IeDEA Global Cohort Consortium

2018 Research Highlights

Website: iedea.org
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Cohorts and regional principal investigators

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- Central Africa IeDEA
  - Kathryn Anastos, Albert Einstein College of Medicine; Denis Nash, City University of New York
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IeDEA Asia-Pacific

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Mortality and losses to follow-up among adolescents living with HIV (ALHIV) in the IeDEA global cohort collaboration

- Objective: describe mortality and retention among ALHIV in routine LMIC care settings
- Inclusion criteria: ALHIV aged 10-19 years, enrolled from January 2003 to June 2016, with ≥6 months of follow-up
- Overall results: 61,242 ALHIV, 270 clinics, 34 countries, 6 regions
  - 3.9% died, 30% lost to follow-up (LTFU), 8.1% transferred

Kariminia A, Law M, Davies MA, Vinikoor M, Wools-Kaloustian K, Leroy V, Edmonds A, McGowan C, Vreeman R, Fairlie L, Ayaya S, Yotebieng M, Takassi E, Pinto J, Adedimeji A, Malateste K, Machado DM, Penazzato M, Hazra R, Sohn AH; IeDEA. J Int AIDS Soc. 2018 Dec;21(12):e25215.

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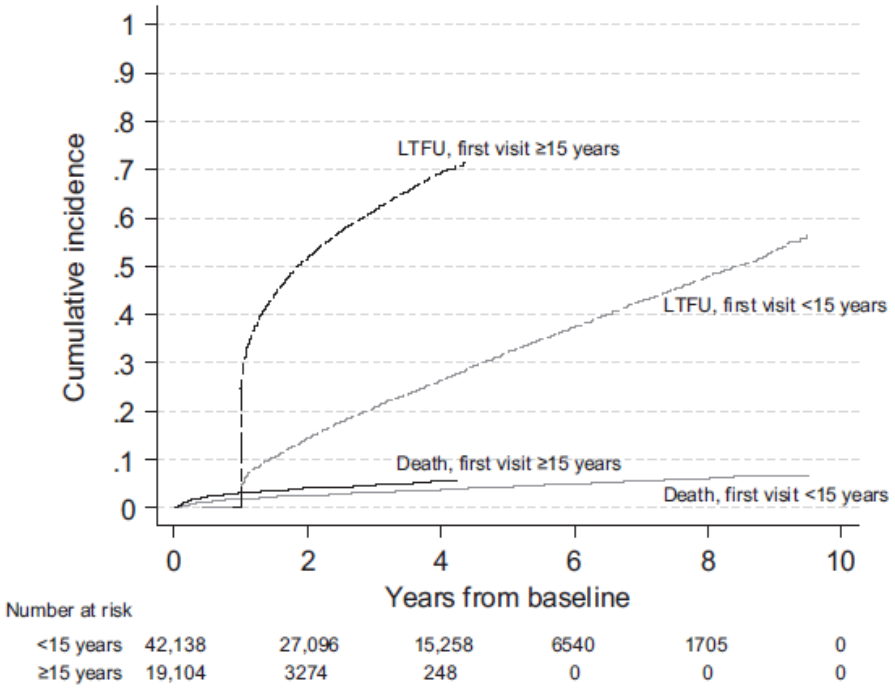
- Mortality and LTFU worse in those entering care at ≥15 years
  - Those entering care 10-15 years with higher risk of death than those in care before age 10
- Delayed diagnoses associated with severe immunodeficiency
- Greater clinical and social support needed to improve adolescent linkage to care and cascade outcomes as they transition to adult care

Estimated cumulative incidences of death and LTFU using competing risk methods among adolescents at IeDEA sites from 2003 to 2016, by age at first visit



Kariminia A, et al for IeDEA. J Int AIDS Soc. 2018 Dec;21(12):e25215.

Early suboptimal ART adherence associated with missed clinic visits in adults with HIV in Asia

- Objective: determine the extent of missed clinic visits and factors associated with missed visits in the adult cohort of IeDEA Asia-Pacific (TAHOD)
- Missed clinic visit = having no clinical or laboratory attendance/assessments in each of the 6-monthly intervals
- Overall results: among 7100 patients from 20 sites in 12 countries, 38% (2676) had at least one missed visit

Jiamsakul A, Kerr SJ, Kiertiburanakul S, Azwa I, Zhang F, Chaiwarith R, Wong W, Ly PS, Kumarasamy N, Ditangco R, Pujari S, Yunihastuti E, Do CD, Merati TP, Nguyen KV, Lee MP, Choi JY, Oka S, Kantipong P, Sim BLH, Ng OT, Ross J, Law M; TREAT Asia HIV Observational Database (TAHOD). AIDS Care. 2018 Dec;30(12):1560-1566.

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- Patients with self-reported adherence <95% in the first 6 months of ART more likely to have a missed visit (OR=2.55)
  - Less likely: older age at ART initiation, and upper-middle and high-income countries
- Intensive adherence support at ART initiation needed to optimize long-term clinic attendance and treatment outcomes

Jiamsakul A, et al. AIDS Care. 2018 Dec;30(12): 1560-1566. See reference for complete table.

Factors associated with missed visits

	Multivariate		
	OR	95% CI	*p-value
ART adherence in the first six months			
≥ 95%	1		
<95%	**2.55**	**(1.81, 3.61)**	**<0.001**
Not done			
Age at ART initiation			**<0.001**
≤30	1		
31-40	**0.81**	**(0.73, 0.89)**	**<0.001**
41-50	**0.73**	**(0.64, 0.83)**	**<0.001**
>50	**0.77**	**(0.64, 0.93)**	**0.006**
Sex			
Male	1		
Female	**0.81**	**(0.72, 0.90)**	**<0.001**
HIV mode of exposure			**<0.001**
Heterosexual contact	1		
Homosexual contact	**1.45**	**(1.27, 1.66)**	**<0.001**
Injecting drug use	0.87	(0.70, 1.08)	0.197
Other/Unknown	**1.48**	**(1.27, 1.74)**	**<0.001**
Initial ART Regimen			**<0.001**
NNRTI-based	1		
PI-based	**1.33**	**(1.15, 1.53)**	**<0.001**
Other combination	**1.79**	**(1.39, 2.32)**	**<0.001**
Hepatitis C co-infection			
Negative	1		
Positive	**1.27**	**(1.06, 1.52)**	**0.011**
Not tested			
Country income			**<0.001**
Low and lower middle	1		
Upper middle	**0.78**	**(0.70, 0.86)**	**<0.001**
High	**0.42**	**(0.35, 0.51)**	**<0.001**

