The impact of dairy farm management on long-term robustness of veal calves

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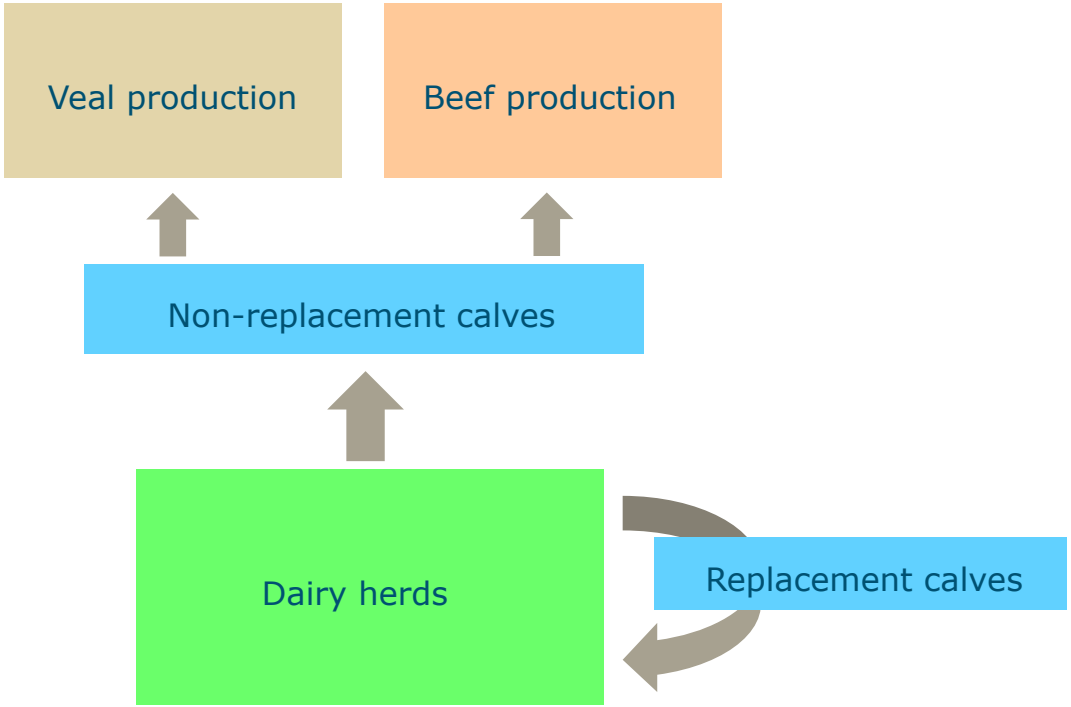
Introduction

- Non-replacement dairy calves → often seen as by-products on the dairy farms
- Mainly ♂



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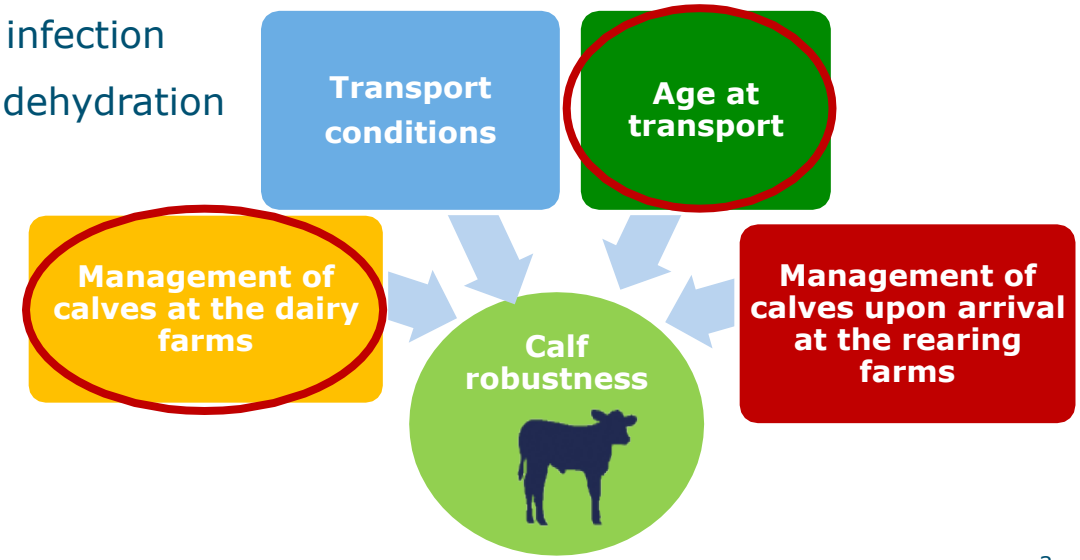
Source: EU report (2022): Study on shifting from transport of unweaned male dairy calves over long distance to local rearing and fattening

