

# Temporal relationship between milk MIR predicted metabolic disorders and lameness events

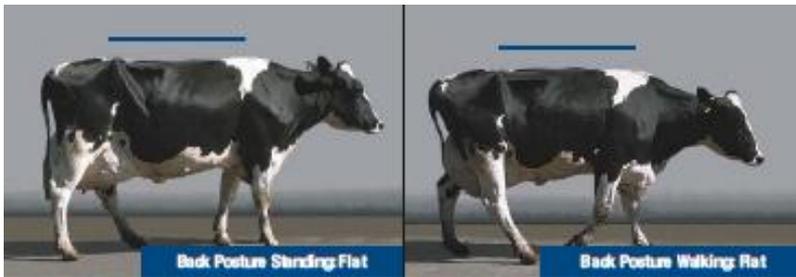
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AUSTRIA, <sup>3</sup>BOKU, VIENNA, AUSTRIA

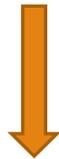
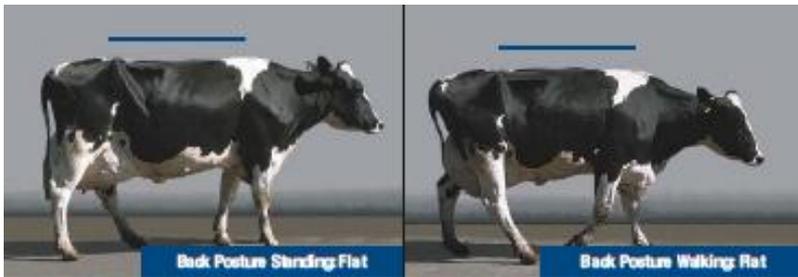
# Context

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Visual locomotion scoring

# Context



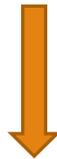
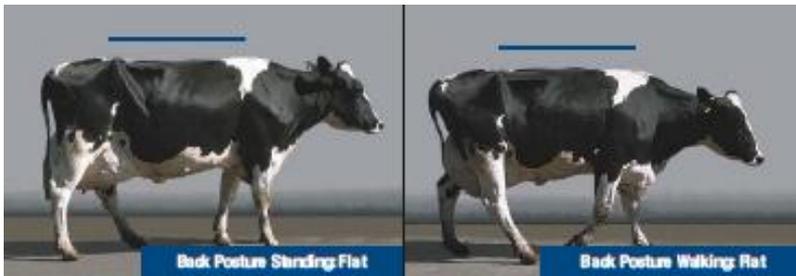
Visual locomotion scoring

TOO LATE !

= Only a diagnosis



# Context



Visual locomotion scoring

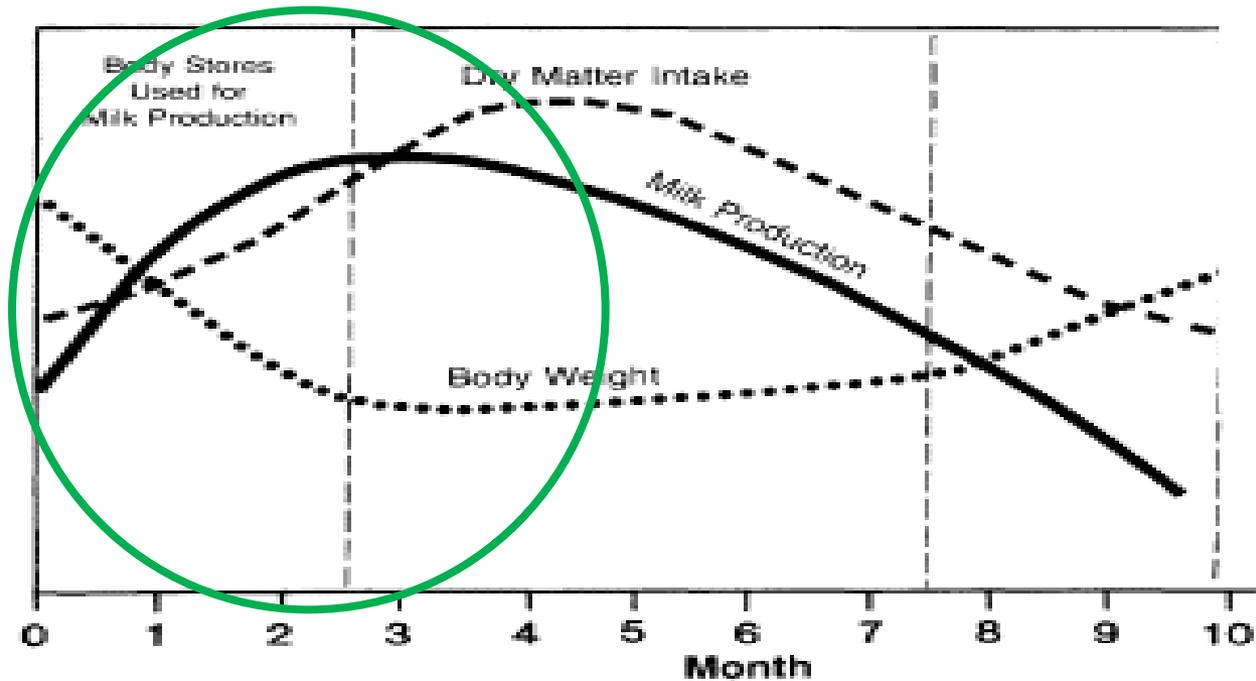
Early detection?



