Table 1. Intervention rules used in all g-formula analyses

	Strategy	Motivation[1]
≥1 & <5 years	i) start ART immediately, irrespective of CD4 count	=WHO 2013 criterion
	ii) start ART if CD4 count <750 cells/mm^3 or CD4% < 25% or WAZ<-2 (as a proxy for a severe event)	≈WHO 2010 criterion
	iii) start ART if CD4 count <350 cells/mm^3 or CD4% < 15% or WAZ<-2 (as a proxy for a severe event)	≈WHO 2006 criterion[2]
	iv) do not start ART	reference criterion
≥5 & <10 years	i) start ART immediately, irrespective of CD4 count	=WHO 2015 criterion
	ii) start ART if CD4 count <500 cells/mm^3 or WAZ<-2 (as a proxy for a severe event)	≈WHO 2013 criterion
	iii) start ART if CD4 count <350 cells/mm^3 or WAZ<-2 (as a proxy for a severe event)	≈WHO 2010 criterion
	iv) start ART if CD4 count <200 cells/mm^3 or WAZ<-2 (as a proxy for a severe event)	≈WHO 2006 criterion[3]
	v) do not start ART	reference criterion
≥10 & <16 years[4]	i) start ART immediately, irrespective of CD4 count	=WHO 2015 criterion
	ii) start ART if CD4 count <500 cells/mm^3	≈WHO 2013 criterion
	iii) start ART if CD4 count <350 cells/mm^3	≈WHO 2010 criterion
	iv) start ART if CD4 count <200 cells/mm^3	≈WHO 2006 criterion
	v) do not start ART	reference criterion

[1] See http://www.who.int/hiv/pub/guidelines/en for WHO guideline documents
[2] for children aged 36-59 months
[3] WHO 2006 criteria for children ≥5 years also supported ART initiation if CD4% < 15%
[4] We do not use WAZ for treatment assignment because there are no WAZ standards for children ≥10 years. We also do not use BMIAZ for treatment assignment since there is no clear threshold to approximate severe clinical events.

Table 2: Patient characteristics at the first visit, stratified by region and age group.

