



Evaluating early life feeding strategies on the development and health of pre-weaned surplus calves

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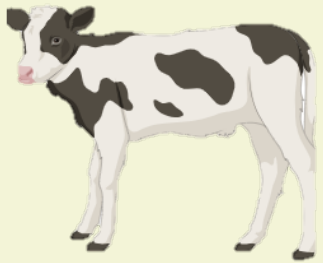
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From the parlour to the feedlot

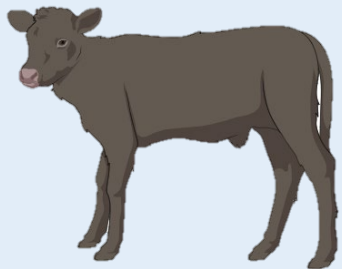


The surplus calf

- Slaughtered shortly after birth
- Veal production

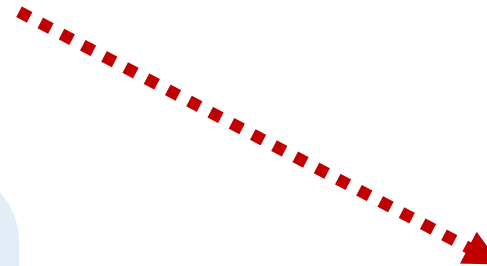


Little financial incentive to encourage high quality care



Dairy Beef

- More valuable surplus calves with improved carcass characteristics



Early life nutrition continues to be a challenge!

Surplus calves: Poor colostrum management and underfeeding

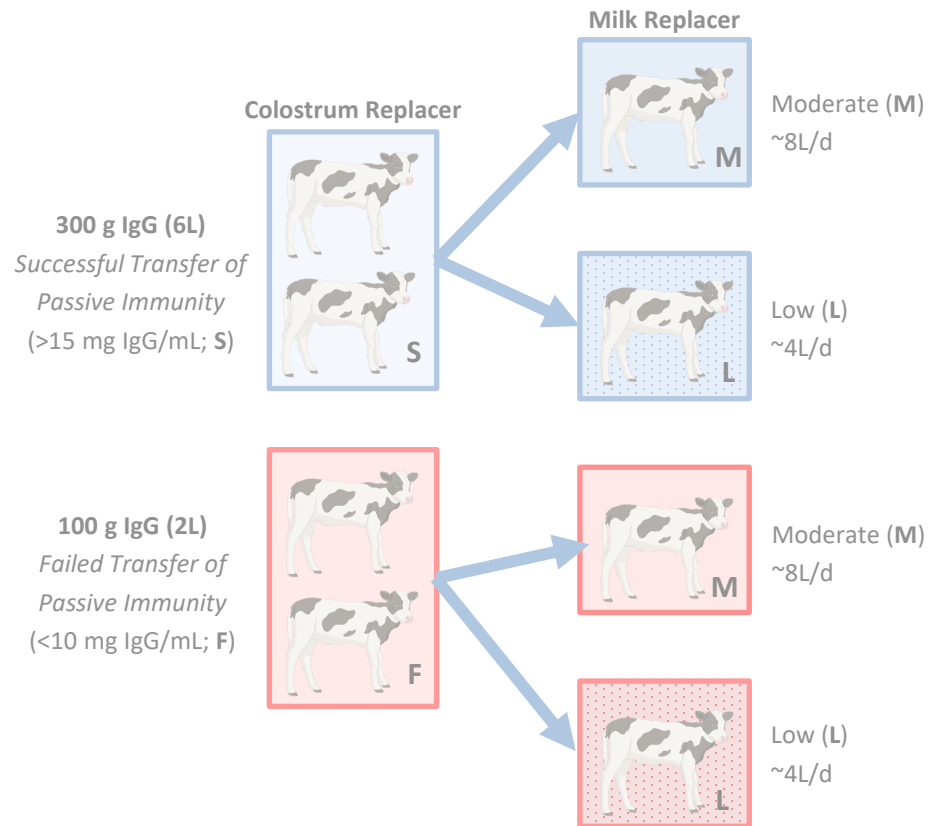
- High number of calves reported to have failure or suboptimal transfer of passive immunity.
- High mortality and morbidity → Digestive + respiratory disorders
- Irresponsible use of antibiotics
- Calves are commonly underfed → 4L/d

Are we compromising their development, future performance, health and welfare? There is a need to explore the interactions of early life nutritional strategies to optimize calf rearing practices

Hypothesis: Increasing colostrum and milk replacer feeding levels will have pre- and post-weaning benefits for development, performance, and health.



