S1 File – Supplementary Figures and Tables

Demographic patterns of human antibody levels to *Simulium damnosum* s.l. saliva in onchocerciasis-endemic areas: an indicator of exposure to vector bites

Laura Willen[1,2] *, Philip Milton[3], Jonathan I.D. Hamley[3], Martin Walker[4], Mike Y. Osei-Atweneboana[5], Petr Volf[1], Maria-Gloria Basáñez[3], Orin Courtenay[6]*

[1] Department of Parasitology, Faculty of Science, Charles University, Prague, Czech Republic

[2] Centre for the Evaluation of Vaccinations, Vaccine and Infectious Disease Institute, University of Antwerp, Wilrijk, Belgium

[3] MRC Centre for Global Infectious Disease Analysis and London Centre for Neglected Tropical Disease Research, Department of Infectious Disease Epidemiology, School of Public Health, Imperial College London, London, UK

[4] London Centre for Neglected Tropical Disease Research and Department of Pathobiology and Population Sciences, Royal Veterinary College, Hatfield, UK

[5] Biomedical and Public Health Research Unit, CSIR-Water Research Institute, Accra, Ghana

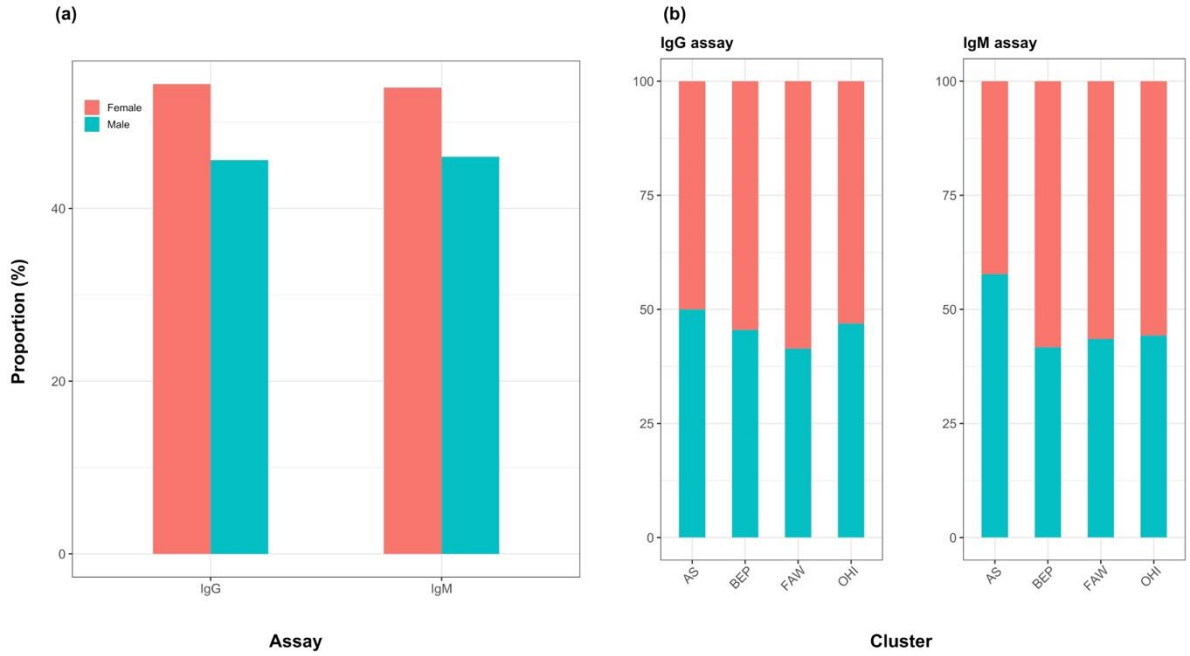
[6] Zeeman Institute for Systems Biology & Infectious Disease Epidemiology Research and School of Life Sciences, University of Warwick, Coventry, UK

* Corresponding author

E-mail: laura.willen@gmail.com

E-mail: orin.courtenay@warwick.ac.uk

Fig A – Proportion of tested individuals. (a) Proportion females and males tested per immunoassay. **(b)** Proportion females and males tested per cluster shown for each immunoassay.



AS: Asubende and Senyase; BEP: Beposo; FAW: Fawoman; OHI: Ohiampe.

Fig B – Age distribution of the population shown per cluster and sex. Panels **(a)** and **(c)** show boxplots of the age distribution within each cluster, for the participants tested with the IgG and IgM immunoassay, respectively. The solid horizontal line within the boxes is the median; the lower and upper borders are, respectively, the 1st (Q1) and 3rd (Q3) quartiles; the vertical bars indicate the 'minimum' and 'maximum' values, calculated as Q1 – 1.5 × IQR (interquartile range) and Q1 + 1.5 × IQR, respectively. Panels **(b)** and **(d)** show boxplots of the age distribution per sex, for the participants tested with the IgG and IgM immunoassay, respectively. F: female; M: male. ASU: cluster 1, Asubende/ Senyase; BEP: cluster 2, Beposo; FAW: cluster 3, Fawoman; OHI: cluster 4, Ohiampe.

