

Session 2.2: Advances on monitoring welfare at group and individual level.

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## **ASSESSING THE IMPACT OF BODY CONDITION SCORE DYNAMICS FROM DRY-OFF TO CALVING ON THE INCIDENCE OF EARLY LACTATION DISEASE IN HOLSTEIN COWS**

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Automated systems generating body condition scores (BCS) through image technology enable daily assessments of body energy reserves of dairy cows in an efficient non-stressful approach and generate objective information. The availability of high-frequency BCS data allows for the analysis of specific points of interest and could result in quick adjustments of management if necessary. The objective of this study was to evaluate the association between the dynamics of BCS from dry-off to calving and early lactation disease in a population of high-producing Holstein cows. A retrospective observational study was completed using data collected from 12,042 lactations in 7,626 Holstein cows calving between April 2019 and January 2022 in a commercial dairy operation located in Colorado, USA. Scores generated by BCS cameras (DeLaval International AB, Tumba, Sweden), at 0.1 point intervals, at dry-off (BCS<sub>dry</sub>) and calving (BCS<sub>calv</sub>) were selected for the analysis and subsequently categorized into quartiles (Q1 = lowest BCS), separately for primiparous and multiparous cows. The change in BCS from dry-off to calving was calculated as BCS<sub>calv</sub> – BCS<sub>dry</sub> and assigned into quartile categories considering Q1 as the 25% of cows with greatest loss. Cows were classified as healthy (HLT; no health event) or affected by at least one health disorder within 60 DIM (SCK). Health disorders included reproductive (retained fetal membranes, metritis, and pyometra), metabolic (clinical hypocalcemia, subclinical ketosis, and left displaced abomasum), and other conditions (lameness, clinical mastitis, digestive problem, injury, and pneumonia). Data were examined using logistic regression and ANOVA considering parity, calving season, and average milk yield up to 60 DIM as covariables. Mean (SE) BCS<sub>dry</sub> for HLT vs. SCK were 3.38 (0.004) vs. 3.42 (0.004) ( $P < 0.0001$ ), while BCS<sub>calv</sub> for HLT vs. SCK were 3.30 (0.003) vs. 3.33 (0.003) ( $P < 0.0001$ ). Mean BCS differences between dry-off and calving for HLT vs. SCK were -0.088 (0.004) vs. -0.11 (0.005) ( $P = 0.0008$ ). The logistic regression analyses indicated that the odds (95% CI) of disease were smaller in the lower BCS<sub>dry</sub> categories relative to cows in the highest BCS category (Q4): Q1 = 0.78 (0.65-0.94); Q2 = 0.75 (0.62-0.90); Q3 = 0.79 (0.65-0.96). On the contrary, BCS<sub>calv</sub> category was not associated with early lactation disease ( $P = 0.48$ ). Reductions in BCS from dry-off to calving were associated with subsequent disease, as cows losing more BCS (Q1 and Q2) had greater odds of disease compared to cows gaining BCS (Q4): Q1 = 1.32 (1.11-1.58) and Q2 = 1.35 (1.14-1.61). Overall, lower BCS at dry-off and greater loss of BCS between dry-off and calving had a significant impact on occurrence of early lactation disease.