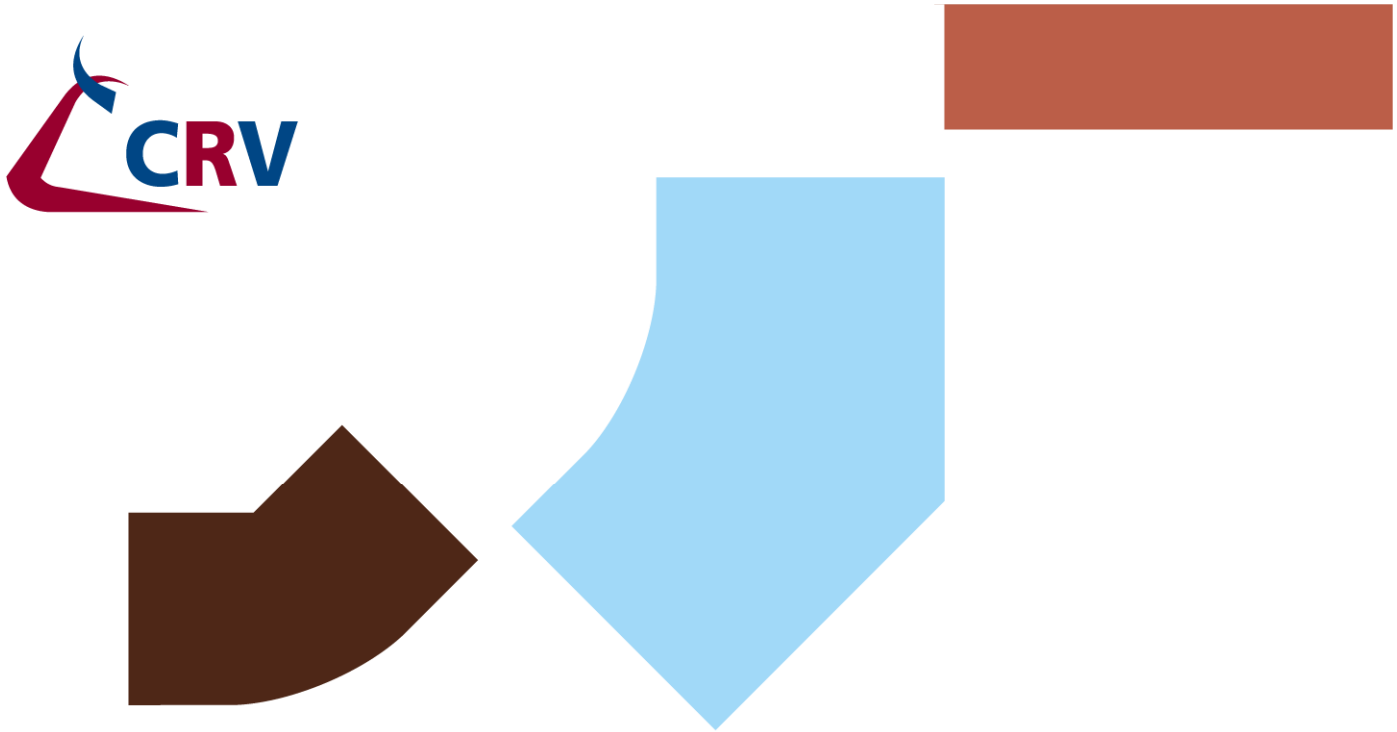

Genetic analysis of calf survival in Dutch Holstein calves

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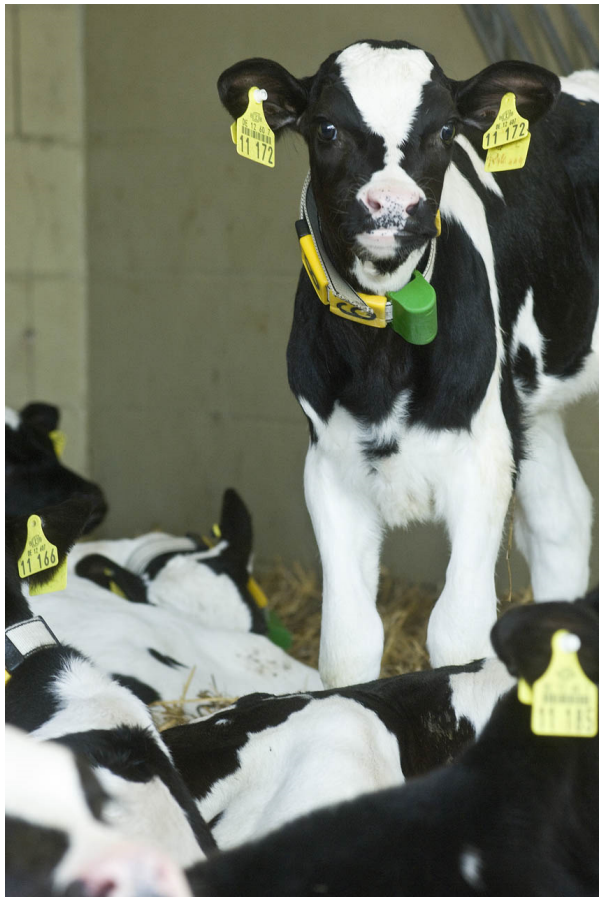
- Introduction
- Definition of calf survival
- Material and methods
- Results
- Conclusions



