

# Cattle on-farm mortality, causes and risk factors in Estonian dairy herds in 2013 and 2014



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## Background and objectives

On-farm mortality is an indicator of animal welfare and causes economical loss for the farmer. Rising on-farm mortality has been reported in several countries. The objective of this study was to identify the level of cattle on-farm mortality (unassisted death and euthanasia) in Estonian dairy herds, identify the reasons of mortality as well as related risk factors.

## Materials and methods

Data was collected from Estonian Agricultural Registers and Information Board for years 2013 and 2014 about all animals present in Estonian dairy cattle herds (herd with more than 75% of animals of dairy breeds) and was used to estimate mortality rate and identify risk factors. The dataset included 363,380 animals from 2,616 herds. Study population to identify causes of death included all animals from dairy herds under animal performance testing (approximately 95% of all dairy cows). The data was obtained from The Estonian Livestock Performance Recording Ltd for years 2013 and 2014.

## Results

Farmers’ stated main reasons for on farm mortality and euthanasia **COWS:**

- Metabolic and digestive disorders (40.1%)
- Claw/leg disorders (23.5%)

**HEIFERS:**

- Metabolic and digestive disorders (43.2%)
- Infectious diseases (26.8%)
- Other reasons (17.6%)

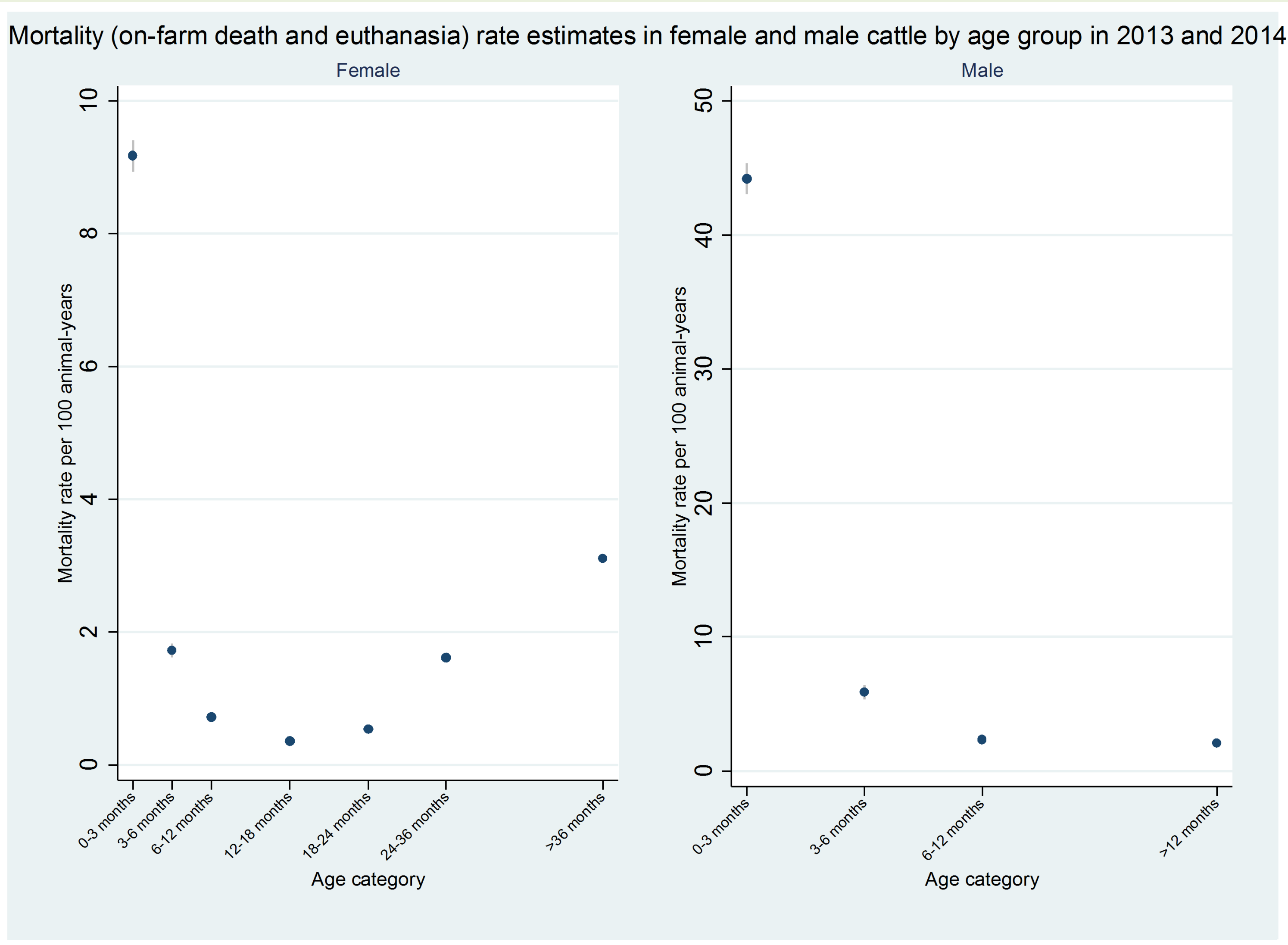


Table 1. Risk factors for on-farm dairy calf (up to 3 months old) mortality including euthanasia in Weibull proportional hazard random effect model evaluated in 192,081 calves from 1,577 herds						