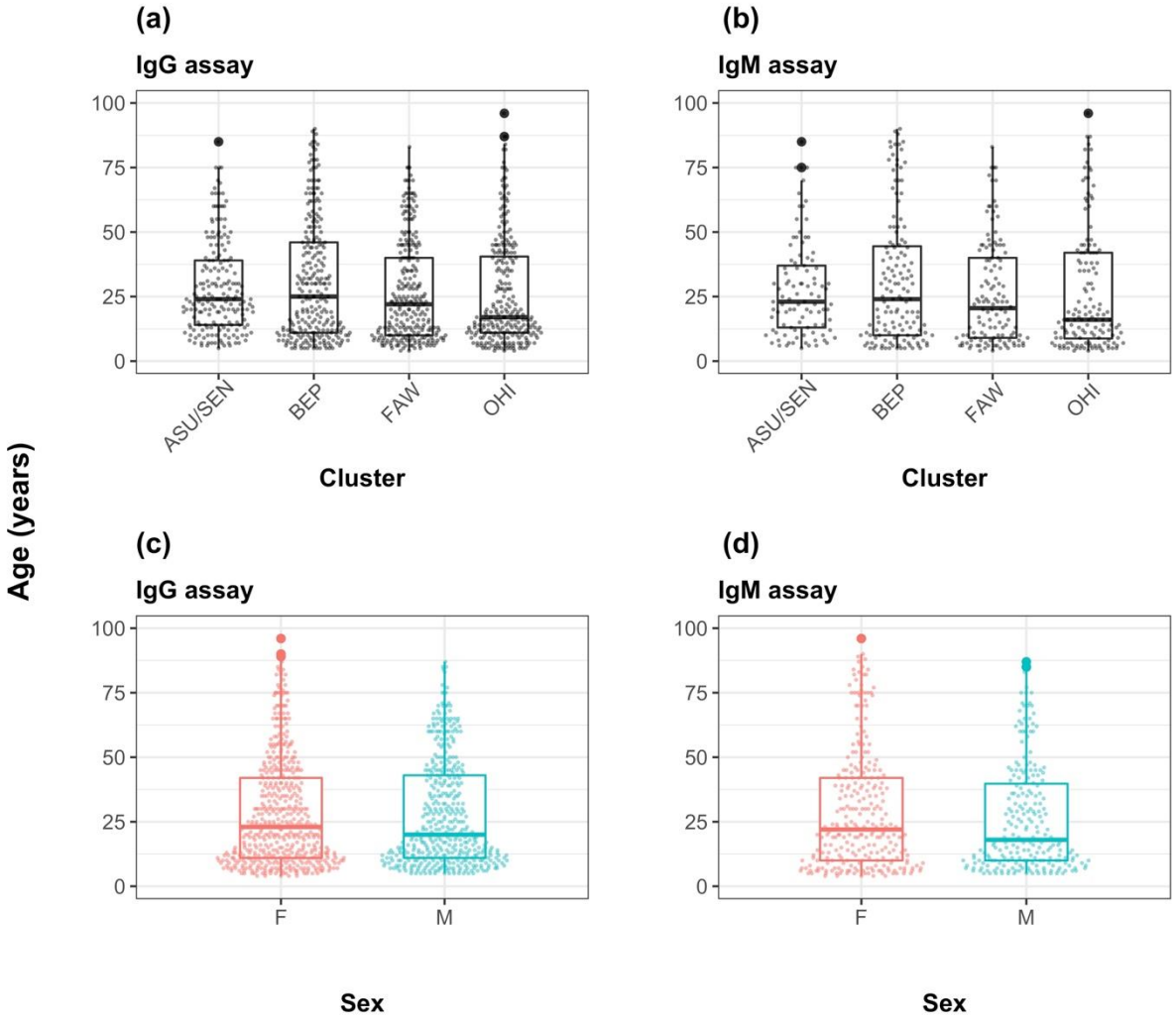


Table C – Number of people sampled and tested for IgG and IgM per age group and sex.