Introduction

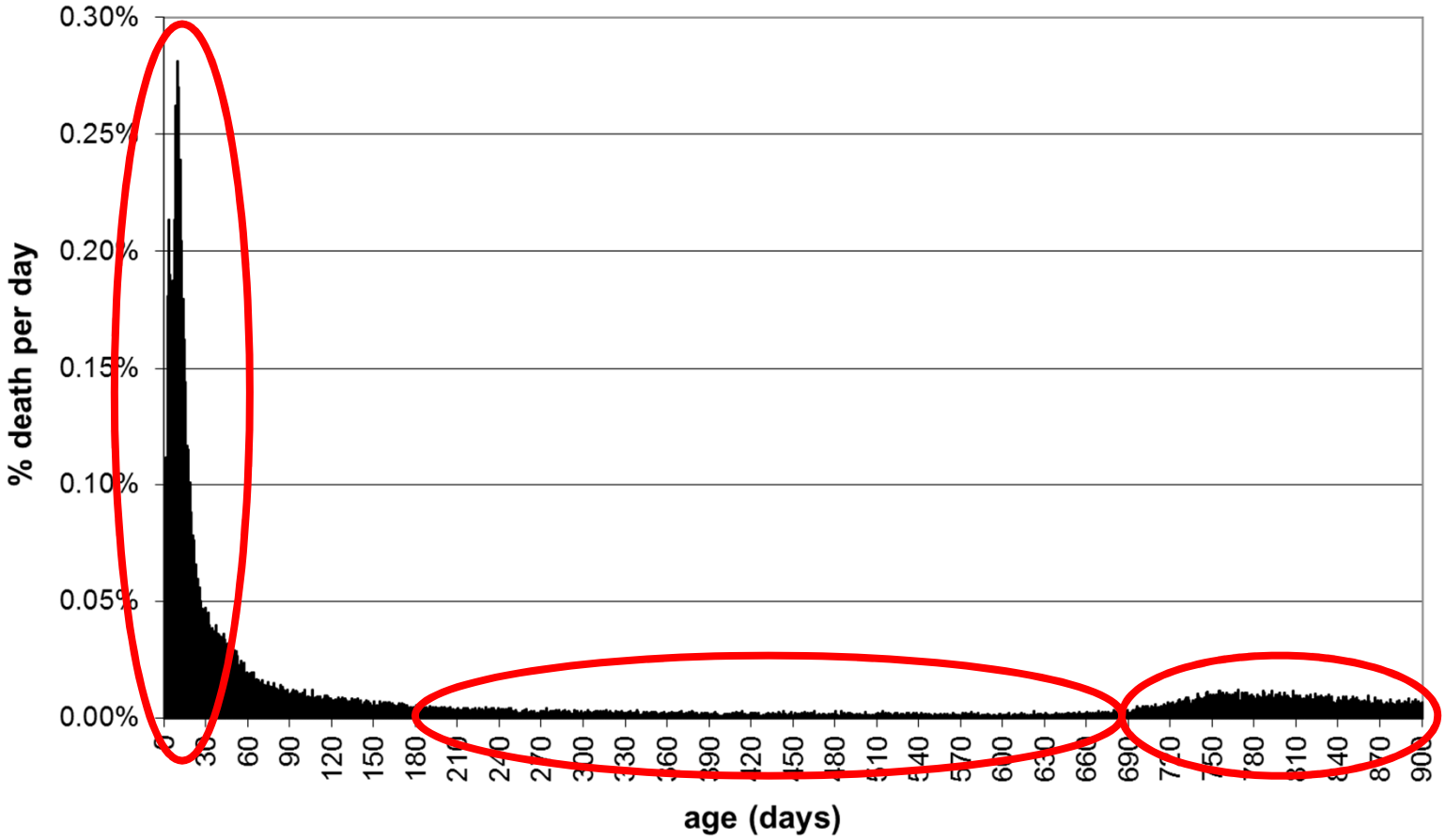
- **Current situation**
  - Survival around birth (BVE livability/still birth)
  - Survival after first calving (BVE longevity)

