

**Nationwide prevalence and risk factors for faecal carriage of Shiga toxin-producing
Escherichia coli O157 and O26 in very young calves and adult cattle at slaughter in New
Zealand**

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SUPPLEMENTARY MATERIAL

Supplementary Table S1: *Univariate logistic regression analysis of risk factors for calves being tested real-time PCR-positive for E. coli O157 or O26 (STEC and non-STEC).*

Variable	O157					O26				
	rt PCR positive	rt PCR negative	Coefficient (SE)	Odds ratio (95% CI)	Wald test <i>P</i> -value	rt PCR positive	rt PCR negative	Coefficient (SE)	Odds ratio (95% CI)	Wald test <i>P</i> -value
Sex										
Male	128	384	Ref	-	-	167	345	Ref	-	-
Female	35	148	-0.34 (0.21)	0.71 (0.47–1.08)	0.109	65	118	0.13 (0.18)	1.14 (0.80–1.62)	0.475
Breed					0.819*					0.135*
Friesian	108	361	Ref	-	-	168	301	Ref	-	-
Jersey	53	167	0.06 (0.19)	1.06 (0.73–1.55)	0.759	62	158	-0.35 (0.18)	0.70 (0.50–1.00)	0.048
Other	2	4	0.51 (0.87)	1.67 (0.30–9.25)	0.556	2	4	-0.11 (0.87)	0.90 (0.16–4.94)	0.900
Farm type										
Dairy	163	526	Ref	-	-	228	461	Ref	-	-
Beef	0	6	-14.39 (594.16)	0.00 (0.00–2.77)	0.981	4	2	1.4 (0.87)	4.04 (0.74–22.24)	0.108
Island										
North	120	375	Ref	-	-	167	328	Ref	-	-
South	43	157	-0.16 (0.20)	0.86 (0.58–1.27)	0.440	65	135	-0.06 (0.18)	0.95 (0.67–1.34)	0.754
Plant					<0.001*					<0.001*
A	78	207	Ref	-	-	126	159	Ref	-	-
B	42	168	-0.41 (0.218)	0.66 (0.43–1.02)	0.060	41	169	-1.18 (0.211)	0.31 (0.20–0.46)	<0.001
C	33	67	0.27 (0.251)	1.31 (0.80–2.14)	0.285	31	69	-0.57 (0.247)	0.57 (0.35–0.92)	0.022
D	10	90	-1.22 (0.359)	0.29 (0.15–0.60)	0.001	34	66	-0.43 (0.243)	0.65 (0.40–1.05)	0.076
Month					0.865*					0.006*
July	33	99	Ref	-	-	57	75	Ref	-	-
August	97	318	-0.09 (0.23)	0.92 (0.58–1.44)	0.702	138	277	-0.42 (0.20)	0.66 (0.44–0.98)	0.039
September	33	115	-0.15 (0.28)	0.86 (0.50–1.50)	0.595	37	111	-0.82 (0.26)	0.44 (0.26–0.73)	0.001
Presence of <i>E. coli</i> O157 or O26										
No	75	388	Ref	-	-	144	388	Ref	-	-
Yes	88	144	1.15 (0.19)	3.16 (2.20–4.54)	<0.001	88	75	1.15 (0.18)	3.16 (2.20–4.54)	<0.001

rt PCR, real-time PCR; SE, standard error; CI, confidence interval; Ref, reference level for comparison;

* *P*-value of variable as whole using Likelihood ratio test.

Supplementary Table S2: *Univariate logistic regression analysis of risk factors for adult cattle being tested real-time PCR-positive for E. coli O157 or O26 (STEC and non-STEC).*

Variable	O157					O26				
	rt PCR positive	rt PCR negative	Coefficient (SE)	Odds ratio (95% CI)	Wald test <i>P</i> -value	rt PCR positive	rt PCR negative	Coefficient (SE)	Odds ratio (95% CI)	Wald test <i>P</i> -value
Sex					0.016*					0.852*
Male	5	168	Ref	-	-	12	161	Ref	-	-
Male castrated	33	322	1.24 (0.49)	3.44 (1.32–8.98)	0.012	26	329	0.06 (0.36)	1.06 (0.52–2.16)	0.872
Female	25	342	0.90 (0.50)	2.46 (0.92–6.53)	0.072	30	337	0.18 (0.35)	1.19 (0.60–2.39)	0.617
Breed					0.095*					0.896*
Friesian	21	255	Ref	-	-	20	256	Ref	-	-
Jersey	2	73	−1.10 (0.75)	0.33 (0.08–1.45)	0.143	5	70	−0.09 (0.52)	0.91 (0.33–2.52)	0.863
Angus	27	287	0.13 (0.30)	1.14 (0.63–2.07)	0.661	22	292	−0.04 (0.32)	0.96 (0.51–1.81)	0.910
Hereford	6	153	−0.74 (0.47)	0.48 (0.19–1.21)	0.118	14	145	0.21 (0.36)	1.24 (0.61–2.52)	0.560
Other breeds	7	64	0.28 (0.46)	1.33 (0.54–3.26)	0.536	7	64	0.34 (0.46)	1.40 (0.57–3.45)	0.465
Age (in years)					0.542*					0.147*
≤2.0	33	405	Ref	-	-	26	412	Ref	-	-
2.5	8	154	−0.45 (0.41)	0.64 (0.29–1.41)	0.267	15	147	0.48 (0.34)	1.62 (0.83–3.14)	0.155
3.5	4	71	−0.37 (0.54)	0.69 (0.24–2.01)	0.498	4	71	−0.11 (0.55)	0.89 (0.30–2.63)	0.837
≥4.0	18	202	0.09 (0.31)	1.09 (0.60–1.99)	0.770	23	197	0.62 (0.30)	1.85 (1.03–3.32)	0.040
Farm type										
Dairy	17	213	Ref	-	-	17	213	Ref	-	-
Beef	46	619	−0.07 (0.29)	0.93 (0.52–1.66)	0.809	51	614	0.04 (0.29)	1.04 (0.59–1.84)	0.891
Island										
North	29	417	Ref	-	-	38	408	Ref	-	-
South	34	415	0.16 (0.26)	1.18 (0.70–1.97)	0.532	30	419	−0.26 (0.25)	0.77 (0.47–1.26)	0.300
Plant					0.259*					0.335*
A	13	199	Ref	-	-	14	198	Ref	-	-
B	16	218	0.12 (0.39)	1.12 (0.53–2.39)	0.763	24	210	0.48 (0.35)	1.62 (0.81–3.21)	0.171
C	24	225	0.49 (0.36)	1.63 (0.81–3.29)	0.171	15	234	−0.10 (0.38)	0.91 (0.43–1.92)	0.798
D	10	190	−0.22 (0.43)	0.81 (0.35–1.88)	0.617	15	185	0.14 (0.39)	1.15 (0.54–2.44)	0.722

