

## SWINE HEALTH

**Title:** Estimating the infectious dose for transmission of PRRSV by aerosol exposure – NPB #07-131

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### SCIENTIFIC ABSTRACT

The objective of this research was to quantify the likelihood of PRRSV transmission via aerosols as a function of exposure dose. **Methods:** The study used PRRSV isolate MN-184 (kindly provided by Dr. Scott Dee, UM). All pigs were confirmed PRRSV negative prior to commencement of the experiment and were housed in HEPA-filtered isolation units throughout the experiment to avoid inadvertent transmission of pathogens. The study was conducted in 10 replicates, 10 pigs per replicate, with pigs randomly assigned to treatment. One negative control pig and one positive control pig were included in each replicate. To conduct the experiment, PRRSV MN-184 was aerosolized into a dynamic aerosol toroid. Pigs to be exposed to the PRRSV aerosol were anesthetized and fitted with a canine surgical mask attached to a pediatric spirometer. Each pig respired 10 liters of virus aerosol. Air samples collected before and after each pig were used to estimate the exposure dose. Serum samples collected 5 and 10 days post-exposure were tested for the presence of PRRSV to determine whether exposure resulted in infection. The dose-response curve for exposure to airborne PRRSV was derived from the proportion of pigs infected by dose. **Results.** Three replicates were disqualified due to failure to meet quality criteria; therefore, the infectious dose 50 (ID50) estimate was based on 7 replicates. Analysis showed that the infective dose 50 (ID50) of MN-184 under the parameters of this study (pig body size and age, exposure dose and time) was  $<1 \times 10^1$  TCID50. **Conclusions:** Under comparable conditions, this ID50 estimate is much lower than a previous estimate based on PRRSV isolate VR-2332 (Hermann et al., 2009). Thus, the data suggested that isolate MN-184 was highly infectious via aerosol exposure and that the ID50 for airborne PRRSV varies among isolates.

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