Experimental design



180 Holstein Friesian Bull Calves

BW: 43.6 kg

Age: 1-3 d

Block: Arrival day, colostrum protocol and BW

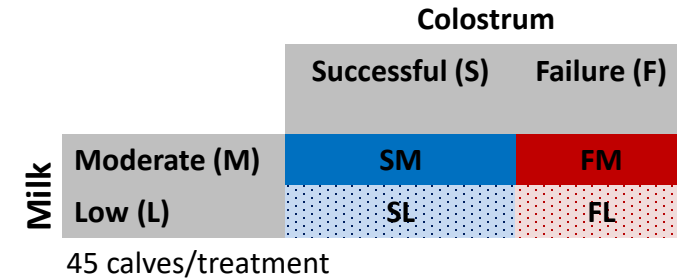
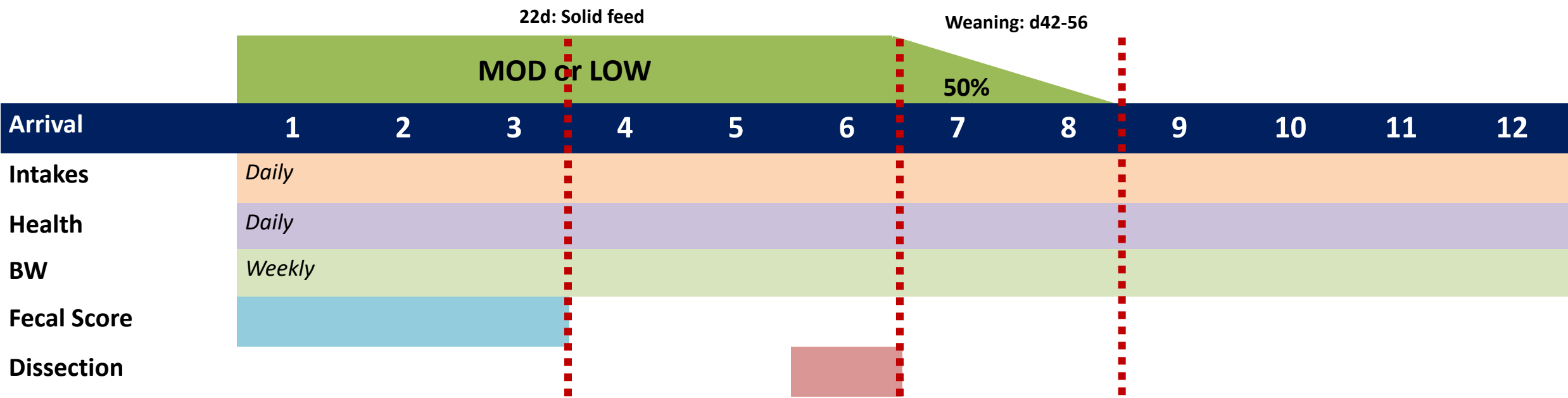


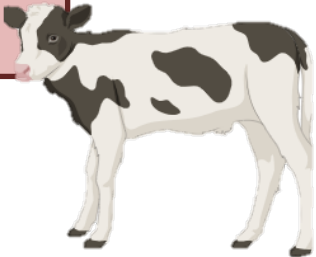
Table 1. Descriptive summary of feed composition (analyzed values; g/kg of DM).

Item ¹	Colostrum Replacer	Milk Replacer	Starter
DM	93.6	96.3	89.5
Protein	52.7	23.5	21.8
Fat	24.6	17.9	3.4
Lactose	14.4	40.8	-
Ash	5.4	6.5	8.3
IgG	17.1	-	-
Starch	-	-	27.0
ME (Mcal/kg of DM)	5.4	4.3	3.3