Introduction

Many calves have been found to have noticeable health abnormalities at the auction facility or on entry to a veal facility[1,2,3,4]:

- 13% to 23%→ calves with diarrhea
- 3% to 20%→ calves with umbilical infection
- 32% to 46% → calves with clinical dehydration

Need to improve robustness of calves!



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[1]Marquou et al. (2019), [2]Scott et al. (2019), [3]Wilson et al. (2020), [4]Renaud and Pardon (2022)

Introduction

- Dam rearing → practice gaining a lot of attention nowadays
- Compared to the standard practices to remove the calf directly after birth, dam-rearing has many beneficial effects:
    - Higher colostrum intake
    - Improved transfer of passive immunity
    - Improved health
    - Better body weight gain

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Lora et al. (2018a,b, 2019)

Introduction

- Most of the research conducted on the impacts of dam-rearing on calf welfare, however, was conducted on the heifer calves that stay on the dairy farm for herd replacement
    - No such research has ever been conducted on the surplus calves for veal production
- Maternal effects, including dam parity and dry-period length on health and performance of non-replacement calves are also not yet well investigated

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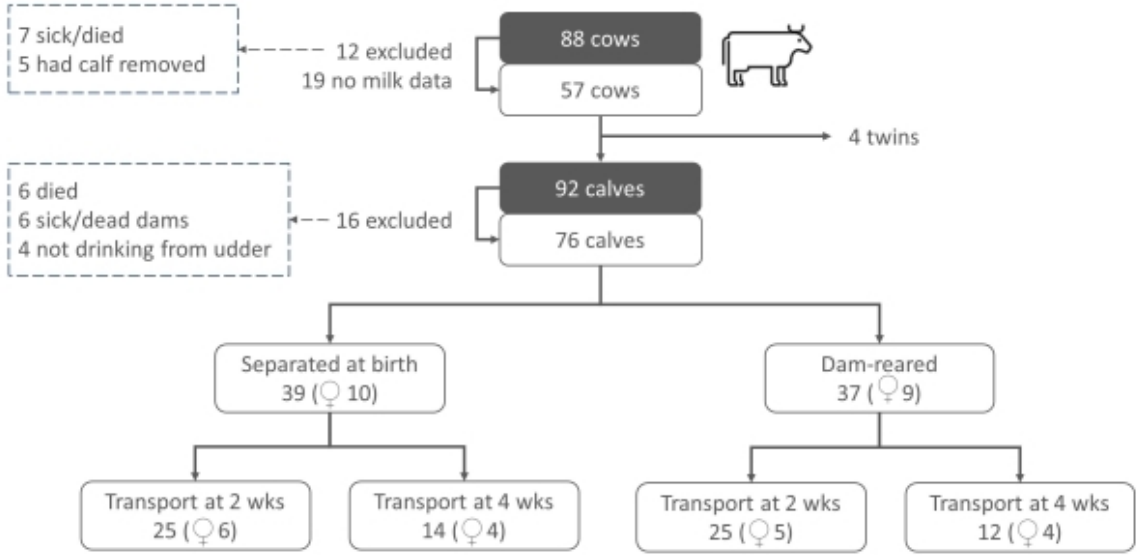
Study design

Laura Webb

- Part of a longitudinal experiment with 13 dairy farms
- Focus on 1 dairy farm
- **2 x 2 factorial experiment**:

• Rearing practice:
- With the dam
- Separated at birth

• Transport age:
- 2 weeks
- 4 weeks



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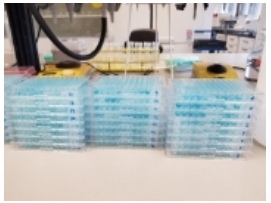
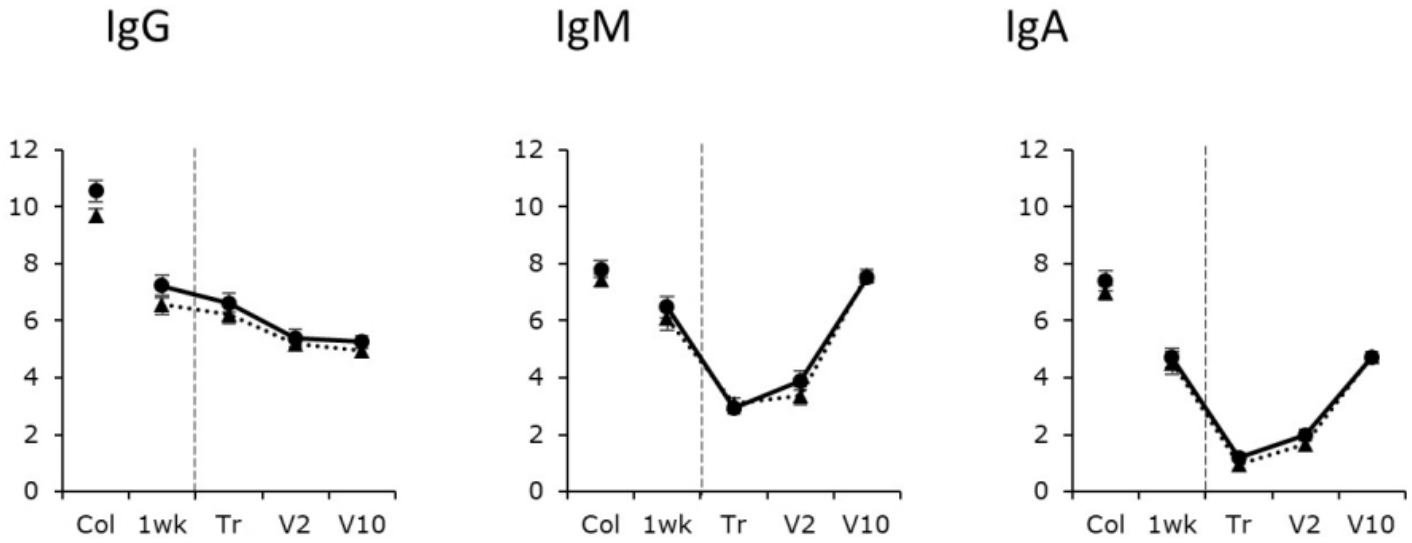
Measurements



- **Immunoglobulins (IgG, IgM and IgA)**
  - Colostrum, serum of calves (week 1, one day before transport and week 2 and 10 post-transport)
- **Body weight**
  - weekly on dairy farm, and upon arrival at the veal farm
- **Carcass weights**
- **Clinical health**
  - weekly on dairy farm and in week 2, 6, 10, 18 and 24 post-transport

