



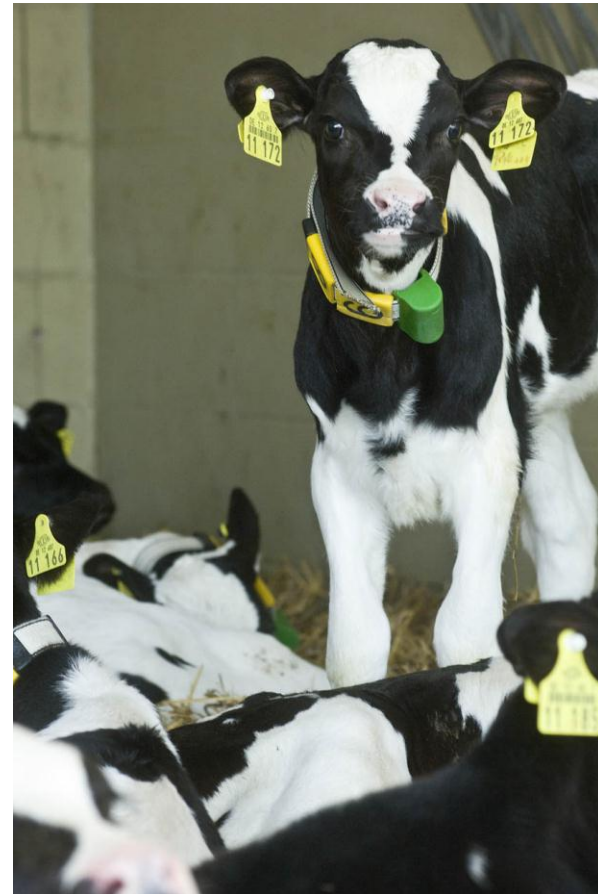
Genetic analysis of calf survival in Dutch Holstein calves

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Content

- **Introduction**
- **Definition of calf survival**
- **Material and methods**
- **Results**
- **Conclusions**



Introduction

- **Current situation**

- Survival around birth (BVE livability/still birth)
- Survival after first calving (BVE longevity)