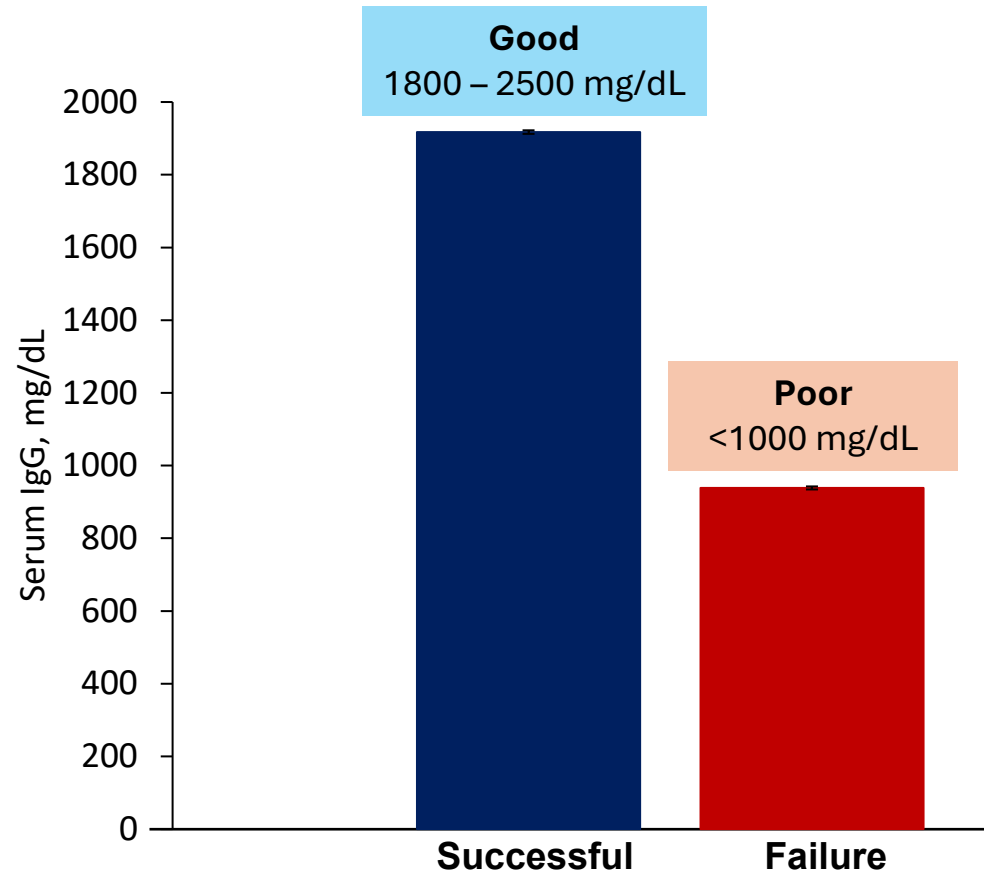
Experimental design - Measurements



15 calves/treatment

