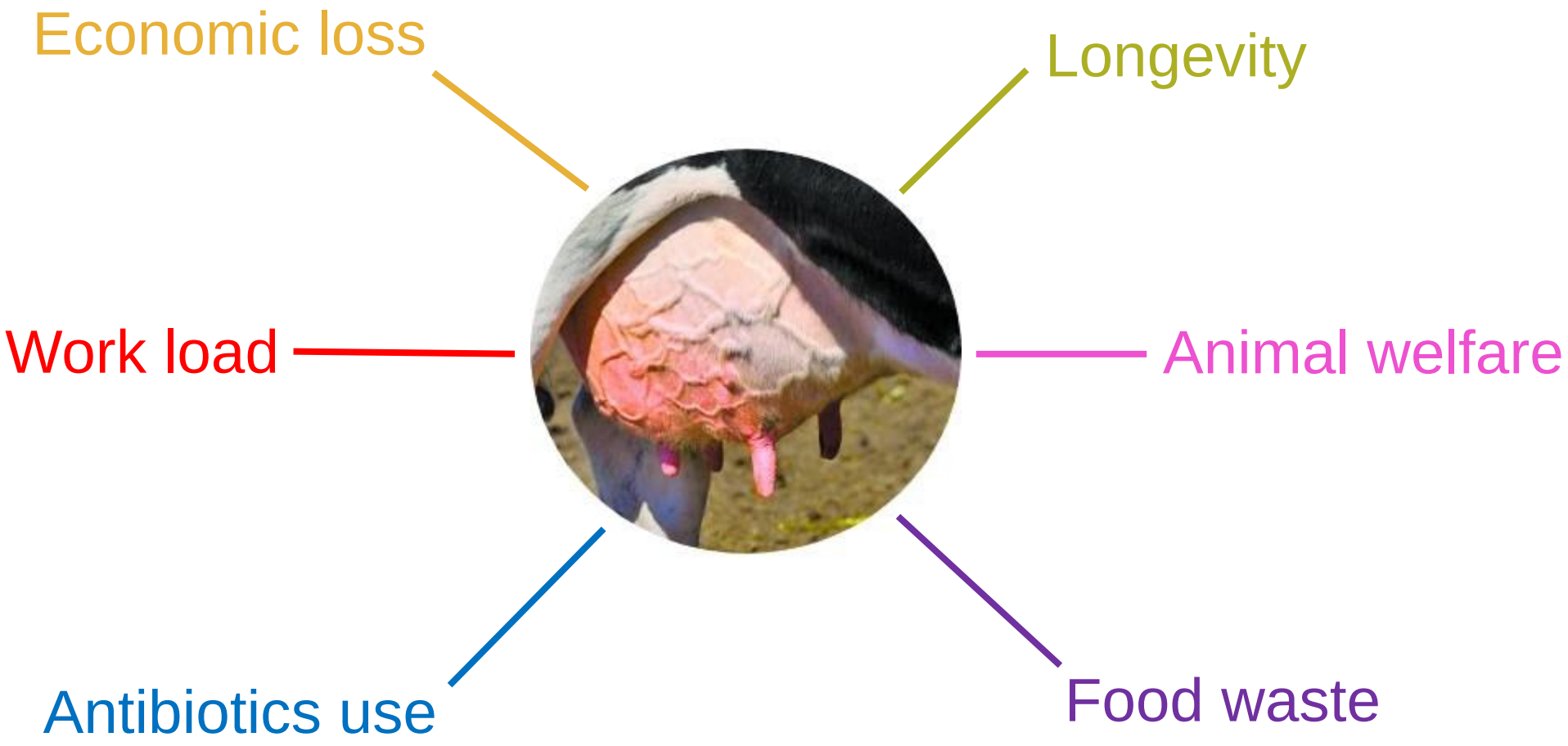
KU LEUVEN

Milk losses at quarter level during clinical mastitis in dairy cows

I. Adriaens, L. D'Anvers, B. De Ketelaere, W. Saeys, K. Geerinckx, I. Van Den Brulle, S. Piepers and B. Aernouts

Clinical mastitis has a huge impact on sustainability



AMS have their challenges and opportunities

New milking installations BE/NL >50% AMS

CHALLENGES

Larger cow-farmer distance

Later disease detection & less detailed follow-up

OPPORTUNITIES

