

# Synthesis of evidence using 1-step Bayesian micro-simulation

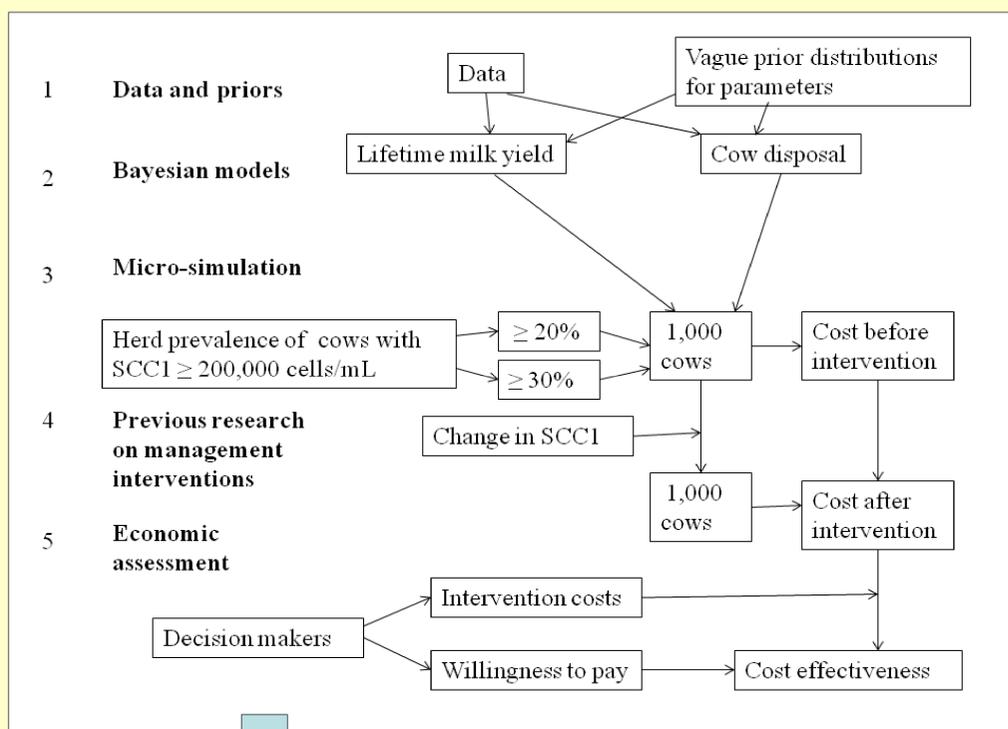
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## INTRODUCTION

Bayesian analyses are inherently useful for decision makers, because the likelihood of different outcomes, based on all available evidence is explicit. This approach can be extended by using micro-simulation to generate posterior predictions for particular scenarios. These methods have been used to assess the cost effectiveness of human medical treatments<sup>[1; 2]</sup>. This research provides a veterinary example of 1-step Bayesian micro-simulation to illustrate synthesis of evidence from multiple sources. The aim was to evaluate the cost effectiveness of interventions to control heifer mastitis in Irish dairy herds, as an aid to decision making.

