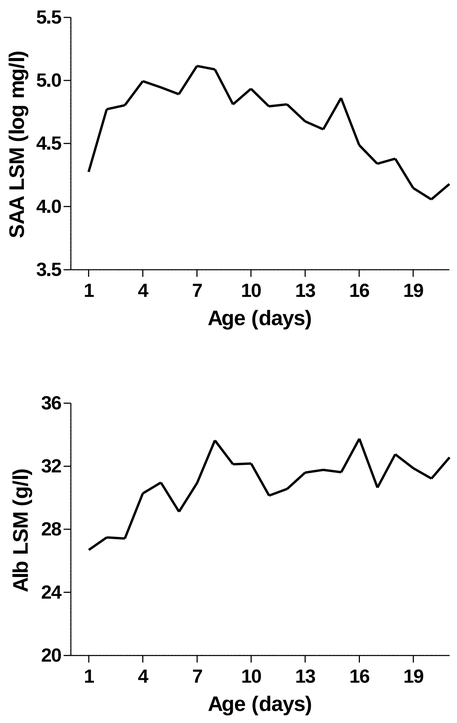
What if serum proteins during the first weeks of life predict dairy cows' health two years later?

Marina Loch*, Tarmo Niine, Kristel Peetsalu, Elisabeth Dorbek-Kolin, Toomas Orro
Institute of Veterinary Medicine and Animal Sciences, Estonian University of Life Sciences, Tartu, Estonia

Background

- The neonatal period primes the immune system and can affect the entire life of a being
- **Acute phase proteins** (APP) – serum amyloid A (SAA), haptoglobin (Hp) and albumin (Alb) – are markers for infections, but also overall health status
- They go through changes in their concentrations not only in response to inflammation, but also with age
- APP concentrations of the first three weeks of life are associated with weight gain of ruminants until up to nine months of age



Acute phase protein concentrations in dairy calves over the first three weeks of life

Materials and Methods

- Sample collection (blood serum and feces) on an Estonian dairy farm in 2015 from all female calves born within the study period (n=144) during a natural outbreak of *Cryptosporidium parvum*
- On-farm data collection regarding all diseases and treatments
- Statistical analysis: logistic regression (linear regression for number of antibiotic treatments)

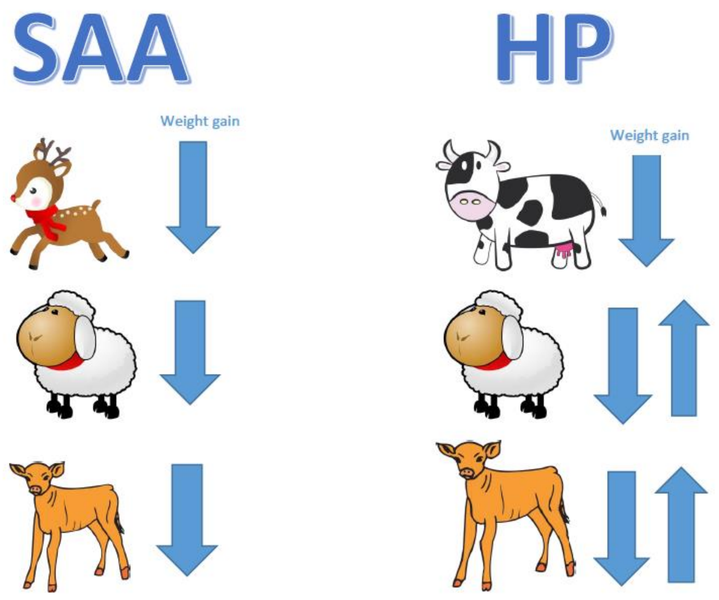
Outcome variables:

- lameness
- metritis
- mastitis
- antibiotic treatments

Explanatory variables

- Hp
- SAA
- Alb
- IgG

} of each of the three weeks studied

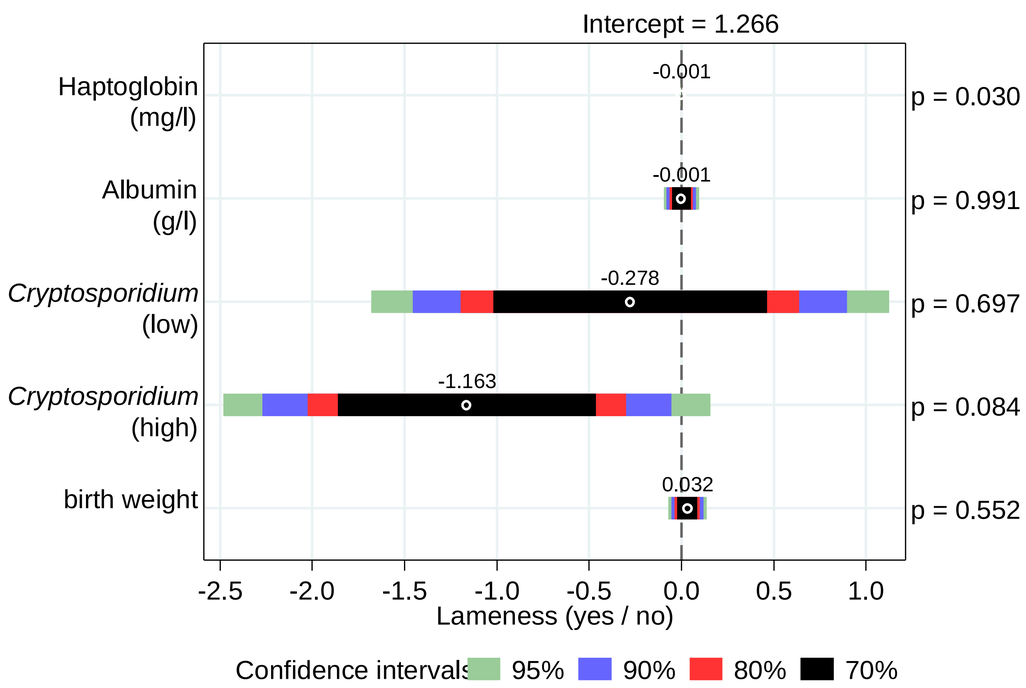


But what are the long-term effects?

Results

	First week	Second week	Third week
Albumin	Lameness ↓ Mastitis ↓	Metritis ↓	
Haptoglobin	Lameness ↓		Lameness ↓
Serum amyloid A	Metritis ↓	Antibiotic treatments ↓	
IgG	Antibiotic treatments ↓	Antibiotic treatments ↓	Antibiotic treatments ↓

Arrows indicate negative association



Coefficient plot for associations from the third week of life with lameness before and during the first lactation, cofounders also shown

➔ Neonatal concentrations of IgG and APP can predict long-term health

www.emu.ee
Eesti Maaülikool
Estonian University of Life Sciences
Veterinaarmeditsiini ja loomakasvatuse instituut
Institute of Veterinary Medicine and Animal Sciences

*corresponding author: Marina Loch
Marina.loch@student.emu.ee

Euroopa Maaelu Arengu Põllumajandusfond: Euroopa investeeringud maapiirkondadesse