The use of quantitative risk assessment to assess lifetime welfare outcomes for breech strike and mulesing management options in Merino sheep

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Abstract

In Australia, flystrike can severely compromise sheep welfare. Traditionally, the surgical practice of mulesing was performed to alter wool distribution and breech conformation and thereby reduce flystrike risk. The aim of this study was to use published data to evaluate the effectiveness of an epidemiologically based risk assessment model in comparing welfare outcomes in sheep undergoing mulesing, mulesing with pain relief, plastic skin-fold clips, and no mulesing. We used four measures, based on cortisol, haptoglobin, bodyweight and behavioural change, across three farming regions in Australia. All data were normalised to a common scale, based on the range between the highest and lowest responses for each variable ('welfare impact'; I). Lifetime severity of welfare challenge (SWC) was estimated by summing annual SWCs (SWC = I × P, where P = probability of that impact occurring). The severity of welfare challenge during the first year of life was higher for mulesed animals compared to unmulesed. However, over five years of life, the highest severity of welfare challenge was for unmulesed animals, and the lowest was for the plastic skin-fold clips. The model produced estimates of SWC that are in broad agreement with expert consensus that, although mulesing historically represented a welfare benefit for sheep under Australian conditions, the replacement of mulesing with less invasive procedures, and ultimately genetic selection combined with anti-fly treatments, will provide a sustainable welfare benefit. However, the primary objective of this work was to evaluate the use of the risk assessment framework; not to compare welfare outcomes from mulesing and its alternatives.

Keywords: animal welfare, flystrike, Merino, mulesing, risk assessment, sheep

Introduction

Although science offers tools to measure aspects of an animal’s welfare, the evaluation of overall animal welfare can be both subjective and qualitative. Animal welfare assessment often takes into account quantitative measurements of behaviour and physiological variables. However, no agreed scientific methodology exists to combine these different elements into an overall assessment of welfare, or for evaluating whether this welfare state is acceptable.

A science-based, objective determination of an animal’s welfare will always be subject to differing interpretations based on individual ethical frameworks, however, there may be considerable opportunity to reduce the subjective component of animal welfare assessment.

The paper by Paton et al. (2013; this issue) proposed a theoretical basis for the objective evaluation of animal welfare using a semi-quantitative approach based on risk assessment principles. In its Scientific Opinion (EFSA 2012) the European Food Safety Authority (EFSA) also details methods for evaluation of welfare using a risk assessment framework. It is recognised both by society and farming industries that it is important to develop systems which quantify, as much as possible, the effects of different environments and management practices on the welfare of animals. These systems may assist in making the science of animal welfare more quantitative, simpler to analyse and easier to communicate. More importantly, semi-quantitative risk assessment may allow comparison of animal welfare for different management strategies and environments.

In Australia, blowfly strike, and more particularly breech strike in sheep, is a serious disease problem and can severely compromise the welfare of animals. Blowfly eggs, laid on the skin of a sheep, hatch into larvae which feed on the sheep’s tissue. Flystrike can produce inflammation, general systemic toxæmia, and even death.

The surgical husbandry practice of mulesing was developed to reduce an animal’s risk of developing breech strike (Beveridge 1984). Mulesing is a procedure in which two strips of skin are cut from the hindquarters of Merino lambs in order to remove wool-bearing wrinkled skin, increase the perineal bare area,