

Porcine Reproductive and Respiratory Syndrome virus (PRRSV) transmission rate is not constant with time-since infection: a serial transmission experiment

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The objective of this study was to estimate the time-dependent transmission rate of Porcine Reproductive and Respiratory Syndrome Virus (PRRSV) in experimental conditions. Relationships between this time-dependent infectiousness and the evolution of virological parameters and antibody response were also assessed. Seven successive transmission trials involving a total of 77 specific pathogen-free piglets were carried out from 7 to 63 days post inoculation (DPI). PRRSV inoculated pigs were mingled successively with susceptible pigs at 7, 14, 21, 28, 42, 56 and 63 days post infection. Once mingled, they remained for 2 days with the seeders and were then returned to their original room to be monitored for PRRSV infection. The transmission rate defined as a function of time-since infection was modelled by maximizing the likelihood of the observed number of infections in each contact group. The PRRSV statuses of the inoculated and contact pigs were monitored until 63 days post-inoculation (DPI) using an in-house real-time RT-PCR in blood or nasal swabs to assess the PRRSV genome load. The infectiousness of inoculated pigs increased from 7 to 14 DPI and then decreased slowly until 42 days post infection (3, 7, 2, 1 and 0 pigs infected at 7, 14, 21, 28 and 42 DPI, respectively). Using those data, the time-dependent infectiousness was modelled by a lognormal-like function with a latency period of 1 day and led to an estimated basic reproduction ratio, R_0 of 2.6 [1.8, 3.3]. Virus genome in blood was detectable in inoculated pigs from 7 to 77 DPI, whereas the viral shedding was detectable from nasal swabs from 2 to 48 DPI. Infectiousness was mainly correlated with the evolution of the viral genome load in blood and the decrease of infectiousness corresponded to seroconversion time.