= Only a diagnosis

# Hypothesis

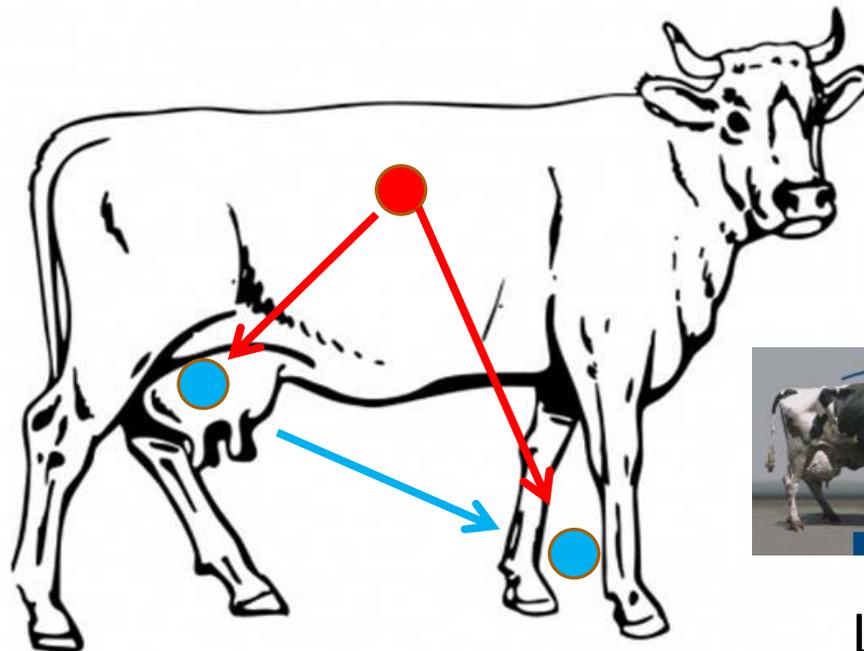
Start of lactation



# Hypothesis



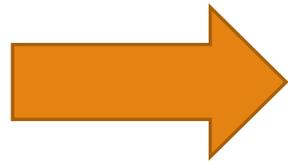
- BHB
- Acetone
- Citrates
- C18:1cis9



Locomotion score

# MIR predicted biomarkers

Milk samples

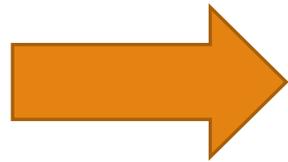


MIR analysis



# MIR predicted biomarkers

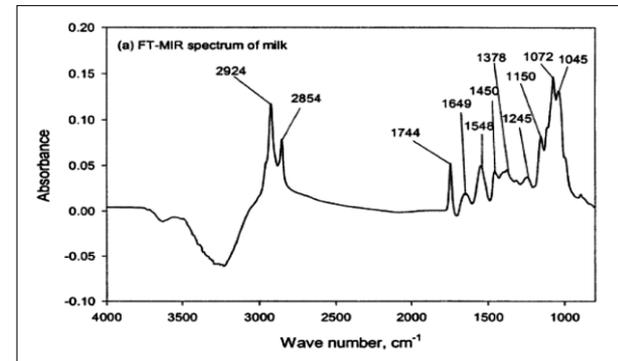
Milk samples



MIR analysis



MIR spectra



# MIR predicted biomarkers

Milk samples



MIR analysis

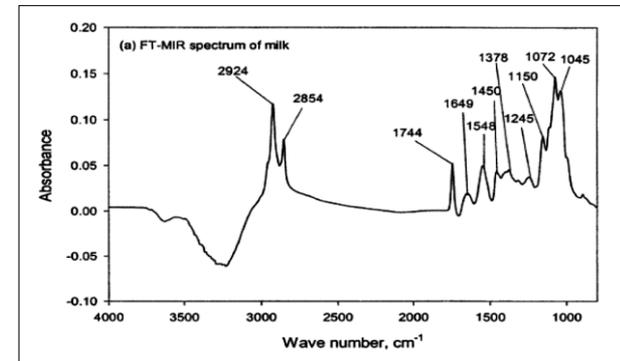


Prediction

**Novel components**

- BHB
- Acetone
- Citrates

MIR spectra



Calibration

Reference values

# Data

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- 3 Breeds
  - 3753 Simmental, 1473 Brown Swiss, 1066 Holstein
- 161 farms
- 45044 samples
  - 9268 MIR
  - 38306 loc scores



