

Screening for important factors in simulation models to support decision makers: case study for national control of BHV1

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Simulation is a popular and frequently applied tool in animal health economics. Since all models contain uncertainty, an important step in the analysis of a system by simulation models is sensitivity analysis. Most simulation practitioners change only one parameter at a time, thereby ignoring dependence between parameters. The techniques of experimental design and regression metamodeling are more effective and efficient in estimating the relationship between model output and parameters.

In this study, these techniques were applied to the simulation model InterIBR-endemic: a stochastic simulation model developed to support decision makers in the national eradication program for endemic bovine herpesvirus type I (BHV1) in The Netherlands. Simulation responses of interest were (1) period to eradicate the virus, (2) total costs of this eradication program, (3) number of yearly outbreaks on free farms and (4) prevalence after four years of control. Starting the experiment with 31 factors with uncertain estimates, the number of factors with important effects on at least one of the responses was reduced to ten main effects and five two-factor interactions. If the model is a good representation of the real system, these factors should have priority in further empirical research.