

## Transmission model details

A number of simplifying assumptions are implicit in our main equation

$$E(I_{i,t+1}) = \beta_{i,t}(\sum_j w_{i,j} I_{j,t} + \eta)^\alpha S_{i,t}.$$

First, we treat entire farms as either infective or susceptible. This is consistent with the observation that infection may spread rapidly following the first appearance of clinical signs [1–5]. The spread may also be actively promoted as a part of recommended feedback procedures to establish herd immunity [6]. Second, we assume that the infection of a farm lags 1 week behind its infectious exposure. Consistently, the time from the introduction of infected animals to the appearance of clinical symptoms in PEDV-naive herds is typically less than 7 days [3,6]. We also found that a 1-week lag had a higher likelihood in our models than lags of 2 to 4 weeks. Third, we assume that farms are only infectious for 1 week. On the one hand, virus shedding from individuals has been observed in experimental settings to subside within 9 days of infection [7], and an infected animal’s diarrhea has been observed in the field to typically last for 5 days [1]. On the other hand, it can take affected farms several weeks to return to baseline production levels [1,3]. Our assumption is that herds will be most infectious the first week, perhaps because the number of animals shedding later becomes smaller or because more stringent biosecurity reduces the amount of infectious material leaving the farm. This assumption is congruent with those made by Ref. [8, p. 71] in setting parameters for an agent-based model of spread.

For the number of farms  $N_i$ , we used data from the 2002 Census [9] instead of data from more recent censuses so as to obtain farm count data that were contemporary with the transport flow data, which are from 2001 [10]. In this analysis, we included farms with any swine in the counts, unlike our analysis of cumulative burdens where we only included farms with at least 25 swine. All farms were included here because farms with fewer than 25 swine are numerous enough to constitute a non-negligible fraction of total swine inventory and flows.

## References

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