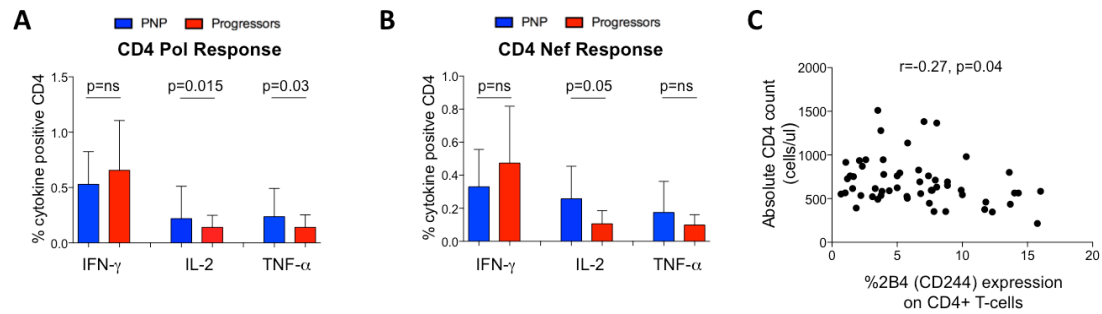
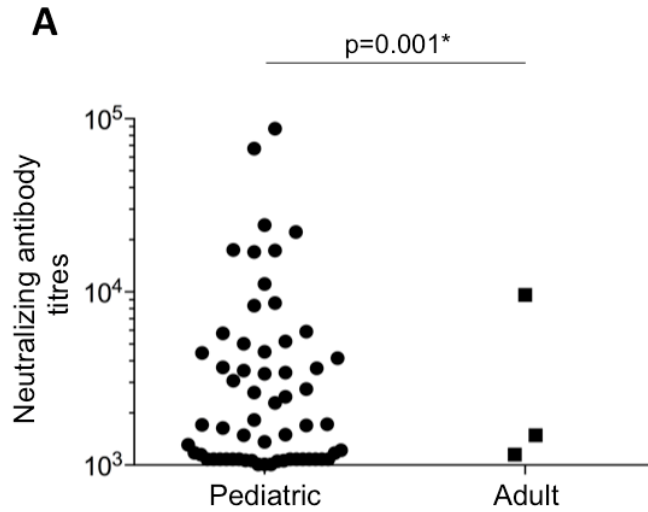


## Supplementary Material



**Fig. S1. Decreased CD4 T-cell function and increased expression of exhaustion markers in pediatric progressors. a-b:** IFN- $\gamma$ , IL-2 and TNF- $\alpha$  intracellular cytokine staining (ICS) responses to Pol and Nef peptide pools in progressors (red bars, n=8) and non-progressors (blue bars, n=18). Mann-Whitney test. **c.** Increased expression of 2B4 (CD244) on CD4 T-cells in pediatric progressors. Spearman rank correlation test (n=58).



**Fig. S2. Neutralizing antibody potency in pediatric and adult subjects. a.** Among neutralizing antibody responses made to all 16 viruses by 85 pediatric and 19 adult subjects, neutralizing antibody titers of >1:1000 were observed in 4.4% versus 0.9% of tests involving pediatric versus adult samples respectively (p=0.001, Fisher's Exact test comparing frequency of neutralizing antibody titers of >1:1000 across 16 viruses).

Generalized linear model				
Variable	Beta-coefficient	95% Confidence Interval		p-value
		Lower	Upper	
Log Viral load	3.9	0.676	7.122	0.018
Total breadth OLP responses	0.81	0.008	1.62	0.048
Age at visit	1.28	-1.03	2.653	0.07
CD4 count	0.001	-0.006	0.009	0.749

**Table S1. CD8+ T-cell activation is independently associated with total breadth of HIV-specific CTL responses and viral load.** Results are shown for a generalized linear model with CD8 T-cell activation (%CD38+HLADR+ CD8 T-cells) as the dependent variable and log viral load, overlapping peptide (OLP) breadth, age and absolute CD4 count as independent variables (n=30).

