

Milk yield relative to supplement intake and rumination time differs by health status for fresh cows in robotic herds

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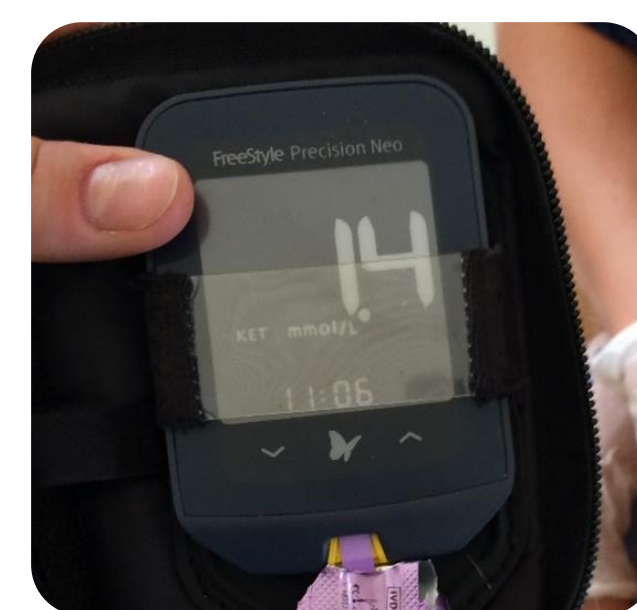
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Background & Objective

- Robotic milking systems provide the ability to adjust the amount of supplemental concentrate offered to cows based on parity, DIM, and milk yield
 - However, settings used to control supplement allowance do not typically take milk yield into account until 20 to 70 DIM, past the peak risk period for developing subclinical ketosis (**SCK**) and other health problems
- The objective of this study was to determine associations of β -hydroxybutyrate (**BHB**) and health status with milk yield, frequency, robot supplement intake, and rumination time

Research Methods

- **For 605 cows in 9 robotic herds, we collected:**
 - Blood samples 1x/wk for the first 3 wk of lactation
 - Data on milk yield, supplement intake, and rumination time from 0-28 DIM for each cow
- For analyses, we matched 172 multiparous cows from 8 herds, within farm, to include an equal number of cows in each of 4 health status groups (n = 43 per group):
 - **SCK** (BHB ≥ 1.2 mmol/L at ≥ 1 of 3 tests and no other disorder in the first 30 DIM)
 - **SCK+** (BHB ≥ 1.2 mmol/L at ≥ 1 of 3 tests, with another health disorder)
 - **HLT-** (BHB always < 1.2 mmol/L, with no other disorder)
 - **OTH** (BHB always < 1.2 mmol/L, with a health disorder)
- We compared milk yield, rumination time, and supplement intake of health status groups
 - We also analyzed associations of BHB concentrations and the risk of SCK with those measures



Research Results

- Milk yield, milking frequency, and rumination time differed by health status ($P < 0.01$; Figure 1)
 - No difference in supplement intake by health status group ($P = 0.11$)
- Milk yield relative to supplement intake and rumination time differed by health status ($P < 0.01$) and both were associated with BHB and risk of SCK (Table 1)
 - SCK cows had the highest milk yield and milk:supplement ratio
 - SCK+ cows had the lowest rumination time and the highest milk:ruminantion ratio

