Antibodies against *Borrelia burgdorferi* sensu lato among Adults, Germany, 2008–2011

**Technical Appendix**

The serum samples were tested at the National Reference Centre for *Borrelia* for the presence of anti-*Borrelia burgdorferi* sensu lato IgG antibodies. As an initial test an ELISA (Enzygnost Lyme link VlsE/IgG; Siemens Healthcare Diagnostics GmbH, Eschborn, Germany) was applied. It is based on a detergent extract from cultured *B. afzelii* (strain PKo) mixed with recombinant VlsE from *B. burgdorferi* sensu stricto (strain B31), *B. afzelii* (strain PKo), and *B. bavariensis* (strain PBi). The test was automatically processed on a BEP III (Siemens Healthcare Diagnostics) and interpreted as recommended by the manufacturer. Validation studies for this ELISA have been published (1,2).

For confirmation of ELISA test–positive and borderline tests samples, a line blot was performed (Borrelia Europe plus TpN17 LINE IgG; Virotech, Rüsselsheim, Germany). It includes the purified antigens OspC, DbpA, and p83 (all from *B. afzelii* strain PKo) and additionally recombinant antigens VlsE (from *B. burgdorferi* sensu stricto strain B31 and *B. garinii* strain IP90), BmpA (PKo), DbpA (from *B. garinii* strain PBr, *B. bavariensis* strain PBi, and *B. spielmanii*). Antigens are bound separately to a nitrocellulose membrane either as single antigens or, in the case of VlsE and DbpA, as a mix of the respective antigens. The test was performed and interpreted according to the manufacturer’s recommendations.

**References**


Technical Appendix Table. Stratified seroprevalence of *Borrelia burgdorferi* sensu lato IgG detected by ELISA (initial test only) in adults 18–79 years of age and results of weighted bivariate logistic regression analysis of potential risk factors for seropositivity, Germany, 2008–2011*

<table>
<thead>
<tr>
<th>Characteristics†</th>
<th>No. positive/no. total†</th>
<th>Prevalence (95% CI)</th>
<th>Univariable analysis</th>
<th>Multivariable analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>OR (95% CI)</td>
<td>p value</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>F</td>
<td>295/3,619</td>
<td>7.1 (6.2–8.2)</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>M</td>
<td>557/3,346</td>
<td>14.5 (12.8–16.4)</td>
<td>Ref</td>
<td>Ref</td>
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<tr>
<td>Age group, y</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18–29</td>
<td>68/1,044</td>
<td>6.9 (5.3–8.9)</td>
<td>Ref</td>
<td>Ref</td>
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<tr>
<td>30–39</td>
<td>66/831</td>
<td>8.2 (6.1–11.1)</td>
<td>1.22 (0.79–1.87)</td>
<td>0.374</td>
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<tr>
<td>40–49</td>
<td>98/1,270</td>
<td>8.0 (6.4–10.0)</td>
<td>1.18 (0.83–1.67)</td>
<td>0.351</td>
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<tr>
<td>50–59</td>
<td>149/1,375</td>
<td>9.8 (7.8–12.1)</td>
<td>1.46 (1.04–2.06)</td>
<td>0.029</td>
</tr>
<tr>
<td>60–69</td>
<td>209/1,364</td>
<td>14.4 (12.0–17.2)</td>
<td>2.28 (1.64–3.16)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>70–79</td>
<td>262/2,081</td>
<td>21.9 (18.6–25.7)</td>
<td>3.80 (2.76–5.23)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Residence location in Germany</td>
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<td></td>
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<tr>
<td>West‡</td>
<td>569/4,761</td>
<td>10.5 (9.3–11.9)</td>
<td>Ref</td>
<td>Ref</td>
</tr>
<tr>
<td>East§</td>
<td>283/2,204</td>
<td>11.8 (9.8–14.2)</td>
<td>1.14 (0.89–1.46)</td>
<td>0.273</td>
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<tr>
<td>North¶</td>
<td>200/1,771</td>
<td>10.1 (8.3–12.2)</td>
<td>1.05 (0.78–1.39)</td>
<td>0.761</td>
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<tr>
<td>Middle#</td>
<td>358/3,094</td>
<td>9.7 (8.1–11.5)</td>
<td>Ref</td>
<td>Ref</td>
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<tr>
<td>South**</td>
<td>294/2,100</td>
<td>12.7 (10.9–14.9)</td>
<td>1.37 (1.05–1.77)</td>
<td>0.020</td>
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<tr>
<td>Population of residence municipality</td>
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<td></td>
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<tr>
<td>&lt;5,000</td>
<td>207/1,264</td>
<td>16.8 (13.9–20.3)</td>
<td>2.23 (1.69–2.95)</td>
<td>&lt;0.001</td>
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<tr>
<td>5,000 to &lt;20,000</td>
<td>205/1,687</td>
<td>11.2 (9.0–13.8)</td>
<td>1.38 (1.03–1.86)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>20,000 to &lt;100,000</td>
<td>237/2,037</td>
<td>10.0 (8.3–12.1)</td>
<td>1.23 (0.94–1.61)</td>
<td>0.154</td>
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<td>&gt;100,000</td>
<td>203/1,977</td>
<td>8.3 (7.0–9.8)</td>
<td>Ref</td>
<td>Ref</td>
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<td>Foreign national†‡</td>
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<tr>
<td>No</td>
<td>829/6,547</td>
<td>11.6 (10.4–12.8)</td>
<td>Ref</td>
<td>Ref</td>
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<tr>
<td>Yes</td>
<td>213/397</td>
<td>4.5 (2.7–7.7)</td>
<td>0.36 (0.20–0.64)</td>
<td>0.001</td>
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<td>Pet in household</td>
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<tr>
<td>No pet</td>
<td>589/4,613</td>
<td>11.0 (9.9–12.2)</td>
<td>Ref</td>
<td>Ref</td>
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<td>Any pet</td>
<td>240/2,185</td>
<td>10.6 (9.0–12.5)</td>
<td>0.96 (0.80–1.16)</td>
<td>0.676</td>
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<td>Dog</td>
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<tr>
<td>No</td>
<td>741/5,928</td>
<td>11.0 (9.9–12.2)</td>
<td>Ref</td>
<td>Ref</td>
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<tr>
<td>Yes</td>
<td>88/859</td>
<td>10.2 (7.8–13.1)</td>
<td>0.92 (0.68–1.23)</td>
<td>0.562</td>
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<td>Cat</td>
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<tr>
<td>No</td>
<td>698/5,708</td>
<td>10.7 (9.6–11.9)</td>
<td>Ref</td>
<td>Ref</td>
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<td>Yes</td>
<td>131/1,079</td>
<td>11.8 (9.4–14.8)</td>
<td>1.12 (0.86–1.45)</td>
<td>0.394</td>
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<td>Other animals</td>
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<td>No</td>
<td>758/6,020</td>
<td>11.2 (10.0–12.4)</td>
<td>Ref</td>
<td>Ref</td>
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<td>Yes</td>
<td>71/767</td>
<td>8.8 (6.7–11.5)</td>
<td>0.77 (0.57–1.04)</td>
<td>0.086</td>
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<td>Total</td>
<td>852/6,965</td>
<td>11.0 (9.7–12.0)</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>

*OR, odds ratio; Ref, reference, –, not included in the final model.
†Unweighted.
#Middle states: Nordrhein-Westfalia, Hesse, Saxony, Saxony-Anhalt, Thuringia.
**Southern states: Rhineland-Palatinate, Baden-Württemberg, Bavaria, Saarland.
††Defined as persons holding a foreign citizenship.