Pseudoviruses tested for neutralizing sera activity		
Subtype A	Subtype B	Subtype C
Q23.17	PVO.4	Du156.2
Q168.a2	6535.3	Du172.17
Q842.d12	TR0.11	CAP45.G3
Q461.e2	WITO.4160	ZM197M
	AC10.0.29	CAP239.G3
	QH0692.42	ZM214M

**Table S2. List of pseudoviruses tested for neutralizing sera activity by HIV-1 subtype.**

## Source data for Fig 1i, 1j, 2b, 2c, 2g, 6c, 6d

**Fig 1i. sCD14 (pg/ul)**

HIV-ve	PNP	Progressors
1920000	1570000	2720000
2160000	1820000	2470000
2020000	1490000	2940000
3200000	1040000	4230000
4500000	1820000	4300000
1970000	2110000	4050000
2650000	3040000	2840000
1340000	2300000	1800000
2120000	2810000	2950000
912000	3210000	3110000
2000000	2370000	2930000
1220000	1500000	4650000
4620000	1100000	5360000
1700000	2090000	3530000
1590000		1730000
1530000		2530000
2360000		
2260000		
1810000		
1960000		
2320000		

**Fig 1j. iFABP (pg/ul)**

HIV-ve	PNP	Progressors
1890	2067	671
1393	1256	4969
1689	3482	2872
2082	2753	1004
3168	860	3778
1275	1375	1391
3838	2448	2744
3067	1092	990
5286	1481	1002
3199	1327	1491
925	721	2418
710	933	1463
2253	681	3471
2691	754	3665
2953		3603
2313		3452
1519		1888
2198		2521
1366		3097
2191		
649		

**Fig 2b, SEB response (%cytokine positive CD4 T-cells)**

non-Progressors				Progressors				HIV-negative		
IFN-gamma	IL-2	TNF-alpha		IFN-gamma	IL-2	TNF-alpha		IFN-gamma	IL-2	TNF-alpha
1.25	7.72	6.68		2.62	9.35	7.74		1.53	8.60	2.79
1.88	10.32	4.06		1.51	2.65	1.37		0.91	6.10	0.26
2.25	10.48	1.44		1.21	2.17	2.44		1.23	5.06	3.22
	9.11	6.58		2.62	2.54	0.70		1.63	5.46	3.07
0.74	4.16	2.90		3.58	0.81	1.80		1.48	4.56	2.02
1.78	3.88	2.47		2.16	6.12	3.72		1.20	9.11	3.35
2.53	6.40	1.31		5.53	5.31	9.56		1.88	7.04	3.21
1.92	11.77	3.58		2.04	7.55	2.24		1.69	7.61	2.19
6.13	5.53	5.60		2.20	9.98	6.40		0.98	6.45	2.41
1.03	6.51	2.29		3.03	8.32	10.32		1.86	8.53	2.80
1.21	4.15	2.60		1.50	4.59	4.63		2.51	4.64	3.62
0.66	6.93	3.25		2.07	4.23	3.39		0.77	3.38	1.17
0.50	8.38	2.46		1.42	3.82	2.84		0.94	5.68	1.09
				7.67	2.91	4.50		0.59	4.94	0.85
				12.92	4.47	12.90		2.63	7.79	3.05
				1.68	5.82	3.89		2.55	5.90	1.60
				15.71	6.35	14.36		4.64	16.50	7.28
				10.36	7.15	12.85		2.63	9.82	4.14
				8.68	0.32	1.49		3.11	6.81	6.86
				15.54	9.91	16.56				
				4.76	7.56	8.43				
				2.69	4.07	3.85				
				2.07	2.80	1.83				
				1.51	2.06	0.93				
				1.36	3.39	1.69				
				6.83	3.47	8.10				
				3.95	6.92	6.77				
				5.77	4.77	4.02				
				7.80	0.53	0.48				
				1.52	3.27	5.83				
				1.30	5.58	4.89				
				1.36	4.27	2.61				

