Supplementary Table 1. Concentrations of 22 inflammatory biomarkers according to HIV status

Pathway	Marker (pg/mL)[a]	HIV negtive (n=62)			HIV positive (n=211)			p value
		Median	95% Confidence Intervals		Median	95% Confidence Intervals		
Pro-inflammatory cytokines	IL6	0.56	0.34	1.13	1.44	0.78	3.90	<0.0001
	IL1β	0.13	0.05	1.10	0.30	0.10	0.70	0.80
	TNFα	3.1	2.5	3.5	7.2	5.3	10.6	<0.0001
Anti-inflammatory	IL10	0.45	0.31	0.72	1.31	0.75	2.38	<0.0001
	IL1Ra	166	124	255	319	213	603	<0.0001
T cell activation	IL 12p70	0.17	0.10	0.25	0.23	0.15	0.35	0.0098
	IL2	0.27	0.15	0.57	0.57	0.42	0.87	<0.0001
	IFNɣ	2.7	1.7	5.1	12.2	6.1	26.3	<0.0001
	IL7	2.4	1.7	4.7	11.7	6.8	20.3	<0.0001
	IL4	0.04	0.02	0.07	0.03	0.02	0.05	0.53
B cell activation	IL13	1.4	0.7	2.5	1.0	0.6	1.5	0.0113
Chemotaxis	IL8	2.5	1.6	5.5	5.9	2.9	12.2	<0.0001
	MCP1	54	45	65	86	66	114	<0.0001

	IP10	202	165	311	870	523	1607	<0.0001
	MIP1β	52	40	78	84	57	122	<0.0001
Innate immunity	CD163[a]	0.48	0.27	0.54	0.82	0.57	1.1	<0.0001
Angiogenesis	VEGF	46	26	84	119	64	278	<0.0001
	bFGF	4.0	1.7	11.2	19.4	7.3	49.4	<0.0001
Vascular inflammation	ICAM[a]	0.38	0.34	0.44	0.63	0.52	0.83	<0.0001
	VCAM[a]	0.39	0.33	0.49	0.58	0.48	0.72	<0.0001
Systemic inflammation	CRP[a]	1.0	0.3	4.1	5.8	1.7	29.1	<0.0001
	SAA[a]	1.4	0.5	5.2	3.1	0.9	45.7	0.0005

[a]All markers are measured in pg/mL apart from those denoted with [a]which are in µg/mL. Note: p-values from ranksum tests.

Supplementary Table 2. Concentrations of 22 inflammatory biomarkers according to HIV status 42 weeks post ART initiation

Pathway	Marker	HIV negative			HIV positive			p value
		Median (pg/mL)[a]	95% Confidence Intervals		Median (pg/mL)[a]	95% Confidence Intervals		
Pro-inflammatory cytokines	IL6	0.59	0.33	0.97	0.70	0.43	1.21	0.02
	IL1β	0.25	0.10	1.08	0.22	0.07	0.67	0.37
	TNFα	3.0	2.6	3.7	3.8	3.0	5.0	<0.0001
Anti-inflammatory	IL10	0.43	0.29	0.67	0.35	0.25	0.60	0.049
	IL1Ra	188	148	335	214	158	413	0.14
T cell activation	IL 12p70	0.15	0.09	0.19	0.14	0.08	0.24	0.77
	IL2	0.21	0.14	0.38	0.30	0.19	0.49	0.0017
	IFNɣ	3.7	2.0	4.9	4.0	2.2	9.6	0.0325
	IL7	2.6	1.6	5.3	5.0	2.9	10.0	<0.0001
	IL4	0.0	0.01	0.06	0.02	0.01	0.05	0.88
B cell activation	IL13	1.89	1.2	2.9	1.5	0.7	2.3	0.04
Chemotaxis	IL8	3.07	1.6	6.9	3.3	1.8	7.2	0.71

	MCP1	56	40	69	69	52	94	<0.0001
	IP10	222	151	306	359	280	584	<0.0001
	MIP1β	57	43	77	69	49	94	0.0052
Innate immunity	CD163[a]	0.48	0.36	0.71	0.55	0.41	0.76	0.12
Angiogenesis	VEGF	46	32	79	70	43	131	0.0001
	βFGF	4	2	11	9	4	21	0.0001
Vascular inflammation	ICAM[a]	0.42	0.35	0.49	0.47	0.39	0.62	0.0007
	VCAM[a]	0.44	0.37	0.53	0.48	0.39	0.61	0.0395
Systemic inflammation	CRP[a]	0.94	0.44	4.4	2.6	0.83	7.9	0.0002
	SAA[a]	1.1	0.43	2.9	0.88	0.41	2.8	0.46

[a]All markers are measured in pg/mL apart from those denoted which are in µg/mL. Note: p-values from ranksum tests.

