Table S1: Optical density readings obtained at different dilutions of mouse anti-sheep IgM and anti-mouse IgG-HRP* on positive controls and blank (diluent; Bovine Serum Albumin) during optimisation of the IDEXX ELISA for detection of IgM antibodies to *C. burnetii*.

Samples	Mouse anti-sheep IgM dilutions	Anti-mouse IgG-HRP dilutions		
		1/1000	1/3000	1/9000
Blank	1/600	0.483	0.227	0.110
	1/300	0.535	0.221	0.108
Positive controls	1/600	2.240	1.169	0.494
	1/300	2.283	1.120	0.571

*HRP is horse-radish peroxidase. There was limited colour intensity in the blank and a strong colour change in positive controls at 1:600 mouse anti-sheep IgM conjugate dilution and 1:3000 anti-mouse IgG-HRP conjugate. The 1:600 mouse anti-sheep IgM and the 1:3000 anti-mouse IgG-HRP were thus chosen as the optimum dilutions for the conjugate.

Table S2. Prior probability distributions placed on parameters to inform Bayesian latent class analysis to estimate diagnostic sensitivity and specificity of the IFA, CFT (Serion Virion), ELISA (IDEXX) and modELISA (modified IDEEX ELISA) for detection *C. burnetii* antibodies in goat sera.

Test	**Parameter**	**Expert-elicited priors distribution**	**mode (Q2.5, Q97.5)**	**Vague priors Distribution**	**mode (Q2.5, Q97.5)**	**References**
IFA (IgG)	Diagnostic sensitivity	Beta (4.982, 1.295)	0.931 (0.500, 0.977)	Beta (2.659, 1.553)	0.750 (0.250, 0.936)	(1, 2)
ELISA (IgG)		Beta (4.982, 1.295)	0.931 (0.500, 0.977)	Beta (2.659, 1.553)	0.750 (0.250, 0.936)	(2)
IFA (IgM)		Beta (8.784, 1.079)	0.990 (0.700, 0.993)	Beta (2.659, 1.553)	0.750 (0.250, 0.936)	(3)
modELISA		Beta (6.110, 1.853)	0.857 (0.500, 0.955)	Beta (2.659, 1.553)	0.750 (0.250, 0.936)	(3)
CFT		Beta (3.490, 10.597)	0.206 (0.087, 0.450)	Beta (3.285, 6.332)	0.400 (0.122, 0.600)	(2)
IFA (IgG)	Diagnostic specificity	Beta (5.218, 1.407)	0.912 (0.500, 0.973)	Beta (2.659, 1.553)	0.750 (0.250, 0.936)	(1, 2)
ELISA (IgG)		Beta (5.218, 1.407)	0.912 (0.500, 0.973)	Beta (2.659, 1.553)	0.750 (0.250, 0.936)	(2)
IFA (IgM)		Beta (4.741, 1.184)	0.953 (0.500, 0.982)	Beta (2.659, 1.553)	0.750 (0.250, 0.936)	(3)
modELISA		Beta (4.522, 1.087)	0.976 (0.500, 0.985)	Beta (2.659, 1.553)	0.750 (0.250, 0.936)	(3)
CFT		Beta (4.549, 1.098)	0.973 (0.500, 0.985)	Beta (2.659, 1.553)	0.750 (0.250, 0.936)	(2)
IgG	Animal-level true prevalence in known infected herd	Beta (4.842, 3.561)	0.600 (0.300, 0.831)	Beta (1.745, 2.119)	0.400 (0.100, 0.834)	
	Animal-level true prevalence in considered disease free herds	Beta (1, 100)	0.010 (0.000, 0.030)	Beta (1.000, 4.322)	0.030 (0.001, 0.060)	Samples from New Zealand (OIE declared Coxiella-free)
IgM	Animal-level prevalence in known infected herds	Beta (9.003, 46.350)	0.150 (0.089, 0.250)	Beta (5.619, 42.573)	0.100 (0.051, 0.200)	
	Animal-level prevalence in considered disease free herds	Beta (1, 100)	0.010 (0.000, 0.030)	Beta (1.000, 4.322)	0.030 (0.001, 0.060)	Samples from New Zealand (OIE declared Coxiella-free)
Both IgG and IgM	Animal-level prevalence in known infected herds	Beta (4.842, 3.561)	0.600 (0.253, 0.864)	Beta (2.346, 4.140)	0.300 (0.100, 0.675)	
	Animal-level prevalence in considered disease free herds	Beta (1, 100)	0.010 (0.000, 0.030)	Beta (1, 100)	0.010 (0.000, 0.030)	Samples from New Zealand (OIE declared Coxiella-free)