**Fig 2c, Gag response (%cytokine positive CD4 T-cells)**

PNP				Progressors		
IFN-gamma	IL-2	TNF-alpha		IFN-gamma	IL-2	TNF-alpha
0.43	0.03	0.02		0.55	0.03	0.01
0.76	0.03	0.03		0.33	0.02	0.03
0.04	0.01	0.53		0.30	0.03	0.02
0.03	0.52	0.45		0.03	0.23	0.03
0.56	0.03	0.01		0.03	0.03	0.28
0.45	0.03	0.61		1.90	0.03	0.10
0.63	0.03	0.03		0.84	0.03	0.02
0.00	0.63	0.54		1.12	0.02	0.12
0.34	1.20	0.88		0.57	0.46	0.02
0.54	0.00	0.18		0.95	0.00	0.03
0.65	0.03	0.30		0.62	0.13	0.03
0.63	0.45	0.03				
0.02	0.86	0.02				
0.07	0.46	0.63				
0.74	0.43	0.03				
0.34	0.56	0.03				
0.88	0.01	0.04				
0.43	0.02	0.34				
0.56	0.34	0.56				
0.04	0.99	0.45				
0.44	0.58	0.03				
1.07	0.03	0.03				
0.04	0.53	0.05				
0.35	0.85	0.45				
0.02	0.66	0.35				
0.44	0.74	0.02				

**Fig 2g. The proportion of cells producing each cytokine to the total CD4 T-cell SEB response was determined (% of cells responding with each cytokine of total SEB response)**

Tn			Tcm			Tem			Temra		
IL-2	IFN-gamma	TNF-alpha	IL-2	IFN-gamma	TNF-alpha	IL-2	IFN-gamma	TNF-alpha	IL-2	IFN-gamma	TNF-alpha
83.3	0.0	0.0	94.0	10.0	6.0	72.0	36.0	36.0	65.0	95.0	75.1
84.2	2.6	0.0	88.0	5.0	10.0	71.0	28.0	36.0	49.0	93.0	78.2
94.9	10.2	5.1	90.4	22.0	29.0	59.0	43.0	45.0	40.0	100.0	30.0
64.7	21.2	7.1	78.6	20.0	17.0	55.0	51.0	37.0	43.0	95.0	69.6
93.7	6.3	0.0	95.2	11.0	10.0	81.0	18.0	44.0	65.0	75.0	50.1
80.6	0.0	0.0	85.4	11.0	22.0	66.0	37.0	53.0	71.0	79.0	71.4
74.2	8.4	0.0	80.3	22.0	12.0	79.0	25.0	49.0	80.0	74.0	59.6
85.2	0.0	2.4	88.0	5.0	16.0	85.0	11.0	37.0	31.0	77.0	62.0
66.7	11.2	11.2	79.9	15.0	19.0	65.0	30.0	44.0	37.0	87.0	66.6
100	0.0	0.0	86.3	10.0	11.0	65.0	45.0	41.0	50.0	100.0	75.5
100	0.0	0.0	94.7	5.0	5.0	66.0	36.0	51.0	32.0	79.0	63.2

**Fig 6c. Viral load (c/ml)**

PNP	FP
76000	34000
25374	21000
12132	160000
8124	140000
13422	440000
175876	29000
13611	58000
41291	16000
144429	10000
18776	36000
	19000
	15000



**Fig 6c. CD4 T-cell count CD4 count (/mm<sup>3</sup>)**

PNP	FP
1057	694
1289	799
1223	1123
1646	576
1151	846
1058	1595
1279	1234
1071	1077
3181	1088
2087	1289
	1604
	1268

**Fig 6d. log HIV copies per million cells**

Tn		Tscm		Tcm		Tem	
PNP	FP	PNP	FP	PNP	FP	PNP	FP
0.19	0.52	2	2.22	2.3	3.9	3.44	2.4
0.74	0.68	1.18	2.32	1.53	2.35	2.75	0.27
0.53	0.74	1.47	3.06	0.74	2.6	2.5	3.52
0.3	0.41	0.25	2.07	0.53	1.52	1.6	1.38
0.375	0.38	1.56	4.81	1.144	1.9	2.745	2.54
0.355	0.465	1.962	2.355	1.288	1.223	2.44	2.14
0.27	0.412	1.8	1.887	2.07	2.565	3.784	2.565
0.171	0.468	2.062	1.972	1.377	4.29	3.025	2.16
0.666	0.612	1.323	2.601	1.666	2.585	2.75	0.243
0.477	0.666	0.225	1.7595	2.477	2.86	1.76	3.168
	0.369		4.0885		1.672		1.242
	0.342		1.344		2.09		2.286