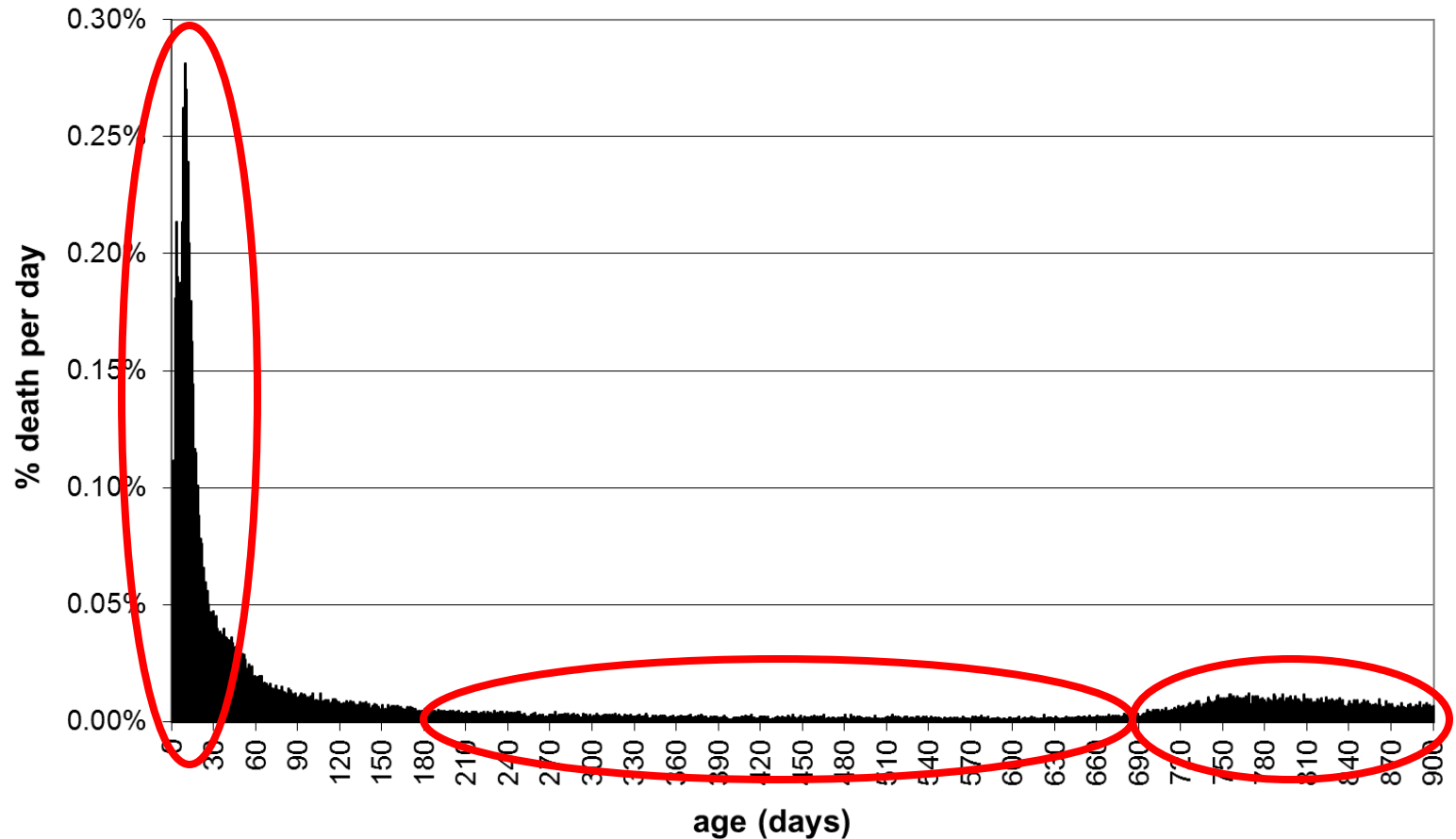
- **Nothing is known about survival in the rearing period**

- Economically important
- Monitoring

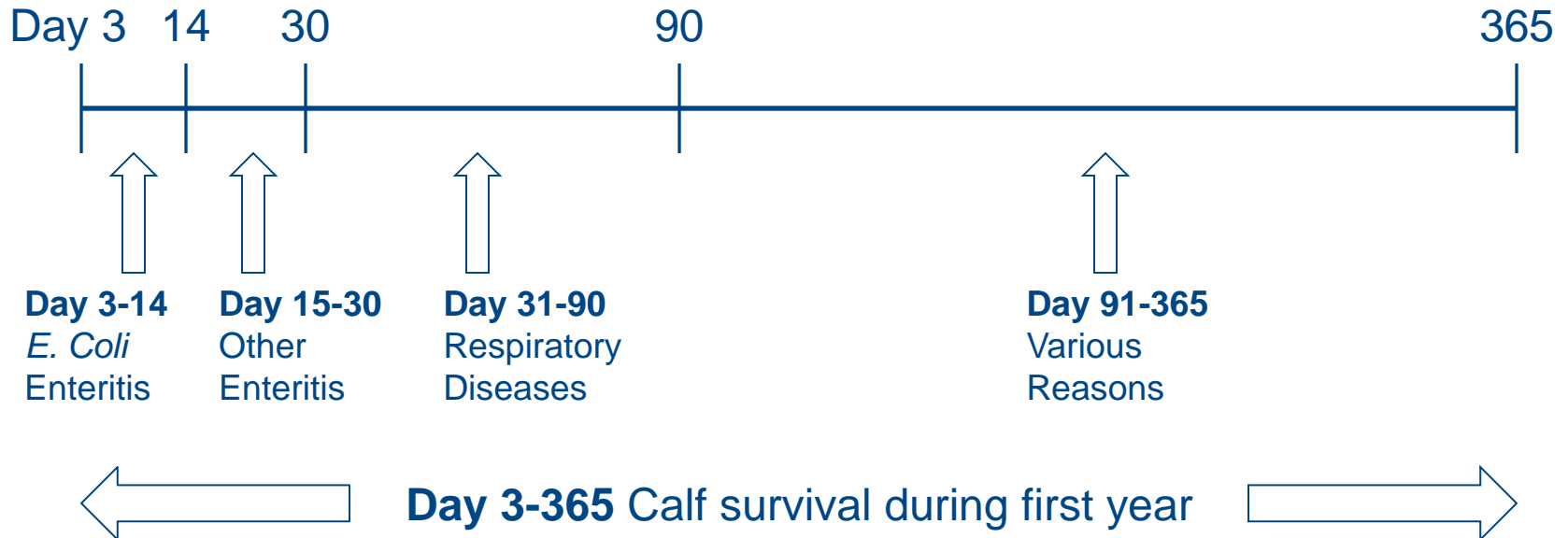
- **Breeding goal is calf survival of replacement heifers in the first year of rearing**