Cardiovascular disease-related mortality and factors associated with cardiovascular events in adults with HIV in Asia

- Objective: investigate CVD-related events, causes of death, and associated factors
- Inclusion criteria: patients on ART between 2003-17
  - Cause of death validated using standardized report forms
- Overall results: 8069 patients, 20 sites, 12 countries: median follow-up 7.3 years (IQR 4.4–10.7); 378 patients died (6.2 per 1000 person-years)
  - Included 22 CVD deaths (0.36 per 1000 PY)
  - During 60,719 person-years at risk, 132 patients experienced a CVD event (2.2 per 1000 PY)

Bijker R, Jiamsakul A, Uy E, Kumarasamy N, Ditango R, Chaiwarith R, Wong WW, Avihingsanon A, Sun LP, Yunihastuti E, Pujari S, Do CD, Merati TP, Kantipong P, Nguyen KV, Kamarulzaman A, Zhang F, Lee MP, Choi JY, Tanuma J, Ng OT, Sim B, Ross J, Kiertiburanakul S. HIV Med. 2019 Jan 8. doi: 10.1111/hiv.12687.

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- Fatal and non-fatal CVD events associated with traditional modifiable risk factors
  - Older age, high blood pressure, total cholesterol, triglycerides, BMI
- Greater effort needed to integrate CVD-HIV care to reduce the CVD-related mortality and morbidity burden

Competing risk analysis of factors associated with CVD events

	Univariate analysis			Multivariate analysis		
	sHR	95CI	p-value	sHR	95 CI	p-value
Age (years)			<0.001			**<0.001**
≤40	1.00			1.00		
41-50	2.53	1.52-4.20	<0.001	**2.24**	**1.34-3.73**	**0.002**
≥51	7.81	4.82-12.65	<0.001	**6.02**	**3.71-9.78**	**<0.001**
Country income group			<0.001			**<0.001**
Lower-middle	1.00			1.00		
Upper-middle	0.37	0.20-0.68	0.001	**0.27**	**0.15-0.50**	**<0.001**
High	2.36	1.60-3.49	<0.001	**1.53**	**1.01-2.33**	**0.046**
Hypertension						
No	1.00			1.00		
Yes	2.92	1.86-4.59	<0.001	**1.91**	**1.21-3.03**	**0.006**
Total cholesterol (mmol/L)						
<5.2	1.00			1.00		
≥5.2	2.08	1.39-3.12	0.001	**1.62**	**1.07-2.45**	**0.023**
Triglycerides (mmol/L)						
<1.7	1.00			1.00		
≥1.7	2.62	1.67-4.12	<0.001	**1.85**	**1.18-2.90**	**0.007**
BMI (kg/m^2) *						
<25	1.00			1.00		
≥25	2.18	1.44-3.30	<0.001	**1.66**	**1.11-2.50**	**0.014**

Bijker R, et al. HIV Med. 2019 Jan 8. doi: 10.1111/hiv.12687.

See reference for complete table with competing risk analysis.

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Prevalence of and risk factors for anal high-risk HPV among HIV-negative and HIV-positive MSM and transgender women in three countries in Southeast Asia

- Objective: assess prevalence and associated risk factors for anal high-risk HPV infection among MSM and TGW in Indonesia, Malaysia, Thailand
- Methods: patients ≥18 years, assessment ofbehavioral characteristics, anal samples for HPV genotyping
- Results: 392 participants (12% TGW)
  - 245 HIV-positive: 78% on cART, median CD4 439 cells/mm, 68% undetectable VL

Somia IKA, Teeratakulpisarn N, Jeo WS, Yee IA, Pankam T, Nonenoy S, Trachuntong D, Mingkwanrungrueng P, Sukmawati MDD, Ramautarsing R, Nilasari H, Hairunisa N, Azwa I, Yunihastuti E, Merati TP, Phanuphak P, Palefsky J, Phanuphak N; ANSAP Study Group. Medicine (Baltimore). 2018 Mar;97(10):e9898.

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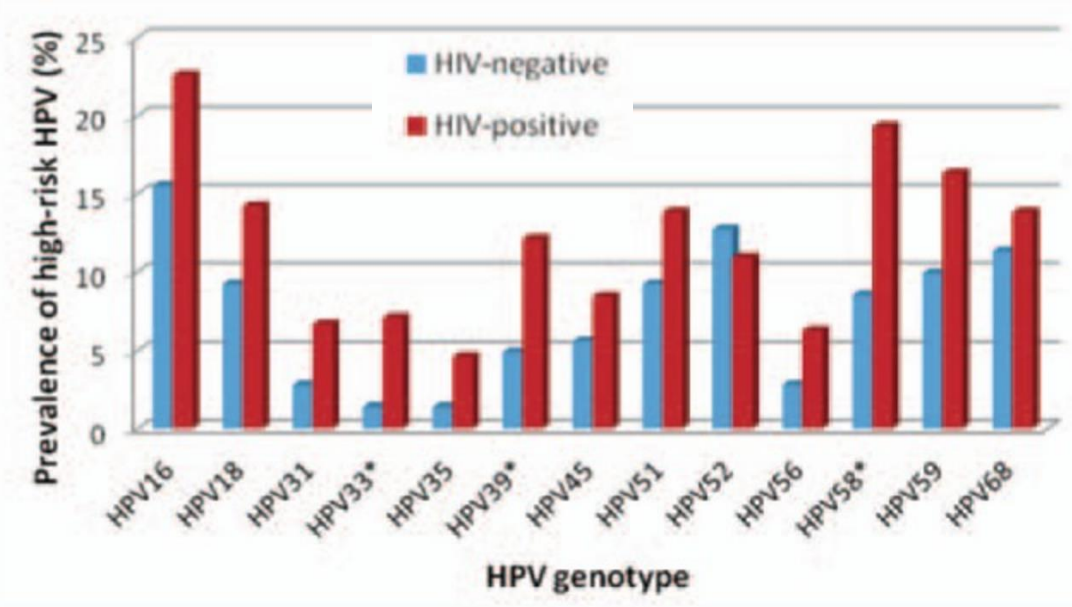
- Most common high-risk anal HPV types
  - HIV-positive
    - HPV16 (22.6%), HPV58 (19.3%), HPV59 (16.3%)
  - HIV-negative
    - HPV16 (15.5%), HPV52 (12.7%), HPV68 (11.3%)

Anal high-risk HPV distribution by HIV status



- Those with HIV at greater risk for high-risk anal HPV infection
  - Prevalence: 77% vs. 54%, $p < 0.001$
  - Regression model: OR 2.87, 95% CI: 1.76-4.70