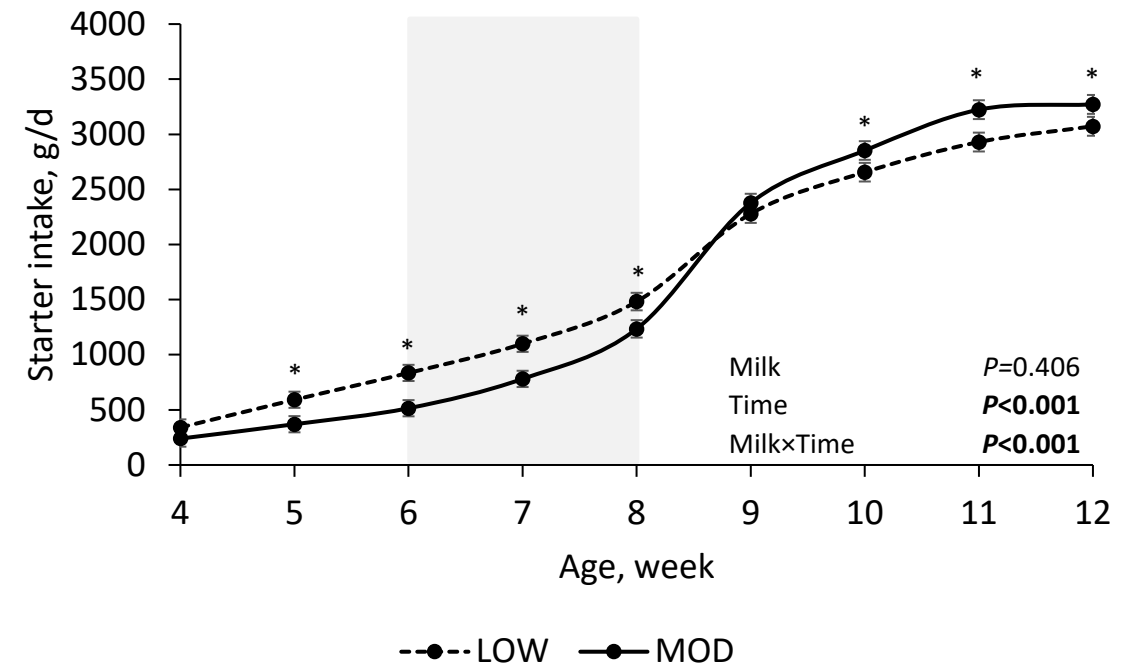
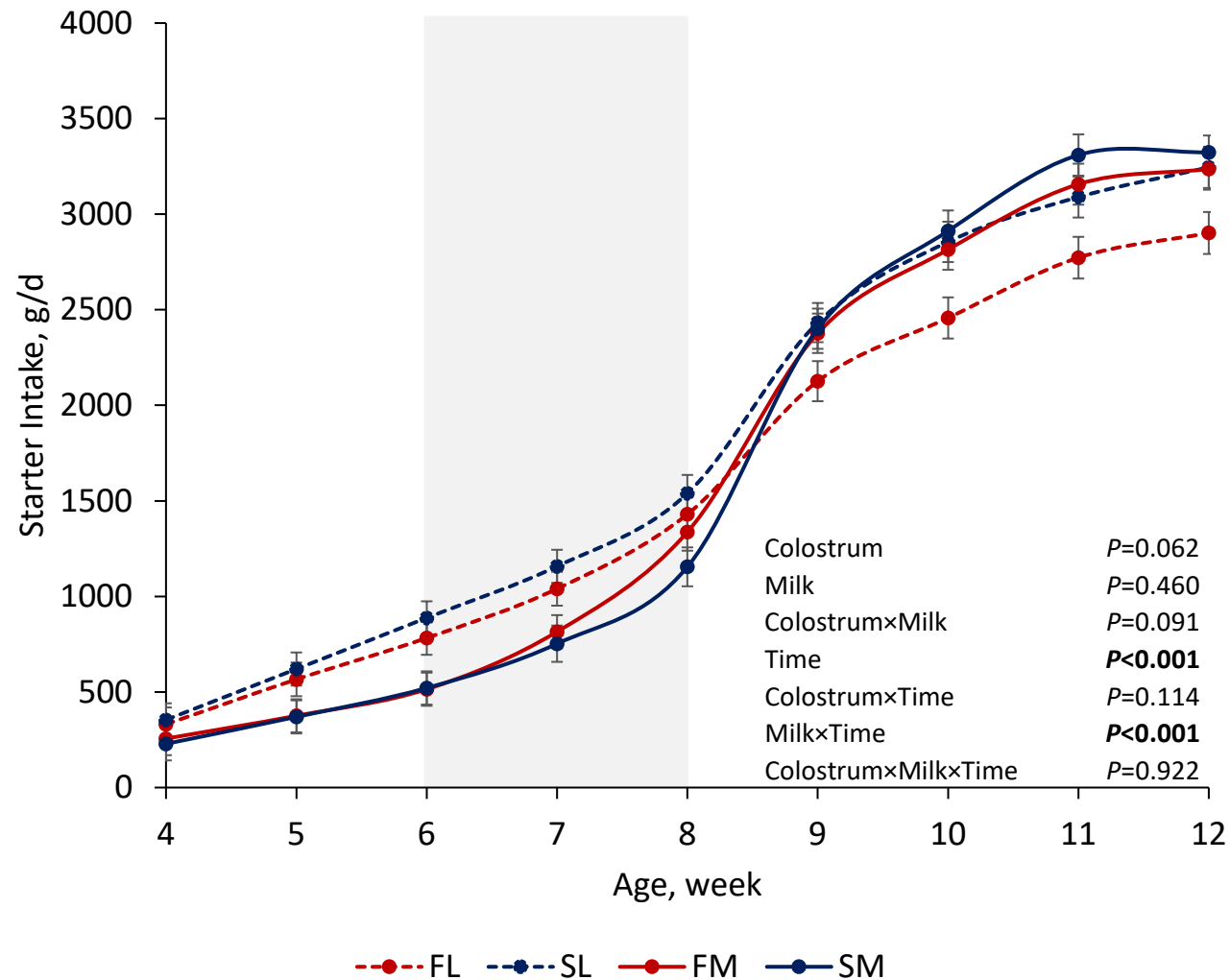