Supplementary Table 3. Risk factors for positive CMV PCR at baseline visit in 193 participants with HIV infection

Baseline factor	Univariate					Clinical Risk Factors[b]				Clinical risk factors and inflammatory biomarkers[c]			
	CMV positive		CMV negative		p value								
	Median or frequency	IQR or %	Median or frequency	IQR or %		OR	95 % CI min	95 % CI max	p value	OR	95 % CI min	95 % CI max	p value
Age years	37	31 – 41	36	29 – 43	0.89	1.00	0.94	1.06	0.96	0.99	0.94	1.04	0.62
Female sex	33	53%	96	51%	0.71	1.60	0.60	4.27	0.34	2.17	0.95	4.98	0.07
Diastolic BP mmHg	72	68 – 80	72	68 – 78	0.87	1.01	0.95	1.06	0.77	-	-	-	-
Haemoglobin g/dL	10.8	10 – 13	12	10 – 13	0.03	0.90	0.69	1.16	0.41	-	-	-	-
BMI (kg/m^2)	19.2	17.8 – 20.8	19.8	18.6 – 21.6	0.03	0.92	0.79	1.07	0.29	-	-	-	-
CD4 count (cells/µL)	32	17 – 53	49	21 – 67	0.03	0.98	0.96	1.00	0.03	0.94	0.90	0.99	0.008

HIV viral load (log copies/mL)	11.9	11.3 – 12.8	11.5	10.4 – 12.4	0.009	0.98	0.38	2.57	0.95	-	-	-	-
Other acute co-infection	15	25%	27	14%	0.06	0.79	0.26	2.36	0.67	-	-	-	-
%Activated CD8+T cells	82	71 – 92	75	62 – 85	0.008	1.03	1.00	1.06	0.07	1.04	1.01	1.07	0.008

Inflammatory biomarkers (pg/mL[a])

IL1Ra	381	270 - 682	286	187 – 473	0.003	-	-	-	-	-	-	-	-
VCAM[a]	13.33	13.18 – 13.60	13.22	13.00 – 13.43	0.002	-	-	-	-	5.26	1.08	25.68	0.04
ICAM[a]	13.46	13.28 – 13.78	13.30	13.08– 13.53	0.0002	-	-	-	-	-	-	-	-
MIP1β	107	70 – 137	72	52 – 109	0.0005	-	-	-	-	1.010	1.002	1.018	0.01

IP10	1251	871 – 2374	772	487 – 1461	<0.0001	-	-	-	-	-	-	-	-
MCP1	102	75 – 125	78	63 – 110	0.007	-	-	-	-	-	-	-	-
IL8	9	4 – 16	5	3 – 9	0.005	-	-	-	-	-	-	-	-
IL10	1.8	1.3 – 3.4	1	0.7 – 2.0	<0.0001	-	-	-	-	-	-	-	-
TNFα	10	7 – 13	7	5 – 10	0.0003	-	-	-	-	-	-	-	-

[a]All inflammatory biomarkers with a univariate association with CMV positivity ($p<0.05$) based on ranksum test, measured in pg/mL apart from those denoted[a] which are in log pg/mL. [b]Logistic regression multivariable fractional polynomial model of all clinical factors entered simultaneously. [c]Logistic regression multivariable fractional polynomial model of age and sex plus those factors with significant associations found in the clinical model together with those inflammatory biomarkers found to have an adjusted association with CMV positivity, entered simultaneously; log transforms selected for VCAM.

Supplementary Table 4. Correlation between individual biomarkers and baseline cfPWV

Pathway	Marker	Fold change[a]	p value
Pro-inflammatory cytokines	IL6	-0.007	0.92
	IL1β	-0.03	0.79
	TNFα	-0.02	0.82
Anti-inflammatory	IL10	0.02	0.79
	IL1Ra	-0.07	0.33
T cell activation	IL 12p70	-0.02	0.80
	IL2	-0.05	0.44
	IFNɣ	-0.03	0.65
	IL7	0.05	0.44
	IL4	-0.13	0.10
B cell activation	IL13	-0.21	0.01
Chemotaxis	IL8	0.13	0.06
	MCP1	0.12	0.08
	IP10	-0.02	0.82
	MIP1β	0.09	0.19
Innate immune response	CD163	0.09	0.21
Angiogenesis	VEGF	0.009	0.89
	βFGF	0.11	0.12
Vascular inflammation	ICAM	0.001	0.99
	VCAM	0.03	0.67
Systemic inflammation	CRP	-0.04	0.54
	SAA	-0.03	0.71

Note: p-values from spearman rho tests. [a]per 1m/s increase in cfPWV

Supplementary Table 5. Inflammatory markers included in PCA analysis and distribution across groups