- **Aim: Development of a genetic evaluation for calf survival**

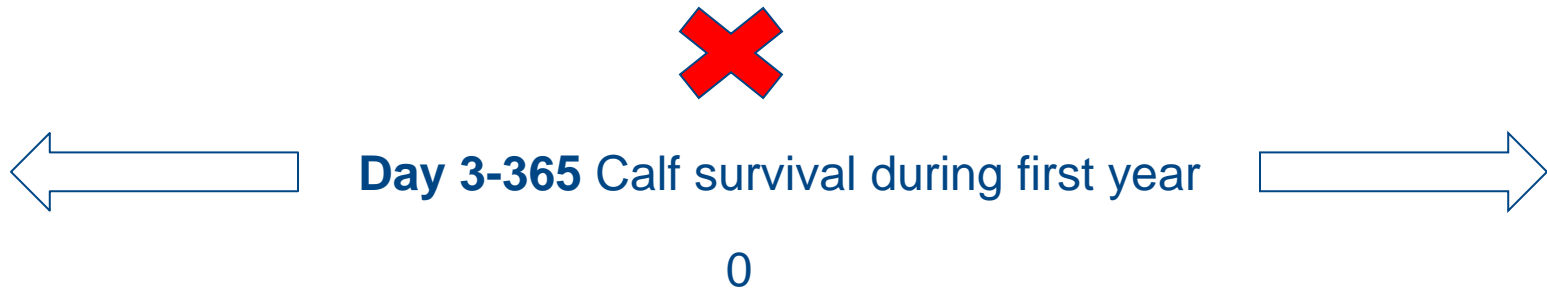
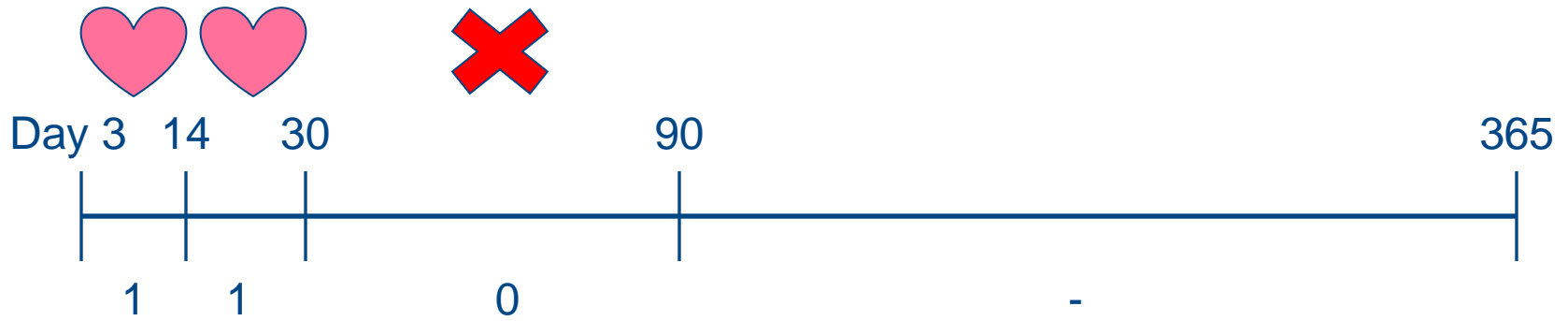
Distribution of calf mortality



