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Transmission of Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) to Age-Matched Sentinel Pigs

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Understanding the ecology of porcine reproductive and respiratory syndrome virus (PRRSV), particularly its transmission, is imperative in the development of successful prevention programs. This study was designed to determine, through a systematic approach, how long PRRSV-infected pigs remain contagious to age-matched sentinel pigs.

Two trials were conducted. Two-week-old pigs were obtained from PRRSV free herds and housed in isolation rooms for 3 weeks until the start of the experiment. In each trial, five pigs (principals) housed in one isolation room were intranasally inoculated with PRRSV. Four or 6 days after the principals were inoculated, a pairs of seronegative sentinel pigs were placed in direct contact with the principal pigs. The sentinel pigs were removed from the principals' room after 2 weeks and moved to a separate isolation room and held for 2 more weeks to allow time for seroconversion. One week after the first pair of sentinel pigs was removed from the principals' room, two more sentinel pigs were placed in direct contact with the principals. After two weeks of exposure to the principals this pair of sentinels was also moved to an isolation room. This rotation was continued through 8 pairs of sentinel pigs.

Serum was collected from the sentinel pigs at the time they were moved into the principal's room, when they were removed from the principals' room, and 2 weeks later. Virus isolation was conducted on the serum samples. The sera were also tested for anti-PRRSV antibodies (ELISA, IDEXX Laboratories, Westbrook, ME). Isolation of virus or positive ELISA results in serum collected from sentinel pigs after exposure to the principals were considered as evidence that transmission had occurred between the principal and the sentinel pigs.

In the first trial, the pigs were all females and the principals were inoculated with a Nebraska PRRSV isolate with a RFLP pattern of 152. In the second trial the pigs were obtained from a different source, only barrows were used, and the virus isolate originated from southeast Iowa (obtained from Dr. W. Mengeling, USDA, ARS, NADC Ames, Iowa) and had a RFLP pattern of 142.

In the first trial, the principal pigs were found to be contagious through day 62 but not after day 69. In the second trial, transmission occurred through day 60 but not after day 67. The experiment was terminated before the principals returned to seronegative status. The principals remained seropositive for at least 14 weeks after they were last shown to be contagious.

The results of this study provide guidelines for estimating the duration of time that infected pigs may be expected to transmit PRRSV to age-matched cohorts. This information is especially pertinent in the development of gilt acclimation programs and in herd virus-elimination programs. Additional studies are needed to determine the effect of different factors such as age of principals, age of sentinels, degree of contact, breed, and strain of virus on transmission. Until the effect of these factors are better understood it is dangerous to assume from a biosecurity point of view that the relatively short contagious period found in this study is typical of transmission between similar aged pigs.