Frequent and automated data collection

Quarter milking approach

Modern dairy farming requires adapted approach

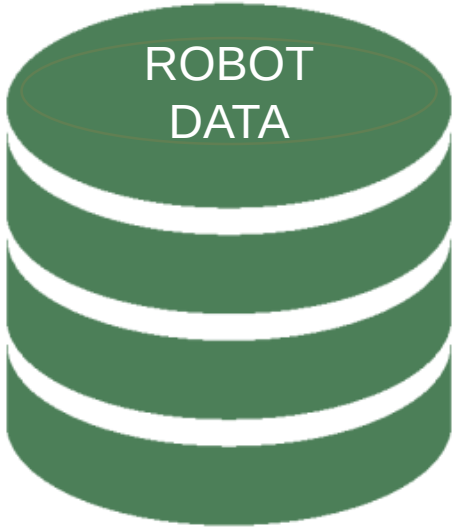
>> Mastitis management today

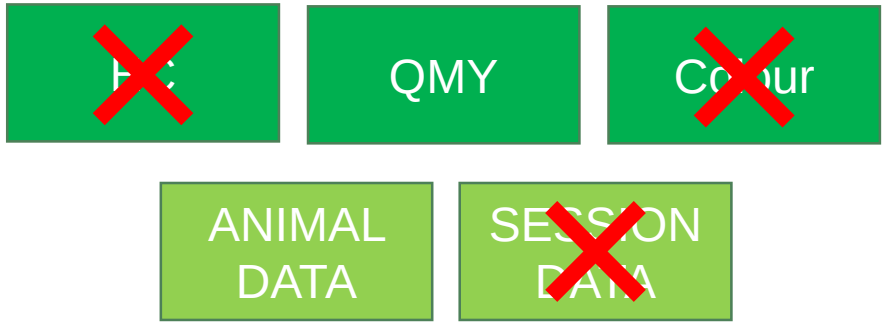
- ✓ Mastitis detection
- ✗ Recovery follow up: suboptimal treatment

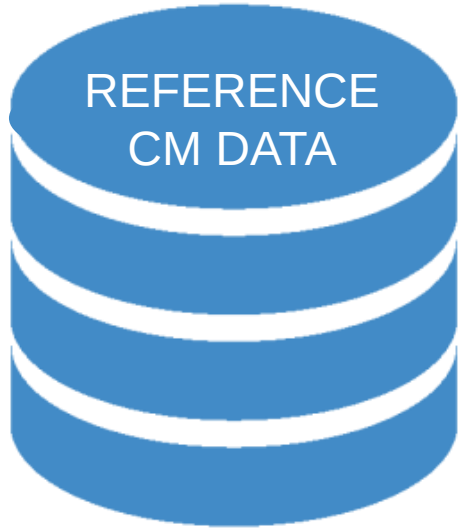
>> Requirements for decision making tool

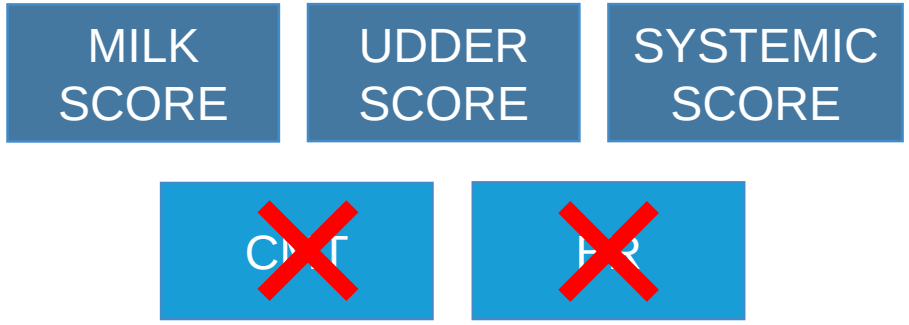
1. GOLDEN STANDARD FOR MASTITIS RECOVERY AND FOLLOW UP
2. PARAMETER FOR DECISION MAKING

