**Table S1. Complete results of regression analysis: change in CD4+ cell count after ART initiation**

 Analysis Of GEE Parameter Estimates

 Empirical Standard Error Estimates

 Standard 95% Confidence

 Parameter Estimate Error Limits Z Pr > |Z|

 Intercept 24874.42 1344.198 22239.84 27509.00 18.51 <.0001

 CD4\_lag\_time 0.0039 0.0036 -0.0032 0.0111 1.09 0.2776

 ART\_cd4 -0.3028 0.0057 -0.3140 -0.2915 -52.66 <.0001

 sex 0 21.8582 0.6099 20.6628 23.0535 35.84 <.0001

 a\_type 1 4.7376 1.9638 0.8886 8.5865 2.41 0.0158

 a\_type 2 10.9888 1.9012 7.2625 14.7150 5.78 <.0001

 a\_type 3 -0.5762 2.3333 -5.1493 3.9969 -0.25 0.8049

 a\_type 4 11.5041 2.3861 6.8275 16.1807 4.82 <.0001

 a\_loc 1 -13.3228 1.4139 -16.0939 -10.5517 -9.42 <.0001

 a\_loc 2 4.2571 1.3422 1.6264 6.8878 3.17 0.0015

 CountryID 1 31.5621 1.3794 28.8586 34.2656 22.88 <.0001

 CountryID 2 -24.7347 1.7576 -28.1796 -21.2898 -14.07 <.0001

 CountryID 3 23.5652 1.5963 20.4366 26.6938 14.76 <.0001

 art\_year -12.2798 0.6687 -13.5905 -10.9691 -18.36 <.0001

 age\_group\_artn 15-24 yrs 5.4836 2.5804 0.4260 10.5411 2.13 0.0336

 age\_group\_artn 40-49 -7.9501 1.3797 -10.6543 -5.2459 -5.76 <.0001

 age\_group\_artn 50 yrs and above -20.5947 1.7896 -24.1023 -17.0872 -11.51 <.0001

Key:

CD4\_lag\_time = time (days) between ART initiation and follow-up CD4+ cell count

ART\_CD4 = CD4+ cell count (cells/mm3) at ART initiation

Sex: 0 = female, 1 = male (reference)

A\_type = facility type, 1 = public primary, 2 = public secondary, 3 = public tertiary, 4 = private, 5 = other

A\_loc = facility location (1 = urban, 2 = peri-urban, 3 = rural (reference)

Countryid = Country identifier (1 = Rwanda, 2 = Mozambique, 3 = Tanzania, 4 = Kenya (reference)

ART\_year = year of ART initiation

Age\_group\_artn = age at ART initiation (15-24 yrs, 25-39 yrs (reference), 40-49 yrs, 50+ yrs)

CD4\_diff (dependent variable) = difference between follow-up CD4 count and CD4 at ART initiation