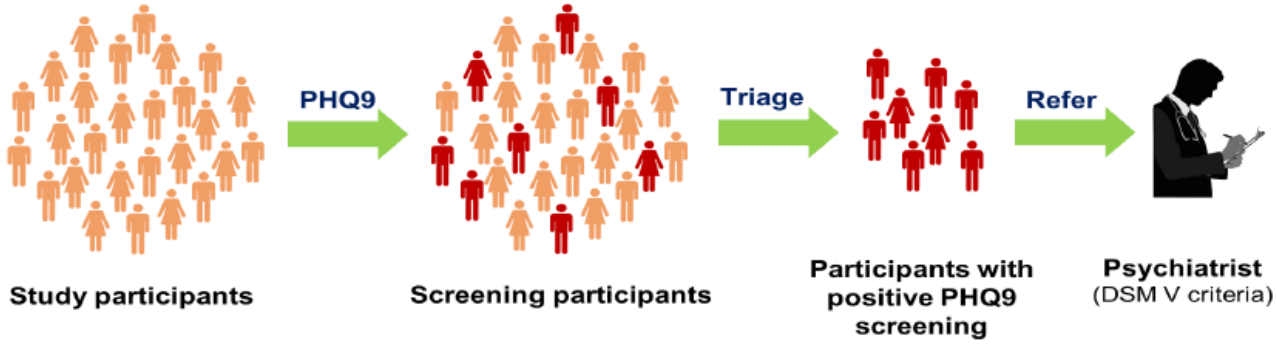
- Among those with HIV, TGW with lower risk vs. MSM
  - Regression model: OR 0.42, 95% CI: 0.19-0.91

Somia IKA, et al. Medicine (Baltimore). 2018 Mar;97(10):e9898.

IeDEA

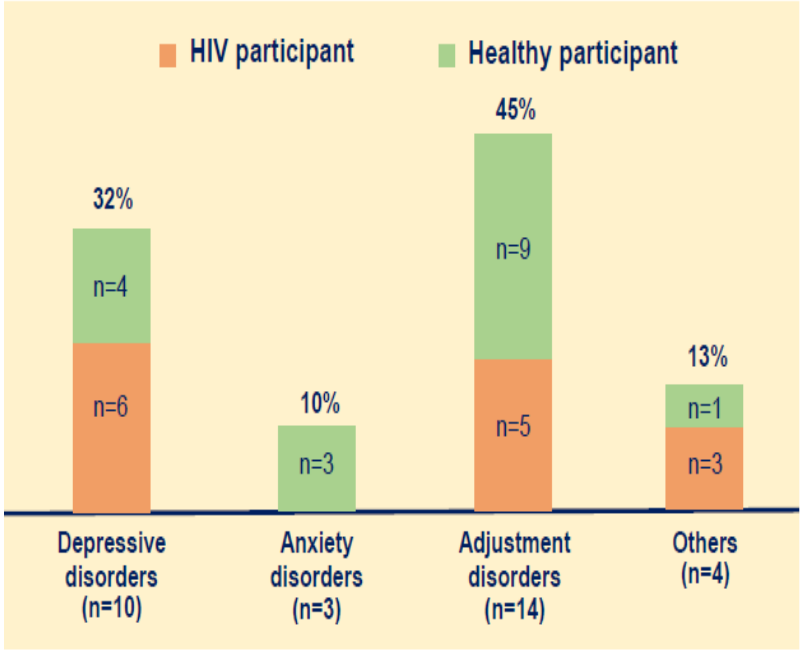
Prevalence of depressive symptoms among Thai adolescents living with HIV using the Patient Health Questionnaire-9 (PHQ-9) screening tool

- Objective: investigate the prevalence and associated factors of depressive symptoms among HIV-infected Thai adolescents
- Methods: 300 participants, aged 15-25 years
  - HIV-positive participants age- and sex-matched to uninfected controls (1:1)



Sudjaritruk T, Aurpibul L, Songtaweesin N, Narkpongphun A, Thisayakorn P, Shotecharoentanon T, Nadsasarn R, Janjing P, Saisangchan C, Puthanakit T. Oral abstract O-08, 10th International Workshop on HIV Pediatrics, July 20-21, 2018, Amsterdam.

- Overall results
  - Median age 19 years; 50% female
  - 15% w/ depressive symptoms; 11% PHQ-9 ≥9; 11% suicidal ideation; 21% hazardous alcohol use by AUDIT (≥8)
    - 67% of those with symptoms had confirmed psychiatric diagnosis
  - Depressive symptoms similar by HIV status (15% vs. 16%)
    - Viral suppression lower among those with symptoms (64% vs. 74%)



- Multivariate analysis
  - Hazardous alcohol drinking associated with depressive symptoms among youth with HIV
    - aOR=4.38, 95%CI 1.21-15.83

Sudjaritruk T, et al. Abstract O-08, 10th International Workshop on HIV Pediatrics, 2018.

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Early retention in care neither mediates nor modifies the effect of sex and sexual mode of HIV acquisition on HIV survival in the Americas

Coelho L, Rebeiro PF, Castilho JL, Caro-Veja Y, Mejia FA, Cesar C, Cortes CP, Padgett D, McGowan CC, Veloso VG, Sterling TR, Grinsztejn B, Shepherd BE, Luz PM. *AIDS Patient Care STDS*. 2018;32:306-313.

- Early retention in care, sex, and sexual mode of HIV acquisition have been associated with mortality risk among persons living with HIV (PLWH).
- 11,721 ART-naïve PLWH ≥18 years of age, enrolled in care from 2000-2015 at six CCASAnet sites and Vanderbilt, starting ART, and with ≥1 visit after ART start were included.
- Early retention in care was defined as ≥2 HIV care visits/labs ≥90 days apart in the first year. Cox models assessed the association between early retention in care, sex, and sexual mode of HIV acquisition [i.e., women, heterosexual men and men who have sex with men (MSM)], and mortality. Associations were estimated separately by site and pooled.
- Median age at ART start was 35.3 years (IQR 29–42.9), median nadir CD4 was 179 cells/mm^3 (IQR 66–286), and median HIV RNA log_{10} was 4.9 copies/mL (IQR 4.4–5.4).
- Median follow-up was 4.3 years (IQR 2.0–7.6), 647 died (rate = 10.9/1000 person-yrs), and 1,985 were lost to follow-up (rate = 33.6/1000 person-yrs).

