Evaluation of customised dry period management in dairy cows

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100years 1918 — 2018

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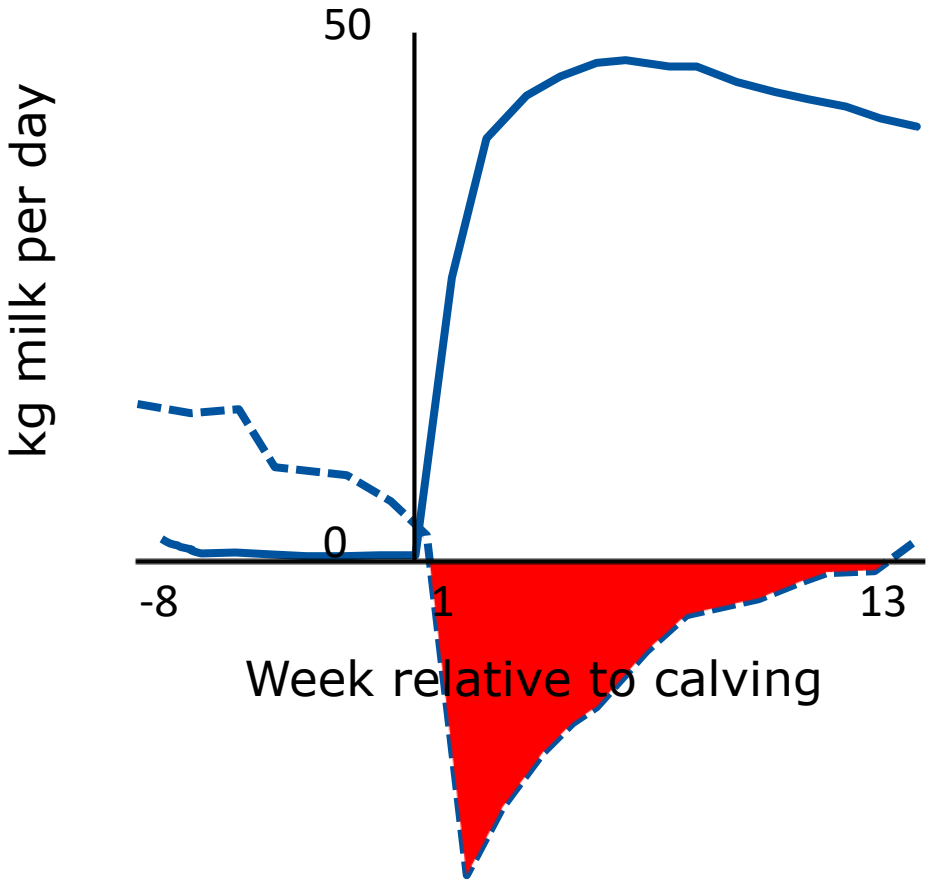
Start lactation – negative energy balance

