S1 Appendix: Estimation of transmission rates

The transmission rates (β) used in our simulation model was drawn from a pert distribution.

The values used as most likely, min. and max. value in the distribution was calculated from the reproduction ratio (R_0) and corresponding the 95% CI reported by Broens et al., 2012a, combined with the duration of carriage (D) used in the same study (estimated by Broens et al., 2012b) as:

$$\beta = R_0/D, \qquad\qquad (A1)$$

where D was 17.4 days.

Broens et al., 2012a introduces the term total infection pressure (IP) defined as:

$$IP = IP \text{ within the pen} + IP \text{ other pens} + IP \text{ environment}, \qquad\qquad (A2)$$

where IP within the pen = proportion of infectious pigs within the pen, IP other pens = proportion of infectious pen within the compartment, but not in the same pen, and IP environment = proportion of positive environmental wipes.

Based on, this Broens et al., 2012a also introduced a variable (pIP) to describe the relative effect of transmission through direct contact with pen mates:

$$pIP = IP \text{ within the pen} /IP \qquad\qquad (A3)$$

R_0 reported by Broens et al., 2012a, when pIP=1 was used for estimation of within-pen transmission rates, whereas between- pen transmission rates were estimated based on R_0 when pIP=0.

References

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