- **Nothing is known about survival in the rearing period**
  - Economically important
  - Monitoring

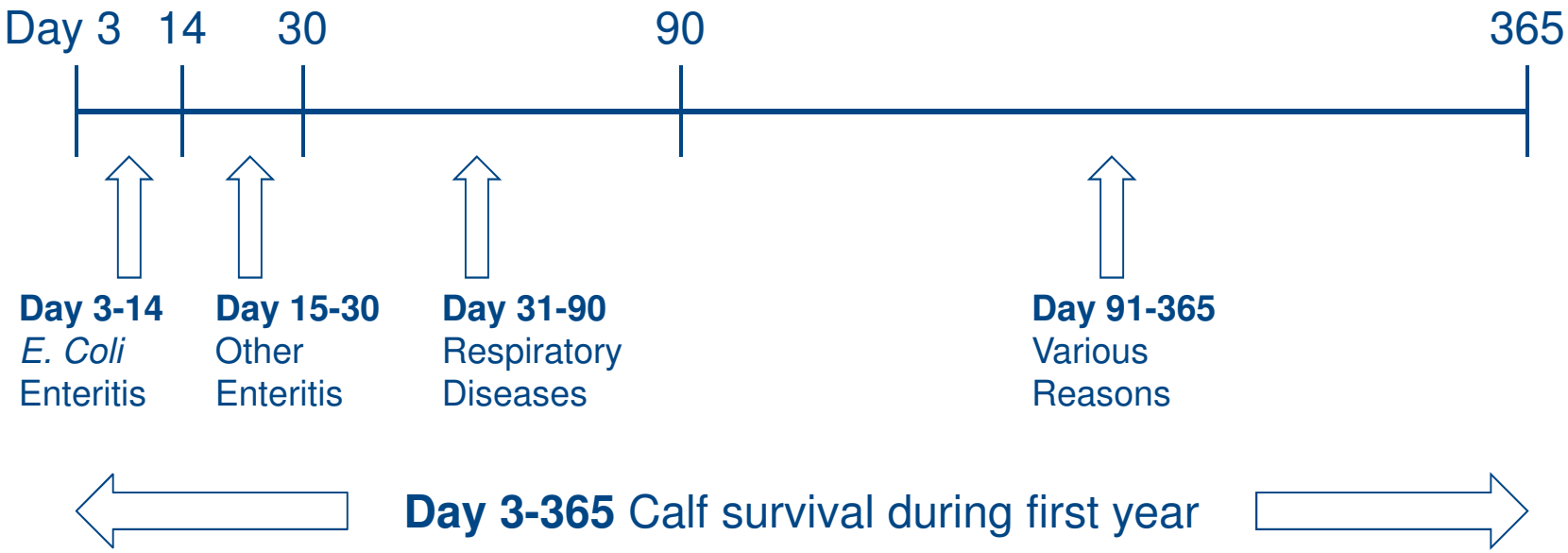
- **Breeding goal is calf survival of replacement heifers in the first year of rearing**

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

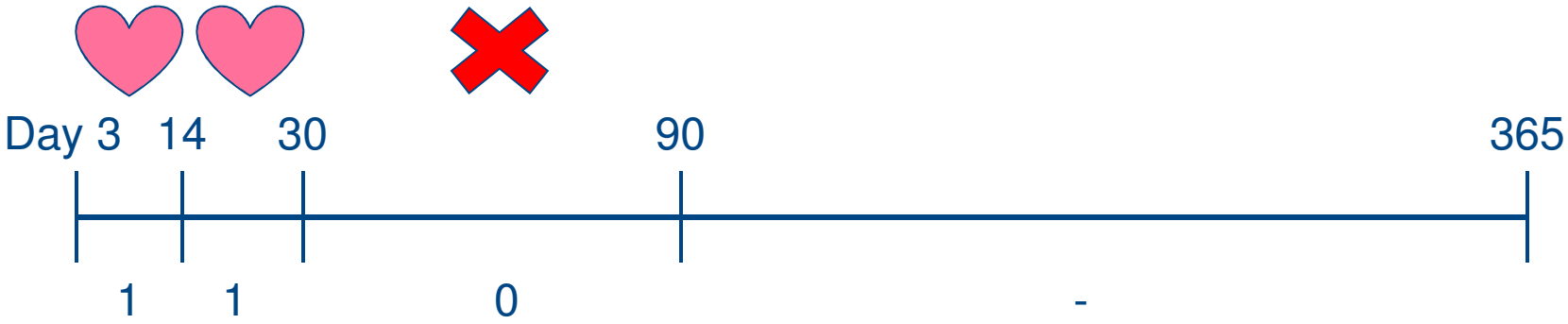
Distribution of calf mortality



Trait definition of calf survival



Death at day 67



Day 3-365 Calf survival during first year

0

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 = HERD + YM + P + 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
First daughters in production						
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