(Rinderzucht Austria, <https://www.zar.at/Aktuelles/Archiv/2017/Zukunftswerkstatt-Rinderzucht.html>)

# Data

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- 3 Breeds
- 161 farms
- 45044 samples
  
- Biomarkers
  - Acetone
  - Citrates
  - BHB
  - Fat
  - C18:1cis9



(Rinderzucht Austria, <https://www.zar.at/Aktuelles/Archiv/2017/Zukunftswerkstatt-Rinderzucht.html>)

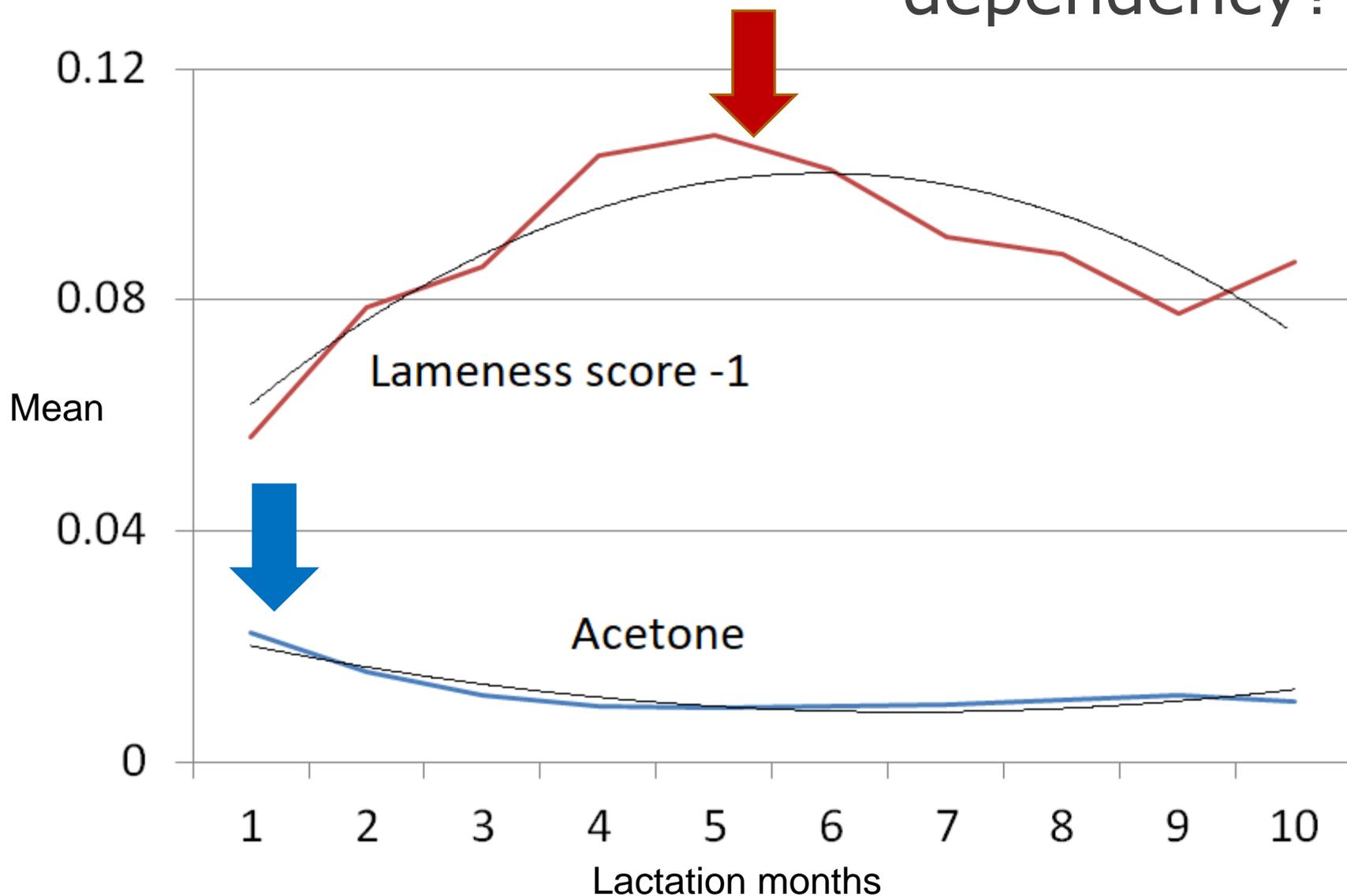
# Objective

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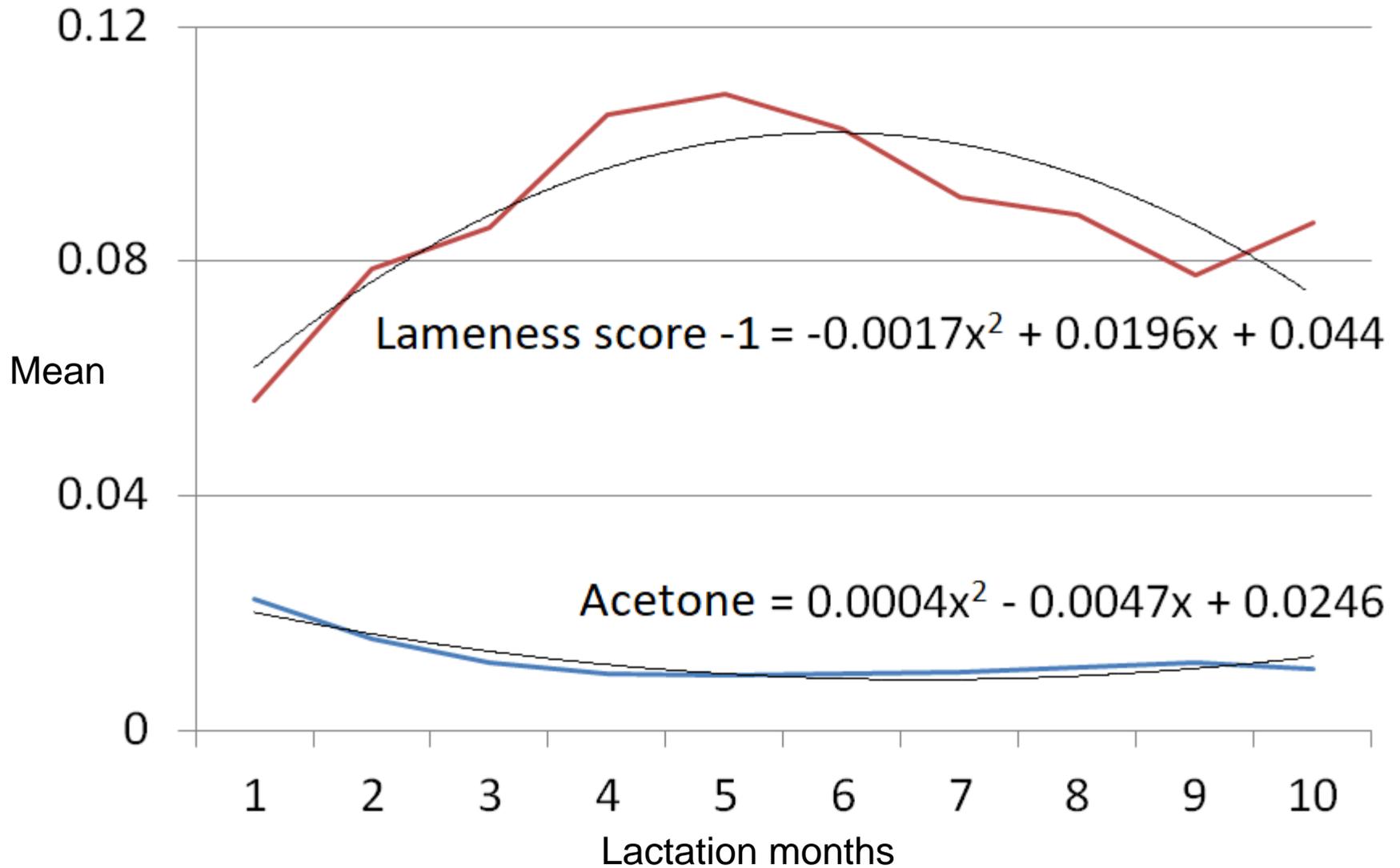
Looking at the relationship between locomotion score and potentially associated biomarkers by modelling temporal dependency.

Temporal relationship?