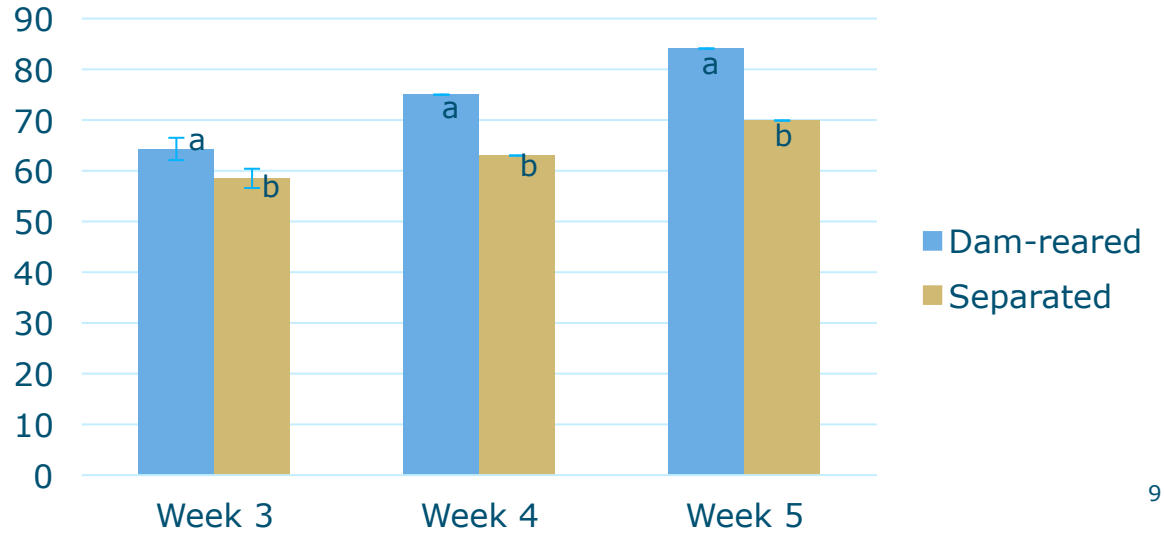
Effects on immunoglobulins

- No significant effects of rearing practice



Effects on performance

- Dam-reared calves were heavier than separated calves:
  - At the dairy farm (week 3, 4 and 5)
  - At arrival at the veal farm (69.8±2.2 vs 63.2±1.8 kg; P=0.010).
- Carcass weights were unaffected by rearing (P=0.871)



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Effects on performance

Clinical health:

		Sign of disease		Dehydrated		Feverish	
	Week	Separated	With dam	Separated	With dam	Separated	With dam
Dairy farm	1	77	73	15	22	31	30
	2	79	70	32	43	5	19
	3	56	64	13	19	3*	25*
	4	57	58	7	0	0	8
	5	27*	58*	0	0	0	0
Veal farm	2	48	57				
	6	21	8				
	10	21	22				
	18	15	11				
	24	7	17				

- No significant differences at the veal farm

*P<0.05

Take home messages

- The higher body weights of dam-reared calves at the dairy farm → not translated in better health and higher Ig’s levels
- Absence of dam-rearing effects on carcass weights:
    - Too big the transition from the dairy to the veal farm
- Calves reared with their dam showed more fear towards humans but engaged in more social behaviour with peers.

Maternal effects

- Calves born from first-parity cows had a lower body weight in wk 1 after birth and 1 d before transport compared with calves born from cows of older parity.

1 d before transport	Parity				SEM	P-value
	1	2	3	4-10		
Body weight (kg)	58.7^{c}	62.5^{a}	63.4^{ab}	64.2^{b}	1.9	<0.01

- Tendency for a lower carcass weight at slaughter for calves born from first-parity cows.

	Parity				SEM	P-value
	1	2	3	4-10		
Carcass weight (kg)	154.8^{a}	160.7^{ab}	159.1^{ab}	163.0^{b}	4.7	0.07

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Maternal effects

- First-parity cows → lower IgG also in colostrum and serum of calves

	Parity				SEM	P-value
IgG (titer)	1	2	3	4-10		
1 week before calving	6.60 ^{b}	7.62 ^{a}	7.60 ^{a}	7.70 ^{a}	0.17	<0.01
colostrum	9.59 ^{c}	10.66 ^{a}	11.12 ^{b}	10.97 ^{ab}	0.23	<0.01
1 week after birth	7.24 ^{c}	7.91 ^{a}	8.44 ^{b}	8.19 ^{ab}	0.26	<0.01
1 d before transport	6.26 ^{c}	7.05 ^{a}	7.46 ^{b}	7.32 ^{ab}	0.19	<0.01
At the veal farm (week 2)	5.51 ^{a}	5.75 ^{ab}	5.94 ^{b}	5.89 ^{b}	0.15	0.02

Maternal effects

Dry period length:

- 0-30 days → led to a birth weight of 42.6 kg
- 30-60 days → led to a birth weight of 44.6 kg
- > 60 days → led to a birth weight of 45.5 kg

Dry period management might be also a factor with a potential influence on future robustness of calves[1]

[1]*Kamal et al. (2014)*

Take home messages

- Effects of parity are unavoidable, but..
- Maternal characteristics play an important role on the immune development/growth of calves
- Colostrum obtained from older cows might confer more protection to calves via passive transfer → always measure quality of colostrum!

Thanks for your attention!!

Questions?

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