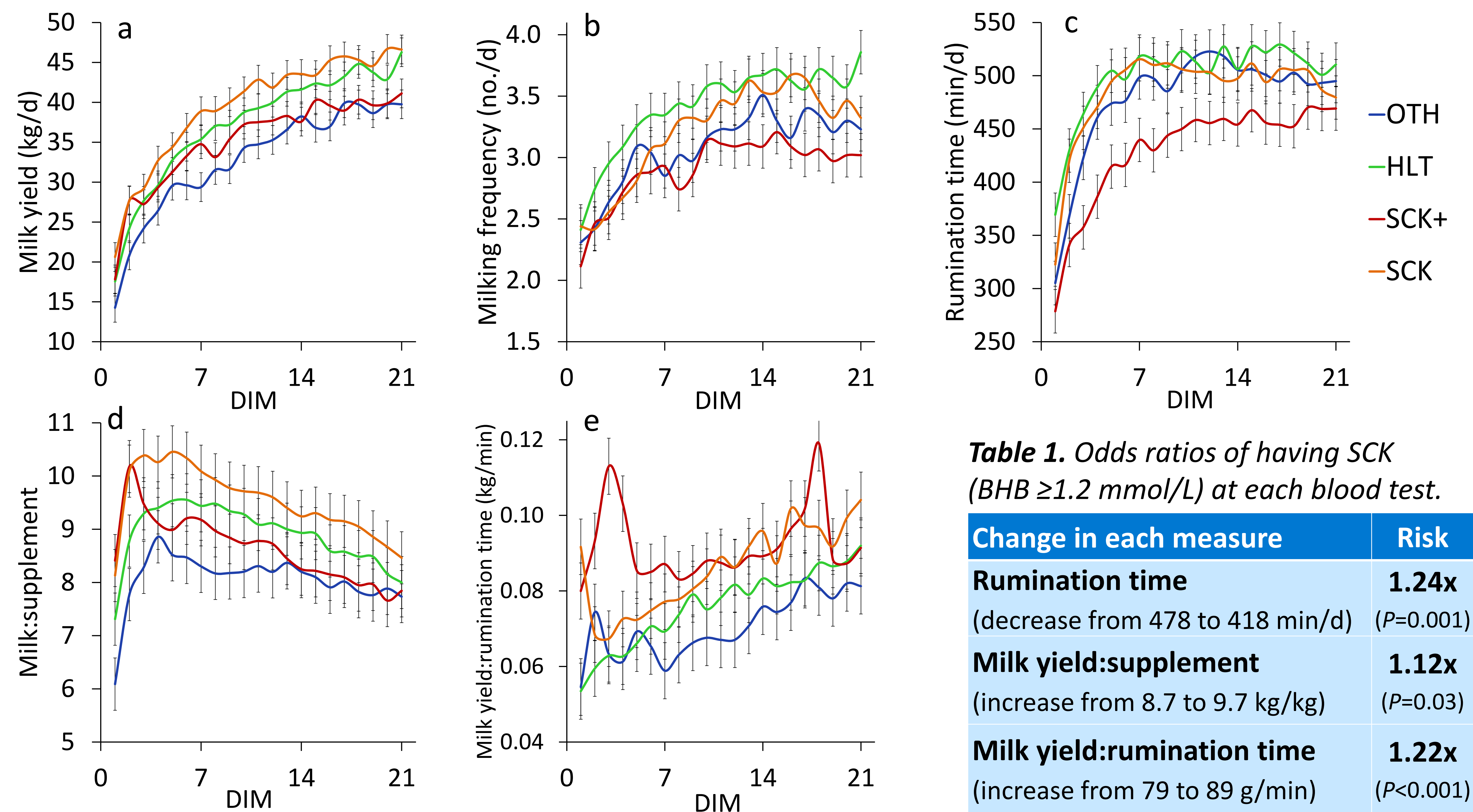


Table 1. Odds ratios of having SCK (BHB ≥ 1.2 mmol/L) at each blood test.

Change in each measure	Risk
Rumination time (decrease from 478 to 418 min/d)	1.24x ($P=0.001$)
Milk yield:supplement (increase from 8.7 to 9.7 kg/kg)	1.12x ($P=0.03$)
Milk yield:ruminantion time (increase from 79 to 89 g/min)	1.22x ($P < 0.001$)

Figure 1. Milk yield (a), milking frequency (b), milk produced per kg supplement consumed (c), rumination time (d), and milk produced relative to rumination time (e) (LSM \pm SE).

Implications

Given the differences in milk production (per day relative to supplement intake or rumination time) based on the health status of fresh cows, it may be possible to reduce negative energy balance of cows in early lactation by modifying their robot feed supplementation.