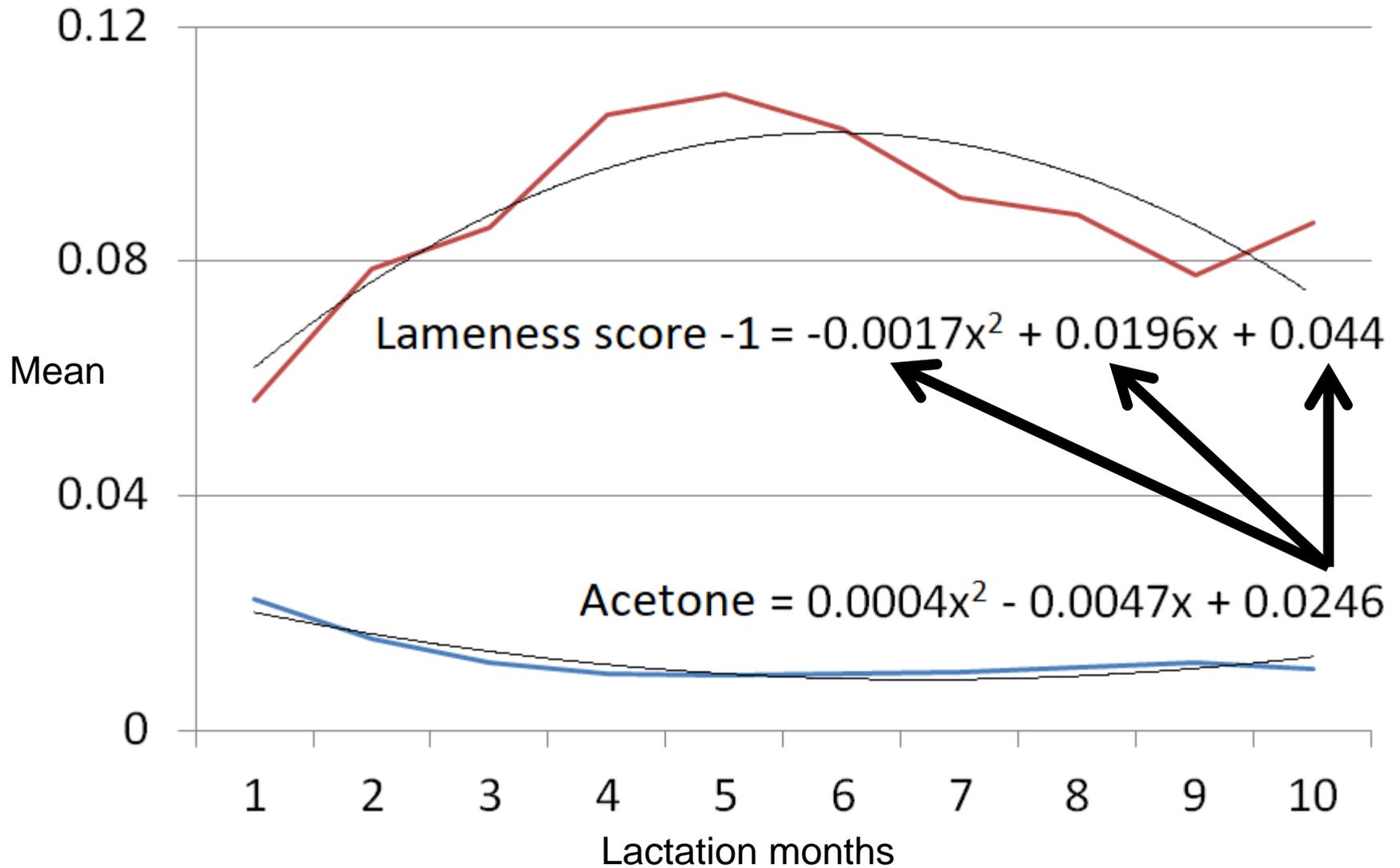
Modelling temporal dependency?



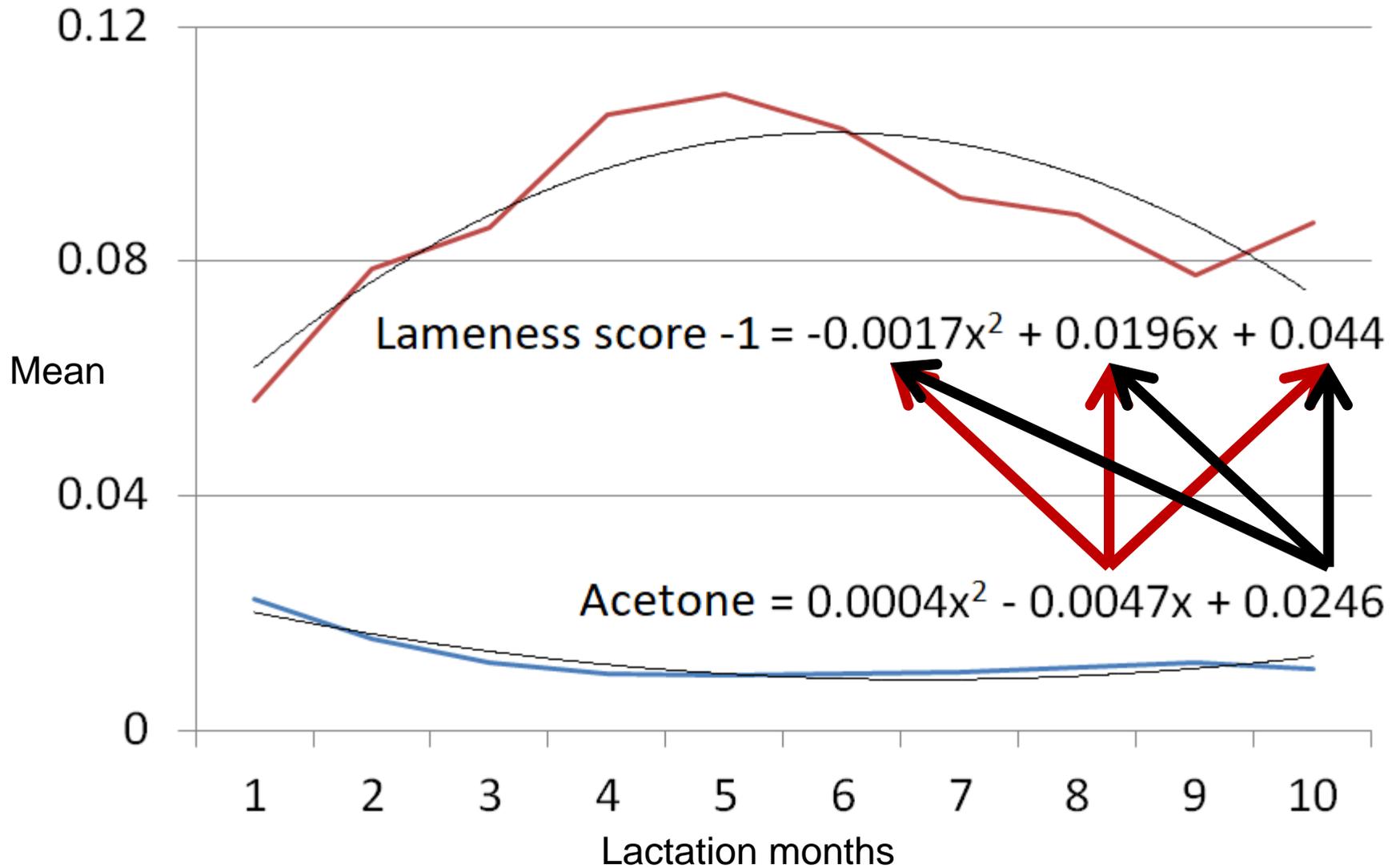
# Modelling temporal dependency?