PMCID: PMC6080124

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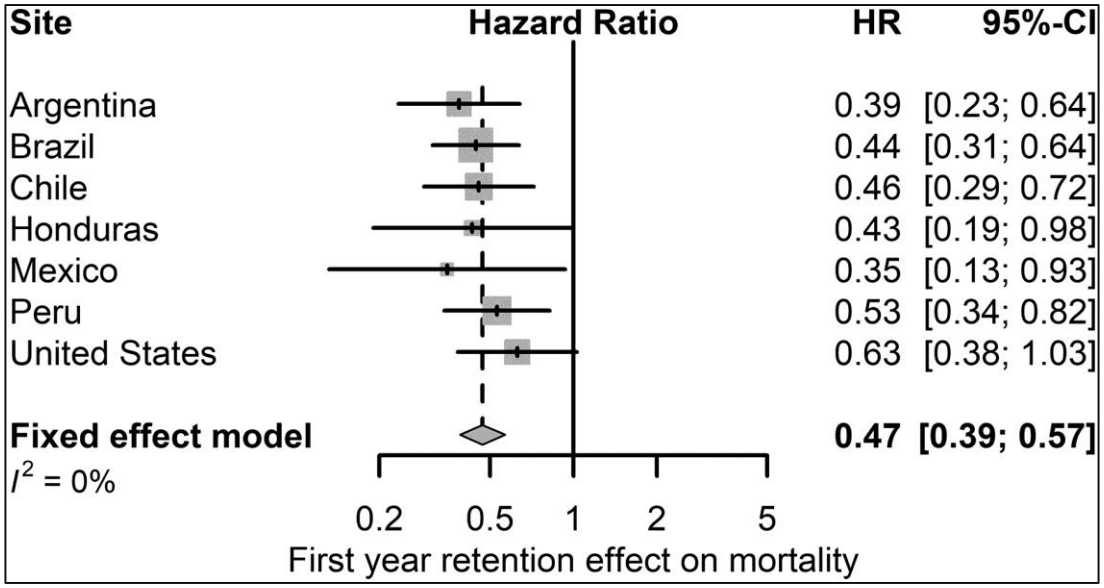
Site-specific and pooled associations of early retention and mortality



- After adjustment for confounders, early retention in care was associated with lower mortality during subsequent years (Figure).
- MSM had lower and heterosexual men had comparable mortality risk to women; risks were similar when adjusting for early retention in care. Additionally, no evidence of an interaction between early retention in care and sex and sexual mode of HIV acquisition on mortality was observed ($p > 0.05$).
- Early retention in care substantially reduced mortality but did not mediate or modify the association between sex and sexual mode of HIV acquisition and mortality in our population.

PMCID: PMC6080124

Is substance use associated with HIV cascade outcomes in Latin America?

De Boni RB, Peratikos MB, Shepherd BE, Grinsztejn B, Cortes C, Padgett D, Gotuzzo E, Belaunzaran-Zamudio PF, Rebeiro PF, Duda SN, McGowan CC. *PLoS ONE* 2018;13:e0194228.

- A Rapid Screening Tool (RST) evaluating NIDU and ART adherence in a 7-day recall period was administered to 3,064 patients on cART (>18 years of age) at routine HIV clinic visits at six CCASAnet sites during 2012–13.
- Study outcomes were retention in care, virologic failure (VF), loss to follow-up, and all-cause mortality; follow up continued through May 2015.
- The majority were male (n=2739, 76%), median age was 42 years (IQR 34–50 years), and median CD4 was 495 cells/mm^3 (IQR 321–692) at time of RST administration.
- Overall, 26% reported having at least one alcoholic drink but no NIDU in a 7-day recall period, 2% reported NIDU only, and 3.5% reported both alcohol and NIDU. The most frequent NIDU used was cannabis (n = 169), followed by cocaine (n = 57).

PMCID: PMC5854364

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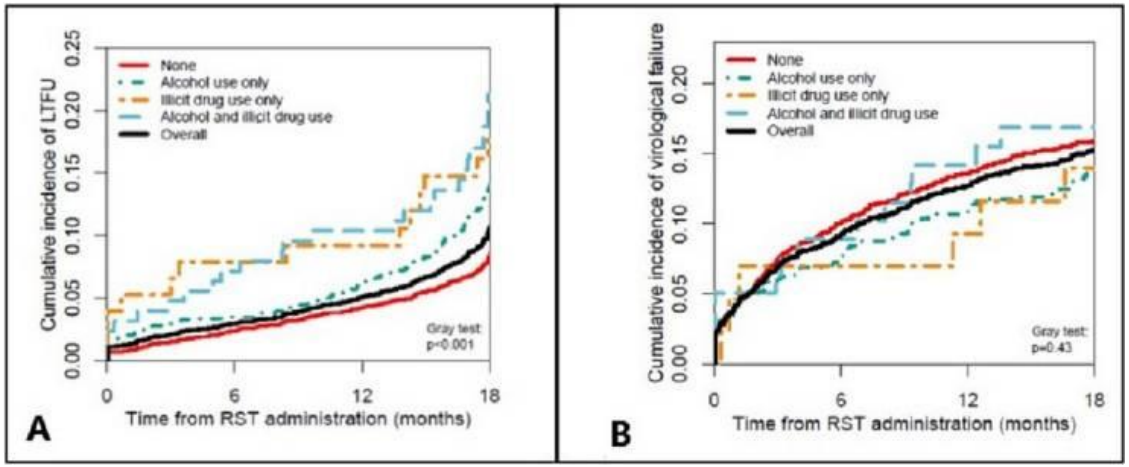
Cumulative incidences of loss to follow-up and virologic failure (VF) stratified by alcohol and substance use, 2014–2015



- Overall cumulative incidence of LTFU during the 18 mos following RST was 10% (95%CI 9–11%): 8% (95%CI 7–9%) for those not reporting alcohol or NIDU, 13% (95%CI 11–15%) for those reporting only alcohol use, 16% (95%CI 9–27%) for NIDU only, and 19% (95%CI 13–27%) for those reporting both (panel A).

- Overall cumulative incidence of VF was 15% (95%CI 14–17%): 16% (95%CI 14–18%) for those not reporting alcohol or NIDU, 14% (95%CI 11–17%) for those reporting only alcohol use, 14% (95%CI 6–29%) for NIDU only, and 17% (95%CI 10–27%) for those reporting both (panel B).

- Alcohol use and NIDU each were associated with an increased hazard of LTFU (adjusted hazard ratio [aHR]=1.22, 95%CI 1.02–1.45 and aHR=1.34, 95%CI 1.00–1.80 for alcohol and NIDU, respectively), but not with an increased hazard of VF (aHR=1.07, 95%CI 0.84–1.36 and aHR=1.40, 95%CI 0.92–2.12 for alcohol and NIDU, respectively).