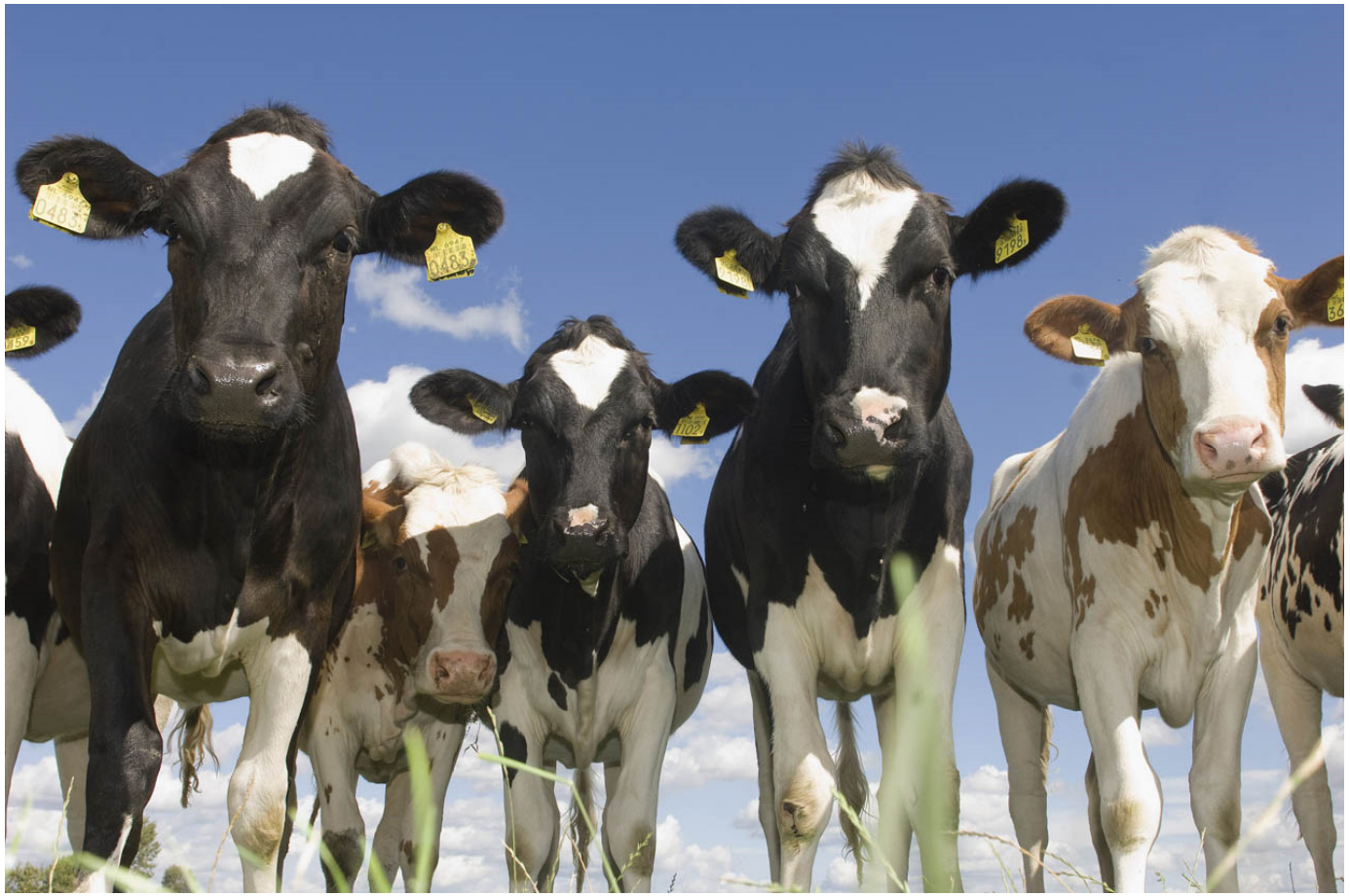
Conclusions

- **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?