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Animal welfare: Definition, measurement and use in the context of dairy herd improvement

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Animal welfare encompasses biological functioning (such as satisfactory health and freedom from injury) and affective state of the animals (such as freedom from pain and experiencing normal pleasures), and being able to live reasonably natural lives by carrying out natural behaviour and having natural elements in their environment.

There are two main types of indicators used to assess animal welfare. The first concerns the risk factors for poor welfare in terms of housing conditions (e.g. animal density, stall dimensions) and herd management (e.g. hoof trimming, pasture access). The second type of indicator concerns outcome measures of animal welfare, which are often considered as the "real" welfare measures because they are a direct assessment of impacts of housing and management on the animal itself. Animal welfare is measured at the individual level and the sum of individual welfare status reflect herd level status.

In most milk-producing countries, industry-, government- and/or other stakeholder-driven initiatives are in place to improve welfare and sustainability of dairying by enhancing profitability and reducing environmental impact. These initiatives typically include system of verifiable indicators to assess farm standard against and assess progress over time. Reliable indicators are a fundamental requirement to provide public assurance and allow improvement on farms.

Currently, outcome measures of welfare in dairy cattle are assessed through visual evaluations, including lameness, injuries, hygiene and body condition. Numerical scoring charts have been validated, together with the development of training programs, to achieve high repeatability of assessors. Sampling strategies have been established to determine how many animals and how many days are required to obtain reliable estimates of prevalence. However, visual evaluations require long period of data collection and multiple visits on farm, along with follow-up checks of assessors to maintain repeatability over time, and in turn, are very costly to implement. The use of automated assessments is currently being explored. Research is investigating the possibility of iceberg indicators, or single measures that capture a lot of animal-based information. While activity monitors are becoming common on commercial farms; among targeted indicators, lying time, frequency of visits to the robotic milking system or feeders could contribute to early detection of health and welfare issues.

Another avenue is the development of early outcome measures of welfare and, possibly, remote indicators, using performance data (milk production, reproductive success, longevity) collected routinely in DHI databases. The rationale is that a herd with good health and high longevity should be at lower risk of poor welfare. Research is still needed to identify the best predictors and their conditions of use, allowing us to discriminate good vs. poor welfare status, both at the individual and herd level. With these tools, producers can remotely

benchmark their own performance relative to others, make timely decisions to improve welfare, and monitor whether improvements put into place are effective.