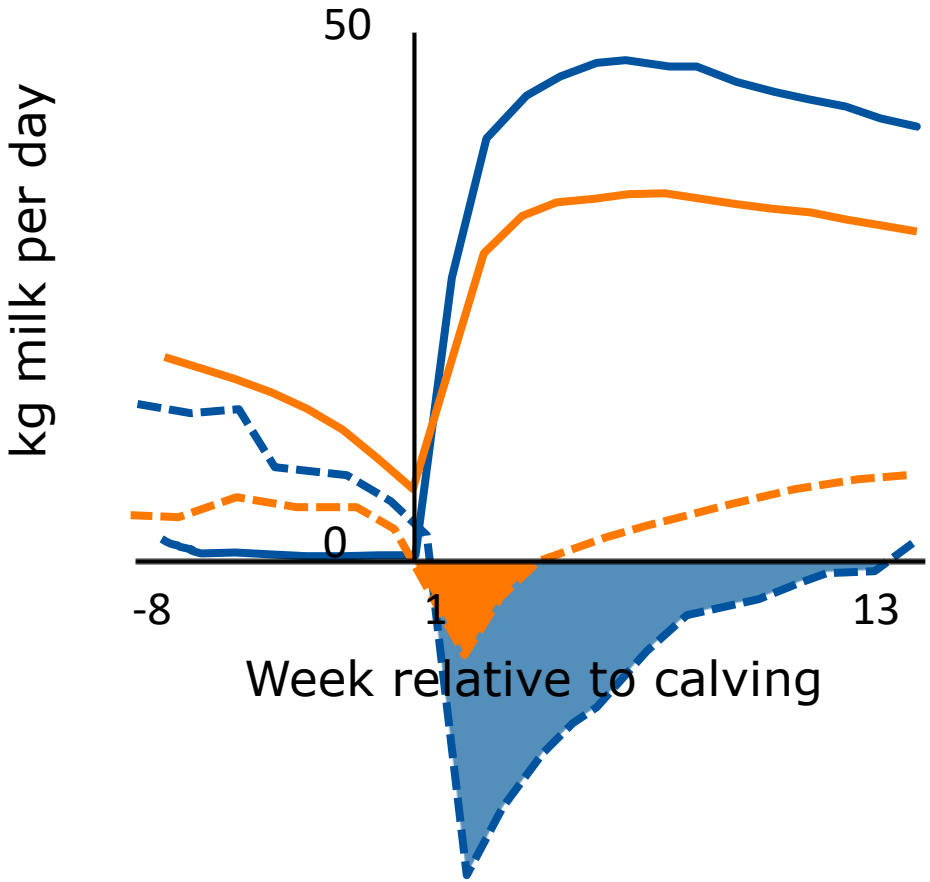


Metabolic disorders &

reduced fertility

Based on Van Knegsel et al., 2014

Solution: short/ no dry period

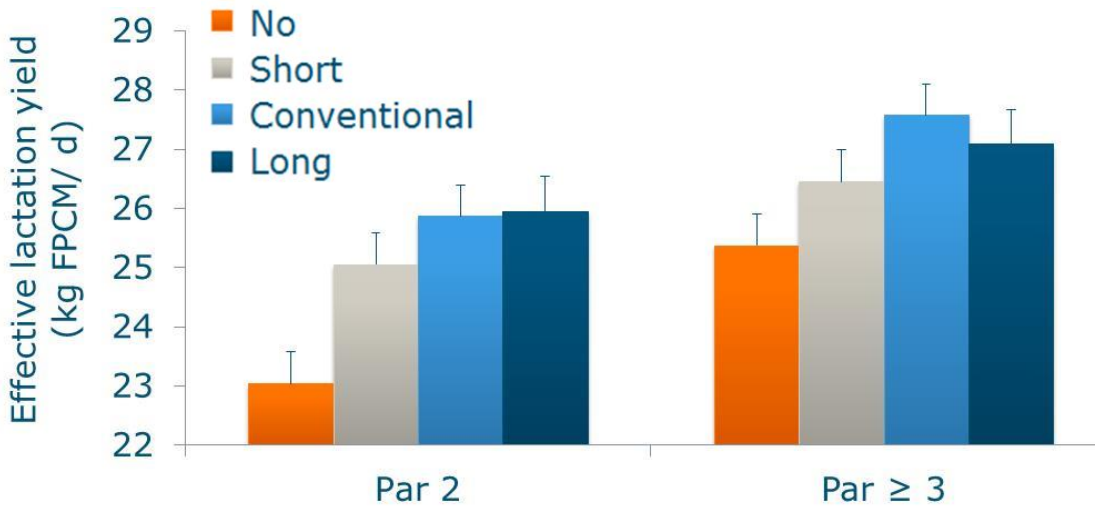


Short and no dry period improve energy balance

Based on Van Knegsel et al., 2014

Disadvantages short/ no dry period

- Reduced milk yield[1]
  - Parity effect
- No dry cow therapy



- For no dry period only: Reduced colostrum quality

→ Clear benefits; but not suitable for all cows.