Successful on farm colostrum management



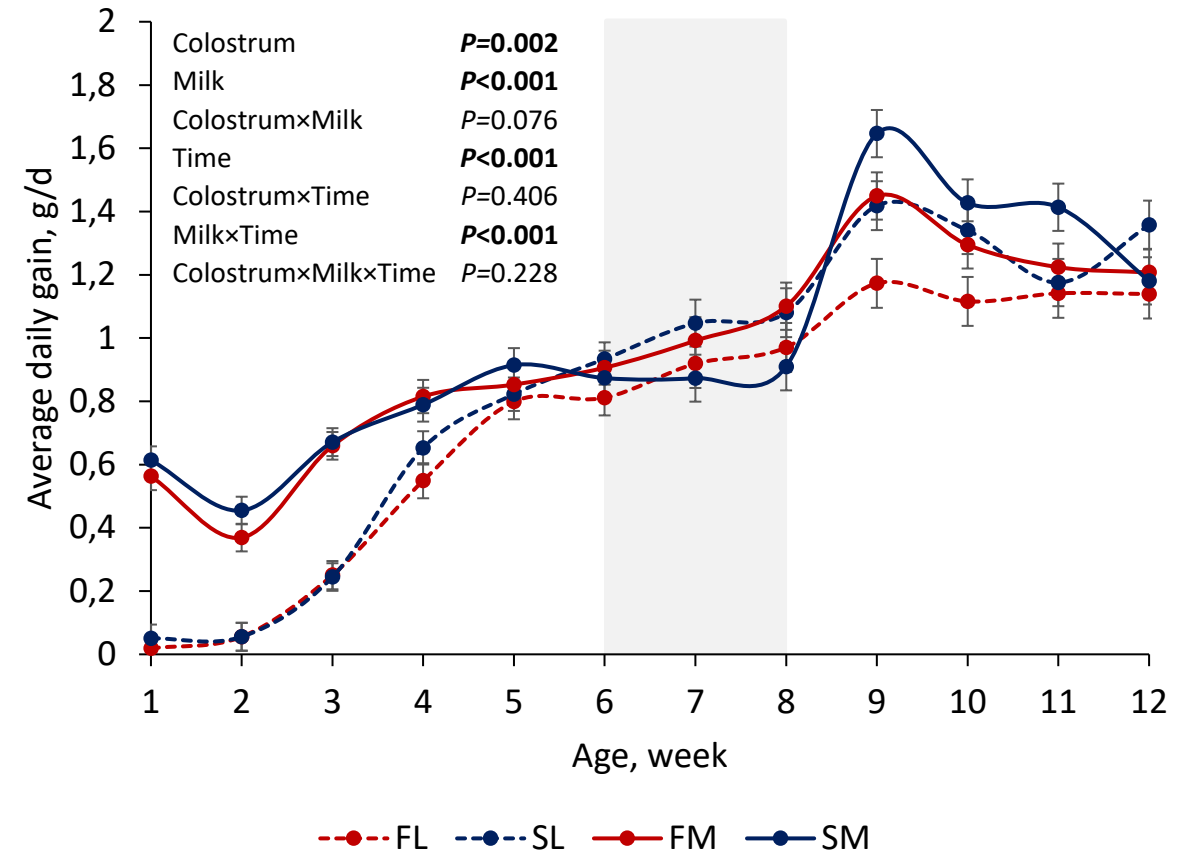
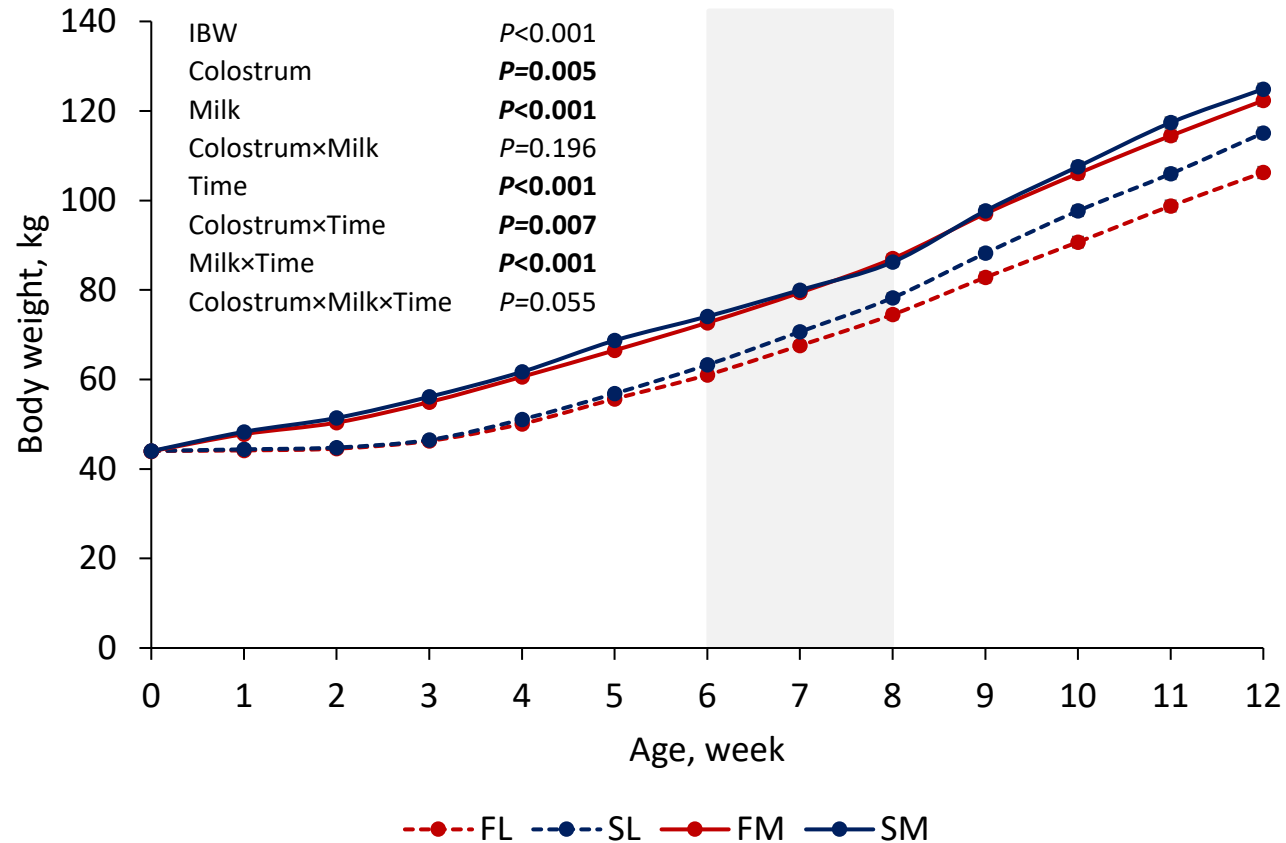
Lombard et al., 2020

Feeding more milk replacer during the preweaning results in higher post weaning starter intake

