, 30 (3.8%) tested positive by ELISA. Of the 96 sow farms tested, only 2 (2.1%) had at least 1 animal test positive by both ELISA and IFA. Additionally, 2 random cases pulled from the UMNVDL tested positive by both ELISA and IFA, however, it should be noted that no data was known about the presumed SVA status of these farms.

**Discussion:**

Of the 96 sow farms enrolled that have never shown clinical signs of Senecavirus A or have had a Foreign Animal Disease Investigation, only two (2.1%) were confirmed sero-positive for SVA by ELISA and IFA between July and October of 2016. This is an encouraging, as it potentially indicates that under most circumstances, it would appear that SVA infections do not go un-noticed, and that the risk of weaning SVA positive piglets into the pork production chain without knowledge is quite low.

These results should give field veterinarians, as well as state and federal animal health agencies some degree of confidence that most cases of SVA are identified at the sow farm level which may also give some confidence that cases in grow finish pigs is not unknowingly transmitted from the sow farm.

Despite the apparent low prevalence among sow farms, veterinarians and producers should remain diligent about biosecurity and other measures aimed at mitigating the incidence of SVA on sow farms. Additionally, this study was one of the first large scale projects to utilize newly developed SVA VP2 ELISA testing at the University of Minnesota Veterinary Diagnostic laboratory. Practitioners should be aware that this test is now available, and while it appears to fairly reliable, current understanding of SVA immunology, is somewhat limited to approximately 60 days post outbreak in a herd of naturally infected sows.

Two main limitations of this study should be considered. First, it is not known how long antibodies are present in the serum of sow after infection with SVA. Today, data is limited to 60 days post-outbreak in naturally infected sows, and it is not known how quickly antibodies decay after that point (Dvorak et al., 2017). Therefore it is possible that some herds enrolled in this project may have become infected with SVA, and cleared antibodies for the sampled sows prior to the sampling date. Consideration for expanding this project into other swine producing regions of the US should be considered.

Second, there may have been a sample size issue for the detection of sero-positive animals within a herd, however, it has demonstrated that between 90 and 100% of all animals sampled in one herd were positive within the 60 day period of sample collection (Dvorak et al., 2017), so the likelihood of declaring a herd negative, when it was indeed positive would be low.

Full publication of this study is ongoing and will likely be submitted as a case series or short communication in either the Journal of Swine Health and Production or in an open source, online journal of veterinary medicine or infectious disease research.

**Conclusions:**

- Apparent SVA sero-prevalence in presumed negative sow farms in the upper Midwest is low
- The VP2 ELISA and IFA for SVA are reliable tests that could be used to assess SVA status of farms
- Continued biosecurity diligence at the sow farm level should be a priority

**References**

Cheryl M. T. Dvorak, Zeynep Akkutay-Yoldar, Suzanne R. Stone, Steven J. Tousignant, Fabio A. Vannucci 6 and Michael P. Murtaugh. An indirect enzyme-linked immunosorbent assay for the identification of antibodies to Senecavirus A in Swine. BMC Veterinary Research, (in press, 2017).