

**Quantification of the effect of physical separation of pigs on spread of *Streptococcus suis***

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*Streptococcus suis* infections are common in swine herds, resulting in abundant use of antibiotics and economic damage. Control of the disease might be achieved by reduction of spread of *S. suis* by physical separation of groups of pigs. The aim of this study was to quantify transmission of *S. suis* among pigs which had either direct or indirect contact with each other. In three replicate experiments, pigs were housed in boxes either pair-wise (direct transmission; n=50) or alone (indirect transmission; n=15). Stable units contained 2-4 pairs, and 1-3 single housed pigs. The distance between the boxes was  $\pm 1$  meter. At 7 weeks of age, one pig in each pair was inoculated intranasally with *S. suis* serotype 9. Colonization was monitored in all pigs for 4 weeks post inoculation by taking tonsillar brush and saliva swab samples that were cultured on selective media. All directly exposed pigs became colonized within 2 days after exposure. Thirteen indirectly exposed pigs became positive within 7-25 days after exposure. For direct transmission, a standard SIR model was used to estimate the transmission rate  $\beta_{dir}$  (3.58, 95% CI: 2.29-5.60). For indirect transmission, a model with linearly increasing infectivity of infectious animals (representing, for instance, accumulation of *S. suis* in the environment) fitted better than the standard model. The results show that physical separation of an infectious and a susceptible pig over  $\pm 1$  meter results in a mean time to infection of 39 days (95% CI: 30-51), compared to 0.28 days (95% CI: 0.18-0.44) when housed together. We conclude that keeping pigs separated might be an effective intervention measure to reduce horizontal transmission of *S. suis* within stables.