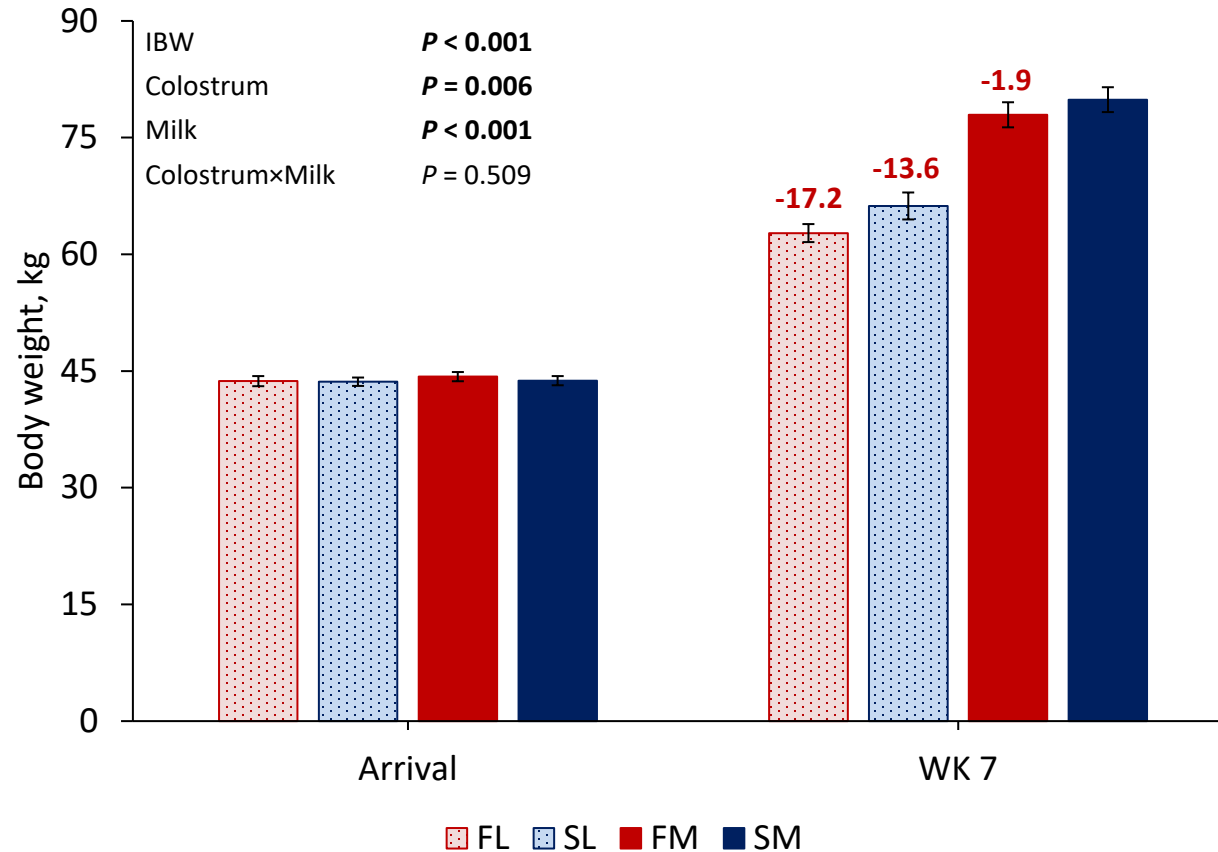


Despite colostrum treatment, MOD calves had greater solid feed intake post-weaning.

Optimal early life nutrition = Better performance



Live weight at slaughter was affected by colostrum and milk replacer



- S calves were 3 kg heavier than F calves ($P=0.016$) regardless of MR treatment
- MOD calves were 14 kg heavier than LOW calves ($P<0.001$), regardless of CR treatment

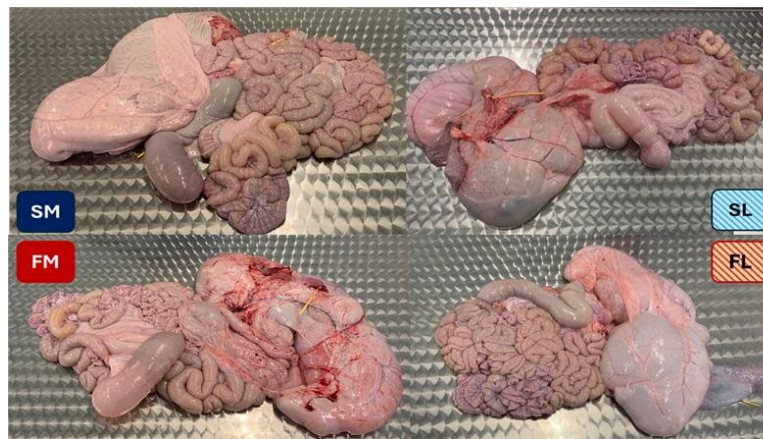
Milk replacer allowance affects forestomach relative weight at 6 wk of age

Table 2. Organ weight relative to live BW (g organ/kg BW).