	Europe (N=991)	Southern Africa (N=16230)	West Africa (N=3355)	1-5 years (N=8665)	5-10 years (N=7358)	10-16 years (N=4553)	Total (N=20576)
Sex N(%)	991 (100%)	16206 (99.9%)	3355 (100%)	8656 (99.9%)	7352 (99.9%)	4544 (99.8%)	20552 (99.0%)
male	468 (47.2%)	7888 (48.7%)	1708 (50.9%)	4419 (51.1%)	3644 (49.6%)	2001 (44.4%)	10064 (49.0%)
Age N(%)	991 (100%)	16230 (100%)	3355 (100%)	8665 (100%)	7358 (100%)	4553 (100%)	20576 (100%)
Median (1st; 3rd quartile)	6.08 (3.18; 9.73)	5.99 (2.98; 9.64)	5.51 (2.9; 8.78)	2.56 (1.7; 3.74)	7.19 (6.06; 8.46)	12.42 (11.15; 14.04)	5.94 (2.98; 9.48)
CD4 count N(%)	835 (84.3%)	11077 (68.3%)	2651 (79.0%)	6019 (69.5%)	5272 (71.7%)	3272 (71.9%)	14563 (70.8%)
Median (1st; 3rd quartile)	555 (299; 879)	421 (200; 725)	489 (198; 841)	676 (394; 1037)	373 (172; 630)	237.5 (88; 425)	440 (205; 757)
CD4% N(%)	799 (80.6%)	9668 (59.6%)	2012 (60.0%)	5471 (63.1%)	4515 (61.4%)	2493 (54.8%)	12479 (60.7%)
Median (1st; 3rd quartile)	20 (13; 27)	15 (9; 23)	15 (8; 22)	17 (11; 24)	15 (8; 23)	13 (6; 20)	16 (9; 23)
WAZ N(%)	615 (62.1%)[1]	8189 (50.5%)[1]	2002 (59.7%)[1]	5956 (68.7%)	4850 (65.9%)		10806 (52.5%)[1]
Median (1st; 3rd quartile)	-0.07 (-0.87; 0.69)	-1.46 (-2.49; -0.6)	-1.94 (-3.34; -0.98)	-1.46 (-2.66; -0.5)	-1.47 (-2.48; -0.62)		-1.46 (-2.57; -0.56)
HAZ N(%)	767 (77.4%)	8545 (52.7%)	2125 (63.3%)	4834 (55.8%)	4178 (56.8%)	2425 (53.3%)	11437 (55.6%)
Median (1st; 3rd quartile)	-0.65 (-1.44; 0.21)	-2.24 (-3.17; -1.29)	-1.98 (-2.94; -0.97)	-2.37 (-3.43; -1.25)	-1.81 (-2.71; -0.94)	-2.12 (-3.01; -1.21)	-2.08 (-3.07; -1.1)
BMIAZ N(%)	474 (47.8%)[1]	4905 (30.2%)[1]	1125 (33.5%)[1]		4116 (55.9%)	2388 (52.5%)	6504 (31.6%)
Median (1st; 3rd quartile)	0.24 (-0.46; 0.94)	-0.56 (-1.45; 0.21)	-1.4 (-2.72; -0.43)		-0.42 (-1.3; 0.32)	-1.02 (-2.08; -0.15)	-0.62 (-1.61; 0.19)
ART started N(%)	991 (100%)	16230 (100%)	3355 (100%)	8665 (100%)	7358 (100%)	4553 (100%)	20576 (100%)
ever	803 (81.0%)	10289 (63.4%)	2031 (60.5%)	5602 (64.7%)	4723 (64.2%)	2798 (61.5%)	13123 (63.8%)
Treatment Start N(%)	991 (100%)	16230 (100%)	3355 (100%)	8665 (100%)	7358 (100%)	4553 (100%)	20576 (100%)
(1995,1999]	142 (14.3%)	69 (0.4%)	1 (0.0%)	133 (1.5%)	64 (0.9%)	15 (0.3%)	212 (1.0%)
(1999,2004]	433 (43.7%)	1663 (10.3%)	679 (20.2%)	1432 (16.5%)	983 (13.4%)	360 (7.9%)	2775 (13.5%)
(2004,2007]	235 (23.7%)	5571 (34.3%)	1289 (38.4%)	3165 (36.5%)	2629 (35.7%)	1301 (28.6%)	7095 (34.5%)
(2007,2010]	132 (13.3%)	6033 (37.2%)	1047 (31.2%)	2763 (31.9%)	2605 (35.4%)	1844 (40.5%)	7212 (35.1%)
(2010,2014]	49 (4.9%)	2894 (17.8%)	339 (10.1%)	1172 (13.5%)	1077 (14.6%)	1033 (22.7%)	3282 (16.0%)
Follow-up time (days)							
Median (1st; 3rd quartile)	1827 (1612; 1827)	824 (285; 1785)	829 (366; 1813)	969 (366; 1827)	982 (366; 1827)	656 (217; 1538)	900 (366; 1827)

[1] Note that WAZ is not calculated for children >10 years, and BMIAZ is not calculated for children<5 years; thus, reported percentages seem small

Table 3 Estimates obtained from the g-formula: Cumulative mortality at 5 years, cumulative mortality difference (MD) between interventions at 5 years, mean measured HAZ at 5 years, and mean measured HAZ difference (MHD) at 5 years. Results are shown (a) for the main scenario (3 month follow-up as in many trials) and for the alternative scenario (irregular follow-up with visit frequency modelled based on our data). All results are reported with 95% bootstrap confidence intervals. Treatment thresholds refer to CD4 count (<200/350/500/750), CD4% (<15%/25%), and WAZ (< -2).