Data


ROBOT
DATA


QMY
ANIMAL
DATA


REFERENCE
CM DATA

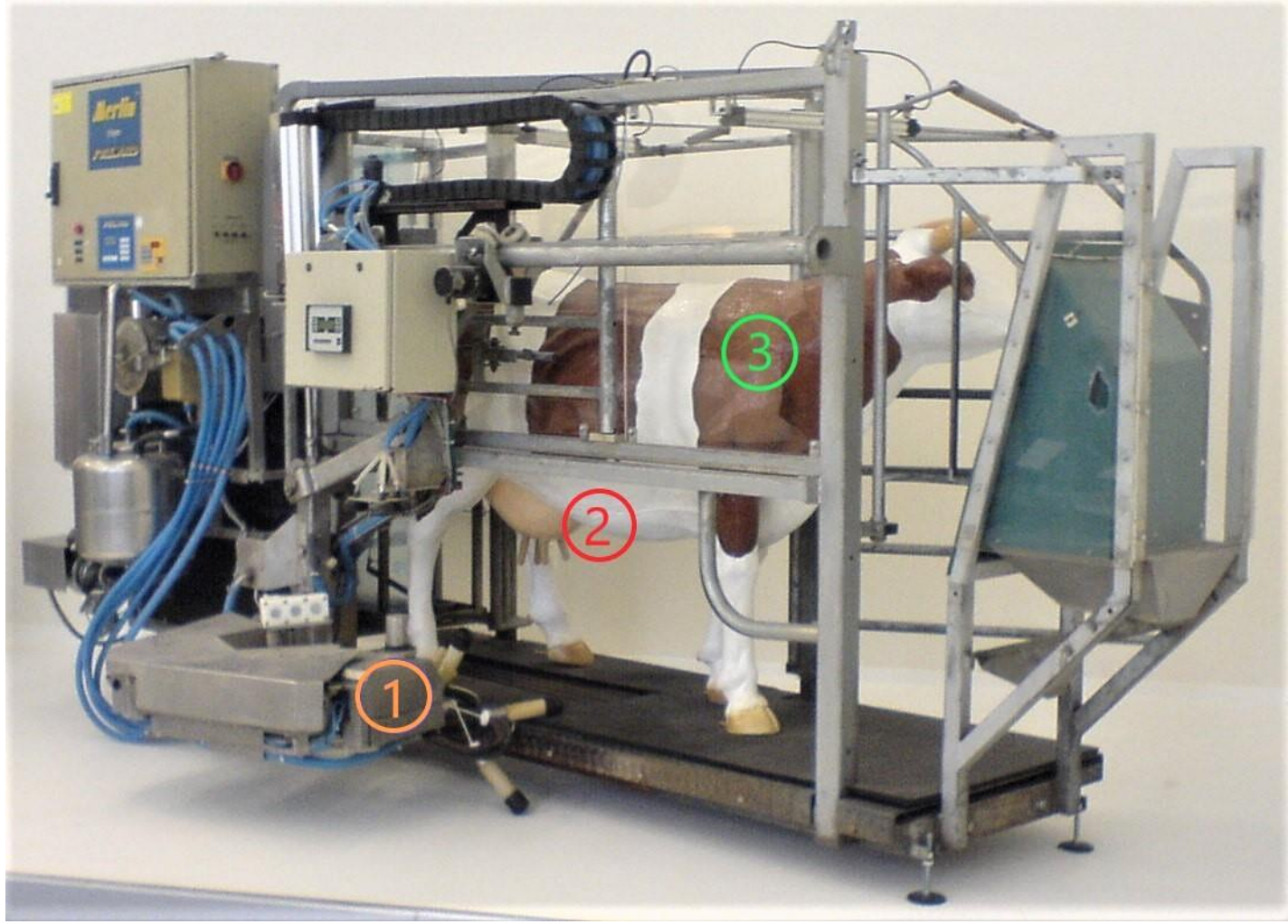

MILK
SCORE
UDDER
SCORE
SYSTEMIC
SCORE

Golden standard for clinical mastitis recovery

Systemic score (SS)

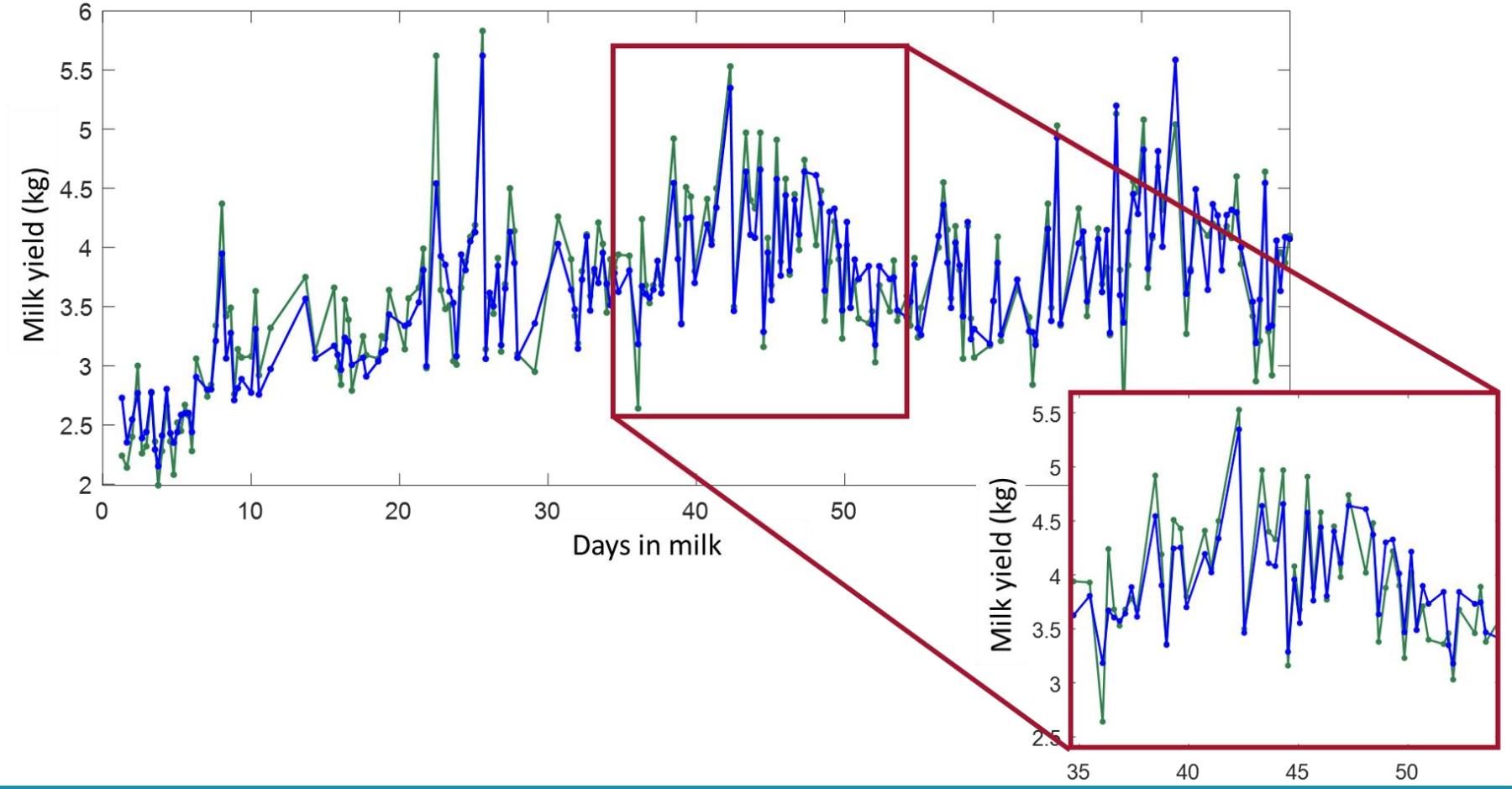
Udder score (US)