[1]Kok et al., 2017

Customised dry period management

1. Udder health: Treat cows with high SCC

2. Metabolic benefits
    - Short dry period: beneficial, limited milk losses
    - No dry period: multiparous high-producing cows most benefits and fewer milk losses

Objective

Develop and evaluate a decision tree for customised dry period management based on SCC, parity and milk yield

Developed decision trees (I)

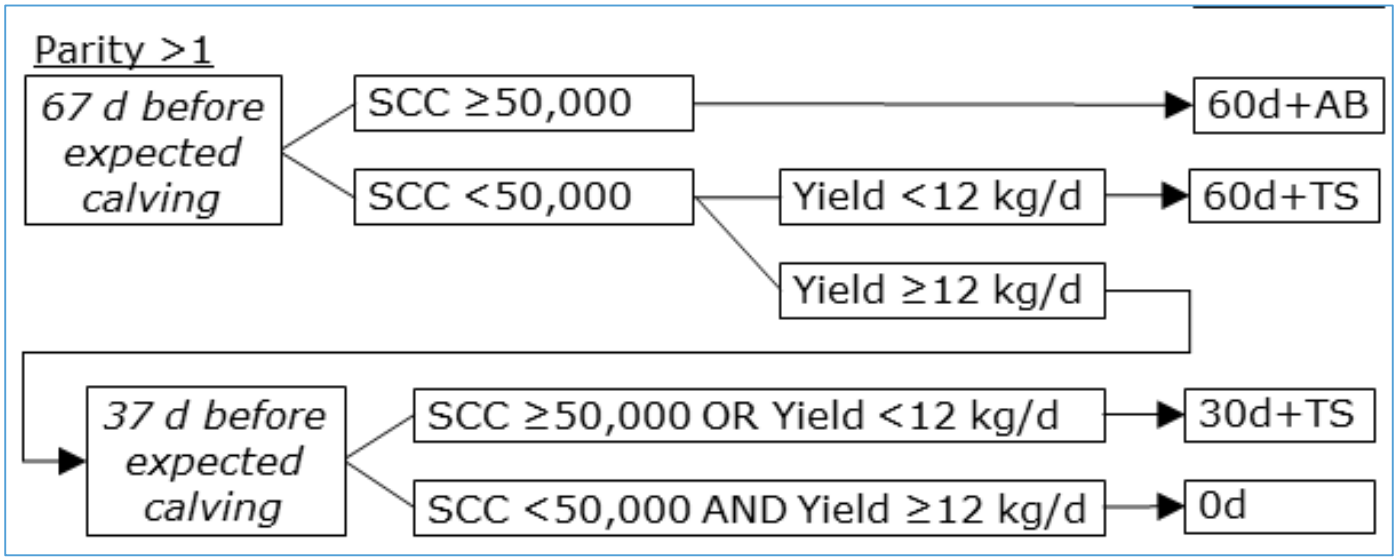
1. Selective dry cow therapy
   - Control: farm protocol
   - T1: national guidelines
   - T2: less strict

		Threshold for antibiotics (SCC, * 10^3 cells/ mL)
Control		150
T1	Par 1 Par >1	150 50
T2		200

2. Dry period length – control: 60 days
   T: parity 1 → 30 days, parity >1 → 30 → 0 days **IF:**
   - ➢ SCC below threshold
   - ➢ Persistent yield, > 12 kg/d

Developed decision trees (II)

Example T1, multiparous cows



AB = dry cow antibiotics; TS = Teat sealant

Methods: Evaluation of decision trees

- 183 Holstein Friesian dairy cows
- 3 decision trees (decided at -74 DIM):
  - Control, T1, T2

- Monitored from -74 till 100 DIM
  - Body weight
  - Milk yield, composition, SCC
  - Diseases