	Number tested per age group (years)							
Immunoglobulin tested	**5-10**	**10-20**	**21-30**	**31-40**	**41-50**	**51-60**	**61-70**	**>71**
IgG (n = 958)	217	252	147	93	101	55	54	39
IgM (n = 500)	140	114	69	50	50	20	20	37
	Sex ratio (M:F) per age group (years)							
Immunoglobulin tested	**5-10**	**10-20**	**21-30**	**31-40**	**41-50**	**51-60**	**61-70**	**>71**
IgG (n = 958)	0.87	0.92	0.63	0.75	0.91	0.96	1.35	0.44
IgM (n = 500)	0.97	0.93	0.73	0.72	0.92	0.67	1.87	0.42

n = number, M = Males, F = Females

Fig D – IgG antibody distribution according to age shown per cluster. Panel **(a)** shows scatterplots per cluster of the distribution of the IgG responses as a function of age of the participant (shown per sex) with indication of the best-fit lines (solid lines) and their confidence intervals (95 % CI, shown as a coloured area around the line). Panel **(b)** shows boxplots per cluster of the distribution of IgG responses per age group. The solid horizontal line within the boxes is the median; the lower and upper borders are, respectively, the 1st (Q1) and 3rd (Q3) quartiles; the vertical bars indicate the 'minimum' and 'maximum' values, calculated as Q1 – 1.5 × IQR (interquartile range) and Q1 + 1.5 × IQR, respectively. IgG levels are shown in units/ml. F: female; M: male. ASU: cluster 1, Asubende/ Senyase; BEP: cluster 2, Beposo; FAW: cluster 3, Fawoman; OHI: cluster 4, Ohiampe.

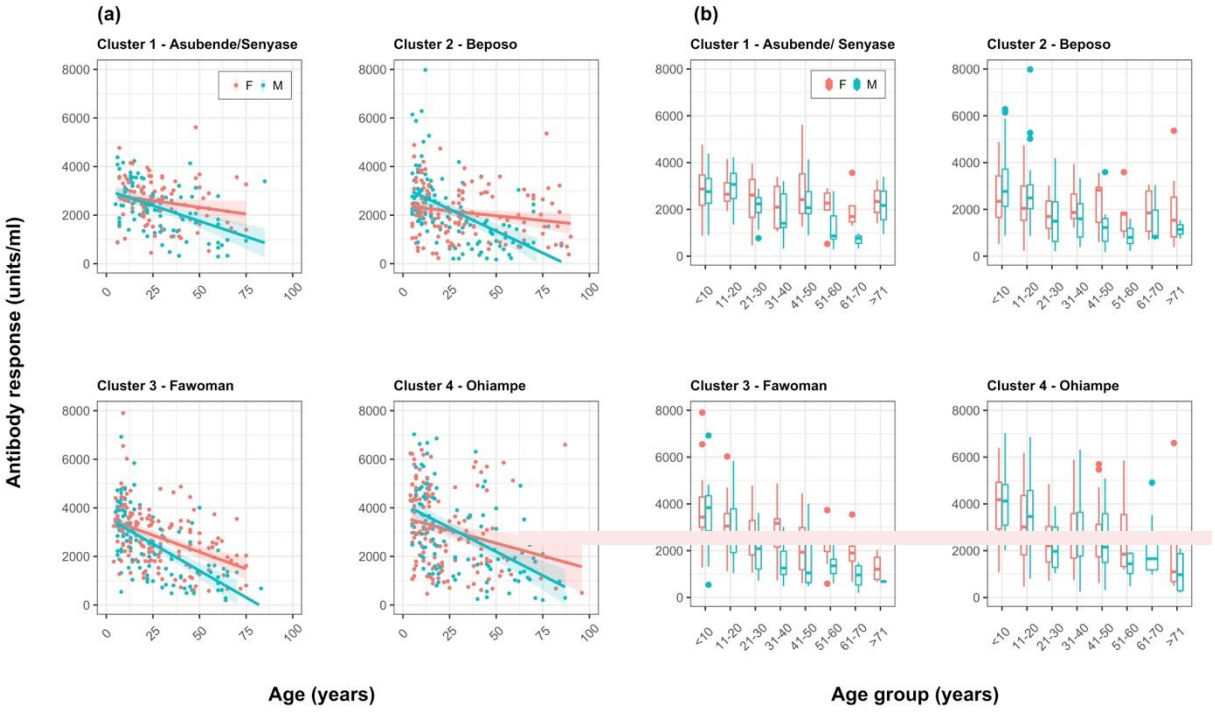


Fig E – IgM antibody distribution according to age shown per cluster. Panel **(a)** shows scatterplots per cluster of the distribution of the IgM responses as a function of age of the participant (shown per sex) with indication of the best-fit lines (solid lines) and their confidence intervals (95 % CI, shown as a coloured area around the line). Panel **(b)** shows boxplots per cluster of the distribution of IgM responses per age group. The solid horizontal line within the boxes is the median; the lower and upper borders are, respectively, the 1st (Q1) and 3rd (Q3) quartiles; the vertical bars indicate the 'minimum' and 'maximum' values, calculated as Q1 – 1.5 × IQR (interquartile range) and Q1 + 1.5 × IQR, respectively. IgM levels are shown in units/ml. F: female; M: male. ASU: cluster 1, Asubende/ Senyase; BEP: cluster 2, Beposo; FAW: cluster 3, Fawoman; OHI: cluster 4, Ohiampe.

