Cost-benefit analysis of vaccination against Bovine Respiratory Disease.

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INTRODUCTION

- Young stock are the future cows.
- Costs of rearing are 5-10% of cost price of milk.
- Bovine Respiratory Disease (BRD) negatively impacts the health of young animals and performance in first lactation.
- Vaccination is a possible management strategy against BRD.

OBJECTIVE

To assess the net economic benefit of vaccination against BRD.

MATERIALS AND METHODS

- An existing calf level, bio-economic simulation model (Mohd Nor et al., 2012) was adapted to estimate the economic effects of vaccination against BRD.
- Effect of two injections with a multivalent inactivated vaccine (Bovilis® Bovipast RSP, MSD Animal Health) at the age of 2 and 6 weeks was evaluated.
- A vaccine efficacy of 80% was assumed.
- Output of the model consisted of:
  - Non-economic: BRD incidence, first calving age, weight, milk production and culling incidence.
  - Economic: Healthcare costs, feed costs, barn costs, breeding costs, labour costs, depreciation costs, and milk and slaughter revenues.
- Simulation consisted of 10,000 iterations.
- A sensitivity analysis investigated the effect of vaccine efficacy, BRD incidence, and other input parameters.

In this bio-economic simulation study, young stock vaccination against BRD was economically beneficial in dairy herds.

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RESULTS

- Vaccination lowered the incidence and mortality of BRD in youngstock and improved production in the first lactation **(Table 1)**.
- The net economic benefit of BRD vaccination was €9 for each animal reaching its first dry-off **(Table 2)**.
- Results were sensitive to:
  - BRD incidence risk.
  - Efficacy of the vaccine.
- Breakeven point for BRD incidence was 18% (with 80% vaccine efficacy) **(Figure 1)**.
- Only the effect of clinical BRD was simulated. Literature on production effects of subclinical BRD is scarce and was therefore not incorporated in the model. The actual net economic benefit can thus be considered an underestimation.
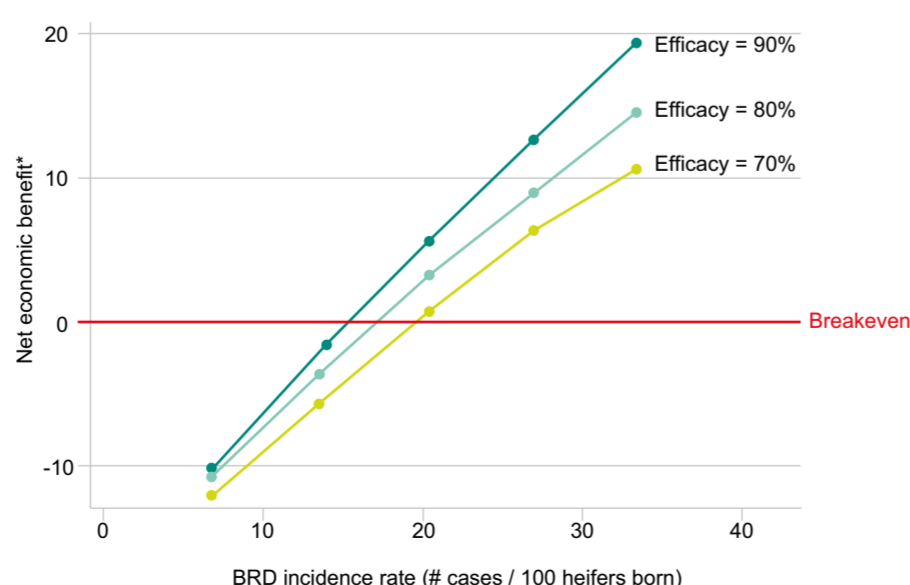
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TABLE 1. Technical results in default scenario vs vaccination with Bovipast.

	Default	Bovipast
BRD clinical incidence risk (%)	26.9	13.9
Death due to BRD (%)	5.6	3.2
Milk production (kg) – completed lactation	8117	8143
Milk production (kg) – culled during lactation	4437	4479

TABLE 2. Economical results in default vs vaccination with Bovipast.

Parameter (€)	Default	Bovipast
Treatment BRD	-3.6	-1.8
Vaccination	0	-25
Total rearing costs	-1727	-1735
Feed 1st lactation – completed	-922	-922
Depreciation	-144	-146
Milk yield – completed	2833	2842
Culled animals	26	28
Total	1793	1802
Net economic benefit		9

FIGURE 1. Sensitivity analysis.

Efficacy = 90%
Efficacy = 80%
Efficacy = 70%
Breakeven

Net economic benefit*
BRD incidence rate (# cases / 100 heifers born)

*Net economic benefit expressed in euro per reared heifer on the farm

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