Variable	Category	HR	n (%)	95% CI	P-value	Wald test P-value
Region	Northeast	1	78,513 (40.87)			<0.001
	Southeast	0.70	42,294 (22.02)	0.54; 0.89	0.005	
	Southwest	0.62	45,122 (23.49)	0.49; 0.79	<0.001	
	Northwest	0.86	26,152 (13.62)	0.65; 1.14	0.308	
Herd size (number of animals) x gender	<100, female	1	16,031 (8.35)			<0.001
	<100, male	1.44	15,410 (8.02)	1.23; 1.69	<0.001	
	100-300, female	1.97	22,629 (11.78)	1.64; 2.36	<0.001	
	100-300, male	3.49	22,721 (11.83)	2.92; 4.18	<0.001	
	300-600, female	1.68	30,388 (15.82)	1.40; 2.01	<0.001	
	300-600, male	3.45	30,050 (15.64)	2.88; 4.13	<0.001	
	≥600, female	2.18	27,239 (14.18)	1.81; 2.62	<0.001	
	≥600, male	4.15	27,615 (14.38)	3.44; 4.99	<0.001	

## Conclusions

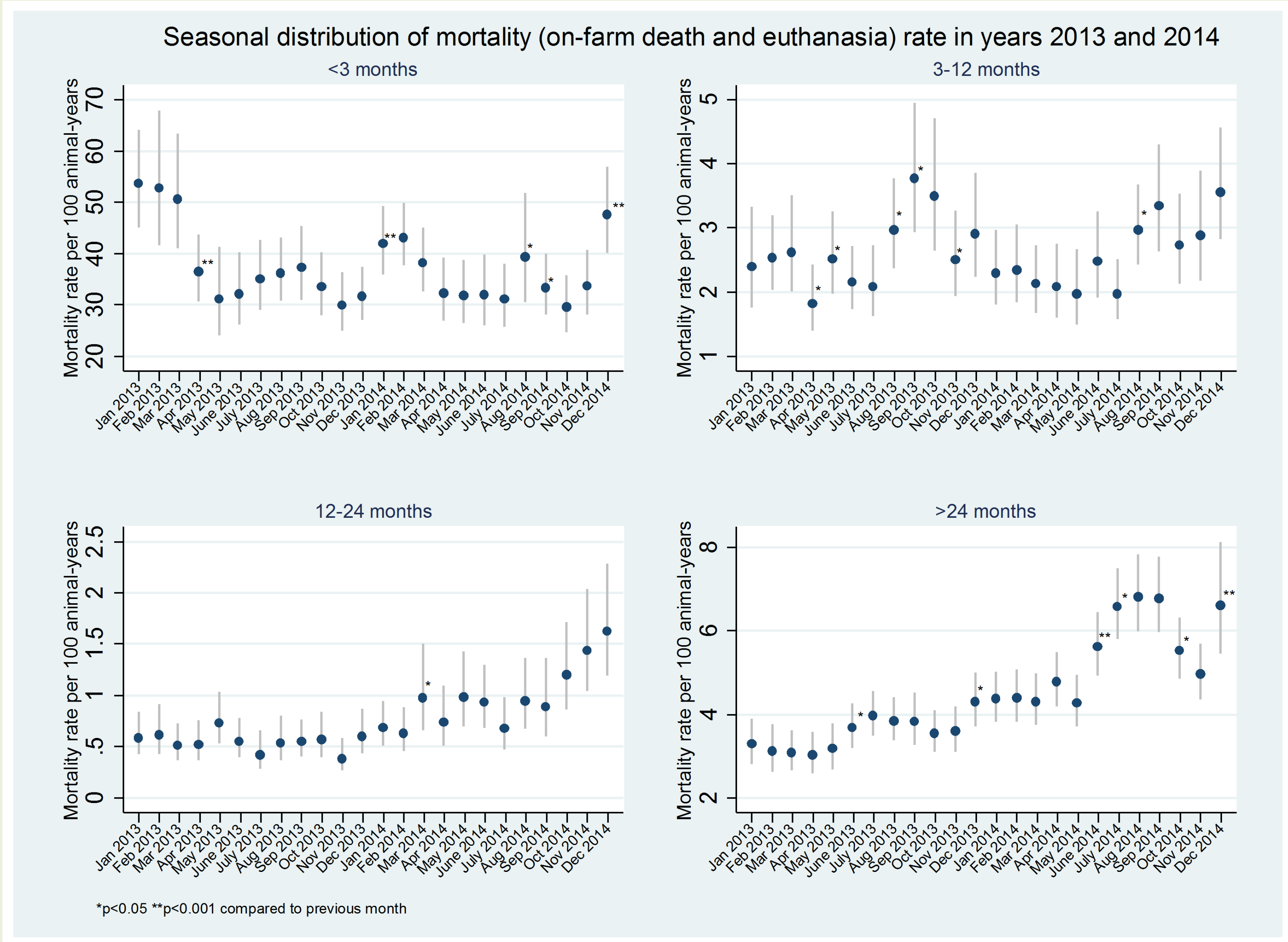
- Prevention of metabolic and digestive tract diseases and feet/claw disorders among cows and diarrhea and respiratory disease incidence among heifers is crucial to reduce mortality.
- Youngest (0-3 months) and oldest (>36 months) age groups, Estonian Holstein breed and male gender were animal level risk factors associated with highest risk of mortality.
- Larger herd size was associated with increased risk of animal death. Regional differences were identified in risk of mortality.
- Calf mortality was higher in winter months, calves 3-12 months of age had higher risk period during autumn.
- Highest mortality risk period among cows occurred in summer months, on average the mortality was highest during the second half-year 2014.