PMCID: PMC5854364

Trends in proportion of older HIV-infected people in care in Latin America and the Caribbean: a growing challenge

Caro-Vega Y, Belaunzarán-Zamudio PF, Crabtree-Ramírez B, Shepherd BE, Mejia F, Giganti MJ, Patterson P, Grinsztejn B, Wolff M, Pape JW, Padgett D, Castilho JL, McGowan C, Sierra-Madero JG.

Epidemiol Infect. 2018;146:1308-1311.

- The proportion of people receiving HIV care who are ≥50 years old (yo) was quantified and the contribution to the growth of this population of those enrolled before and after 50 years of age was estimated at seven CCASAnet sites between 2000 and 2015.

- Among 24,317 adult patients retained in care during any given year of the study period, 5,505 were older than 50 years of age. Of these, 2,789 (51%) were <50 yo at enrollment who aged in care and 2,716 (49%) were ≥50 yo at enrollment.

- The percentage of male patients, frequency of heterosexual transmission, and frequency of AIDS at enrollment were similar between groups. In contrast, people aging in care had a slightly, but statistically lower median CD4 count at enrollment than people who enrolled in care after 50 years of age (CD4 188 cells/mm^3 (IQR 75 – 338) vs 196 (IQR 85 – 341), P-value =0.049).

PMCID: PMC6062450

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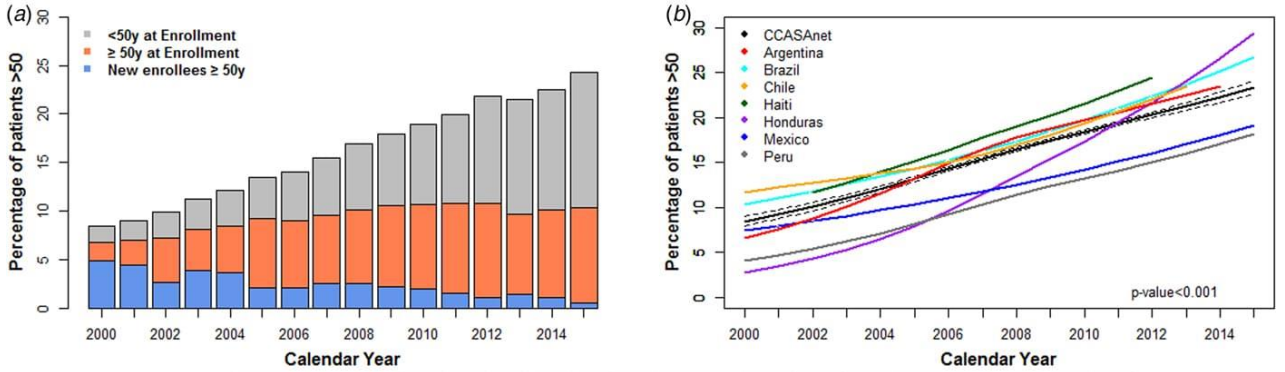
Percentage of HIV+ patients older than 50 years of age actively receiving care by age group (<50 vs ≥50 yo at enrollment) and calendar year (a) and trend in percentage of patients older than 50 years of age among active patients by site and calendar year (b).



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Active patients	1020	1839	2720	3901	5414	6828	7979	9314	10789	12559	14050	15506	15818	12198	11419	8176
Older than 50	86	165	268	439	659	921	1116	1443	1824	2257	2664	3094	3446	2623	2574	1983
1. <50y at enrollment	17	37	71	121	199	293	398	557	732	935	1165	1423	1738	1440	1413	1134
Turned 50 during the year	17	21	35	52	79	99	120	172	194	235	272	307	379	310	288	209
2. ≥ 50y at Enrollment	69	128	197	318	460	628	718	886	1092	1322	1499	1671	1708	1183	1161	849
Newly enrolled ≥ 50y	50	81	73	150	195	140	166	241	276	273	281	235	172	168	121	47

- In the <50 yo at enrollment group, active patients who aged to over 50 years of age while in care are shown in gray; the ≥50 yo at enrollment group are shown in blue + orange.
- The percentage of new patients enrolled at ≥50 years of age in each year are shown by the blue bar.
- The increase in the percentage of patients older than 50 over time was statistically significant for each site (P-values are <0.001 for each country and for the whole cohort).
- The percentage of patients ≥50 yo increased three-fold (8% to 24%) between 2000 and 2015. Most of the growth of this population was explained by the increasing proportion of patients that enrolled before age 50 and subsequently aged in care.

PMCID: PMC6062450

HIV-related tuberculosis: mortality risk in persons without vs. culture-confirmed disease

Crabtree- Ramírez BE, Jenkins C, Jayathilake K, Carriquiry G, Veloso VG, Padgett D, Gotuzzo E, Cortes C, Mejia F, McGowan C, Duda S, Shepherd BE, Sterling TR. *IJTLD*. 2019. Accepted for publication.

- The relationship between TB culture status and mortality in HIV-positive persons is unclear.
- HIV-positive adults treated for TB at or after the first HIV clinic visit at eight CCASAnet sites from 2000-2015 were included.
- TB treatment included two months of isoniazid, rifampin/rifabutin, pyrazinamide+/- ethambutol, then continuation phase treatment with isoniazid+rifampin/rifabutin.
- Among 759 TB/HIV patients, 238(31%) were culture-negative, 228(30%) culture unknown/not performed, and 293(39%) culture-positive.
- Median age was 35 years, 77% were male, and 47% had pulmonary TB only; median CD4 at TB diagnosis was 96 cells/mm^3 (IQR 40-228), and 636 (84%) 124 received concomitant ART and anti-TB therapy.
- Median follow-up was 3.79 years (IQR 1.66 – 6.36). There were 113 patients (14.9%) lost to follow-up, with 7.4% lost in the first year after TB diagnosis.