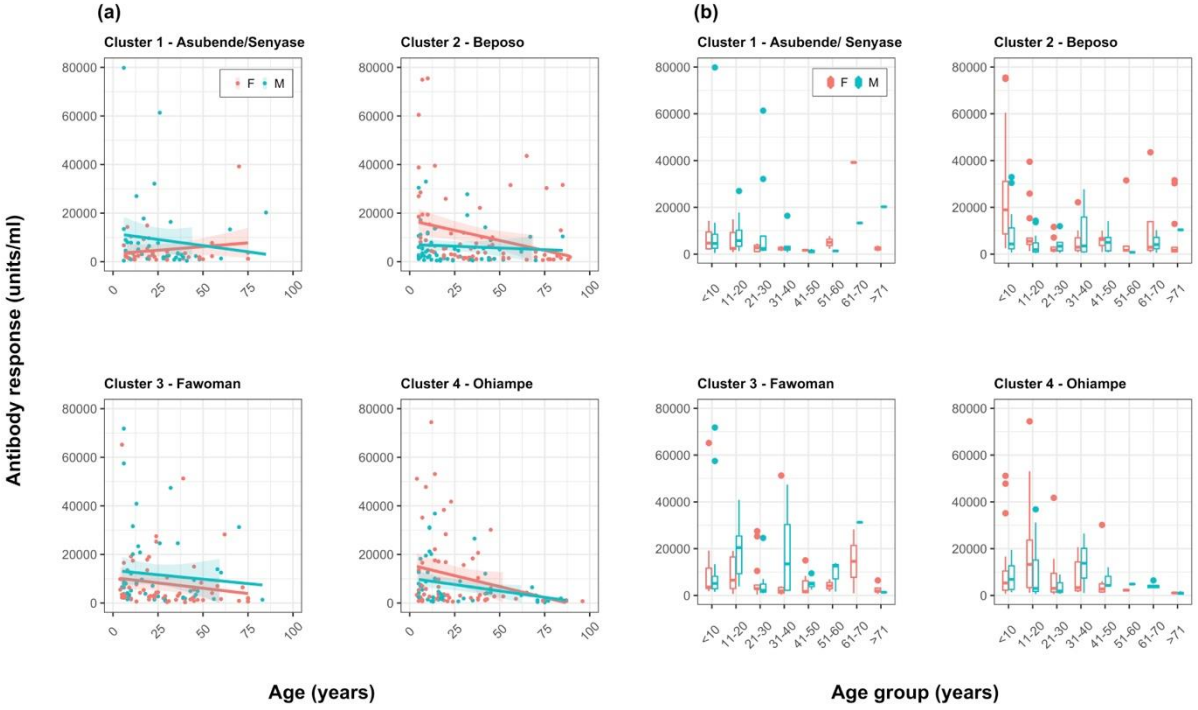


Table F – Summary of exponentiated regression coefficient estimates.

	Estimates [95% CI] IgG responses	Estimates [95% CI] IgM responses
(Intercept)	2562.291 ***	7927.734 ***
	[2369.958 – 2770.243]	[5553.306 – 11317.398]
BEP	0.860 **	1.191
	[0.783 – 0.945]	[0.791 – 1.792]
FAW	1.040	1.248
	[0.948 – 1.142]	[0.820 – 1.900]
OHI	1.233 ***	1.108
	[1.122 – 1.354]	[0.729 – 1.683]
Sex (male)	0.887 ***	0.890
	[0.833 – 0.945]	[0.676 – 1.171]
Age	0.994 ***	0.988 **
	[0.992 – 0.996]	[0.980 – 0.996]
Age:Sex (male)	0.990 ***	1.002
	[0.987 – 0.993]	[0.990 – 1.015]

The reference groups were Asubende/ Senyase (ASU/SEN) for village clusters, females for sex and for the age × sex interaction term. Village clusters: BEP: Beposo; FAW: Fawoman, OHI: Ohiampe. 95% confidence interval (CI) shown in square brackets; *** $P<0.001$; ** $P<0.01$; * $P<0.05$.

Fig F – Correlation between IgG and IgM responses. (a) shows the overall Spearman correlation between IgG and IgM responses (r_s = 0.1). **(b)** shows the correlation between both antibody responses broken down by sex ($r_{s_{\text{males}}}$ = 0.08, $r_{s_{\text{females}}}$ = 0.12).