Supplementary Table 1: Multi-Ancestry PGS$_{lymph}$ Performance on Baseline and Post-Treatment CD4 Cell Count in ACTG Without Correcting for Covariates (Univariate Model)

Ancestry	Key	EUR PGS$_{lymph}$ ~ Baseline CD4 Cell Count	AFR PGS$_{lymph}$ ~ Baseline CD4 Cell Count	EUR PGS$_{lymph}$ ~ Change CD4 Cell Count Post Treatment	AFR PGS$_{lymph}$ ~ Change CD4 Cell Count Post Treatment
Multi-Ancestry	Adjusted R^2	1.363e-3	2.230e-4	8.826e-5	-3.033e-4
	p-value	5.355e-3	0.147	0.256	0.933
European	Adjusted R^2	2.253e-4	2.876e-4	-6.710e-4	1.562e-3
	p-value	0.230	0.211	0.734	0.080
African	Adjusted R^2	-3.860e-4	1.014e-3	-8.543e-4	9.831e-4
	p-value	0.586	0.091	0.900	0.144

*Significant p-values marked in green

Supplementary Table 2: Multi-Ancestry PGS$_{lymph}$ Performance on Baseline and Post-Treatment CD4 Cell Count in ACTG Correcting for Age, Sex, PC1-15, Viral Load, and Baseline CD4 T-Cell Count (Multivariate Model)

Ancestry	Key	EUR PGS$_{lymph}$ ~ Baseline CD4 Cell Count	AFR PGS$_{lymph}$ ~ Baseline CD4 Cell Count	EUR PGS$_{lymph}$ ~ Change CD4 Cell Count Post Treatment	AFR PGS$_{lymph}$ ~ Change CD4 Cell Count Post Treatment
Multi-Ancestry	Adjusted R^2	0.278	0.278	0.073	0.073
	p-value	4.200e-322	4.200e-322	2.070e-45	2.223e-45
European	Adjusted R^2	0.271	0.270	0.083	0.084
	p-value	5.251e-122	9.761e-122	8.244e-19	5.073e-19
African	Adjusted R^2	0.261	0.261	0.089	0.092
	p-value	6.372e-108	6.644e-108	1.723e-17	3.005e-18

*Significant p-values marked in green

Supplementary Table 3: AFR PGS_{lymph} ~ Change CD4 T-Cell Count: Applied to Individuals of African Ancestry in ACTG

Variable	Effect Size	p-value
log_{10}HIV-1 RNA (Viral Load)	58.370	5e-16
Age	-2.356	1.1e-8
SQRT Baseline CD4 T-Cell Count	3.936	5.3e-7
Sex	47.618	1.3e-6
AFR PGS_{lymph}	-2.062	0.044
PC1	7006.358	0.050
PC12	-1532.705	0.090
PC2	14384.781	0.109
PC14	1205.529	0.114
PC9	2394.370	0.158
PC7	1890.453	0.273
PC11	1352.068	0.320
PC15	-298.210	0.367
PC10	985.727	0.468
PC8	-494.557	0.569
PC5	1260.512	0.582
PC3	-3183.397	0.638
PC6	965.505	0.710
PC4	1269.009	0.856
PC13	-193.283	0.859

*Significant p-values marked in green

Supplementary Table 4: AFR PGS_{lymph} ~ Change CD4 T-Cell Count: Applied to Individuals of African Ancestry in ACTG: Including Interactions Between AFR PGS_{lymph} and Covariates

Variable	Effect Size	p-value
log_{10}HIV-1 RNA (Viral Load)	58.451	5e-16
Age	-2.373	8.9e-9
SQRT Baseline CD4 T-Cell Count	3.933	5.5e-7
Sex	46.960	1.8e-6
AFR PGS_{lymph}	-1.952	0.059
PC1	6764.179	0.059
PC12	-1522.37	0.092
PC14	1245.346	0.104
PC9	2559.650	0.132
PC2	13240.510	0.139
PC7	1971.010	0.254
PC11	1524.281	0.265
AFR PGS_{lymph}*log_{10}HIV-1 RNA (Viral Load)	-1.560	0.305
PC15	-333.858	0.315
AFR PGS_{lymph}*Age	0.076	0.432
PC10	1006.535	0.460
PC5	1188.526	0.605
PC3	-3511.826	0.605
AFR PGS_{lymph}*SQRT Baseline CD4 T-Cell Count	0.090	0.614
PC8	-406.277	0.641
PC6	902.865	0.729
AFR PGS_{lymph}*Sex	0.822	0.730
PC13	-242.729	0.824
PC4	1531.005	0.827