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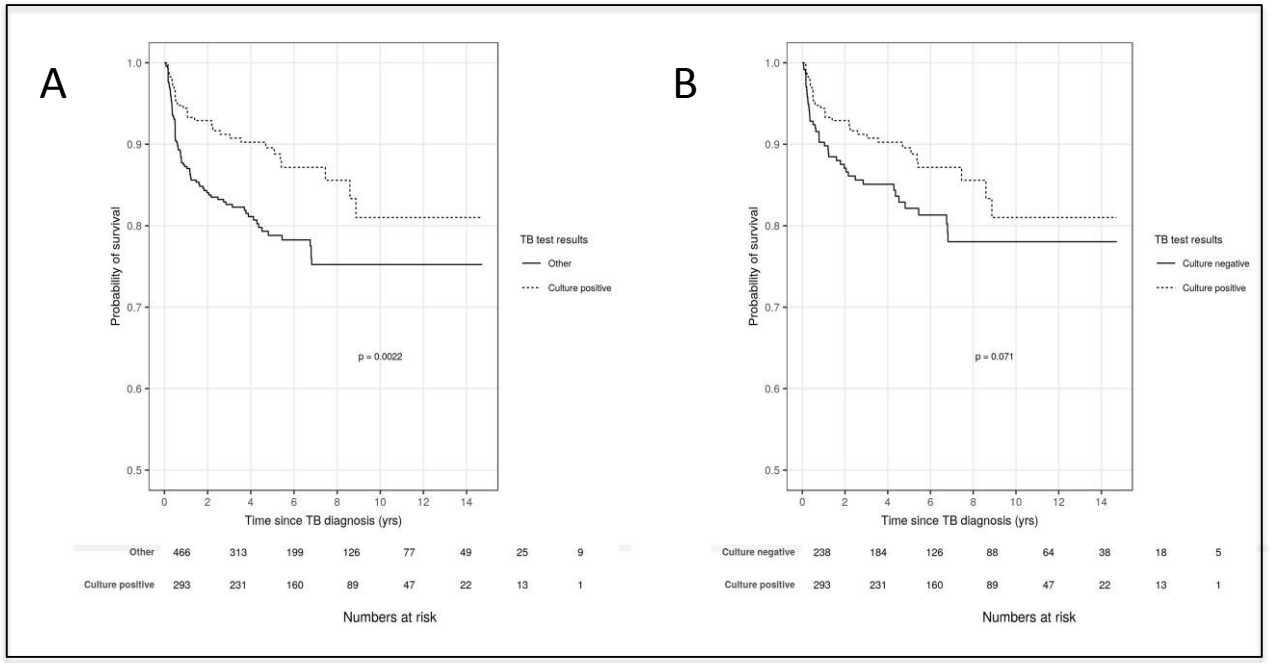
Mortality in TB patients without culture-confirmed disease was higher than patients with culture-confirmed disease



- There were 123(16%) deaths: 90/466(19%) TB culture-negative, unknown, or not performed vs. 33/293(11%) TB culture-positive (P=0.005).
- Kaplan-Meier curves of time to death according to culture status among TB/HIV patients are shown in the Figure (panel A: culture-positive vs. all others [negative, unknown, not performed] and panel B: culture-positive vs culture-negative).
- Mortality in TB/HIV patients without culture-confirmed disease was higher than those with culture-confirmed TB (P-value=0.002).
- In a Cox model adjusting for age, sex, CD4, ART timing, disease site, and stratified by study site, mortality in persons without culture-confirmed TB was higher compared to those with culture-confirmed TB, but was not statistically significant (HR=1.39; 95%CI:0.89-2.16; P-value=0.15).

Trends and predictors of non-communicable disease multimorbidity among adults living with HIV and receiving antiretroviral therapy in Brazil

Castilho JL, Escuder M, Veloso V, Gomes J, Jayathilake K, Ribeiro S, Souza R, Ikeda M, Ricardo de Alencastro P, Tupinanbas U, Brites C, McGowan CC, Grangeiro A, Grinsztejn B. *JIAS*. 2019. Accepted for publication.

- Persons living with HIV (PLWH) on ART experience high rates of non-communicable diseases (NCDs) and multimorbidity that may lead to poor health outcomes. Little is known of the trends or predictors of NCD multimorbidity in PLWH in low- and middle-income countries.
- We examined NCD multimorbidity in adult PLWH initiating ART between 2003-2014 using a multi-site, observational cohort in Brazil (Coorte Brasil). NCDs included cardiovascular artery disease, hyperlipidemia (HLD), diabetes, chronic kidney disease, cirrhosis, osteoporosis, osteonecrosis, venous thromboembolism, and non-AIDS-defining cancers. Multimorbidity was defined as the incident accumulation of two or more unique NCDs.
- 6,206 adults were included, contributing 24,003 person-years of observation.
- There were a total of 1,158 incident NCD diagnoses among all patients. 332 (5%) developed multimorbidity during the study period;
- The most common NCDs were hyperlipidemia and diabetes; however, osteoporosis was also frequent in women (16 vs. 35% of men and women with multimorbidity, respectively).

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Prevalence and cumulative incidence of multimorbidity

Figure a) Prevalence of multimorbidity and aging of cohort

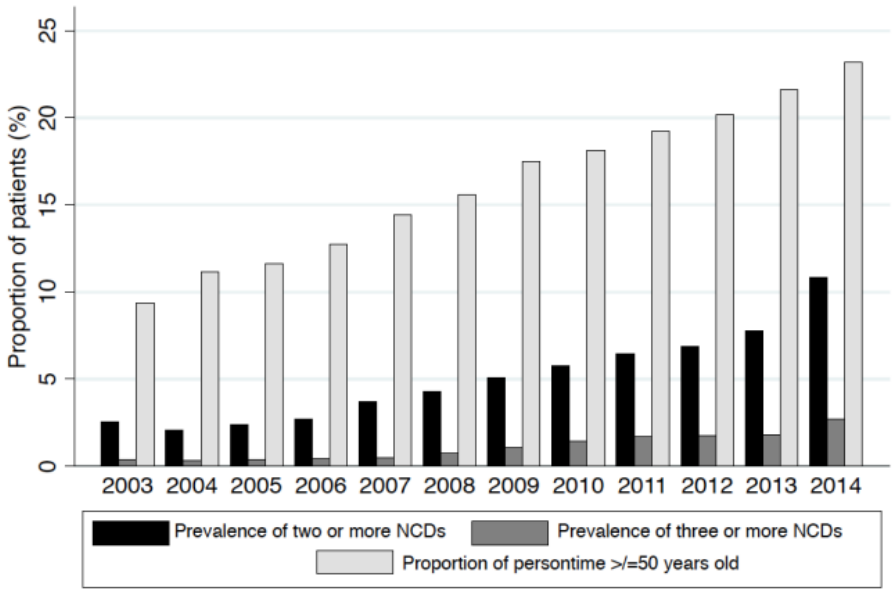
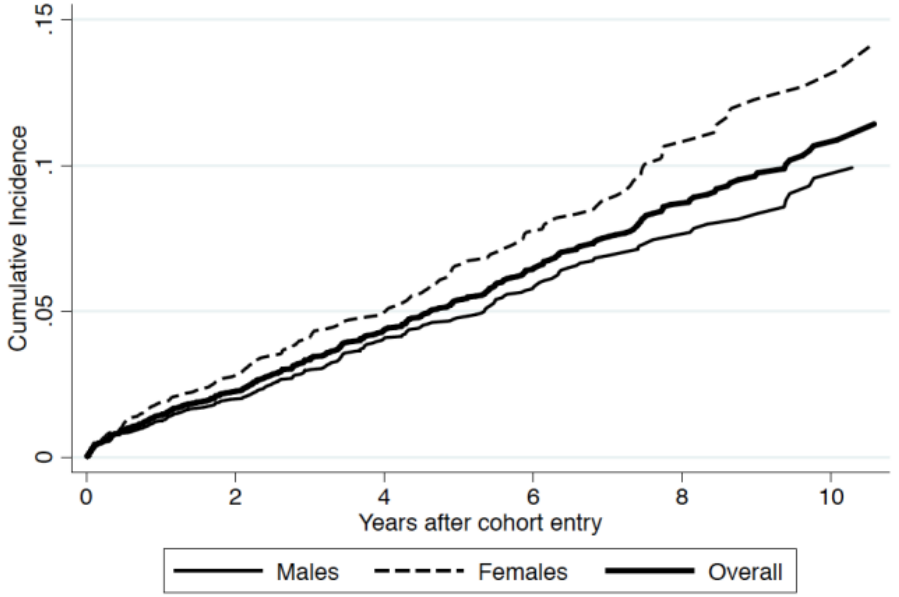