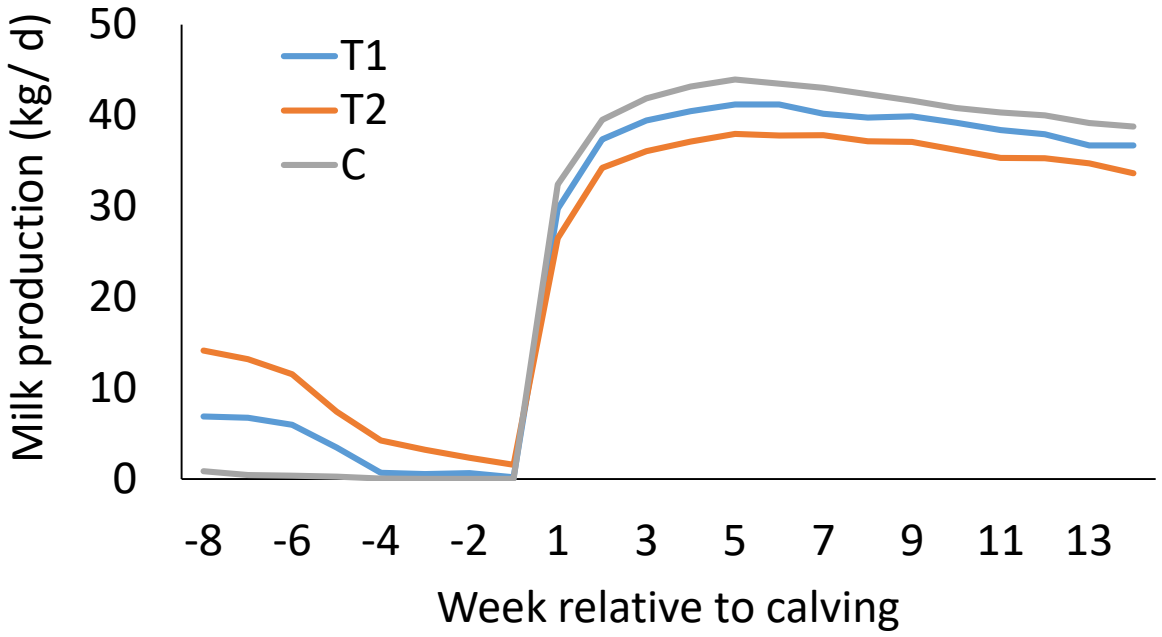
- Mixed models and chi-square

Results: Distribution of cows

Decision Tree	Parity at decision	Dry period management: 60 days With AB	60 days No AB	30 days	0 days	Total
Control	**1**	3	20	-	-	23
	>1	9	29	-	-	38
T1	**1**	3	-	18	-	21
	>1	34	-	3	1	38
T2	**1**	3	-	20	-	23
	>1	8	1	12	19	40

Thresholds for dry-cow antibiotics
In C: 150.000 cells/ mL for all
In T1: 150.000 cells/ mL for parity 1
50.000 cells/ mL for parity >1
In T2: 200.000 cells/ mL for all

Results: Milk production



→ More milk before, and less milk after calving for T1 and T2 vs. C

→ Earlier increase in body weight in T2 after calving

Results: Milk composition & SCC after calving

	Decision tree		
	C	**T1**	**T2**
Milk, kg/d	40[a]	37[b]	35[b]
Lactose, %	4.6	4.6	4.6
Fat, %	4.2	4.1	4.2
Protein, %	3.4[a]	3.5[b]	3.6[b]

→ less milk, greater protein% for T1 and T2 vs. C

→ lower SCC with decision tree T1

Results: Disease incidence after calving

	Decision tree		
	C	**T1**	**T2**
Milk fever	3	6	3
Mastitis	5	4	5
Claw- and leg problems	8	9	3
Retained placenta	7	4	3
White vaginal discharge	15	11	8
Endometritis	8	9	7
Cystic ovaries	4	6	1
Other	5	1	4

→ Tendency for fewer total disease cases in T2

Discussion

- Health: impact on disease requires more data
- Economic impact?
  - Milk revenues
  - Costs (dry-cow antibiotics, disease)
- Future: refinement of decision tree

Conclusion

- Selecting cows for a short or no dry period seems to work: lower disease incidence, fewer milk losses.
- Much depends on threshold for dry-cow antibiotics.