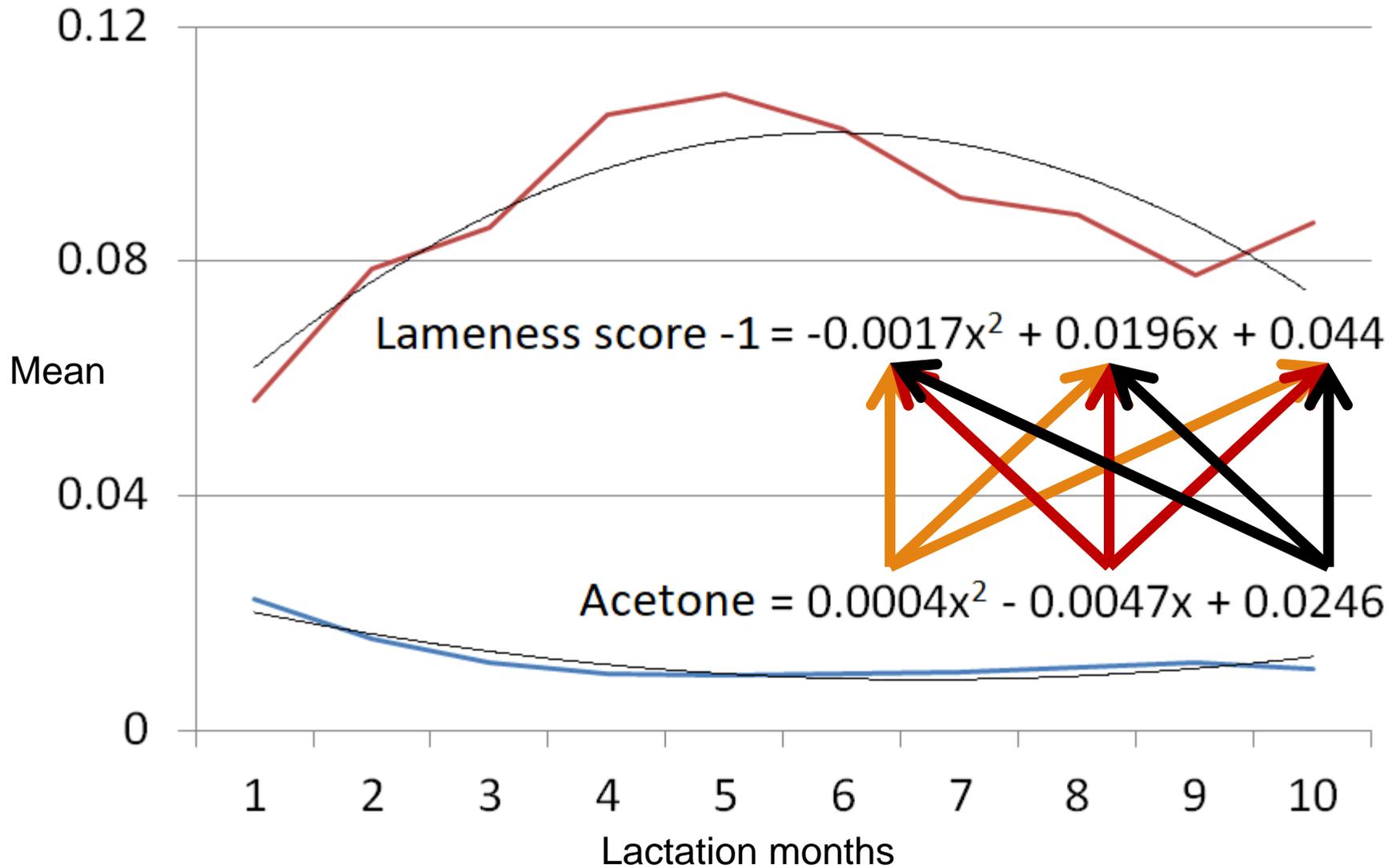
# Modelling temporal dependency?