Figure b) Cumulative incidence of multimorbidity



- The prevalence of multimorbidity steadily increased during the study period (p <0.001); parallel to the aging of the cohort, the prevalence of multimorbidity rose from 3 to 11% (Figure a).
- Cumulative incidence of multimorbidity increased over time (Figure b).
- Older age, female sex (aHR = 1.29 [95%CI 1.02-1.63]) and low CD4 nadir (<100 vs ≥200 cells/mm^3 aHR = 1.54 [95%CI 1.17-2.03]) at cohort entry were significantly associated with increased risk of multimorbidity.
- Further studies examining prevention, screening and management of NCDs in PLWH in low- and middle-income countries are needed.

Central Africa – IeDEA

2018 Research Highlights

IeDEA

The effect of 'Treat All' on rapid ART initiation in SSA: 6-country regression discontinuity analysis (MR121)

AIMS: To (a) describe rapid ART initiation (within 30 days or enrollment into care) rates under different country-level eligibility guidelines; and (b) assess the impact of Treat All policies on rapid ART initiation.

METHODS

- 814,603 patients ≥ 16 years old, enrolled in HIV care in six countries (Burundi , Rwanda, Kenya, Uganda, Malawi, and Zambia).
- Regression discontinuity analysis used to estimate effect of Treat All on rapid ART initiation, with enrollment date used as assignment variable, and the date of national Treat All adoption as the discontinuity threshold.
    - Regression discontinuity design creates a quasi-experimental condition where the only systematic difference between patients enrolling before and after Treat All adoption is the probability of treatment eligibility.

O Tymejczyk et al. In process.

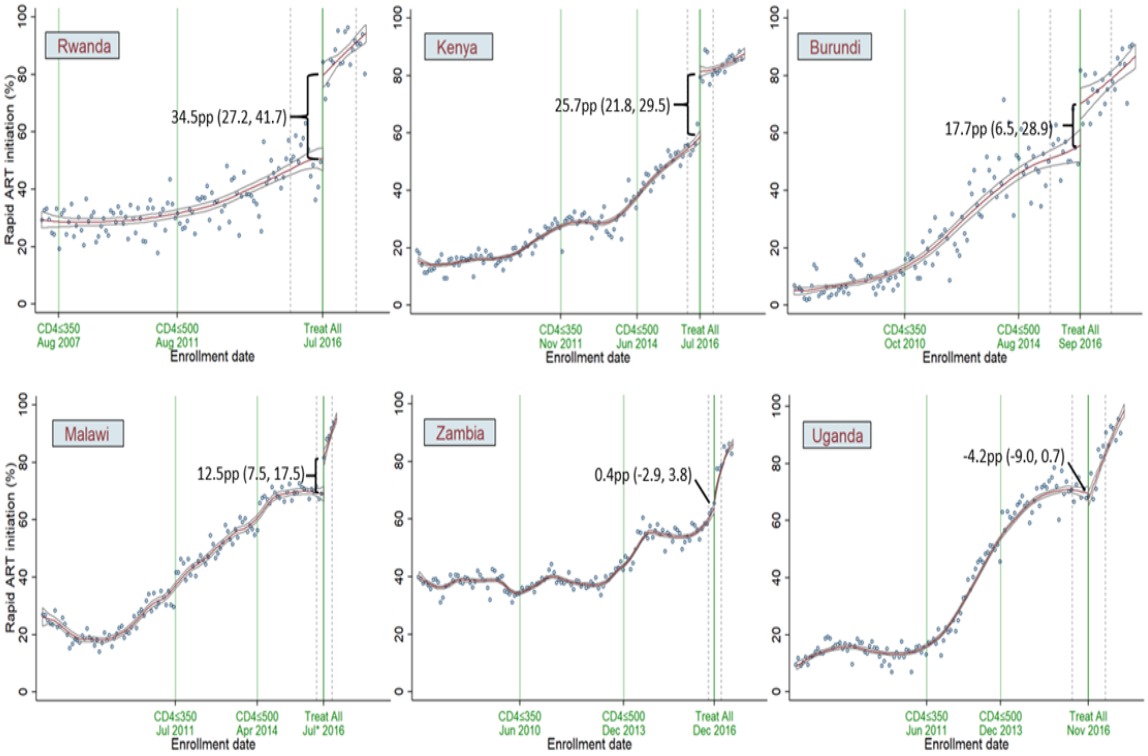
IeDEA

The effect of 'Treat All' on rapid ART initiation in SSA: 6-country regression discontinuity analysis (MR121)

- Across the six countries, 81.6% of patients enrolling under Treat All initiated treatment within 30 days.

- Statistically significant increases in rapid ART initiation immediately following national adoption of Treat All observed in in Rwanda, Kenya, Burundi, and Malawi.
  - Largest increases observed in Rwanda (34.5 pp; 95% CI: 27.2-41.7), Kenya (25.7pp, 95% CI: 21.8 to 29.5), and Burundi (17.7 pp, 95% CI: 6.5 to 28.9).

Rapid ART initiation by ART eligibility period and country



O Tymejczyk et al. In process.

