**Supplementary Information**

**1.1 Summary of latent class analysis output**

|  |  |  |  |
| --- | --- | --- | --- |
| Assay result | Assay +ve / Group N | Risk | Risk Ratio |
| GP ELISA High Titre  Group A  Group B | 11 / 20  3 / 95 | 0.550  0.032 | 17.4  (5.3 – 56.8) |
| WB GP positive  Group A  Group B | 10 / 20  2 / 95 | 0.500  0.021 | 23.7  (5.6 – 100.2) |
| WB NP positive  Group A  Group B | 17 / 20  14 / 95 | 0.850  0.147 | 5.8  (3.4 – 9.7) |
| WB VP40 positive  Group A  Group B | 4 / 20  12 / 95 | 0.042  0.600 | 14.2  (5.1 – 39.7) |
| WB negative  Group A  Group B | 0 / 20  75 / 95 | 0.789  0 | - |

**Supplementary table 1:** Results of latent class analysis from GP-ELISA

* 1. **Diagram

     Description automatically generatedConsort diagram of sample processing pipeline and selection process**

**Supplementary figure 1:** Consort diagram of serum sample processing.

* 1. **Outcomes of serological analysis stratified by village status**

|  |  |  |  |
| --- | --- | --- | --- |
|  | Affected | Unaffected | Overall |
|  | (N=194) | (N=304) | (N=498) |
| Anti-GP ELISA | |  |  |
| High | 9 (4.6%) | 5 (1.6%) | 14 (2.8%) |
| Intermediate | 111 (57.2%) | 167 (54.9%) | 278 (55.8%) |
| Low | 74 (38.1%) | 132 (43.4%) | 206 (41.4%) |
| Latent class group | |  |  |
| Group A | 8 (16.3%) | 12 (18.2%) | 20 (17.4%) |
| Group B | 41 (83.7%) | 54 (81.8%) | 95 (82.6%) |
| Not tested | 145 | 238 | 383 |
| Neutralisation data | |  |  |
| High | 3 (10.3%) | 2 (6.1%) | 5 (1.0%) |
| Low | 3 (10.3%) | 2 (6.1%) | 5 (1.0%) |
| Negative | 23 (79.3%) | 29 (6.1%) | 52 (10.4%) |
| Not tested | 165 | 271 | 436 |

**Supplementary table 2:** Serological outcome data stratified by village status. Villages were classified as affected or unaffected by 2013-2016 EBOV outbreak (see methods).

* 1. **Ecological associations with EBOV immunological outcomes: Sensitivity analysis**

|  |  |  |  |
| --- | --- | --- | --- |
| Predictors | Odds ratio | 95% CI | p-value |
| Outcome |  |  |  |
| LCA group A | 20 / 498 |  |  |
| Village status |  |  |  |
| Affected | Reference |  | 0.86 |
| Unaffected | 1.09 | 0.40 – 2.94 |
| Age |  |  |  |
|  | 1.03 | 0.99 – 1.06 | 0.12 |
| Closed forest |  |  |  |
| Shape index (500m) | 0.28 | 0.08 – 0.98 | 0.02 |
| Vegetation |  |  |  |
| Perimeter area ratio (20,000m) | 0.35 | 0.08 – 0.98 | 0.01 |
| Random Effects |  |  |  |
| ICC | 0.02 |  |  |
| N village | 38 |  |  |

**Supplementary table 3**: Multivariable generalised linear mixed effects model (binomial family) of immunological group defined by latent class analysis of ELISA and Western Blot analysis (Group A vs Group B). Success defined as Group A. Variables were selected using a forward, stepwise approach using AIC. P-values estimated by likelihood ratio test. Mixed effect models not used due to singular fit from village-level random intercepts.

|  |  |  |  |
| --- | --- | --- | --- |
| Predictors | Estimate | 95% CI | p-value |
| Age |  |  |  |
| 18 – 30 | Reference |  |  |
| 31 – 50 | 0.19 | -0.15 – 0.53 | 0.55 |
| 51 – 90 | 0.15 | -0.25– 0.55 |
| Closed canopy cover |  |  |  |
| Perimeter area ratio (500m) | -0.63 | -1.24 – -0.02 | 0.05 |
| Random Effects |  |  |  |
| ICC | 0.14 |  |  |
| N village | 24 |  |  |

**Supplementary table 4:** Multivariable mixed-effects linear regression of log2 anti-EBOV-GP total antibody titre excluding all participants from villages with confirmed EBOV cases during 2013-2016 outbreak (195/498; 39.2%). Variables were selected using a forward, stepwise approach using AIC. P-values estimated by likelihood ratio test.

|  |  |  |  |
| --- | --- | --- | --- |
| Predictors | Odds ratio | 95% CI | p-value |
| Outcome |  |  |  |
| High titre GP-ELISA | 14/498 |  |  |
| Village status |  |  |  |
| Affected | Reference |  | 0.24 |
| Unaffected | 0.35 | 0.14 – 1.56 |
| Age |  |  |  |
|  | 1.02 | 0.98 – 1.06 | 0.35 |
| Vegetation |  |  |  |
| Perimeter area ratio (20,000m) | 0.37 | 0.12 – 1.04 | 0.06 |

**Supplementary table 5**: Multivariable generalised linear model (binomial family) of log2 anti-EBOV-GP total antibody titre classified by finite mixture models (high titre individuals vs. intermediate and low titre individuals combined; see figure 1). Success defined as high titre individual. Variables were selected using a forward, stepwise approach using AIC. P-values estimated by likelihood ratio test.