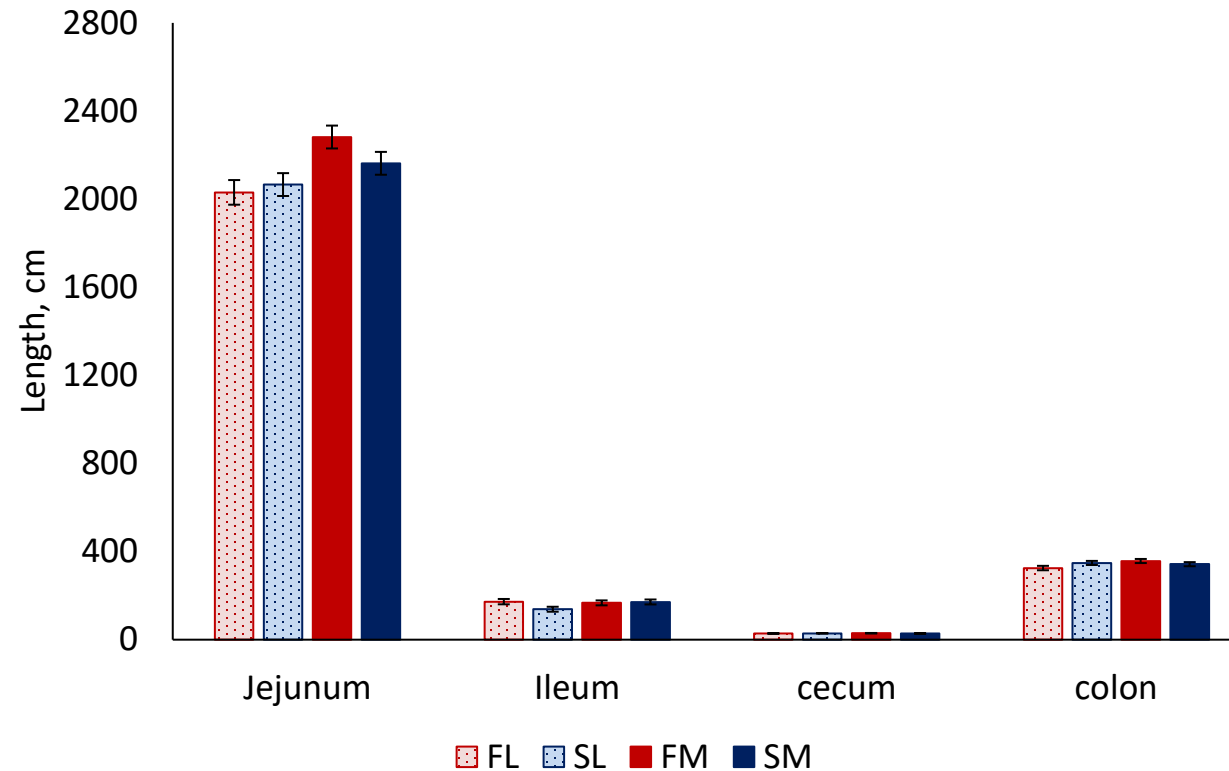
	Colostrum Replacer ¹				Milk Replacer ²			
	S	F	SEM	P-value	LOW	MOD	SEM	P-value
Rumen	11.9	10.4	0.53	0.053	13.0	9.4	0.45	<.0001
Reticulum	1.8	1.7	0.09	0.468	2.1	1.4	0.07	<.0001
Omasum	2.9	2.4	0.17	0.020	3.0	2.3	0.16	<.0001
Abomasum	6.1	6.1	0.14	0.949	6.0	6.2	0.16	0.488

¹S = Successful transfer of passive immunity (300g IgG); F = Failed transfer of passive immunity (100g IgG)

²LOW = Low milk replacer allowance (4L/d); MOD = Moderate milk replacer allowance (8L/d)

