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THE EFFECT OF DAM BREED ON CALF MORTALITY IN FIRST MONTH OF LIFE IN SLOVENIA

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Reproduction → sustainable and profitable milk and beef production

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Calf mortality →
- economic loss
- poor animal welfare and health

THE AIM

- To asses risk factors for increased calf losses in the first month of age.
- To estimate the differences in mortality rates of calves among different dam breeds in Slovenia.

MATERIAL AND METHODS

- 1,333,647 calves born in Slovenia from January 1st 2005 to December 31st 2012

  Central register of bovine animals in Slovenia

  - **Date of birth:**
    from January 1st 2005 to December 31st 2012

    Calving season: - spring (March to May)
    - summer (June to August)
    - autumn (September to November)
    - winter (December to February)

- **Sex**
- **Number of calves/calving:** - singletons
  - twins
  - triplets or more
- **Breed of the dam:** - Holstein Friesian (20.3 %)
  - Simmental (50.3 %)
  - Brown (12.4 %)
  - other breeds with crossbreeds (17 %)
- **Age of the dam at calving:** - age < 2.5 years
  - 2.5 - 3.5 years
  - 3.5 - 4.5 years
  - 4.5 - 5.5 years
  - 5.5 - 6.5 years
  - age > 6.5 years
- **Herd size**

  ≤ 10, 11 – 20, 21 – 30, 31 – 50, 51 – 100, ≥ 101 cattle

Mortality rate: - perinatal (aborted, stillborn and death within 24 hours after birth)
- neonatal (from day 2 to 30)

Statistical analysis

SAS/STAT

- **GENMOD (Generalised Linear Models)**

Mortality rate - *logit(p)=log(p/1-p)*

Risk factors:

- The year of birth
- Calving season
- Number of calves at birth
- Dam breed
- Age of the dam at calving