Milk score (MS)

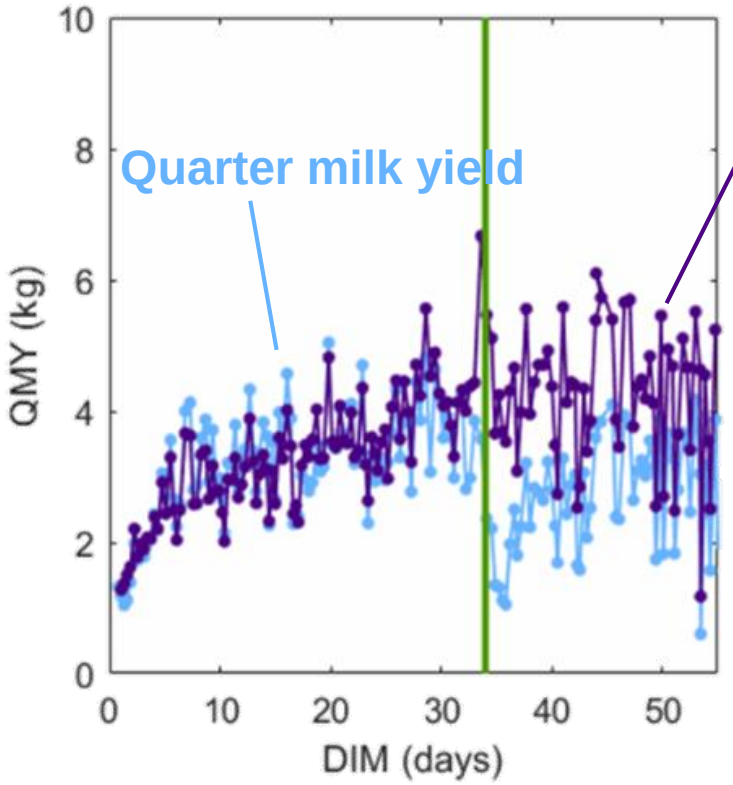


Model: reference analysis

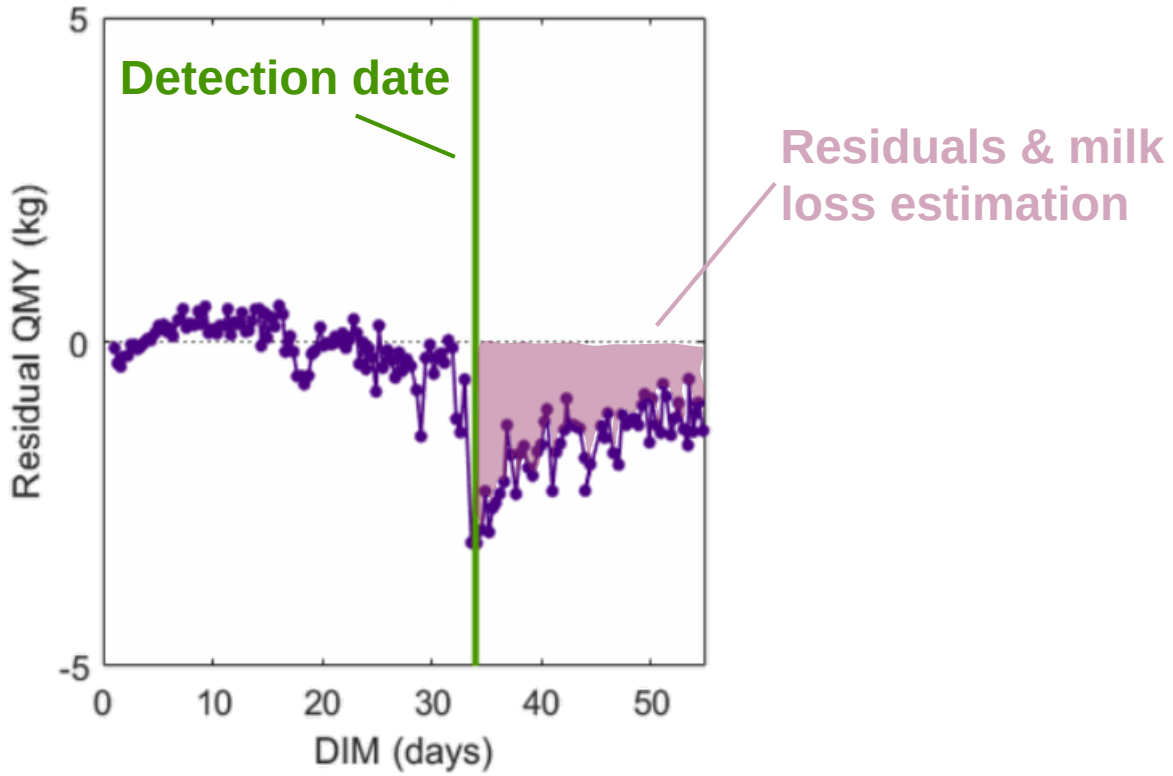
>> Quarter level milk yield model: ‘reference’ curves represent QMY in unperturbed state