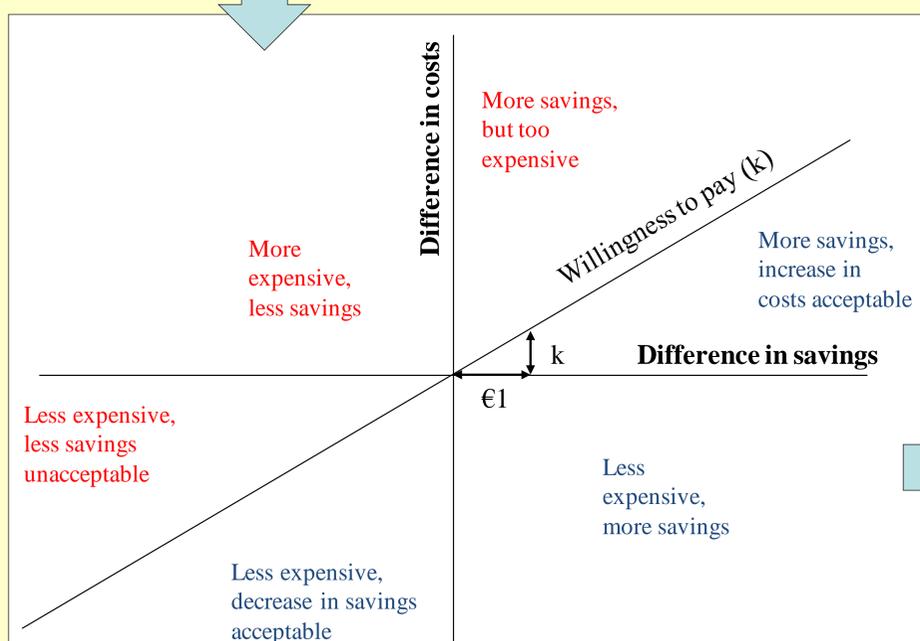


## METHODS

The impact of management interventions to improve environmental hygiene during the *pre-partum* period (such as decreasing stocking density of housing) were simulated in terms of likely reductions in the herd level prevalence of heifers with high milk somatic cell count between 5 and 30 days into lactation (SCC1).

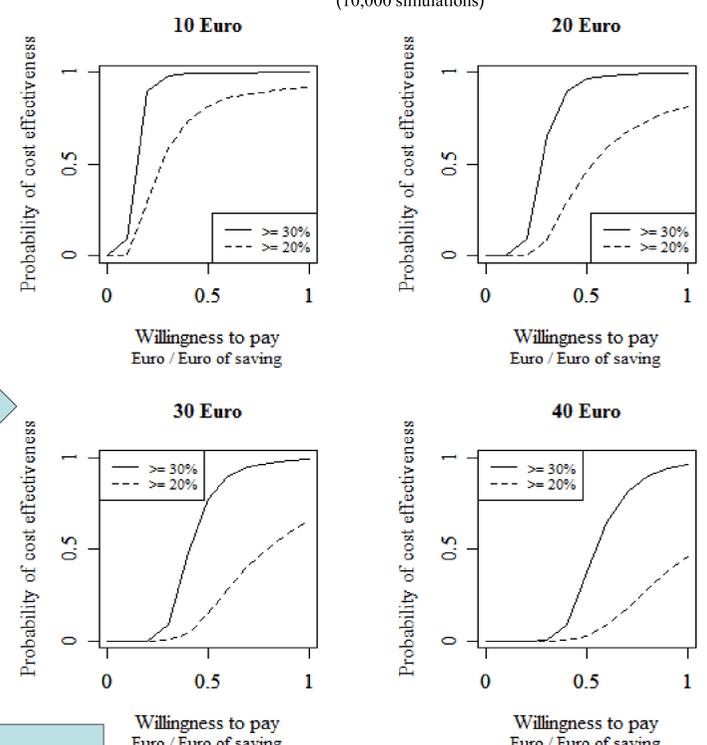
Savings in terms of increased lifetime milk yield and decreased disposal risk were determined from Bayesian models.

Probabilities that interventions would be cost effective were determined at different intervention costs, and for different decision makers who varied in 'willingness to pay', and hence their minimum expected return on investment.



## RESULTS

(10,000 simulations)



## CONCLUSION

Probability of cost effectiveness was sensitive to the intervention cost, and the expected return on investment, particularly for herds with lower initial prevalence. This highlights the importance of understanding the objectives of decision makers when giving evidence based advice.

## REFERENCES

- [1] O'Hagan, A. and J. W. Stevens. 2001. A framework for cost-effectiveness analysis from clinical trial data. *Health econ.* 10:303-315.  
[2] Spiegelhalter, D. J. and N. G. Best. 2003. Bayesian approaches to multiple sources of evidence and uncertainty in complex cost-effectiveness modelling. *Statist. Med.* 22:3687-3709.