

Economic modelling for lameness, based on prevalence data (mobility scores)

What does lameness cost?

An economic review of the costs of lameness (Willshire and Bell, 2009) estimated the average lameness event costs in the region of £330. Of course, there is a large variation depending on the type of lesion and duration of lameness. Typically, a case of digital dermatitis costs in the region of £75, a case of white line disease £300 and a sole ulcer £520.

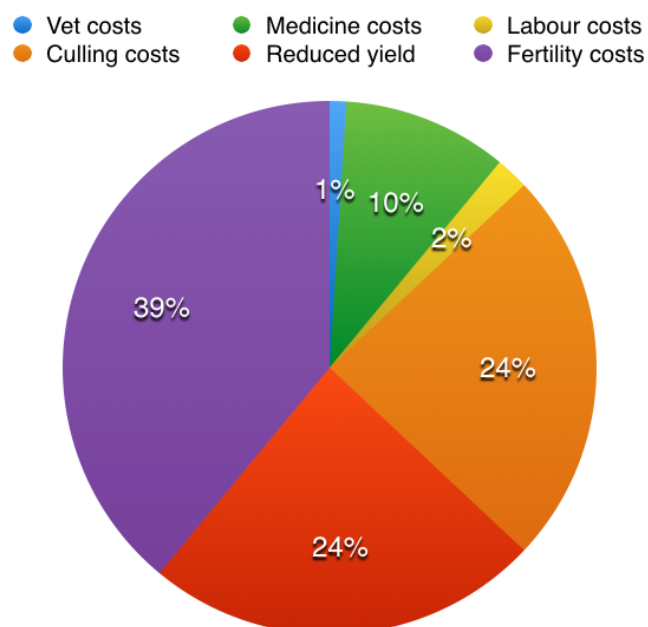
It is not always easy for farmers to appreciate these costs. A large UK study (Atkinson et al, 2013) found that 25% of farmers were simply unable to put any estimate on the economic effects of lameness within their herds. Those that did underestimated by an average of 250%.

However, farmers were able to identify the three main economic impacts of lameness, namely:

- an increased risk of premature culling
- reduced fertility
- reduced milk yields.

Figure 1 shows the distribution of annual costs associated with lameness in a typical UK herd.

Figure 1 Breakdown of annual costs of lameness



(from Willshire and Bell, 2009)

What is the best way to express the costs of lameness for a farmer?

Not many farmers can accurately calculate their incidence of new lameness cases. And many incidences last several months, or even years. In fact, the average lameness incident is likely to last around 5 months (Green et al, 2002). Perhaps a more simple way to calculate the economic impact of lameness, therefore, is on a £/day/lame cow basis.

Using the data presented, the average lameness case costs £2.20 for every day the cow is lame. Therefore, a 200 cow herd with a 25% prevalence of Mobility Score (MS) 2 and 3 cows ("lame") has an economic tariff due to lameness of £110 per day.

We might go one step further, and suggest that MS 3 cows, more severely affected by their condition, cost the farmer more than an average case whilst MS 2 cows cost slightly less than the average. Using the typical prevalences of MS 2 and MS 3 cows, it is reasonable to assume:

- the daily cost to the farmer of a MS 2 cow is typically £1.47/day, rounded to £1.50
- the daily cost to the farmer of a MS 3 cow is typically £4.40/day, rounded to £4.50

Recent research indeed indicates that cows with MS 3 lose over twice the amount of daily yield than cows with MS 2 (Reader et al, 2011). The mean yield losses in this study were 1.6kg/cow/day for MS 3 cows and 0.7kg/cow/day for MS 2 cows, compared to their non-lame herd mates. Note, however, that other research shows that yield is affected both before and after the lameness event, as well as during.

Key Points

- To increase motivation to reduce lameness, it is important to have a simple way of expressing herd lameness costs, which is easy to calculate for any dairy herd, which is likely to be credible, and which is easily understandable.
- Farmers find it very difficult to estimate their true costs of herd lameness.
- Farmers often identify with only one, if any, of the three main factors accounting for true costs (reduced yield; reduced fertility; increased premature culling risk).
- Farmers sometimes identify the costs of treatment or trimming as being their herd cost of lameness, as this is more tangible; in fact treatment only accounts for a small percentage of the true costs of lameness.
- Previous studies calculating costs of lameness have been on the basis of lesion incidence. These data are not easily available to vets, advisers and farmers, and are inaccurate unless carefully defined and collected in a controlled manner (e.g. university-led academic studies).
- Prevalence data (mobility scores) are easily obtainable and can be reasonably accurate, depending on the quality of mobility scoring (e.g. fully trained and member of ROMS).
- From previous research, it is reasonable to estimate a relationship between incidence and prevalence of approximately 2.5:1. This allows a calculation of lameness costs based on prevalence data (mobility scores) alone.
- The largest factor in the true cost of a lameness incident is the length of time the cow remains lame. This accounts for the most significant differences between costs of lameness based for different lesion types.
- Estimating lameness costs on prevalence data removes the large variable of length of time affected. There is therefore little need to have lesion-type data as well as prevalence data when calculating costs based on mobility scores.
- More severely lame cows (MS 3) are likely to have a higher daily tariff due to a greater risk of premature culling and more severe yield depression.
- Previous UK studies have found a typical relationship between MS 2 and MS 3 cows to be in the region of 3:1. Taking account of known yield reductions, and expected effects on

premature culling risk, a MS 3 cow is likely to have a daily tariff approximately 3 x that of a MS 2 cow.

- **Lame cows (MS 2 and MS 3 combined) cost an average of £2.20 per day that they are lame.**
- **MS 2 cows cost an average of £1.50 per day that they are lame.**
- **MS 3 cows cost an average of £4.50 per day that they are lame.**

References:

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