**Supplementary Information**

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**Seropositivity of *Borrelia burgdorferi* s.l. in Germany – an analysis across four German National Cohort (NAKO) study sites**

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**Table S1** Test kits used for screening and confirmatory testing of antibody presence against *Borrelia burgdorferi* s.l.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Antibody type | Test type | Test kit | Manufacturer | Sensitivity1 | Specificity1 | Strains |
| Immunoglobulin G | Screening test, ELISA | *Borrelia afzelii* and VlsE IgG Europe ELISA | Virotech Diagnostics GmbH | >99% | 97% | * Zs7 (B. burgdorferi) * PBr (B. garinii) * Pko (B. afzelii) |
| Immunoglobulin M | *Borrelia afzelii* IgM ELISA | 98.8% |
| Immunoglobulin G | Confirmatory test, line blot | WE225 Borrelia Europe plus TpN17 LINE IgG | Virotech Diagnostics GmbH | >99.9% | 98% | * OpsC (p23) (B. afzelii PKo) * VlsE recombinant (B. burgdorferi B31) * p39 (BmpA) recombinant (B. afzelii PKo) * DbpA (Pko) and DbpA (PBi, PBr, A14 S) recombinant (B. bavariensis PBi, B. garinii PBr) * p58 (OppA‐2) recombinant (B. bavariensis PBi) * p83/100 recombinant (B. afzelii PKo) |
| Immunoglobulin M | WE224 Borrelia Europe LINE IgM |
| IgG = Immunoglobulin G; IgM = Immunoglobulin M; ELISA = enzyme-linked immunosorbent assay;  1 In brief and with reference to the information provided by the manufacturer [1-3], sensitivity and specificity were determined by testing clinically characterized sera. More information can be obtained from the original test kit documentations provided by the manufacturer [1-3]. | | | | | | |

**Table S2** Crude and weighted seropositivity proportions with 95% confidence interval of IgG and IgM antibodies against *Borrelia burgdorferi* s.l. For weighting, we used local age and sex distributions of the general population.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Augsburg | | Berlin | | Hanover, as also published in [4] | | Münster | |
|  | Proportion (%, 95% confidence interval) | | | | | | | |
|  | Crude | Weighted | Crude | Weighted | Crude | Weighted | Crude | Weighted |
| IgG: ELISA\* | 9.7 (8.6-10.8) | 8.7 (7.6-9.9) | 5.8 (4.5-7.1) | 4.9 (3.7-6.1) | 7.0 (6.5-7.6) | 6.8 (6.3-7.4) | 9.1 (7.9-10.2) | 8.8 (7.6-9.9) |
| IgG: RKI\*\* | 6.9 (5.9-7.9) | 6.2 (5.3-7.2) | 6.1 (4.8-7.4) | 5.0 (3.8-6.3) | 5.4 (4.9-5.9) | 5.2 (4.7-5.6) | 5.8 (4.9-6.8) | 5.1 (4.2-6.0) |
| IgG: MIQ12\*\*\* | 3.8 (3.1-4.6) | 3.4 (2.7-4.1) | 4.6 (3.5-5.8) | 4.1 (3.0-5.2) | 3.1 (2.8-3.5) | 3.0 (2.7-3.4) | 3.1 (2.4-3.8) | 2.7 (2.1-3.4) |
| IgM: ELISA\* | 0.6 (0.3-0.9) | 0.5 (0.3-0.8) | 1.2 (0.6-1.8) | 1.0 (0.4-1.5) | 2.0 (1.7-2.3) | 2.1 (1.8-2.4) | 1.0 (0.6-1.4) | 1.0 (0.6-1.4) |
| IgM: RKI\*\* | 0.7 (0.4-1.0) | 0.6 (0.3-0.9) | 0.8 (0.3-1.3) | 0.6 (0.1-1.0) | 1.3 (1.1-1.6) | 1.4 (1.2-1.7) | 0.6 (0.3-1) | 0.8 (0.4-1.1) |
| IgM: MIQ12\*\*\* | 0.5 (0.2-0.7) | 0.4 (0.1-0.6) | 0.8 (0.3-1.3) | 0.6 (0.1-1.0) | 0.9 (0.7-1.2) | 0.9 (0.7-1.2) | 0.5 (0.2-0.8) | 0.6 (0.3-1.0) |
| IgG = Immunoglobulin G; IgM = Immunoglobulin M; ELISA = enzyme-linked immunosorbent assay; RKI = Robert Koch Institute; \* seropositivity is defined by a positive ELISA result; \*\* seropositivity defined as positive ELISA screening test and positive or equivocal line blot or equivocal ELISA screening test and positive confirmatory line blot immunoassay [2]; \*\*\* we defined seropositivity as positive or equivocal ELISA screening test with positive confirmatory line blot immunoassay; proportions presented with two-sided 95%-confidence interval (Wald); we weighted our sample with the respective local age and sex distribution (www.destatis.de); Note: Usually, the ELISA-only classification (\*) is the most sensitive. However, due to a higher share of ELISA-equivocal samples in our study, the second most sensitive classification (\*\*) showed higher proportions of overall seropositivity in a few instances. | | | | | | | | |

**Table S3** Weighted seropositivity percentages with 95% confidence interval of IgG antibodies against *Borrelia burgdorferi* s.l. for comparison with earlier investigation

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Augsburg | | Berlin | | Hanover | | Münster | |
|  | Weighted % (95% confidence interval) | | | | | | | |
|  | BGS98 | DEGS | BGS98 | DEGS | BGS98 | DEGS | BGS98 | DEGS |
| IgG: ELISA\* | 8.5 (7.4-9.6) | 9.2 (8.0-10.3) | 4.8 (3.6-6.0) | 5.4 (4.1-6.6) | 6.6 (6.0-7.1) | 7.0 (6.4-7.5) | 8.8 (7.7-10) | 8.8 (7.7-9.9) |
| IgG: RKI\*\* | 6.1 (5.1-7.0) | 6.5 (5.5-7.4) | 5.0 (3.8-6.3) | 5.6 (4.3-6.9) | 4.9 (4.5-5.4) | 5.3 (4.8-5.8) | 5.2 (4.3-6.1) | 5.5 (4.5-6.4) |
| IgG: MIQ12\*\*\* | 3.2 (2.6-3.9) | 3.6 (2.8-4.3) | 4.0 (2.9-5.1) | 4.3 (3.2-5.4) | 2.9 (2.5-3.3) | 3.1 (2.7-3.5) | 2.6 (2.0-3.3) | 2.9 (2.2-3.6) |
| IgG = Immunoglobulin G; RKI = Robert Koch Institute; BGS98 = German National Health Interview and Examination Survey 1998; DEGS = German Health Interview and Examination Survey for Adults; For comparability, we weighted our sample with the age- and sex distributions of the underlying study population BGS98 and DEGS [2]; \* seropositivity is defined by a positive ELISA result; \*\* seropositivity defined as positive ELISA screening test and positive or equivocal line blot or equivocal ELISA screening test and positive confirmatory line blot immunoassay [5]; \*\*\* we defined seropositivity as positive or equivocal ELISA screening test with positive confirmatory line blot immunoassay | | | | | | | | |

**References**

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