Fixed effects

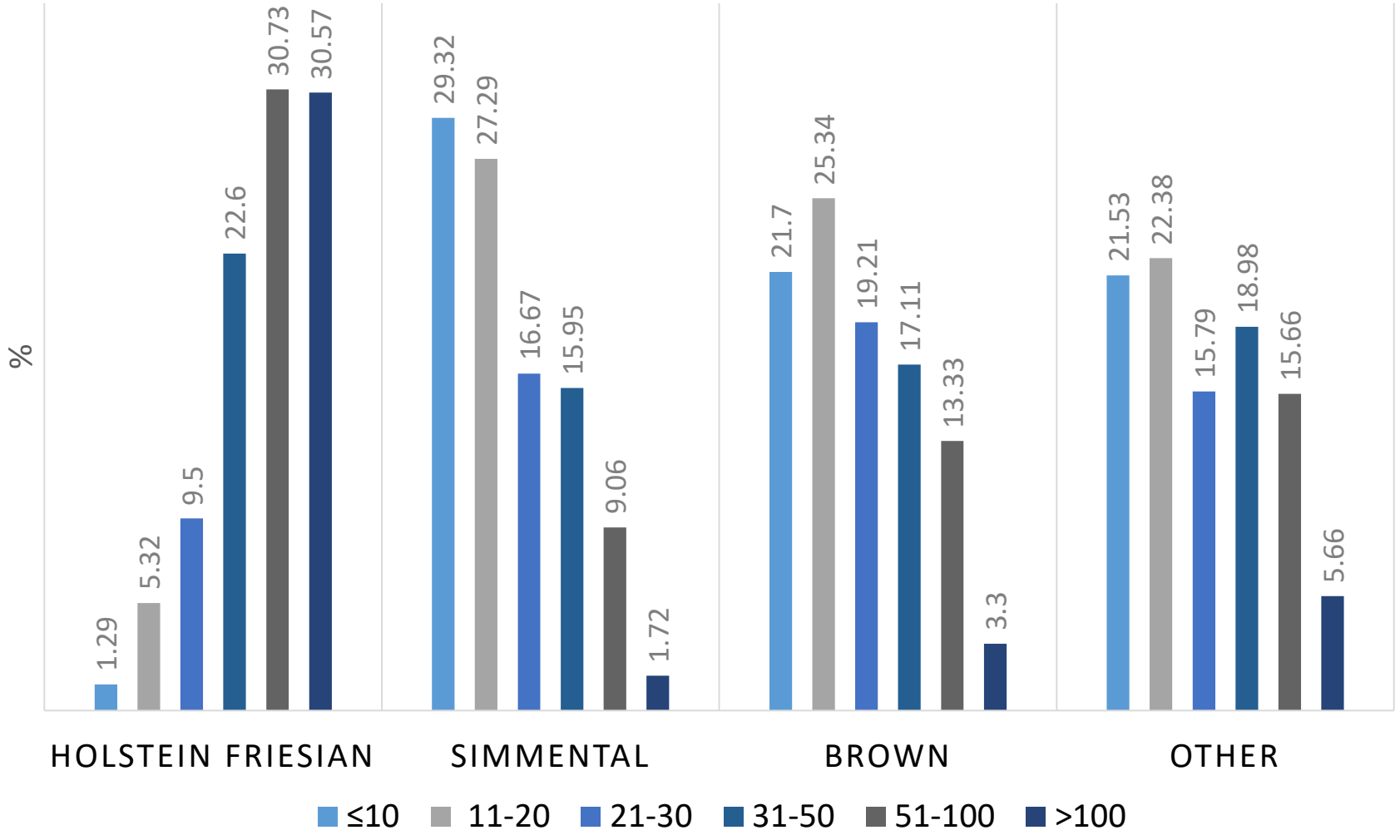
- Herd size

Covariate

ODDSRATIO

RESULTS

The distribution of calves according to dam breed and herd size class



Calf mortality rates (%) in dam breeds in two periods

	Dam breed				
	Holstein Friesian	Simmental	Brown	Other	Total
PM	8.08	4.69	5.04	5.56	5.57
M 2-30	4.28	2.15	2.36	2.57	2.68
Overall	12.36	6.84	7.40	8.13	8.25

PM – perinatal mortality (aborted, stillborn, death within 24 hours after birth)
M 2-30 – neonatal mortality rate from the day 2 to 30 of age

Analysis of variance for calf mortality rate in the perinatal period and in neonatal period from the day 2 to 30 of age

Mortality rate		Effect of					
		Birth year	Calving season	Num. of calves at calving	Age of the dam at calving	Breed of the dam	Log_{10} herd size (breed of the dam)
	D.F.	7	3	2	5	3	4
PM	χ^2	381.3	110.2	19863.0	8081.7	394.2	1163
	P-value	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
M 2-30	χ^2	199.8	1018.0	464.2	361.8	13.0	4642.1
	P-value	<0.0001	<0.0001	<0.0001	<0.0001	0.0046	<0.0001

PM – perinatal mortality (aborted, stillborn, death within 24 hours after birth)
M 2-30 – neonatal mortality rate from the day 2 to 30 of age

Estimated odds ratios for mortality rate in perinatal period and in neonatal period until 30 days of age among calves of different dam breeds at average herd size

Dam breed	Dam breed	Odds ratio	95% CI	P-value
PM				
Holstein Friesian	Simmental	1.579	1.540-1.619	<0.0001
Holstein Friesian	Brown	1.397	1.354-1.442	<0.0001
Holstein Friesian	Other	1.428	1.387-1.470	<0.0001
Simmental	Brown	0.885	0.863-0.908	<0.0001
Simmental	Other	0.904	0.884-0.924	<0.0001
Brown	Other	0.826	0.677-1.008	0.0603
M 2-30				
Holstein Friesian	Simmental	1.125	1.084-1.168	<0.0001
Holstein Friesian	Brown	1.089	1.040-1.141	0.0003
Holstein Friesian	Other	1.084	1.038-1.131	0.0002
Simmental	Brown	0.968	0.933-1.004	0.0801
Simmental	Other	0.963	0.933-0.994	0.0217
Brown	Other	0.995	0.935-1.038	0.8172

The effect of herd size on mortality rate in perinatal and neonatal period until 30 days of age in different dam breeds

	Odds ratio	95% CI	P-value
PM			
Holstein Friesian	1.146	1.106-1.187	<0.0001
Simmental	1.445	1.404-1.488	<0.0001
Brown	1.408	1.330-1.490	<0.0001
Other	1.497	1.434-1.562	<0.0001
M 2-30			
Holstein Friesian	2.553	2.422-2.650	<0.0001
Simmental	2.555	2.447-2.669	<0.0001
Brown	2.616	2.403-2.847	<0.0001
Other	2.295	2.156-2.444	<0.0001

PM – perinatal mortality (aborted, stillborn, death within 24 hours after birth)
M 2-30 – neonatal mortality rate from the day 2 to 30 of age

Estimated odds ratios for mortality rate in the perinatal and neonatal period until 30 days of age in different dam breeds due to increased herd size

Dam breed	Dam breed	Odds ratio	95% CI	P-value
PM				
Holstein Friesian	Simmental	0.793	0.757-0.830	<0.0001
Holstein Friesian	Brown	0.814	0.761-0.870	<0.0001
Holstein Friesian	Other	0.765	0.724-0.809	<0.0001
Simmental	Brown	1.026	0.963-1.094	0.4241
Simmental	Other	0.965	0.917-1.016	0.1808
Brown	Other	0.941	0.8761-1010	0.0910
M 2-30				
Holstein Friesian	Simmental	0.991	0.931-1.055	0.7871
Holstein Friesian	Brown	0.969	0.880-1.066	0.5141
Holstein Friesian	Other	1.104	1.022-1.192	0.0122
Simmental	Brown	0.977	0.888-1.074	0.6304
Simmental	Other	1.113	1.032-1.201	0.0057
Brown	Other	1.140	1.026-1.266	0.0151

CONCLUSIONS

- Total mortality rate is 8.25% (5.57%-perinatal; 2.68% neonatal mortality rate from day 2 to 30).
- Higher perinatal and neonatal mortality rates were found in calves of Holstein Friesian dams.
- More consideration should be paid to calves of Holstein Friesian breed.

Thank you for your attention!