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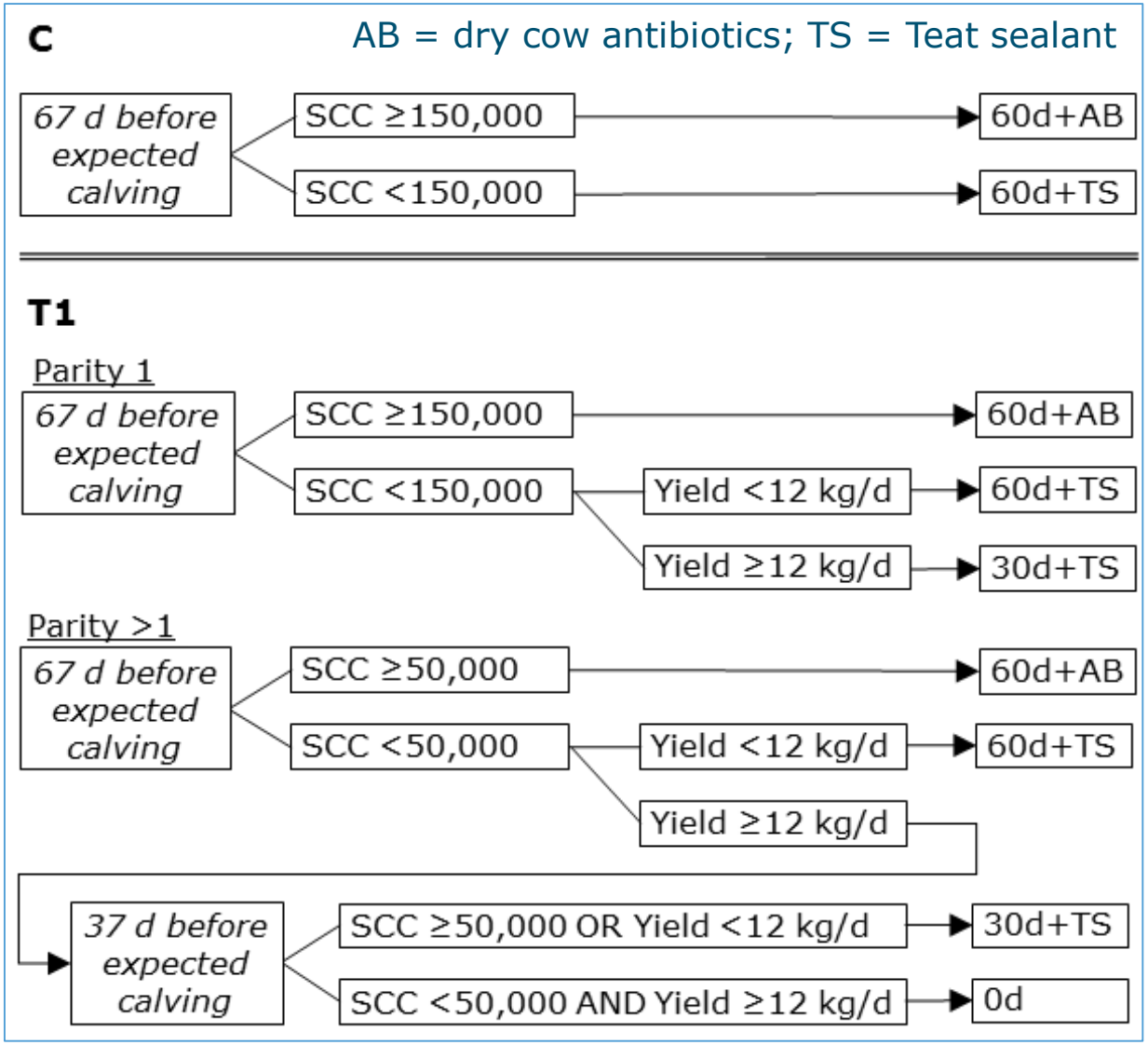
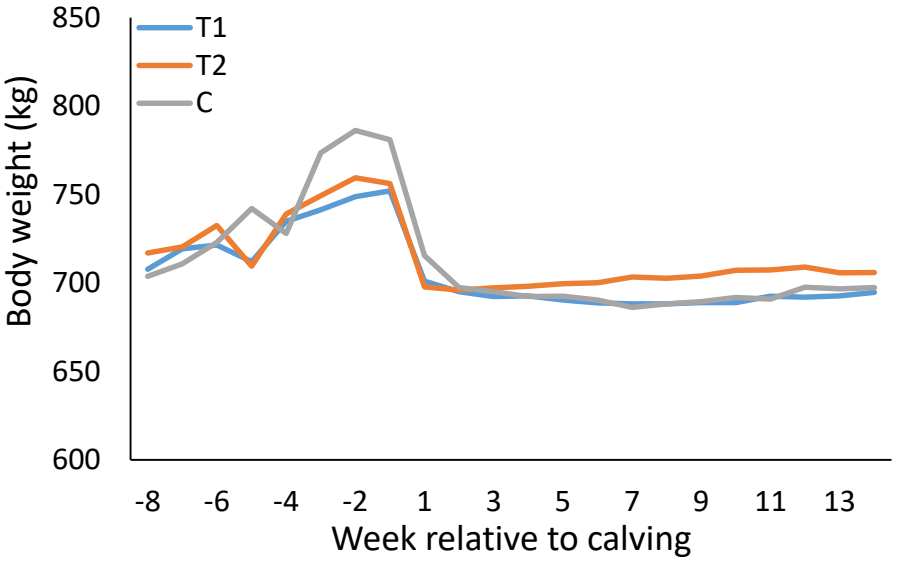
Developed decision trees (II)

