The effect of management system on mortality and other welfare indicators in Pennsylvania dairy herds

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Abstract

The objective of this study was to identify farm characteristics that were associated with cow (Bos taurus) welfare outcomes, including mortality rate, culling by 60 days of lactation, survival to ≥ 6 years of age and ≥ 5th parity (aged cows), somatic cell score, milk yield, and milk composition. Data were collected on housing systems, feeding systems, pasture strategies, bedding type, labour management practices and other farm characteristics in face-to-face interviews with 314 Pennsylvania dairy herd owners where performance records were available. Five herd management systems were identified in the sample: free-stalls with complete confinement (n = 37); free-stalls that allowed outdoor access (n = 76); tie-stalls with complete confinement (n = 52); tie-stalls with outdoor access and that fed a total mixed ration (n = 72); and tie-stalls with outdoor access and that did not feed a total mixed ration (n = 77). Welfare outcomes were evaluated with multivariable linear regression models and marginal means were estimated for herd management system. Tie-stalls that allowed outdoor access and that did not feed total mixed rations had the lowest mortality rate (2.0%), culling in the first 60 days of lactation (5.1%), and the highest proportion of aged cows (13.8%). Those herds also had high lifetime-to-date milk yield, a low proportion of fat-protein inversions, and low somatic cell scores. Free-stalls with complete confinement had significantly higher levels of mortality (8.3%), culling in the first 60 days of lactation (9.7%), and fewer aged cows (6.4%). It was concluded that shifts toward more efficient herd management systems have not benefited cow health and welfare. This suggests that cow welfare has been compromised to facilitate the economic survival of dairy farms.

Keywords: animal welfare, culling, dairy cattle, housing, management, mortality

Introduction

Social concern for the treatment of farm animals has resulted in legislative efforts intended to improve their well-being in the USA (California 2008). Many food industry groups have also developed best management practices intended to provide uniform standards of animal care and demonstrate a commitment to animal welfare. For example, the National Dairy Animal Well-Being Initiative (NDAWBI 2009) was launched by the dairy industry. The identification of animal management practices and production systems that enhance dairy cow (Bos taurus) welfare will help facilitate the development of legislative and industry efforts that will accomplish their intended aim. Economic pressure has dictated that dairy farms become more efficient. The proportion of the retail food dollar that is returned to dairy producers declined from approximately 50% in 1980 to 30% in 2000 (ERS-USDA 2009). Not surprisingly, trends in cow health and survival during this timeframe were not favourable. Holstein cows born in 2000 remained in the milking herd 3.95 months fewer than those born in 1980 (AIPL-USDA 2009) and on-farm cow mortality rates were estimated to rise from 3.8% in 1996, to 4.8% in 2002 and 5.7% in 2007 (NAHMS II 2007). Mortality risk for Danish dairy cows was also reported to increase from 2 to 3.5% from 1990 to 1999 (Thomsen et al 2004). On-farm mortality rates rose before restrictions limiting the sale of downer cows were enacted in the US (Miller et al 2008), which indicates rising mortality is due to degraded cow health rather than legislative changes. Mortality rates have risen even though the mean age of cows has declined steadily (Hare et al 2006). The most recent trends for cow lifespan have improved slightly (AIPL-USDA 2009). This likely reflects aggressive use of reproductive synchronisation programmes (Caravelli et al 2006; Miller et al 2007) and a subsequent reduction in culling for reproductive failure. Genetic selection for milk yield is reported to be unfavourably correlated with mastitis (Zwald et al 2004; Negussie et al 2008; Vallimont et al 2009) and diseases other than mastitis (Rogers et al 1999; Zwald et al 2004). There are also breed differences in mortality rates. An analysis of > 2 million records revealed