# Modelling temporal dependency?



# Modelling temporal dependency?



# Results

Brown Swiss, oleic acid (C18:1cis9)

Correlations between  
NON temporal regression coefficients

	L_ct	L_lin	L_q
B_ct	0.16	0.27	0.84
B_lin	-0.13	< 0.01	-0.93
B_q	0.01	-0.13	> 0.99

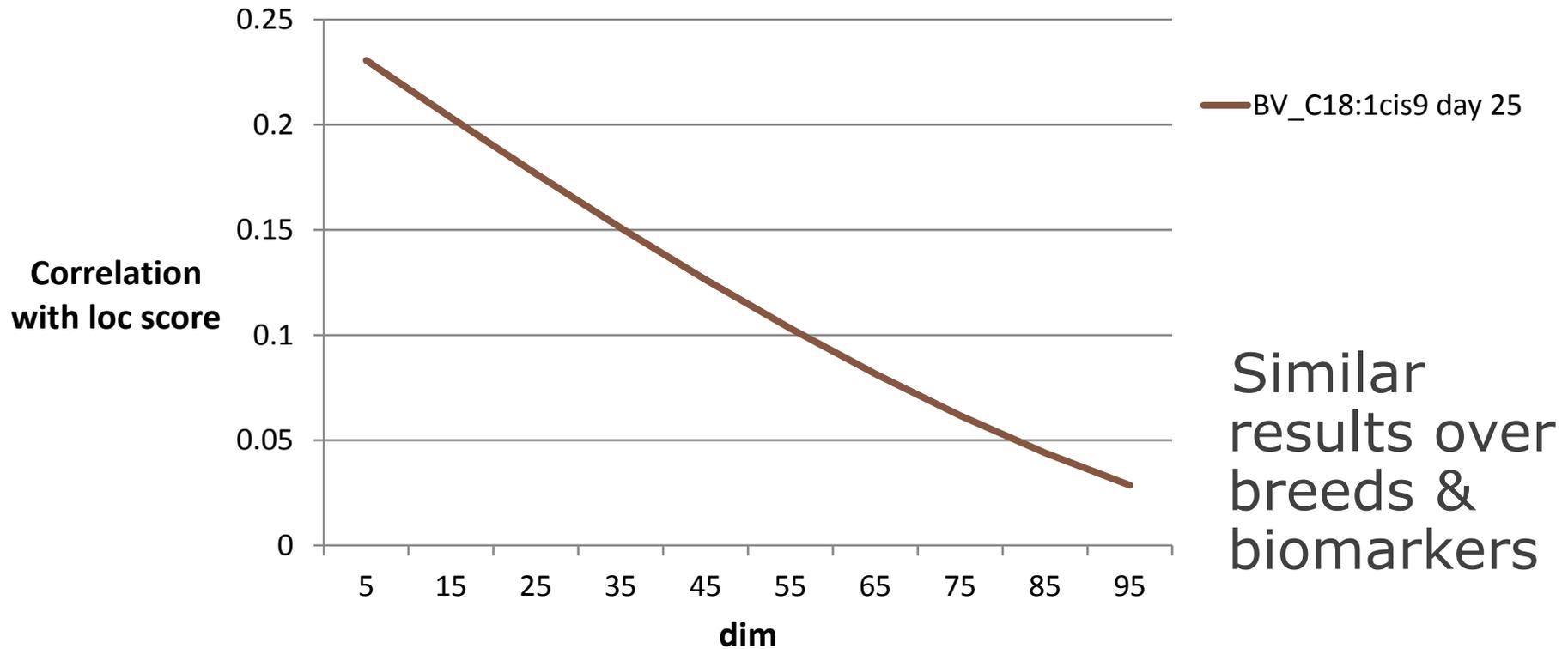
! Variances !