Trait definition of calf survival



Death at day 67



Data selection

- Female herdbook calves with known sire
 - At least 75% Holstein Friesian
 - Sire is an AI-bull
 - Born and culled in the same herd
 - Calves born between 2002-2009
 - Herds with at least 100 calves
 - Herds with conventional rearing policy
 - Bulls with at least 25 progeny in at least 10 herds
-
- In total 522,335 records from 3,253 herds and 4,258 sires

Results

Survival per period

Period	Survival (%)
day 3 – 365	93.55
day 3 – 14	97.41
day 15 – 30	98.81
day 31 – 90	98.56
day 91 – 365	98.65

Statistical model

Linear sire model

$$Y = \text{HERD} + \text{YM} + \text{P} + \text{sire} + e$$

Y = observation of calf survival

Herd = herd of birth (fixed)

YM = year x month of birth (fixed)

P = parity of dam (fixed)

sire = additive genetic effect (random)

e = residual (random)

Results

Genetic parameters

	d 3 - 365	d 3 - 14	d 15 - 30	d 31 - 90	d 91 - 365	gen.sd. (%)
day 3 - 365	0.011	0.62	0.63	0.83	- ²	2.49
day 3 - 14	0.85	0.006	0.00	0.00	0.00	1.20
day 15 - 30	1.00 ¹	0.90	0.002	0.00	0.00	0.46
day 31 - 90	0.97	0.44	0.71	0.001	0.00	0.45
day 91 - 365	- ²	0.19	0.51	0.67	0.005	0.82

blue = genetic correlation; red = error correlation

¹ fixed at boundary

² did not converge

Predictor traits

- **Veal calves**
 - Day 3 – 14 together with replacement heifers
 - Day 15 – 180
- **Data from all calves could be used potentially**
- **Use in genetic evaluation**

	day 3 - 365	day 3 - 14	day 15 - 180	gen.sd.(%)
day 3 – 365	0.011	0.62	0.00	2.49
day 3 – 14	0.85	0.006	0.00	1.20
day 15 – 180	0.66	0.37	0.005	1.12

blue = genetic correlation; red = error correlation

Results

Reliability of bulls

Status bull	Number of progeny			Reliability		
	day 3-365	day 3-14	day 15-180	day 3-365	day 3-14	day 15-180
test 1	0	319	0	44	48	32
test 2	0	324	78	46	49	37
test 3	184	411	198	62	61	50
<i>First daughters in production</i>						
proven 1	313	810	334	70	69	57
proven 2	4,889	10,913	4,909	94	95	88
proven 3	24,849	51,388	22,753	98	99	97

Conclusions

- **Possible to estimate genetic parameters for calf survival**
 - h^2 is 0.011 for day 3-365
- **Genetic variation exists**
 - σ_g is 2.5%
- **Day 3-14 is a good early predictor**
- **Data of veal calves can be used as predictor**
- **Reliability of progeny tested bulls will be around 60%**
- **Genetic evaluation enables monitoring of calf survival**

Follow up

- **Introduction breeding value estimation**
 - Probably April 2013
 - Enough data available
 - Around 1 million calves per year

Thank you for your attention



Questions?