Supplementary Table S2 continued

Variable	O157					O26				
	rt PCR positive	rt PCR negative	Coefficient (SE)	Odds ratio (95% CI)	Wald test <i>P</i> -value	rt PCR positive	rt PCR negative	Coefficient (SE)	Odds ratio (95% CI)	Wald test <i>P</i> -value
Season					<0.001*					0.513*
Spring	17	138	Ref	-	-	14	141	Ref	-	-
Summer	11	261	-1.07 (0.40)	0.34 (0.16–0.75)	0.007	24	248	-0.03 (0.35)	0.97 (0.49–1.94)	0.942
Autumn	31	242	0.04 (0.32)	1.04 (0.56–1.95)	0.903	16	257	-0.47 (0.38)	0.63 (0.30–1.32)	0.220
Winter	4	191	-1.77 (0.57)	0.17 (0.06–0.52)	0.002	14	181	-0.25 (0.39)	0.78 (0.36–1.69)	0.526
Presence of <i>E. coli</i> O157 or O26										
No	48	779	Ref	-	-	53	779	Ref	-	-
Yes	15	53	1.52 (0.33)	4.59 (2.41–8.74)	<0.001	15	48	1.52 (0.33)	4.59 (2.41–8.74)	<0.001

rt PCR, real-time PCR; SE, standard error; CI, confidence interval; Ref, reference level for comparison;

* *P*-value of variable as whole using Likelihood ratio test.

Supplementary Table S3: *Multivariate logistic regression analysis models (with ‘Farm’ as random effect) showing risk factors for a calf being tested real-time PCR-positive for E. coli O157 or E. coli O26 (STEC and non-STEC). From 695 observations, 25 were deleted due to missing carcass weights.*

Serogroup	Variable	Reference category	Categories within variable	Coefficient (SE)	Odds ratio (95% CI)	Wald test <i>P</i> -value	Likelihood ratio test*
O157 ^a	Intercept			−1.95 (0.76)			
	Slaughter plant	A	B	−0.05 (0.31)	0.95 (0.52–1.73)	0.871	<0.001
			C	0.56 (0.36)	1.75 (0.86–3.57)	0.126	
			D	−1.61 (0.53)	0.20 (0.07–0.57)	0.002	
	Presence of <i>E. coli</i>	No	Yes	1.54 (0.25)	4.65 (2.86–7.55)	<0.001	
	Sex	Male	Female	−0.48 (0.29)	0.62 (0.35–1.09)	0.096	
	Carcass weight			0.03 (0.04)	1.03 (0.95–1.11)	0.476	
O26 ^b	Intercept			−1.83 (1.24)			
	Slaughter plant	A	B	−1.29 (0.30)	0.28 (0.15–0.50)	<0.001	<0.001
			C	−0.59 (0.36)	0.56 (0.27–1.13)	0.105	
			D	0.17 (0.39)	1.18 (0.56–2.52)	0.662	
	Month	July	August	−0.82 (0.27)	0.44 (0.26–0.75)	0.003	0.006
			September	−1.06 (0.38)	0.35 (0.16–0.73)	0.005	
	Presence of <i>E. coli</i>	No	Yes	1.57 (0.24)	4.82 (3.01–7.72)	<0.001	
	Breed	Friesian	Jersey	−0.32 (0.24)	0.73 (0.45–1.17)	0.185	0.400
			Other breed	0.42 (1.23)	1.52 (0.14–17.08)	0.735	
	Farm type	Dairy	Beef	1.58 (1.08)	4.87 (0.59–40.46)	0.143	
	Carcass weight			0.01 (0.04)	1.01 (0.94–1.08)	0.820	

SE, standard error; CI, confidence interval; * *P*-value of variable as whole.

^a Likelihood ratio test = 90.016 (df = 6, *P* < 0.001) for ‘Calf-O157’ model.

^b Likelihood ratio test = 111.79 (df = 10, *P* < 0.001) for ‘Calf-O26’ model.