(a) regular follow-up (3 monthly, as in a trial)

	Mortality	95%CI		MD	95%CI		Mean HAZ	95%CI		MHD	95%CI	
Age 1-5												
no ART	8.4%	7.5%	10.4%	3.7%	3.5%	5.5%	-1.53	-1.65	-1.41	-0.29	-0.36	-0.21
<350/15%/-2	5.0%	4.6%	5.9%	0.3%	0.1%	0.6%	-1.32	-1.41	-1.21	-0.08	-0.09	-0.06
<750/25%/-2	4.7%	4.3%	5.5%	0.0%	-0.1%	0.2%	-1.26	-1.36	-1.16	-0.02	-0.03	-0.004
immediate	4.7%	4.3%	5.5%	-	-	-	-1.24	-1.34	-1.15	-	-	-
Age 5-10												
no ART	7.4%	6.5%	9.3%	3.3%	2.3%	4.9%	-1.88	-1.94	-1.77	-0.34	-0.37	-0.27
<200/-2	4.6%	4.1%	5.5%	0.5%	0.2%	0.8%	-1.66	-1.73	-1.59	-0.12	-0.14	-0.09
<350/-2	4.4%	3.9%	5.3%	0.3%	0.04%	0.5%	-1.61	-1.69	-1.55	-0.07	-0.08	-0.05
<500/-2	4.2%	3.8%	5.2%	0.1%	-0.1%	0.3%	-1.59	-1.65	-1.52	-0.05	-0.06	-0.02
immediate	4.1%	3.7%	5.1%	-	-	-	-1.54	-1.62	-1.48	-	-	-
Age 10-16												
no ART	12.5%	11.1%	15.3%	3.2%	2.4%	4.8%	-1.72	-1.85	-1.49	-0.15	-0.21	-0.07
<200	10.0%	9.1%	12.0%	0.7%	0.2%	1.1%	-1.63	-1.75	-1.41	-0.06	-0.09	-0.03
<350	9.2%	8.7%	11.3%	-0.1%	-0.2%	0.6%	-1.60	-1.60	-1.39	-0.03	-0.05	0.0
<500	9.4%	8.6%	11.1%	0.1%	-0.3%	0.4%	-1.58	-1.70	-1.38	-0.01	-0.03	0.01
immediate	9.3%	8.5%	11.1%	-	-	-	-1.57	-1.69	-1.36	-	-	-

(b) irregular follow-up (visit frequency modelled based on our data)

	Mortality	95%CI		MD	95%CI		Mean HAZ	95%CI		MHD	95%CI	
Age 1-5												
no ART	7.7%	6.8%	9.0%	2.0%	1.2%	2.9%	-1.66	-1.78	-1.55	-0.28	-0.33	-0.26
<350/15%/-2	5.9%	5.4%	6.7%	0.2%	0.0%	0.6%	-1.47	-1.59	-1.36	-0.09	-0.11	-0.07
<750/25%/-2	5.8%	5.3%	6.5%	0.1%	-0.2%	0.3%	-1.40	-1.51	-1.29	-0.02	-0.04	-0.01
immediate	5.7%	5.2%	6.4%	-	-	-	-1.38	-1.48	-1.27	-	-	-
Age 5-10												
no ART	7.1%	5.7%	8.4%	1.9%	0.8%	2.6%	-1.77	-1.85	-1.72	-0.12	-0.15	-0.10
<200/-2	5.5%	4.7%	6.3%	0.3%	0.0%	0.5%	-1.71	-1.80	-1.66	-0.06	-0.08	-0.05
<350/-2	5.5%	4.7%	6.2%	0.3%	-0.1%	0.4%	-1.70	-1.78	-1.65	-0.05	-0.06	-0.03
<500/-2	5.4%	4.5%	6.2%	0.2%	-0.1%	0.3%	-1.68	-1.76	-1.63	-0.03	-0.04	-0.02
immediate	5.2%	4.6%	6.0%	-	-	-	-1.65	-1.74	-1.60	-	-	-
Age 10-16												
no ART	12.2%	10.8%	14.2%	1.9%	1.3%	2.6%	-1.77	-1.91	-1.67	-0.04	-0.05	-0.01
<200	11.0%	9.6%	12.4%	0.7%	0.0%	0.9%	-1.76	-1.89	-1.67	-0.03	-0.04	0.00
<350	10.6%	9.4%	12.1%	0.3%	-0.2%	0.6%	-1.65	-1.89	-1.66	-0.01	-0.03	0.01
<500	10.4%	9.2%	11.9%	0.1%	-0.3%	0.4%	-1.74	-1.88	-1.66	-0.01	-0.01	0.01
immediate	10.3%	9.2%	12.0%	-	-	-	-1.73	-1.88	-1.66	-	-	-