Supplementary Material

Article: Seroepidemiology of *Borrelia burgdorferi* s.l. among German National Cohort (NAKO) Participants, Hanover

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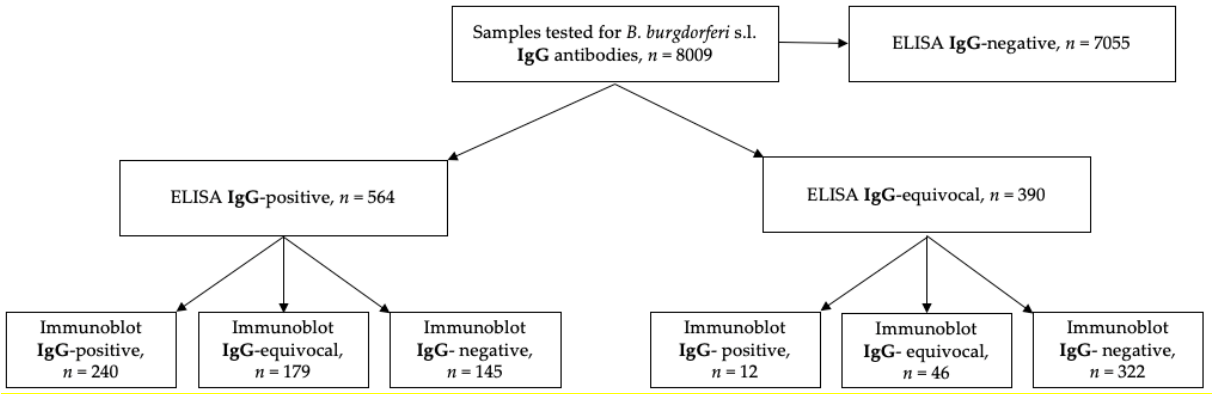

Figure S1. Flowchart from two-tier sample testing for IgG antibodies against *B. burgdorferi* s.l. IgG = Immunoglobulin G.

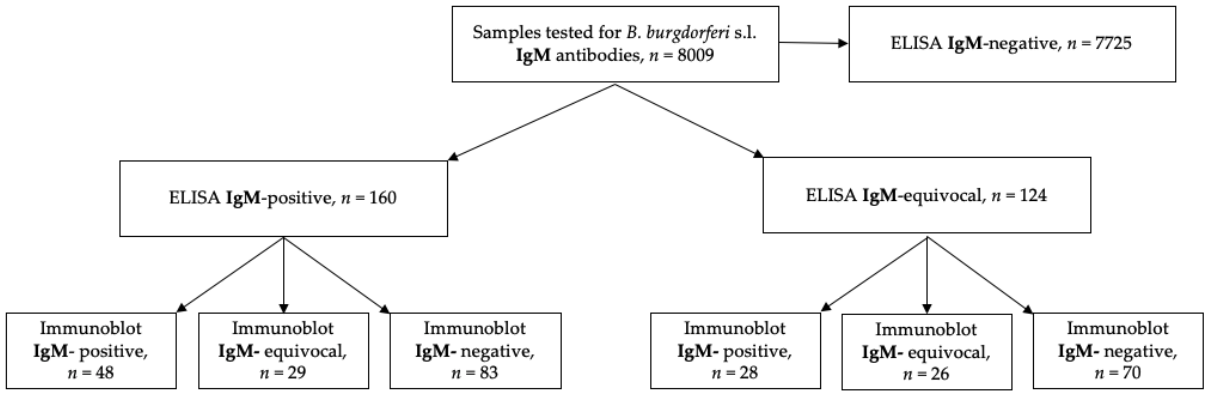

Figure S2. Flowchart from two-tier sample testing for IgM antibodies against *B. burgdorferi* s.l. IgM = Immunoglobulin M.

Table S1. Implementation and comparison of force of infection (FOI) models.