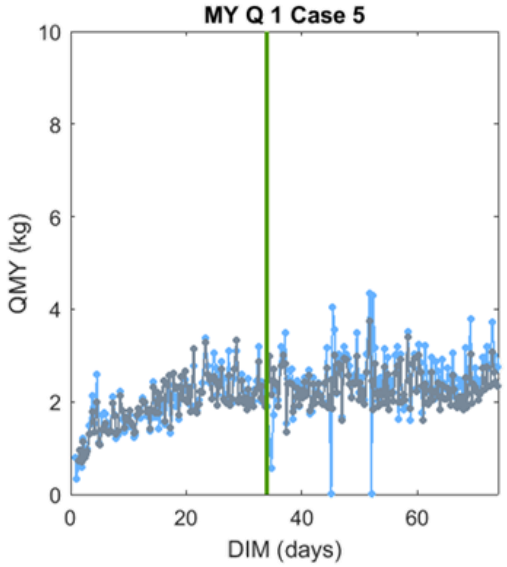


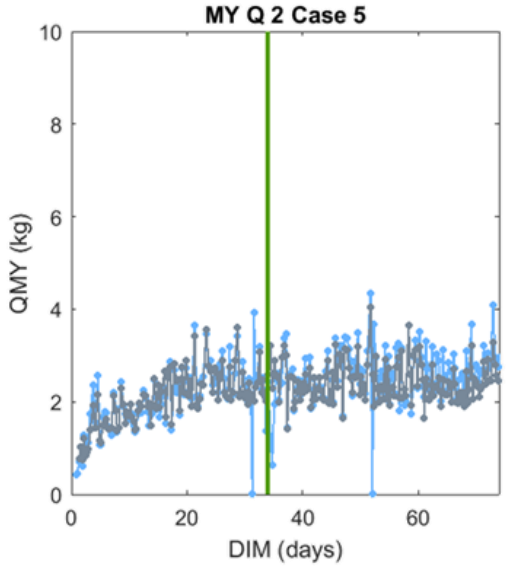
Milk losses

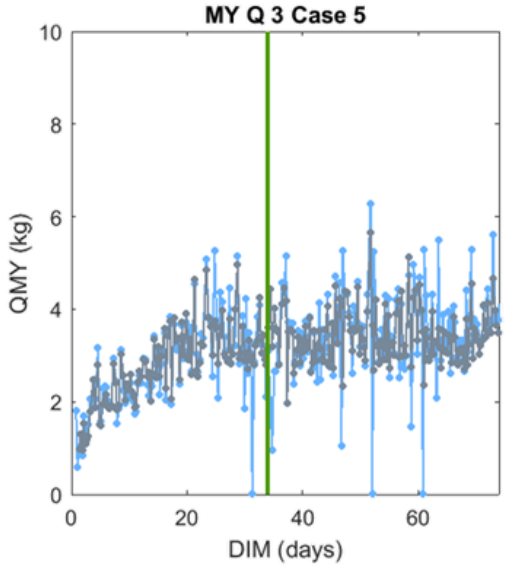


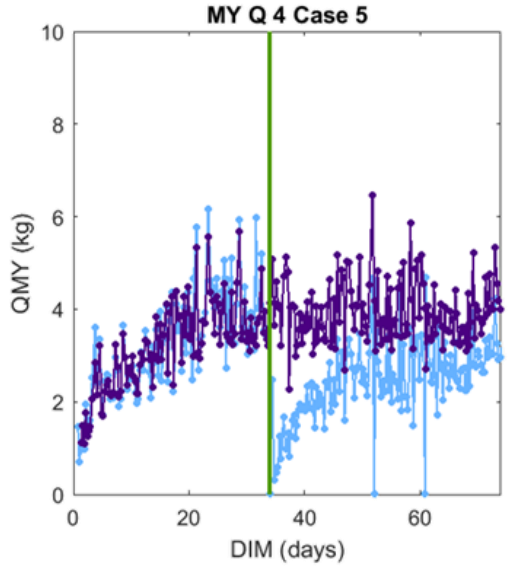
$QMY_{measured} - QMY_{predicted}$

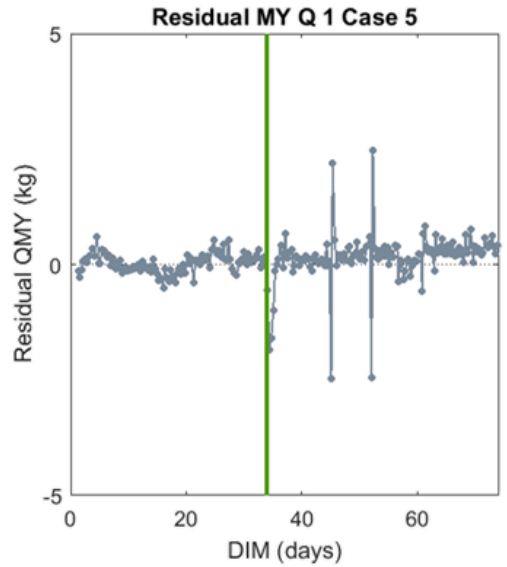


