Economic evaluation of two PRRSv-elimination strategies for an endemic infected multiplier pig farm using Monte Carlo simulation

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Porcine Respiratory and Reproductive Syndrome virus (PRRSv) causes decreased production efficiencies and increased health costs in pig farms. Elimination of PRRSv on farms can be reached by depop-repop or herd closure with offsite rearing of weaning piglets. Pre-elimination cost-benefit analysis is often based on partial budget methods, while stochastic modeling could include variation between farms with regards to production parameters and therefore variation in outcome. A Monte Carlo simulation model calculating the gross margin of a multiplier pig farm was created. Data and distributions for farm parameters were derived from 900 Dutch pig farms and agricultural databases. Both PRRSv elimination strategies were evaluated and for herd closure elimination reached at 4 and 8 months was evaluated. Conservative estimates for the change of technical parameters after elimination were derived from literature and used in a uniform distribution. The time until breakeven of the accumulated gross margins for the old versus the PRRSv free situation, including the elimination period, was calculated. Next to this, the minimum increase in piglet price was calculated when a farmer wants to break even in 1 or 3 years. When pig prices would not increase after elimination, the breakeven in gross margins was reached in 11.7 years (8.4-18.4) for full depop-repop and within a year for both of the herd closure scenarios. The piglet price needed to increase with 5 euro to reach the breakeven of gross margins within 3 years and with 13 euro to break even in 1 year, for the full depop-repop method. Sensitivity analysis showed that piglet price was the most influential parameter on gross margin and years till breakeven. Herd closure is more profitable for farmers as elimination strategy, when only elimination of PRRSv is considered.