Life time measurements of production and health variables to improve decisions on economical and welfare related interventions in dairy cattle

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OBJECTIVES	CONCLUSIONS
To identify economical and welfare related indicators that can be calculated on a life time basis of the individual animal	Production and health variables measured and aggregated on a life time basis may serve to improve the foundation for decisions on dilemmas between economy and animal welfare

INTRODUCTION

The evaluation of interventions in dairy cattle production is usually based on relatively immediate effects of the intervention. For example, decision on treatment is based on cure rate and grouping of calves is based on the effect on social behaviour when housed in groups.

However, in some contexts it may be relevant to look at the effect of a certain intervention for the whole lifetime of the animal. Although economic simulation programs may include the total life span of animals, the measurements are not made from the individual animals' perspective. When focus is on animal welfare it may be an advantage if not only the here and now effects are evaluated (Fig.1). Initially there is a need to identify, which measures are relevant and possible to calculate on a life time basis.

MATERIAL AND METHODS

Different reports on cattle welfare were analysed to identify the most frequent and important variables that were used to describe welfare.

In particular, ethical dilemmas were identified together with relevant measures on health and production.

Each variable was evaluated as to whether a different quantification of this measure would be beneficial for the discussions of ethical dilemmas and whether there would be any information in the Danish Cattle Database that could be quantified in relation to the life span of the animal. The variables were listed in the following categories: a) Health and disease, b) Behaviour, c) Physiology, d) Production conditions and e) Production output.
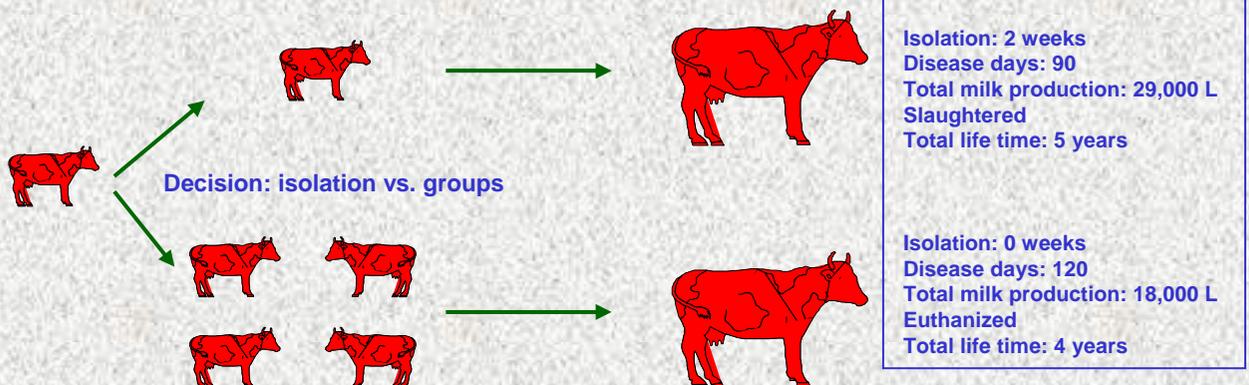

Life time measures

Isolation: 2 weeks
Disease days: 90
Total milk production: 29,000 L
Slaughtered
Total life time: 5 years

Isolation: 0 weeks
Disease days: 120
Total milk production: 18,000 L
Euthanized
Total life time: 4 years

Decision: isolation vs. groups

Figure 1. Hypothetical example of life time measures for a cow

RESULTS

The most relevant and readily available variables include relevant diseases, sudden yield reduction, mortality, number of live-born calves and milk production. Available variables within behaviour and physiology are very limited, but to some extent production conditions can be used as surrogate measures.

Several interventions could be identified where lifetime measures would be feasible for decisions on dilemmas between economy and animal welfare.

For example, dairy cow breeding has for several years focussed on increased milk production. At the same time there has been an increased occurrence of production related diseases as a side effect. It has therefore been recommended that breeding for the sake of the animals should put more emphasis on animals' health. In the discussion of this dilemma it would be beneficial to have calculations on life time disease occurrence versus life time milk production.

DISCUSSION

The list of possible welfare indicators within health, behaviour and physiology is very long and it is of course a huge limitation that life time measures can only be made for very few indicators. In addition, there is quite some uncertainty attached to the selected variables. Still these measures can be used as an addition and not as an alternative to the existing measures. Within several ethical dilemmas they may help to identify the acceptable level of occurrence of a certain indicator. By including both the short term and long term effects for the individual animals it will not be possible to reject a decision with a positive short term effect, just by arguing that there are "some" long term negative effects. One would be forced to substantiate the argument. For future research it is therefore recommended that existing data are analysed from this perspective and that additional measures on clinical scores and online alarms from biosensors as well as longevity of diseases are included in the data bases.