Table S3. Bayesian estimates of diagnostic sensitivity and specificity of the indirect immunofluorescence assay (IFA) in comparison to the ELISA (IDEXX) and modELISA (modified IDEEX) in detection of IgG and IgM antibodies to phase 1 and 2 *Coxiella burnetii* at 1:160 serum dilution

Antibody Types	Tests	Sensitivity % (95% PI)	Specificity % (95% PI)	Prevalence 1 % (95% PI)	Prevalence 2 % (95% PI)	Agreement [a] % (95% PI)	*K* [a] (95% PI)	PABAK [a] (95% PI)
IgG Phase 2	**IFA**	92.1 (74.1, 99.3)	93.6 (81.9, 99.4)	35.3 (22.9, 48.2)	0.00 (0.00, 1.30)	85.2 (77.3, 91.0)	0.67 (0.50, 0.80)	0.70 (0.55, 0.82)
	ELISA	78.1 (59.7, 94.9)	95.9 (88.5, 99.2)	—	—	—	—	—
IgG Phase 1	**IFA**	94.8 (80.0, 99.6)	92.7 (78.1, 99.4)	39.4 (25.6, 52.1)	0.00 (0.00, 1.20)	82.1 (74.0, 88.5)	0.61 (0.45, 0.75)	0.64 (0.48, 0.77)
	ELISA	71.5 (53.9, 92.5)	96.3 (89.4, 99.3)					
IgM Phase 2	**IFA**	87.2 (54.1, 99.4)	97.2 (90.7, 99.8)	13.8 (7.5, 22.3)	0.00 (0.00, 1.20)	77.7 (69.3, 84.8)	0.34 (0.16, 0.52)	0.55 (0.39, 0.69)
	modELISA	79.6 (56.6, 94.8)	80.9 (71.5, 89.7)	—	—	—	—	—
IgM Phase 1	**IFA**	87.2 (55.8, 99.3)	94.6 (86.1, 99.5)	14.2 (7.1, 23.1)	0.00 (0.00, 1.30)	73.4 (64.8, 81.0)	0.24 (0.07, 0.43)	0.47 (0.30, 0.62)
	modELISA	71.6 (45.9, 92.5)	79.4 (69.9, 88.4)	—	—	—	—	—

Table S4. Prior sensitivity analysis: Bayesian estimates of diagnostic sensitivity and specificity of the indirect immunofluorescence assay (IFA) in comparison to the ELISA (IDEXX) in detection of IgG and IgM antibodies to *Coxiella burnetii* at the 1:160 cut-off, **utilising vague priors**.

Antibody Types	Tests	Sensitivity % (95% PI)	Specificity % (95% PI)	Prevalence 1 % (95% PI)	Prevalence 2 % (95% PI)	Agreement [a] % (95% PI)	*K* [a] (95% PI)	PABAK [a] (95% PI)
IgG Phases 1 & 2	**IFA**	89.8 (58.0, 98.9)	89.3 (66.2, 98.9)	38.7 (13.8, 60.6)	0.00 (0.0, 1.5)	80.2 (71.5, 87.2)	0.57 (0.40, 0.72)	0.60 (0.43, 0.74)
	ELISA	62.8 (39.2, 86.0)	93.3 (77.3, 98.7)	—	—	—	—	—
IgM Phases 1 & 2	**IFA**	65.4 (21.8, 95.6)	87.9 (77.0, 97.0)	12.8 (3.3, 24.2)	0.00 (0.00, 2.60)	71.9 (63.1, 79.8)	0.21 (0.03, 0.40)	0.44 (0.26, 0.60)
	modELISA	64.7 (33.2, 90.1)	78.5 (68.0, 89.1)	—	—	—	—	—
Phase 2 only (IgM/IgG)	**IFA**	83.1 (50.2, 98.0)	89.4 (69.3, 98.8)	34.4 (10.7, 56.3)	0.0 (0.0, 1.2)	73.6 (64.8, 81.3)	0.34 (0.18, 0.50)	0.47 (0.30, 0.63)
	CFT	32.5 (16.4, 51.0)	93.4 (83.0, 98.6)	—	—	—	—	—

[a] Estimated including negative controls from New Zealand (OIE-declared *Coxiella burnetii* free). PI Predictive interval, Prevalence 1 is estimated animal-level true prevalence in samples from known infected herd. Prevalence 2 is estimate of animal-level true prevalence in samples from New Zealand. Agreement is proportion agreement, *K* Cohen's Kappa, PABAK Prevalence and bias adjusted *K*, modELISA modified IDEXX ELISA

References

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