Wait and see? Biosecurity decision-making under disease risk – Part 1
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This short science page offers insights on decision making where a wait-and-see attitude induces a delay in biosecurity investments and implementation, which creates instability and uncertainty in the industry’s ability and capacity to control disease.

Biosecurity is a way of working and caring for the herd that accounts for unseen threats to animal health. When applied consistently, it supports health and better production. Yet for a variety of reasons biosecurity protocols are not implemented, reasons such as to gain time for completing other tasks or to save money on production costs or to simplify their life in the multitude of regulations. However, taking shortcuts on biosecurity comes with the risk of consequences to health and productivity. For example, the porcine epidemic diarrhea virus (PEDv) outbreak in 2013 took the swine industry by surprise, causing high fatality in piglets, loss of weight in adults, and disruptions to the supply chain. PEDv exposed the industry’s vulnerability to a means of transmission that had been previously discounted – the fact that feed could become contaminated and spread the disease further.

The attitude people take towards risk is a factor that affects biosecurity decision making at several levels (Koliba et al., 2022): at the operational level in workers’ decisions on whether to implement biosecurity protocols or not; at the tactical level in owners or managers’ decisions on whether or not to invest in biosecurity measures and; at the strategic level in the industry or regulators’ decision on whether to develop biosecurity mandates or incentivize biosecurity. Risk attitude describes people’s willingness to take more or less risky behaviors. Our research used a series of experimental computer games where people were immersed in virtual scenarios as they played the role of a farm worker or a production manager (Clark et al., 2022; Merrill et al., 2019a; Merrill et al., 2019b). The decisions made by the players in different scenarios of disease risk, risk communication strategies, and neighboring farm biosecurity implementation allowed us to identify three prominent behavioral groups. The risk tolerant players invested very little in biosecurity in contrast to risk averse players who invested consistently throughout the simulation to protect their farms. Our third category, risk opportunists, primarily invested in biosecurity during high risk scenarios but limited investments during rounds with lower chance of infection. Risk tolerant and opportunist behaviors are important to study because they can reduce the efficacy of biosecurity measures in preventing disease spread across the production system.

In the next science page, we will share results on an agent-based model to simulate the stakeholders of a swine production system in a randomly introduced disease to study each outbreak’s spread under different scenarios of risk behavior. In other words, “What happens when the system is piloted by people who are primarily risk tolerant or opportunist?”

References: