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Dairy cow welfare in Austria –
Risk indicators and farmers' motivation for improvement

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Summary

A mandatory on-farm welfare assessment in dairy cattle herds using predominantly animal-based outcome measures was implemented in 2017 by the dairy company SalzburgMilch. The assessments of 2,537 farms were carried out by 13 trained and inter-observer agreement tested inspectors of two independent certification service providers. In total, data of a sample of 38,572 cows (81%) out of 47,421 cows present on the inspected farms were obtained.

Using a subset of this large dataset (1,221 farms with data of 23,749 cows), the aim of the first publication *'Animal welfare outcomes and associated risk indicators on Austrian dairy farms: A cross-sectional study'* was to identify prevailing welfare problems and associations thereof with main farm and management characteristics. Between-farm variability in herd-level prevalence of the analysed welfare measures (body condition, cleanliness, diarrhoea, integument alterations, claw condition, lameness, rising behaviour, avoidance distance toward humans, mastitis treatments, antibiotic dry-cow therapy, and mortality and dystocia rate) was high, but median prevalence values of severe welfare problems (e.g., very lean cows, lesions, lameness, or mastitis treatments) were low compared with previously reported findings. A good human-animal relationship was indicated as on half of the farms at least 83% of cows could be touched in a standardised approach test. Using generalized linear models, positive as well as negative associations between prevalence values of welfare measures and the amount of milk per cow delivered to the dairy company, housing system (loose vs. tethered housing), and assessment period (winter vs. summer period) were observed. However, an increasing number of days with access to pasture as well as organic compared with conventional farming consistently showed beneficial associations.

In the second paper (under review) *'To meet or not to meet welfare outcome thresholds: A case-control study in Austrian dairy farms'*, herds were allocated to target, caution and alert ranges for measures lameness, claw disorders, integument alterations, and leg hygiene, based on recently published welfare outcome thresholds. On a subset of farms used in the first publication for which herd improvement testing data were available (264 tethered and 392 loose-housed herds), cumulative logistic regression models showed several associations between animal-, management- and resource-related exposure variables and the risk to exceed welfare outcome thresholds. Regardless, no principal risk indicator consistently determining the probability to exceed predefined thresholds was identified, which indicates that outcome-specific factors need to be considered when aiming to fall below welfare outcome thresholds. Such epidemiological knowledge might be used in advising farmers, for which the understanding of underlying motivational constructs to improve welfare is essential.

The third publication *'Resource, collaborator, or individual cow? Applying Q methodology to investigate Austrian farmers' viewpoints on motivational aspects of improving animal welfare'* addressed this key role of farmers utilising Q methodology, a combination of qualitative and quantitative social research, for the first time in this context. From a sample of 34 dairy farmers, four

distinct viewpoints revolving around instrumental and intrinsic values of animal welfare, economic considerations, job satisfaction, societal expectations, as well as ethical standards of livestock farming were identified and used to draw comprehensive pictures of farmer typologies. Awareness of these differences enables advisors to tailor intervention strategies and to specifically address leverage points with a high chance of farmer compliance. In conclusion, associative links between welfare outcome measures and risk indicators identified in an epidemiological survey seem to be promising starting points to improve the welfare of farmed livestock, if such knowledge is conveyed effectively to farmers. Still, further research is suggested to investigate the validity of the identified risk indicators and to enable a more efficient mapping of farmers according to the identified typologies.