Table 2. Risk factors for on-farm dairy heifer (3 to 24 months old) mortality including euthanasia in Weibull proportional hazard random effect model evaluated in 172,207 cattle from 2,069 herds						
Variable	Category	HR	n <sup>ab</sup> (%)	95% CI	P-value	Wald test P-value
Breed <sup>a</sup>	Estonian Holstein	1	133,022 (77.23)			<0.001
	Estonian Red	0.80	34,260 (19.89)	0.70; 0.91	0.001	
	Other	0.75	4,967 (2.88)	0.59; 0.96	0.021	
Herd size (number of cows) <sup>a</sup>	<100	1	55,178 (32.03)			<0.001
	100-300	1.63	39,402 (22.88)	1.40; 1.90	<0.001	
	300-600	1.68	41,957 (24.36)	1.45; 1.95	<0.001	
	≥600	2.04	35,712 (20.73)	1.74; 2.39	<0.001	
Region <sup>a</sup>	Northeast	1	70,033 (40.67)			<0.001
	Southeast	0.74	39,190 (22.76)	0.59; 0.93	0.011	
	Southwest	0.59	38,030 (22.08)	0.47; 0.75	<0.001	
	Northwest	0.86	24,954 (14.49)	0.67; 1.11	0.253	
Age (months) x gender <sup>b</sup>	3-12, female	1	107,918 (31.65)			<0.001
	12-18, female	0.32	91,690 (26.89)	0.28; 0.35	<0.001	
	18-24, female	0.46	86,932 (25.50)	0.41; 0.51	<0.001	
	3-24, male	1.44	54,420 (15.96)	1.32; 1.58	<0.001	

<sup>a</sup>Number of animals  
<sup>b</sup>Number of observations in each category after splitting the observations according to age categories

Table 3. Risk factors for on-farm dairy cow (≥24 months old) mortality including euthanasia in Weibull proportional hazard random effect model evaluated in 164,094 cows from 2,343 herds						
Variable	Category	HR	n <sup>ab</sup> (%)	95% CI	P-value	Wald test P-value
Breed <sup>a</sup>	Estonian Holstein	1	128,041 (78.00)			<0.001
	Estonian Red	0.70	33,487 (20.40)	0.65; 0.75	<0.001	
	Other	0.47	2,620 (1.60)	0.36; 0.61	<0.001	
Herd size (number of cows) x age (months) <sup>b</sup>	<100, 24-36	1	33,882 (15.61)			<0.001
	<100, ≥36	1.15	31,983 (14.74)	1.04; 1.27	0.006	
	100-300, 24-36	1.25	20,014 (9.22)	1.09; 1.43	0.001	
	100-300, ≥36	1.83	29,320 (13.51)	1.64; 2.04	<0.001	
	300-600, 24-36	1.13	22,962 (10.58)	1.00; 1.27	0.052	
	300-600, ≥36	1.75	35,559 (16.38)	1.60; 1.92	<0.001	
	≥600, 24-36	0.96	16,293 (7.51)	0.83; 1.10	0.532	
	≥600, ≥36	1.85	27,017 (12.45)	1.68; 2.03	<0.001	
Region <sup>a</sup>	Northeast	1	67,461 (41.11)			<0.001
	Southeast	0.58	34,123 (20.79)	0.50; 0.68	<0.001	
	Southwest	0.61	38,576 (23.51)	0.52; 0.72	<0.001	
	Northwest	0.70	23,934 (14.59)	0.58; 0.83	<0.001	

<sup>a</sup>Number of animals  
<sup>b</sup>Number of observations in each category after splitting the observations according to age categories



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