Global Trends in CD4 Count Measurement and Prevalence of CD4 <200 cells/μL at ART Initiation

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BACKGROUND

Since the 'Treat-All' era, people with HIV (PWH) are eligible to start antiretroviral therapy (ART) immediately after diagnosis, regardless of CD4 count. However, CD4 counts are still necessary (1) to offer opportunistic infection screening and prophylaxis to PWH with advanced HIV disease (CD4 <200 cells/μL or a WHO Stage 3 or 4 defining condition)[1], (2) to monitor and evaluate ART programs (late ART initiation, defined as CD4 <200 cells/μL at ART initiation, is a national priority indicator in WHO strategic information guidelines)[2], and (3) to inform epidemiological models.

METHODS

- We included PWH who first initiated ART at age 15–80 years during 2005–2019, within the International epidemiology Databases to Evaluate AIDS (IeDEA).[3]
- We described proportions of PWH with:
  - CD4 available (measured within 6 months before to 2 weeks after first ART start);
  - CD4 <200 cells/μL (among those with a CD4 available); by year, IeDEA region, age, and birth sex.

RESULTS

- We included 1,355,104 PWH from eight IeDEA regions (Table 1). Age and sex distribution of PWH initiating ART did not change substantially over time.
- Across regions, CD4 availability was 58–86% in 2005, and 48–87% in 2015 (Figure 1). By 2019, it remained between 61–86% in North America, Latin America, Asia-Pacific, and South Africa; but declined to 13–53% in other IeDEA regions in sub-Saharan Africa (SSA).
- Prevalence of CD4 <200 cells/μL was 54–90% in 2005, 29–45% in 2015, and 30–45% in 2019 (Figure 1).
- CD4 availability was similar between age and sex groups.
- Among those with CD4 counts in 2015–2019, prevalence of CD4 <200 cells/μL was higher in males than females in SSA, including South Africa (43% vs 28%), but not in the other regions (35% in males vs 38% in females) (Figure 2); and higher in older ages in all regions (40% in ages ≥45 vs 19% in ages 15–24).

CD4 measurement at ART start declined from 54% (2015) to 16% (2019) in sub-Saharan Africa (except South Africa).

Prevalence of CD4 <200 cells/μL at ART start remains high (≥30%) in all regions among PWH with CD4 counts.

Figure 1. CD4 count availability (blue) and prevalence of CD4 <200 cells/μL (red) at ART initiation by IeDEA region and year

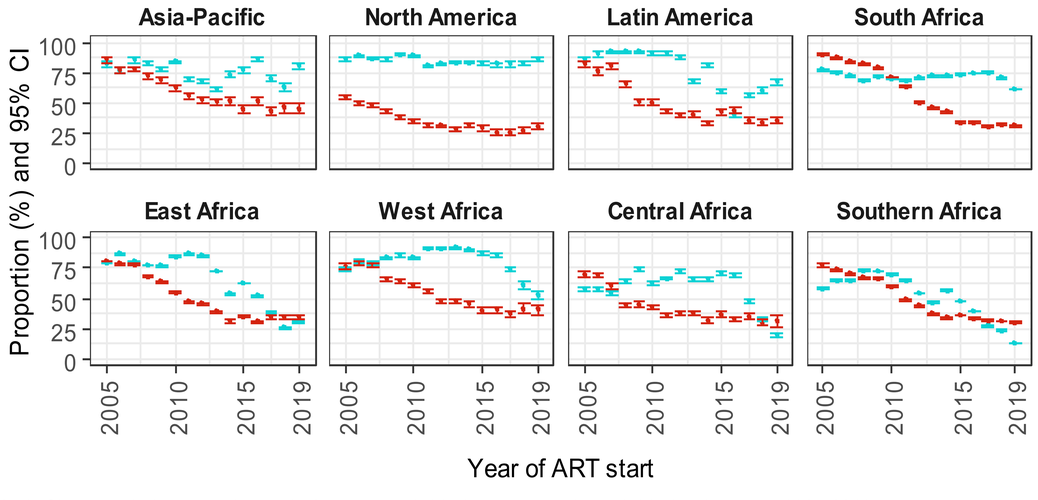
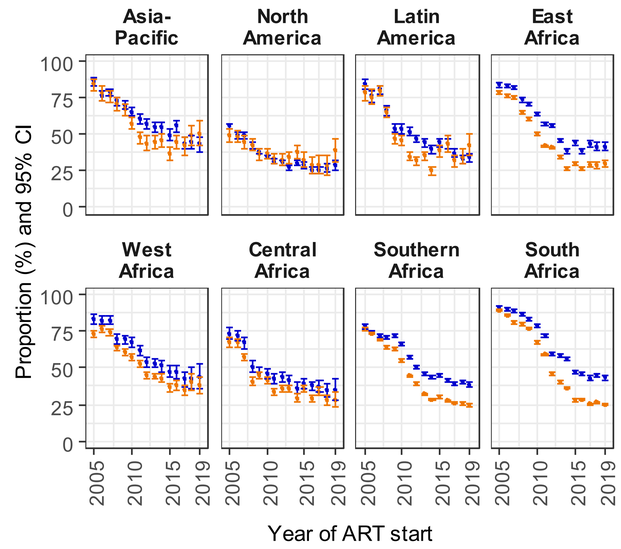


Table 1: Characteristics at antiretroviral treatment initiation, among those initiating between 2005-2019

Region	Overall	Asia-Pacific	North America	Latin America	South Africa	East Africa	West Africa	Central Africa	Southern Africa
n	1,355,104	24,446	51,469	33,243	316,394	236,981	37,956	51,667	602,948
Countries, n	43	15	2	7	1	3	5	5	5
Female sex[a]	849,633 (63%)	8,500 (35%)	8,574 (17%)	13,569 (41%)	218,294 (69%)	154,744 (65%)	25,241 (67%)	33,862 (66%)	386,849 (64%)
Age: Females[b]	32 (26–39)	35 (29–41)	41 (30–50)	34 (27–43)	31 (26–39)	33 (27–40)	34 (29–41)	34 (28–41)	31 (26–38)
Age: Males[b]	37 (31–44)	36 (30–43)	39 (33–47)	35 (28–43)	37 (31–44)	38 (31–45)	39 (33–47)	39 (33–47)	36 (31–43)
CD4 2005[c]	115 (48–188)	97 (44–170	184 (62–299)	78 (29–173)	104 (45–163)	106 (40–180)	117 (49–196)	151 (77–213)	120 (57–192)
CD4 2015[c]	280 (140–419	234 (80–384)	345 (162–517)	246 (90–428)	286 (149–413)	291 (139–435)	258 (114–393)	278 (129–431)	269 (141–411)
CD4 2019[c]	309 (156–497)	235 (73–385)	319 (156–503)	308 (134–484	311 (164–495)	310 (130–527)	270 (109–480)	336 (171–534)	310 (167–496)

a. n (%), b. years, median (interquartile range), c. cells/μL, median (interquartile range).

Figure 2. Prevalence of CD4 <200 cells/μL at ART initiation by male (blue) vs female (orange) sex at birth, IeDEA region and calendar year



CONCLUSIONS

CD4 measurement at ART initiation has declined in recent years to very low levels, especially in SSA, with the exception of South Africa. PWH with and without a CD4 might differ in terms of disease severity; however, among those with a CD4, the prevalence of CD4 <200 cells/μL at ART initiation remains concerningly high. CD4 measurement around the time of ART initiation should be more widely adopted and adequately funded.

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