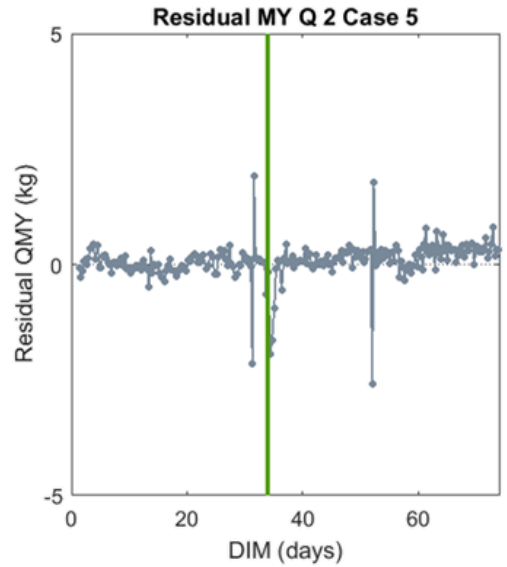

MY Q 1 Case 5
QMY (kg)
DIM (days)

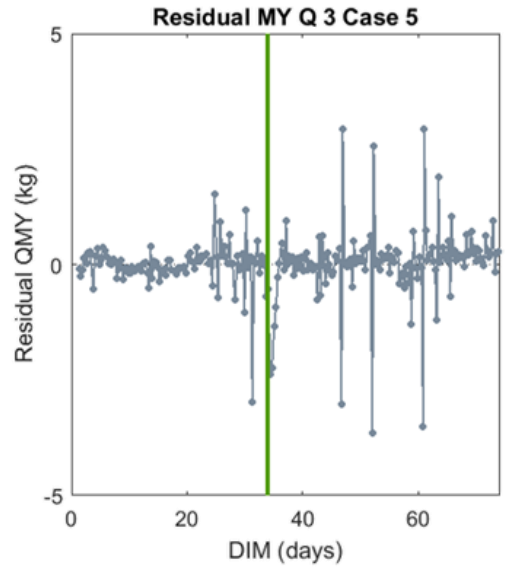

MY Q 2 Case 5
QMY (kg)
DIM (days)

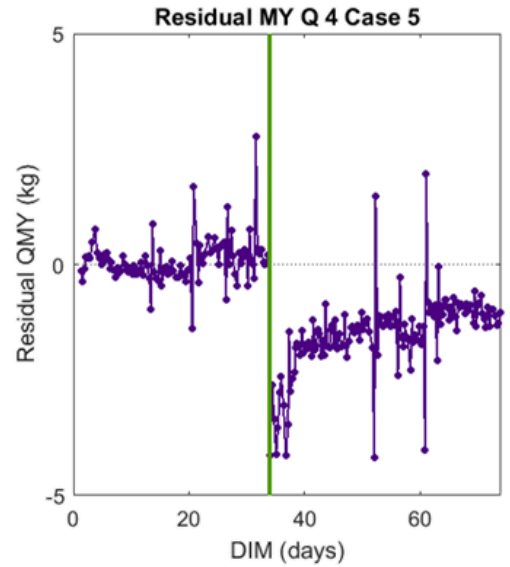

MY Q 3 Case 5
QMY (kg)
DIM (days)