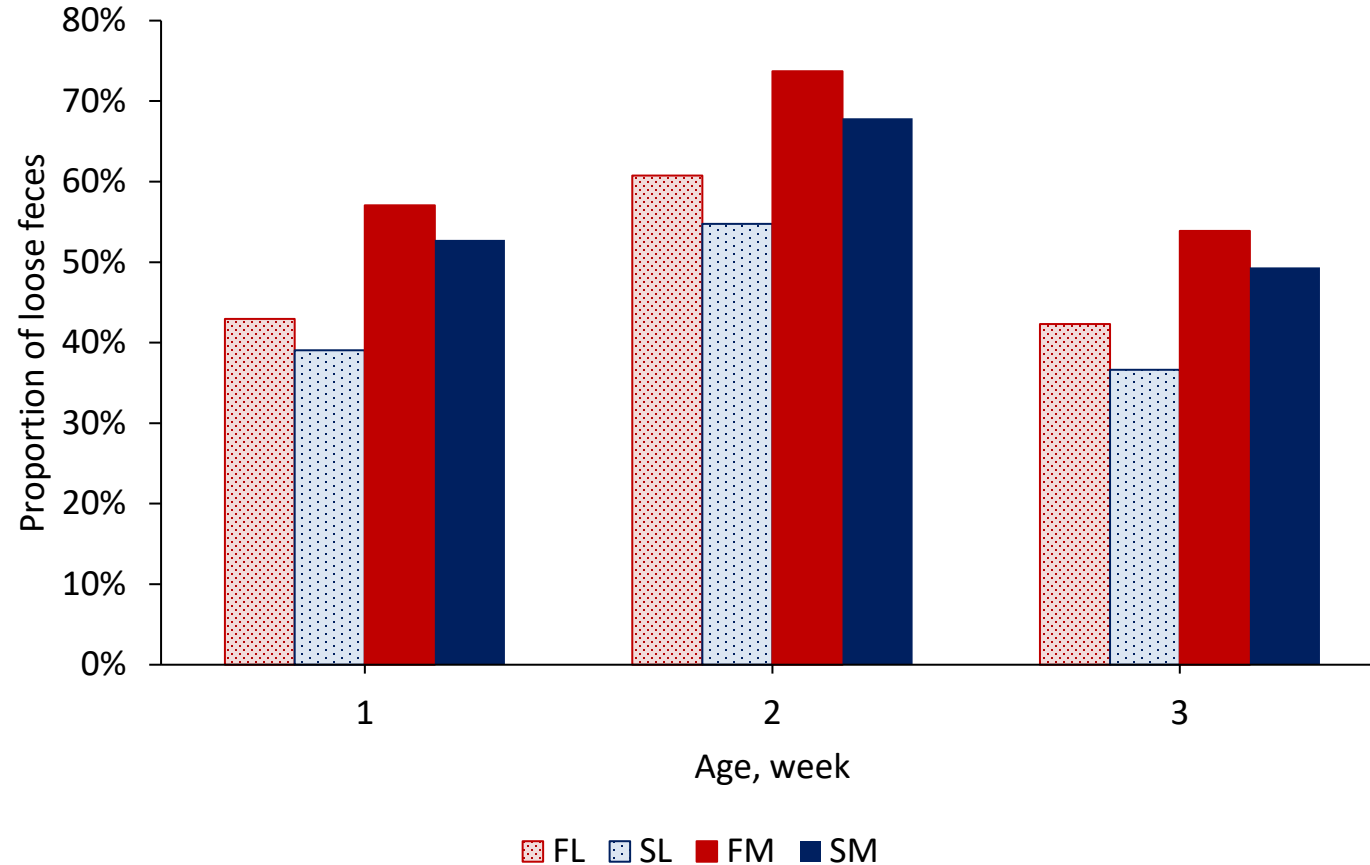


Length of the jejunum was affected by milk replacer



<i>P</i> - value	Jejunum	Ileum	Cecum	Colon
Colostrum	0.415	0.186	0.833	0.631
Milk	0.001	0.231	0.853	0.153
ColostrumxMilk	0.137	0.095	0.366	0.044

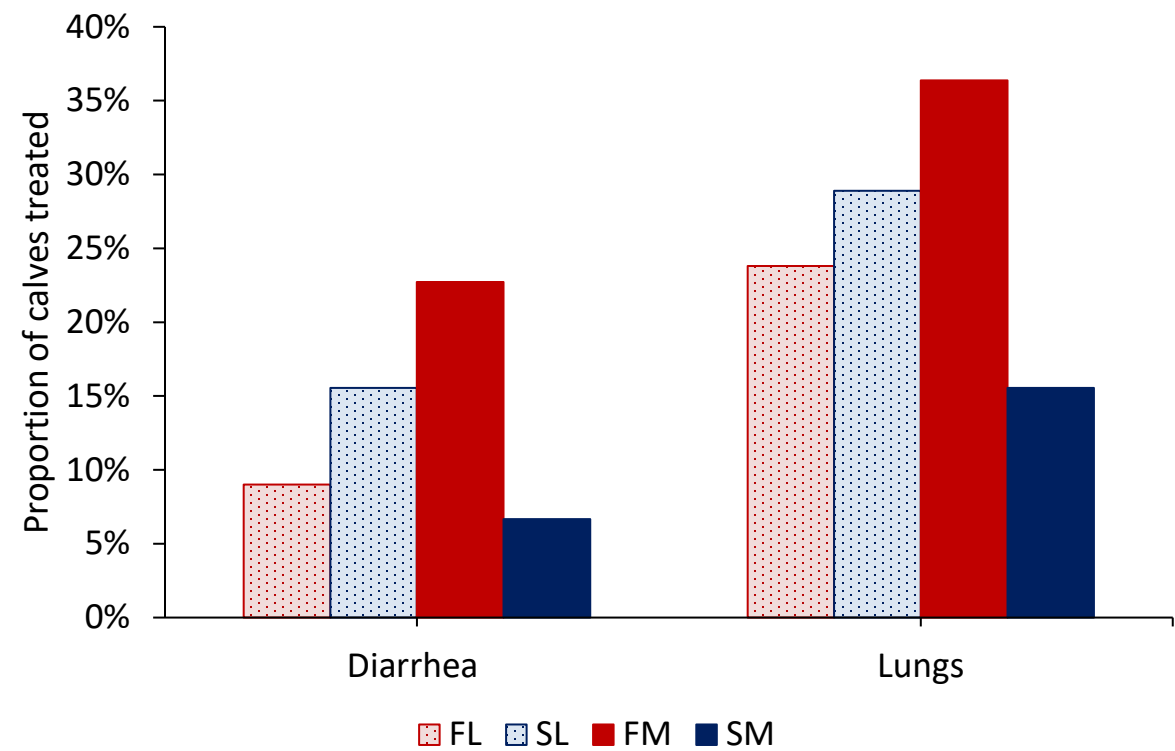
Fecal consistency was mainly affected by milk replacer feeding levels



- Failed transfer of passive immunity resulted in more watery feces → Disease?
- Higher milk allowance increased watery feces → Liquid feed level?

P - value	Week 1	Week 2	Week 3
Colostrum	0.096	0.007	0.042
Milk	<0.001	0.001	0.001
Colostrum×Milk	0.955	0.859	0.788

Optimizing early life nutritional strategies decreases disease incidence



- Lowest % of calves treated for respiratory diseases: **SM**

Mortality: 2.2%

3 FL
1 FM

P-value	Diarrhea	Lungs
Colostrum	0.569	0.226
Milk	0.395	0.917
Colostrum×Milk	0.007	0.047

Summary

- Effective colostrum management establishes a strong foundation for a healthy, thriving calf.
- The remainder of the pre-weaning period is crucial in providing the necessary nutrition to ensure the calf's long-term health and productivity.
- Increasing milk intake during the pre-weaning period can lead to higher solid feed consumption post-weaning.
- Optimal early life nutrition supports postnatal growth and development of calves while contributing to a reduction in digestive disorders and antibiotic usage, promoting better overall health and more robust calves.



Thank you!

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