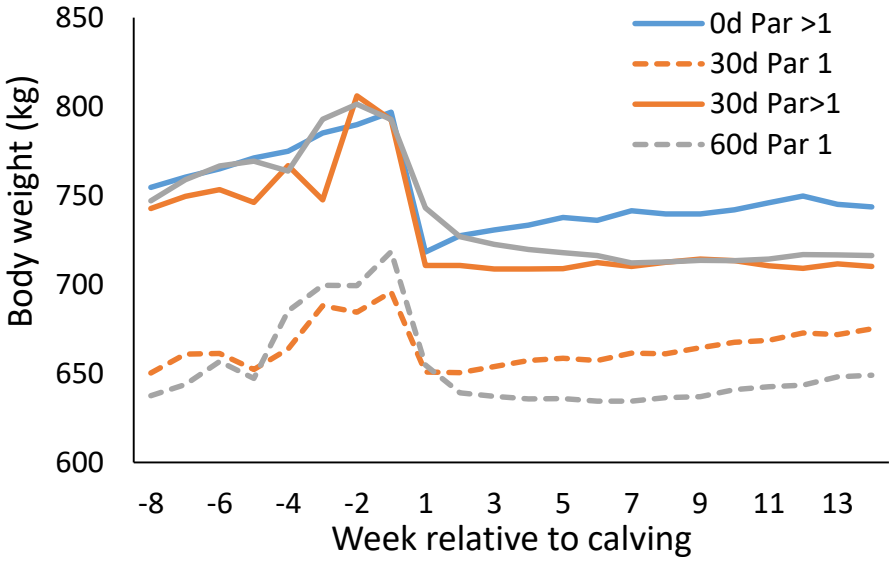


T2 same as T1, but threshold selective DCT >200,000 cells/ml

Body weight

→ earlier **increase in BW** in decision tree T2 after calving, due to animals with 0d and 30d dry periods