*Significant p-values marked in green

Supplementary Table 5: Multi-Ancestry PGS$_{lymph}$ performance on Baseline Lymphocyte Count in ACTG Without Correcting for Covariates (Univariate Model)

Ancestry	Key	EUR PGS ~ Lymphocyte Count	AFR PGS ~ Lymphocyte Count
Multi-Ancestry	Adjusted R^2	4.102e-4	3.875157e-4
	p-value	0.088	0.094
European	Adjusted R^2	2.211e-3	1.246e-3
	p-value	0.025	0.070
African	Adjusted R^2	-5.306e-4	2.083e-3
	p-value	0.767	0.032

*Significant p-values marked in green

Supplementary Table 6: Multi-Ancestry PGS$_{lymph}$ Performance on Baseline Lymphocyte count in ACTG Correcting for Age, Sex, PC1-15, and Viral Load (Multivariate Model)

Ancestry	Key	EUR PGS ~ Lymphocyte Count	AFR PGS ~ Lymphocyte Count
Multi-Ancestry	Adjusted R^2	0.097	0.098
	p-value	7.330e-93	7.286e-94
European	Adjusted R^2	0.103	0.101
	p-value	8.502e-36	1.134e-34
African	Adjusted R^2	0.108	0.109
	p-value	4.479e-35	2.900e-35

*Significant p-values marked in green

Supplementary Table 7: EUR PGS_{lymph} ~ Inverse Normal Baseline Lymphocyte Count: Applied to Individuals of European Ancestry in ACTG

Variable	Effect Size	p-value
$\log_{10}$HIV-1 RNA (Viral Load)	0.389	5e-37
Sex	-0.366	3e-6
EUR PGS_{lymph}	0.025	0.018
PC8	20.745	0.042
PC14	3.936	0.045
PC7	-13.717	0.099
PC3	-57.186	0.165
PC1	-141.407	0.173
PC15	3.594	0.205
PC10	9.314	0.215
PC6	-13.482	0.221
PC12	-3.489	0.235
PC4	26.923	0.331
PC9	-5.458	0.3809
PC2	-35.347	0.551
Age	-1.2e-3	0.585
PC13	-1.773	0.732
PC5	1.870	0.738
PC11	-1.232	0.890

*Significant p-values marked in green

Supplementary Table 8: EUR PGS_{lymph} ~ Inverse Normal Baseline Lymphocyte Count: Applied to Individuals of European Ancestry in ACTG: Including Interactions Between EUR PGS_{lymph} and Covariates

Variable	Effect Size	p-value
$\log_{10}$HIV-1 RNA (Viral Load)	-0.386	2e-36
Sex	-0.367	3.1e-6
EUR PGS_{lymph}*Age	-3.0e-3	7.3e-3
EUR PGS_{lymph}	0.025	0.015
PC8	20.584	0.0434
PC14	3.950	0.0437
PC7	-12.880	0.121
PC3	-58.232	0.157
PC1	-134.164	0.196
PC15	3.668	0.196
PC6	-13.974	0.204
PC12	-3.688	0.210
PC10	9.009	0.230
PC4	29.742	0.283
PC9	-5.523	0.375
PC2	-41.768	0.481
EUR PGS_{lymph}*$\log_{10}$HIV-1 RNA (Viral Load)	9.2e-3	0.521
PC5	2.451	0.662
Age	-8.9e-4	0.689
PC13	-1.881	0.717
EUR PGS_{lymph}*Sex	6.850e-3	0.862
PC11	-0.771	0.893

*Significant p-values marked in green

Supplementary Table 9: AFR PGS_{lymph} ~ Inverse Normal Baseline Lymphocyte Count in ACTG: Applied to All Participants in ACTG

Variable	Effect Size	p-value
$\log_{10}$HIV-1 RNA (Viral Load)	-0.432	3e-101
Sex	-0.224	4.1e-9
AFR PGS_{lymph}	8.3e-3	8.7e-3
PC1	-3.741	0.094
PC5	2.876	0.117
PC6	5.019	0.125
PC9	-4.077	0.207
PC14	1.864	0.217
PC2	4.140	0.268
PC3	2.799	0.366
PC13	1.842	0.369
PC12	1.137	0.483
PC11	-1.636	0.530
PC7	-1.162	0.567
PC15	-0.664	0.572
PC10	-0.708	0.777
PC8	-0.685	0.790
Age	-9.0e-5	0.949
PC4	0.357	0.960