1473 animals  
10 026 records

# Results

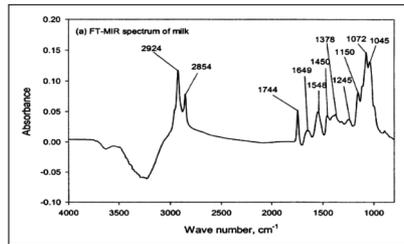
## Brown Swiss, oleic acid (C18:1cis9)

### Correlations across time

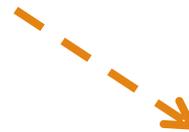


# Discussion

NOT optimized:

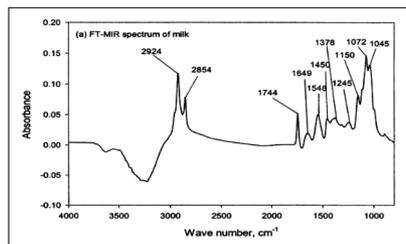


- BHB
- Acetone
- Citrates

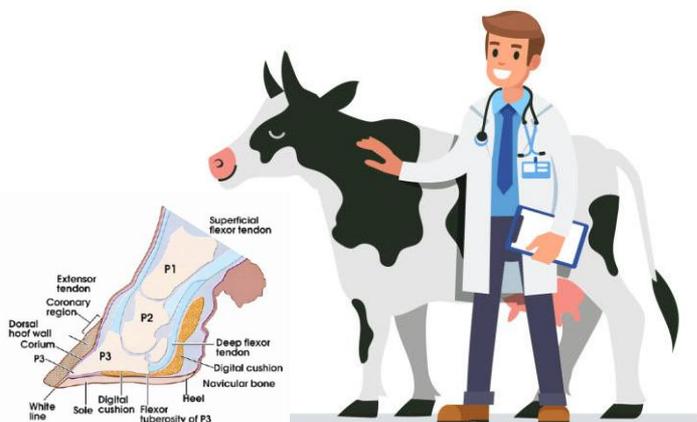


# Discussion

NOT optimized:



- BHB
- Acetone
- Citrates



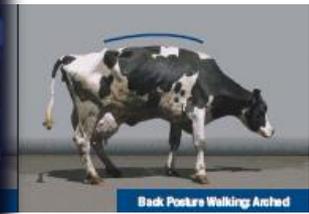
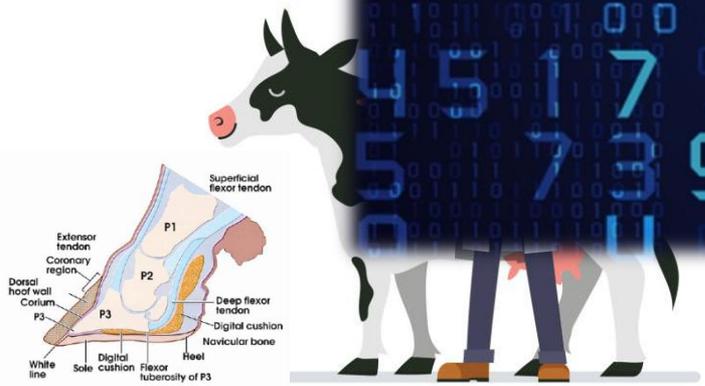
Hoof and leg diseases  
=> NO distinction

# Discussion

NOT optimized:



PLIB  
betone  
rates



Hoor and leg diseases  
=> NO distinction

# Conclusions

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Relation = right direction

BUT

Size of the correlations = small

# Conclusions

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Relation = right direction

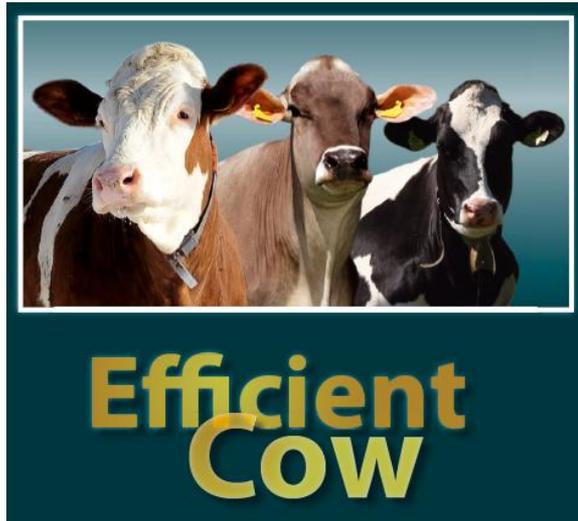
BUT

Size of the correlations = small

Worth investigating!

# Acknowledgments

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The views expressed in this publication are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Commission.

# Temporal relationship between milk MIR predicted metabolic disorders and lameness events

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**THANK YOU**

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# Methodology

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Lamescore

OR = Herd-Year-Season + month + Lactgroup + Animal-Lactation + e

Biomarker

Nested: Pol Leg 2 

Reml, test-day model