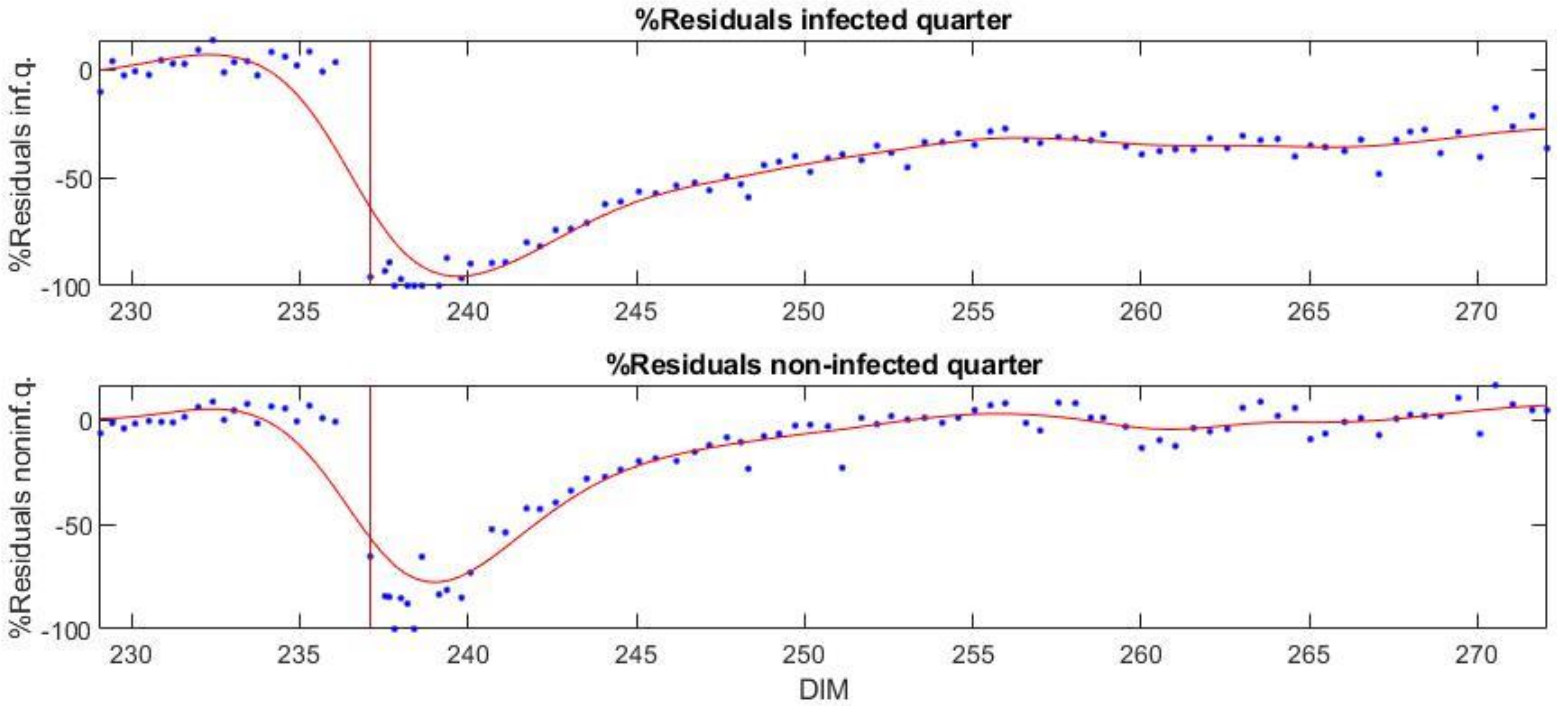

MY Q 4 Case 5
QMY (kg)
DIM (days)


Residual MY Q 1 Case 5
Residual QMY (kg)
DIM (days)


Residual MY Q 2 Case 5
Residual QMY (kg)
DIM (days)


Residual MY Q 3 Case 5
Residual QMY (kg)
DIM (days)


Residual MY Q 4 Case 5
Residual QMY (kg)
DIM (days)



>> Milk losses during CM show similar shapes, but vary in terms of recovery

Fast first perturbation, then gradual recovery

Non-infected quarters return faster to unperturbed state

Often no full recovery within first 35 days

Sometimes two perturbations

Case Nr	DIM	Infectious agent	Q position	Loss infected	Loss non-infected
1	85	*S. aureus*	LH	-36,6%	5,8%
2	112	*E. coli*	LF	-16,6%	-7,3%
3	209	*S. dysgalactiae*	LF	-12,6%	1,1%
4	36	*C. bovis*	RF	-33,8%	-25,0%
5	223	Yeast	RH	-62,8%	-17,0%
6	84	*Enterococcus spp.*	RH	-25,6%	-1,1%

