Classical swine fever (CSF) is a notifiable, highly contagious viral disease of swine which results in severe welfare and economic consequences (e.g., barrier to trade) in affected countries. In order to improve preparedness for disease incursion, it is critical to have some understanding of how vulnerable a CSF-free swine industry may be and, thus, evaluate how CSF would spread should it be introduced. In Great Britain (GB), the last epidemic of CSF occurred in 2000 and involved 16 farms located in East Anglia, a major pig rearing area in GB. Based on these data, we informed a spatially explicit, premises-based model used to explore the risk of widespread dissemination of CSF, through both local spread and animal movements, in the British pig industry in which realistic control and surveillance activities are implemented. We found that the overall probability of CSF epidemic take-off in the British industry remained consistently low throughout the year despite increasing the duration of the silent period, varying from 0.028 to 0.078. When 8 weeks of silent spread was considered, the probability of epidemic take-off was strongly spatially dependent, with few geographic areas showing a take-off probability greater than 0.15. Widespread outbreaks (>50 farms) were nevertheless possible, regardless incursions occurring in low or high risk areas. We further clarified what factors, whether geographical, temporal, economic or behavioral, may influence the risk of epidemic take-off. These results suggest that, although rare, widespread epidemics of CSF would be possible in GB at any time of the year and regardless of the duration of the silent period. Knowledge of spatial and temporal variation in the probability of epidemic take-off are key components for surveillance planning and resources allocation, and this work provides a valuable stepping stone in guiding policy on CSF surveillance and control in GB.

1Epidemiology Research Group, Centre for Immunity, Infection and Evolution, University of Edinburgh; 2Epidemiology Research Unit, Scotland’s Rural College; 3Biomathematics & Statistics Scotland; 4School of Veterinary Medicine, Boyd Orr Centre for Population and Ecosystem Health, University of Glasgow