Pathway	Marker (pg/mL)[a]	Cluster 1 (n=51)		Cluster 2 (n=153)		Cluster 3 (n=7)		p value
		Median	IQR	Median	IQR	Median	IQR	
Pro-inflammatory cytokines	IL 6	1.9	0.8 – 5.6	1.2	0.7 – 2.3	19.9	8.6 – 39.1	<0.0001
	IL1β	0.43	0.10 – 0.76	0.27	0.11 – 0.65	3.21	1.39 – 4.82	0.007
	TNFα	7.7	6.7 – 10.6	6.8	5.1 – 10.4	9.0	5.4 – 10.6	0.20
Anti-inflammatory	IL10	1.1	0.6 – 1.8	1.3	0.8 – 2.2	5.0	2.9 – 6.8	0.001
	IL1RA	314	174 – 592	304	206 – 420	2882	1465 – 10920	<0.0001
T cell activation	IL12p70	0.16	0.10 – 0.28	0.24	0.17 – 0.35	0.34	0.24 – 0.70	0.007
	IL2	0.52	0.31 – 0.80	0.58	0.37 – 0.86	0.49	0.44 – 0.90	0.46
	IFNɣ	7	3 – 29	11	6 – 22	312	132 – 1087	<0.0001
	IL7	12	6 – 18	12	7 – 20	21	15 – 22	0.13
	IL4	0.02	0.11 – 0.04	0.03	0.01 -0.05	0.03	0.01 – 0.09	0.42
B cell activation	IL13	1.10	0.85 – 1.86	0.79	0.41 – 1.13	0.66	0.28 – 1.51	0.02
Chemotaxis	IL 8	4.8	2.6 – 9.5	5.6	2.9 – 11.8	35.4	20.7 – 84.2	0.001
	MCP1	78	65 – 112	86	65 – 112	125	58-316	0.41

	IP 10	772	418 – 1621	846	501 – 1385	23,000	1500 – 230,000	0.002
	MIP1β	77	51 – 114	92	60 – 122	110	70 – 169	0.14
Innate immune response	sCD163[a]	0.8	0.5 – 1.1	0.8	0.6 – 1.0	1.2	0.5 – 1.3	0.70
Angiogenesis	VEGF	89	58 – 195	143	67- 285	416	194 – 528	0.007
	BFGF	20	11 – 40	26	7 – 65	27	21 – 38	0.69
Vascular inflammation	sICAM1[a]	0.6	0.4 – 0.9	0.6	0.5 – 0.7	1.9	1.1 – 2.2	<0.0001
	sVCAM1[a]	0.5	0.4 – 0.7	0.6	0.5 – 0.7	1.0	0.8 – 1.3	0.0004
Systemic inflammation	CRP[a]	9.9	2– 69	4	1 – 16	170	120 – 200	<0.0001
	SAA[a]	7	0.9 – 142	2	1 – 13	225	46 – 92	0.0003

[a] All markers are measured in pg/µL except for those denoted with [a]which are in µg/µL

Supplementary Table 6: Comparison of Clinical Characteristics for Malawian adults living with HIV according to availability of biomarker data

		Biomarker data available (n=211)		Biomarker data not available (n=68)	
		Median or frequency	IQR or %	Median or frequency	IQR or %
Clinical characteristics	Age (years)	36.3	30.8 – 43.0	37.7	31.8 – 44.6
	Systolic BP (mmHg)	116	108 - 128	127	111 - 132
	Diastolic BP	72	68 - 80	74	69 - 82
	Heart rate (bpm)	82	72 - 100	78	72 - 92
	Temperature (°C)	36.4	36 – 36.9	36.4	36.1 – 37.0
	Haemoglobin (g/dL)	11.6	10.1 – 13.0	11.3	10.0 – 12.5
	Creatinine (µmol/L)	64	54 - 77	68	58 - 82
	Platelets ($x10^9$/L)	236	185 – 334	223	189 – 304
	Nadir CD4 (cells/mm^3)	37	18 - 61	43	18 - 65
	HIV viral load (copies/mL $x10^6$)	1.1	0.4 – 2.8	1.2	0.4 – 2.9
	Acute co-infection	43	20	14	22
	CMV PCR positive [a]	60	28	1	2

	Death [a]	10	5	13	19
Arterial stiffness [a]	**Week 2 cfPWV (m/s)**	7.3	6.5 – 7.9	8.5	6.6 - 10
	Week 12 PWV (m/s)	7.1	6.5 – 7.8	8.1	6.5 – 9.3
	Week 24 cfPWV (m/s)	7.0	6.3 – 7.7	7.5	7.0 – 8.3
	Week 44 cfPWV (m/s)	6.8	6.3 – 7.7	7.6	6.8 – 8.4
Immune cell surface phenotype	**%CD4 Activation**	76	62 - 86	73	53 - 79
	%CD4 Exhaustion	54	44 – 58	54	29 - 69
	%CD4 Senescence	15	9 – 22	15	11 - 26
	%CD8 Activation	79	65 – 88	75	59 - 86
	%CD8 Exhaustion	38	29 – 50	36	27 - 48
	%CD8 Senescence	54	43 – 64	52	45 - 62
	%Intermediate Monocytes	9.8	6.0 – 13.0	11.5	6.3 – 15.0

[a]Consent for biomarker data analysis was obtained retrospectively towards the end of recruitment, therefore differences in CMV positivity, mortality rates and arterial stiffness may be explained by differences in those providing consent as well as loss to follow-up and death during the study. As arterial stiffness and mortality was lower amongst those included in the biomarker analysis, results described here may underestimate prevalence and cardiovascular risk for inflammatory clusters at ART initiation.