>> Milk losses can be estimated

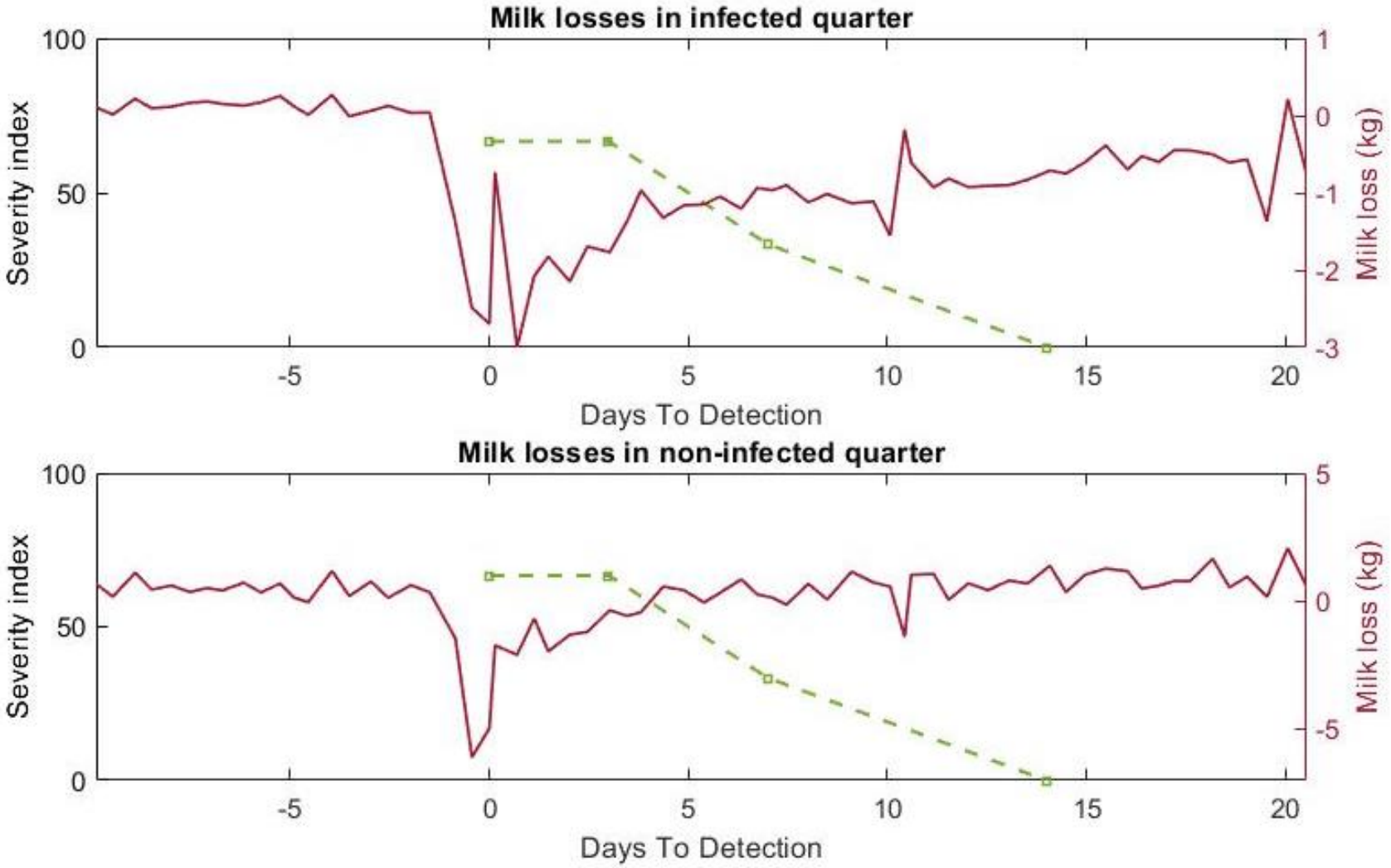
Big difference between infected and non-infected quarter → Quarter level approach

Sometimes positive loss in the non-infected quarter → compensation effect?

Difference between infecting pathogens?

Farm ID	# cases/year	Incidence (%)	# recurrent in same lactation	# selected for losses analysis	Average loss infected Q	Average loss non-infected Q
1	44	18,9%	23 = 25,8%	49 = 55,1%	90,3 ± 66kg	46,5 ± 84,6kg
2	16	17,3%	7 = 18,9%	28 = 75,4%	96,5 ± 94,7kg	64,1 ± 159,7kg
3	13	15,3%	1 = 9,1%	8 = 72,3%	56,3 ± 23,8kg	57,5 ± 43,3kg
4	25	31,9%	7 = 33,3%	11 = 44,0%	82,5 ± 84,9kg	58,7 ± 70,6kg

Comparing milk losses with severity index



Conclusion and future perspectives

>> Severity index might be used as a golden standard for clinical mastitis

>> Milk losses were calculated and investigated

- Preliminary results: perturbations show similar shapes, but vary in terms of final recovery

>> Prediction model ideas:

- Particle smoothing
- Parametric non-linear model
- Parametric combination of linear decrease and non-linear recovery phase (bended regression): better for online monitoring

Thank you!