*Significant p-values marked in green

Supplementary Table 10: AFR PGS_{lymph} ~ Inverse Normal Baseline Lymphocyte Count: Applied to All Individuals in ACTG: Including Interactions Between AFR PGS_{lymph} and Covariates

Variable	Effect Size	p-value
$\log_{10}$HIV-1 RNA (Viral Load)	-0.431	1e-100
Sex	-0.224	4.1e-9
AFR PGS_{lymph}	8.4e-3	7.9e-3
PC1	-3.823	0.087
PC5	2.840	0.122
PC6	5.021	0.125
PC9	-4.091	0.206
PC14	1.853	0.220
AFR PGS_{lymph}*Sex	0.010	0.231
PC2	4.187	0.263
AFR PGS_{lymph}*Age	-3.1e-4	0.329
PC3	2.770	0.371
PC13	1.833	0.372
PC12	-1.136	0.484
PC11	-1.558	0.550
PC7	-1.142	0.574
PC15	-0.586	0.619
PC10	-0.706	0.777
PC8	-0.700	0.785
AFR PGS_{lymph}*$\log_{10}$HIV-1 RNA (Viral Load)	5.3e-4	0.906
Age	-6.5e-5	0.963
PC4	0.276	0.969

*Significant p-values marked in green

Supplementary Table 11: Multi-Ancestry PGS$_{lymph}$ Performance on Lymphocyte Count in PMBB Without Controlling for Covariates (Univariate Model)

Ancestry	Key	EUR PGS ~ Lymphocyte Count	AFR PGS ~ Lymphocyte Count
Multi-Ancestry	Adjusted R^2	6.442e-3	0.014
	p-value	1.870e-54	2.87351e-114
European	Adjusted R^2	0.017	3.914e-3
	p-value	3.045591e-99	1.279619e-23
African	Adjusted R^2	8.029e-3	8.406e-3
	p-value	6.835213e-20	9.582295e-21

*Significant p-values marked in green

Supplementary Table 12: Multi-Ancestry PGS$_{lymph}$ performance on Lymphocyte Count in PMBB Controlling for Age, Sex, and PC1-15 (Multivariate Model)

Ancestry	Key	EUR PGS ~ Lymphocyte Count	AFR PGS ~ Lymphocyte Count
Multi-Ancestry	Adjusted R^2	0.102	0.087
	p-value	4.19956e-322	4.19956e-322
European	Adjusted R^2	0.085	0.064
	p-value	4.19956e-322	4.19956e-322
African	Adjusted R^2	0.070	0.0678
	p-value	1.18212e-149	3.29387e-144

*Significant p-values marked in green

Supplementary Table 13: EUR PGS_{lymph} ~ Inverse Normal Lymphocyte Count: Applied to All Individuals in PMBB

Variable	Effect Size	p-value
Age	-0.011	5e-273
PC1	30.900	5e-182
EUR PGS$_{lymph}$	0.015	2e-178
Sex	0.248	2e-130
PC7	-18.000	2e-48
PC12	9.973	1e-21
PC4	10.082	8e-12
PC15	6.055	2.4e-8
PC2	4.842	1.7e-3
PC6	2.817	3.9e-3
PC8	-2.429	0.014
PC10	-2.315	0.016
PC11	2.122	0.030
PC9	-0.967	0.327
PC5	0.933	0.537
PC13	0.714	0.620
PC14	-0.237	0.810
PC3	0.129	0.900

*Significant p-values marked in green
* Results for EUR PGS$_{lymph}$ applied to European and African ancestry groups not shown due to redundancy

Supplementary Table 14: AFR PGS_{lymph} ~ Inverse Normal Lymphocyte Count: Applied to All Individuals in PMBB

Variable	Effect Size	p-value
Age	-0.011	1e-268
Sex	0.247	1e-126
AFR PGS$_{lymph}$	-5.1e-3	1e-40
PC1	14.510	6e-38
PC4	9.912	2e-11
PC3	6.035	2.7e-9
PC2	6.673	2.9e-5
PC15	-3.280	1.5e-3
PC8	-2.607	8.7e-3
PC5	-2.823	0.063
PC9	1.815	0.066
PC7	1.166	0.241
PC14	0.707	0.477
PC11	0.562	0.567
PC13	-0.454	0.754
PC6	0.248	0.801
PC12	-0.088	0.929
PC10	0.024	0.981

*Significant p-values marked in green
* Results for EUR PGS$_{lymph}$ applied to European and African ancestry groups not shown due to redundancy