Associations between herd management, barn design, lameness, and production in farms with robotic milking systems

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The objective of this study was to evaluate management, barn design, lameness, and productivity in farms using robotic milking systems. During visits to 76 dairy farms in Ontario, we surveyed producers regarding management practices and collected robotic milking system records. Farms averaged 99 ± 73 lactating cows, 2.3 ± 1.4 robot units, a milk yield of 36.7 ± 4.7 kg/cow/d and 1607 ± 343 kg/robot/d, a milking frequency of 3.0 ± 0.4x/d, and a SCC of 215 ± 88 (x1,000) cells/mL. Thirty cows/farm were gait scored (or 30% for herds >100 cows) using a numerical rating system (NRS; 1=sound to 5=lame) and were defined as clinically lame with NRS$\geq$3 ($28.6\pm11.7\%$) and severely lame with NRS$\geq$4 ($3.0\pm3.2\%$). Severe lameness prevalence increased by 0.15 percentage points (p.p.) when doubling the proportion of under-conditioned cows from the mean of 5.6 to 11.2% (P=0.04) and tended to be 0.35 p.p. greater for farms using a bedding product (P=0.06). Clinical lameness was 8.8 p.p less prevalent on farms using sand bedding (P=0.003), tended to be lesser with a greater daily frequency of raking lying stalls (P=0.07) and 5.7 p.p. lesser for farms that built new barns vs. retrofitting existing barns (P=0.07). Herd average milk yield/cow decreased with greater proportions of clinically (-0.1kg/d for 1 p.p. increase; P=0.01) and severely lame (-0.8kg/d with doubled prevalence from 3 to 6%; P=0.003) and over-conditioned cows (P<0.001). Milk yield per robot decreased with a greater prevalence of clinical lameness (-7.1kg/d for 1 p.p. increase; P=0.01). Milking frequency decreased with a greater proportion of over-conditioned cows (P=0.04). Milk SCC increased with a greater proportion of clinically lame (P<0.001) and under-conditioned cows (P=0.05).

Take Home Messages: This study demonstrates that maintaining good hoof health, mobility, and body condition are key factors to optimize productivity and milk quality in robotic milking herds.