Model	GLM FOI Formula [1]	GLM Implementation in R Programming Language [1,2]	AIC
Muench [1,2]	$\eta(a) = \log(\beta) + \log(a)$	glm(cbind(Positive,Total-Positive) ~ 1, offset=log(Age), family = binomial(link = "cloglog"))	200.55
Griffiths [3]	$\eta(a) = \beta_1 a + \beta_2 a^2$	glm(cbind(Total-,Positive) ~ −1 + Age + I(Age^2), family = binomial(link = "log"))	202.54
Grenfell and Anderson [4]	$\eta'(a) = \beta_1 + 2\beta_2 a + 3\beta_3 a^2$	glm(cbind(Total-,Positive) ~ −1 +Age + I(Age^2) + I(Age^3), family = binomial(link = "log"))	192.39

GLM: generalized linear model; AIC: Akaike information criterion; η: linear predictor; a: age; β: transmission parameter; [1] as suggested by Hens et al. [5]; [2] The glm() call fits a generalized linear model; Positive: vector containing seropositive counts; Total: vector containing the sum of seropositives and seronegatives; Age: vector containing the participants' age in years.

Table S2. Odds Ratios for IgG/IgM seropositivity from logistic regression.

Independent Variables	Odds Ratio for IgG Seropositivity [1] (95% CI)	p	Odds Ratio for IgM Seropositivity [1] (95% CI)	p
Age, 10-year increments	1.26 (1.13–1.42)	**<0.001**	1.07 (0.88–1.30)	0.512
Sex				
Female	Ref.	Ref.	Ref.	Ref.
Male	2.58 (1.94–3.46)	**<0.001**	1.24 (0.78–2.00)	0.362
Migration background [1]				
No	Ref.	Ref.	Ref.	Ref.
Yes	0.71 (0.48–1.02)	0.071	1.02 (0.56–1.75)	0.947
Education [2]				
Ongoing	1.03 (0.24–2.97)	0.968	2.49 (0.66–7.67)	0.138
Low	0.39 (0.06–1.25)	0.188	1.62 (0.38–4.84)	0.440
Medium	Ref.	Ref.	Ref.	Ref.
High	1.22 (0.92–1.63)	0.179	1.39 (0.83–2.39)	0.223
Net equivalent monthly income, 100-EUR increments	1.00 (0.99–1.00)	0.325	0.98 (0.96–1.00)	**0.038**
Body Mass Index [3]	0.96 (0.93–0.99)	**0.021**	0.95 (0.90–1.01)	0.105
Depression status (PHQ-9, point increase) [4]	0.94 (0.90–0.98)	**0.006**	0.99 (0.93–1.05)	0.780
Smoking status				
Never	Ref.	Ref.	Ref.	Ref.
Former	1.10 (0.82–1.48)	0.523	1.40 (0.81–2.42)	0.224
Current	1.05 (0.71–1.52)	0.818	1.11 (0.54–2.18)	0.765
Unknown	1.30 (0.80–2.03)	0.274	1.38 (0.59–2.95)	0.421

IgG = Immunoglobulin G; IgM = Immunoglobulin M; Ref = reference; CI = confidence interval; Observations = 8009. We considered a sample as seropositive for *Borrelia burgdorferi* s.l. with positive or equivocal ELISA and subsequent positive immunoblot result (MiQ12) [6]; [1] Migration derived from a minimum set of indicators by Schenk et al. [7]; [2] Education level derived according to ISCED97 [8] ; [3] BMI corresponding to the classification of the International Obesity Task Force [9] ;[4] Depression status obtained from the 9-question Patient Health Questionnaire (PHQ-9) [10]

Table S3. Estimated mean force of infection (FOI) for IgG seropositivity against *B. burgdorferi* s.l.

	FOI Estimation		
Age (years)	**Muench [1]**	**Griffiths [2]**	**Grenfell and Anderson [3]**
20–24	0.000637	0.000634	0.0000656
25–29	0.000637	0.000637	−0.000153
30–34	0.000637	0.000641	−0.000230
35–39	0.000637	0.000644	−0.000167
40–44	0.000637	0.000647	0.0000375
45–49	0.000637	0.000651	0.000383
50–54	0.000637	0.000654	0.000869
55–59	0.000637	0.000657	0.00150
60–64	0.000637	0.000661	0.00226
65–69	0.000637	0.000664	0.00317

The FOI represents the average annual change in the population's seropositivity proportion. IgG = Immunoglobulin G; [1] Muench's model [1,2] assumes constant FOI over age; [2] [3]; [3] [4], Best performing model considering AIC.

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