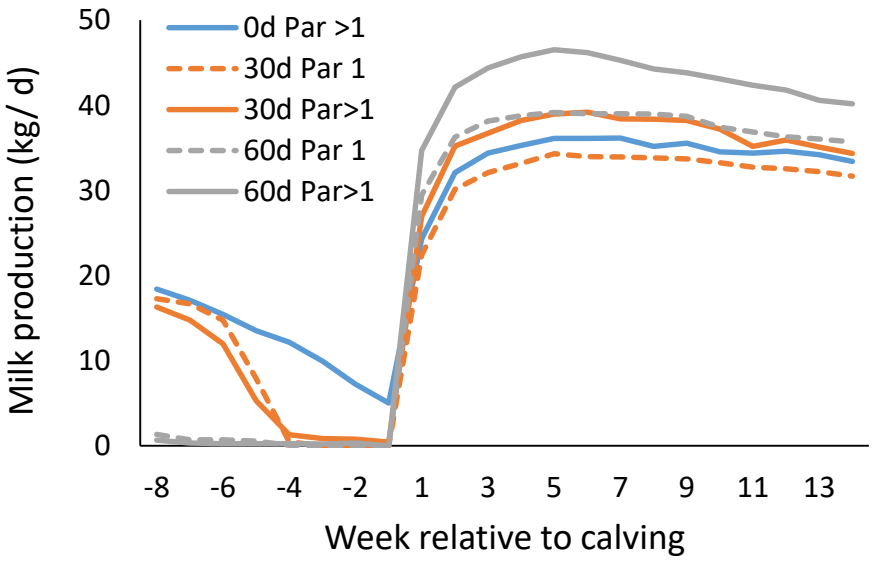


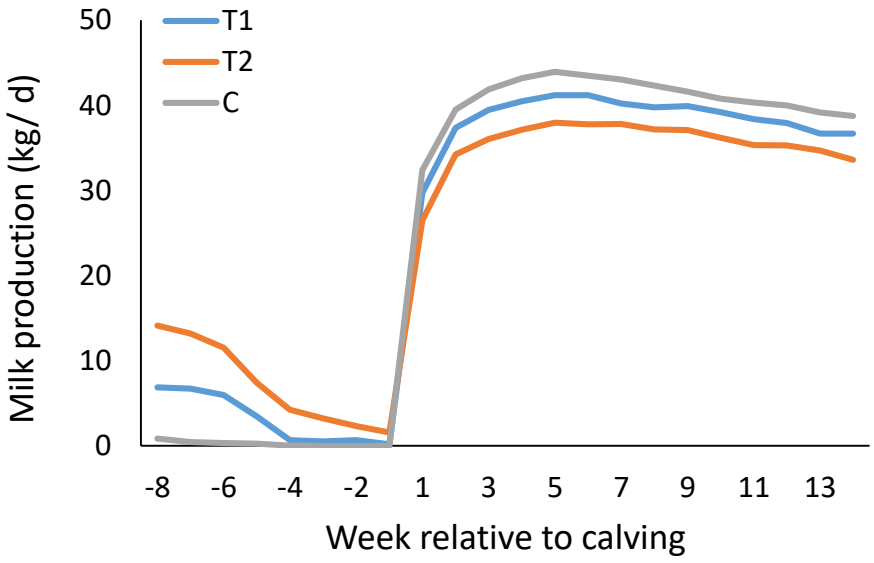


Body weight of cows (N=183) from -8 till 14 wks relative to calving per **decision tree** and per **dry period management per parity.**

C= Control group, T1= decision tree 1, T2= decision tree 2

Milk production





→ **Before calving**: More milk for cows with decision tree T1 and T2 (0.1 vs. 4.1 vs. 7.9 kg/d for C vs T1 vs T2)

→ **After calving**: Less milk for cows with decision tree T1 and T2 (40 vs. 37 vs. 35 kg/d for C vs T1 vs T2)

0/30/60d= dry period of 0/30/60 days; par= parity

C= Control group, T1/2= decision tree 1/2

Table 6. Milk production, milk revenues[1], use of dry-cow antibiotics and disease incidence in this experiment per decision tree.
[1]Milk revenues are based solids using the average Dutch milk price from 2008-2016 as in (Kok et al., 2017b).

	T1	**T2**	**C**
N cows	59	63	61
Milk production per cow			
8 weeks before calving			
kg protein	8.4	16.8	0.0
kg fat	10.6	20.7	0.0
kg lactose	10.1	19.0	0.0
14 weeks after calving			
kg protein	126.4	122.5	134.3
kg fat	149.0	144.1	162.7
kg lactose	166.6	157.8	179.3
Milk revenues[1] (€)			
8 weeks before calving	85	167	0
14 weeks after calving	1,254	1,212	1,346
Total period	**1,339**	**1,379**	**1,346**
Dry-cow antibiotics (% of cows)	0.63	0.17	0.20
Disease incidence (n / cow)	0.85	0.54	0.90