IeDEA Consensus Statement on Research Priorities to Inform 'Treat All' Implementation in SSA (MR099)

AIM: To identify a set of research priorities that can inform and guide Treat All implementation in sub-Saharan Africa.

METHODS

- Undertook consultative process, using the Delphi method, to engage IeDEA researchers and stakeholders in defining research priorities related to Treat All implementation (June 2017-March 2018).
  - Working group conducted literature scans and formulated initial list of research priorities.
  - Iterative review, rating and refinement of research priorities before and after the IeDEA All-Africa meeting in Kigali Rwanda (November 2017) involved more than 200 participants, with diverse backgrounds, from 14 countries.
- Process resulted in identification of 9 research priorities related to ***critical metrics*** to inform Treat All policies and planning and ***intervention effectiveness trials/evaluations*** to improve rollout of Treat All.

M Yotebieng et al. *JIAS* (in press)

IeDEA

Consensus Statement on Research Priorities to Inform 'Treat All' Implementation in SSA (MR099)

Metrics and estimates to guide 'treat all' policies, planning, monitoring and evaluation
1. Generate accurate national and sub-national estimates of the number and proportion of persons living with HIV who are undiagnosed, disaggregated by age, sex, and population group.
2. Characterize/understand critical facilitators of and barriers to timely diagnosis, care linkage, ART initiation, and sustained care engagement and ART adherence, particularly for key and under-served populations.
3. Develop/validate country-specific policy models to support Treat All implementation decision-making.
4. Develop and apply metrics that reflect the timeliness with which short-term and long-term HIV care cascade outcomes are achieved.
5. Estimate the incidence and prevalence of HIV drug resistance and 2nd and 3rd line regimen switching at national and subnational levels, disaggregated by age, sex, and population group.
Intervention effectiveness trials and economic evaluations to improve the rollout of 'treat all' and its effect on the achievement of 90-90-90 goals.
6. Identify service delivery models and strategies to optimize uptake of HIV testing, including repeat testing, and linkage to care for key and under-served population groups.
7. Identify service delivery models and strategies to reduce the time from infection to diagnosis to ART initiation for key and under-served population groups.
8. Identify service delivery models and strategies to improve early and sustained viral suppression, early identification of drug resistance, and timely regimen switching.
9. Identify screening, diagnostic, and treatment interventions for MH/SUDs that can be integrated into HIV care to improve timely diagnosis and ART initiation, retention and viral suppression.

M Yotebieng et al. *JIAS* (in press)

JVE Supplement on Research Priorities for Achieving Universal HIV Treatment in Africa

Published by the *Journal of Virus Eradication Vol.4(S2) 2018*, this supplement includes scoping reviews and commentaries on high-priority topics identified during the 2017 All-Africa IeDEA meeting in Kigali, Rwanda. Papers include:

- Treating all people with living with HIV in sub-Saharan Africa: a new era calling for new approaches (opening editorial)
- The contribution of observational studies in supporting the WHO 'treat all' recommendation for HIV/AIDS
- IeDEA-WHO Research-Policy Collaboration: contributing real-world evidence to HIV progress reporting and guideline development
- Mental health and HIV: research priorities related to the implementation and scale up of 'treat all' in sub-Saharan Africa
- Substance use and universal access to HIV testing and treatment in sub-Saharan Africa: implications and research priorities
- Achieving UNAIDS 90-90-90 targets for pregnant and postpartum women in sub-Saharan Africa: progress, gaps and research needs
- Traversing the cascade: urgent research priorities for implementing the 'treat all' strategy for children and adolescents living with HIV in sub-Saharan Africa
- Mathematical modelling to inform 'treat all' implementation in sub-Saharan Africa: a scoping review
- HIV drug resistance in sub-Saharan Africa: public health questions and the potential role of real-world data and mathematical modelling

See http://cunyisph.org/iedea-treat-all-jve

IeDEA

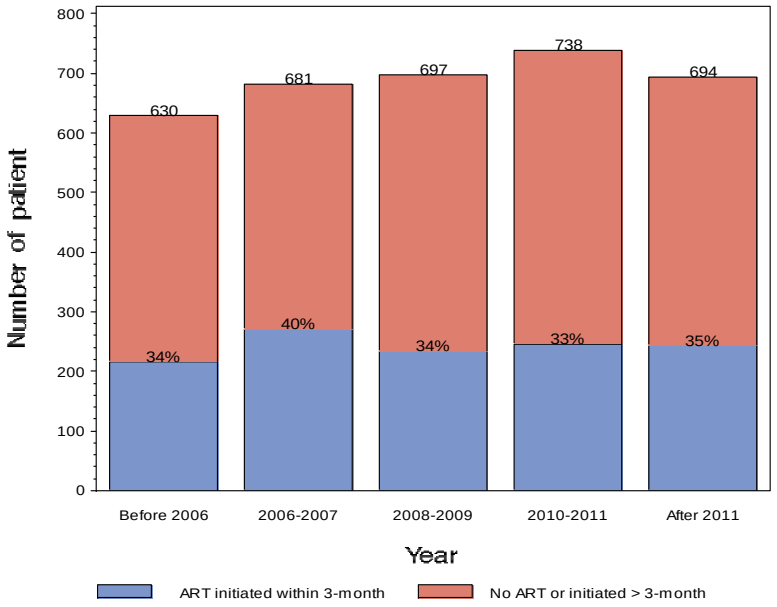
Characteristics of HIV-infected children at enrollment and ART initiation in Central Africa IeDEA

AIMS: To describe the characteristics of pediatric patients at enrollment into HIV care and ART initiation and how they have changed over time (2004-2013).

FINDINGS:

- Median age at care enrollment decreased from 77.2 months in 2004 to 30.3 months in 2013. Median age at ART initiation decreased from 83.0 to 66.9 months.
- Median CD4 count at enrollment into care increased from 563 cells/µl (IQR: 275-901) in 2004 to 660 (IQR: 339-1071) in 2013, and the median CD4 count at ART initiation increased from 310 (IQR:167-600) in 2004 to 589 (IQR: 315-1113) in 2013.

Proportion initiating ART within 3 months



- Little change over time in the proportion initiating ART within 3 months.

- From 2004 to 2013, median WAZ improved from -2 (IQR: -3.4, -1.1) to -1 (IQR: -2.5, -0.2) at enrollment in care and from -2 (IQR: -3.8, -1.6) to -1 (IQR: -2.6, -0.4) at ART initiation.

A Adedimeji et al. *PLoS One*

IeDEA

Comparison of Central Africa IeDEA cohort characteristics to Demographic Health Surveys (CA-1701)

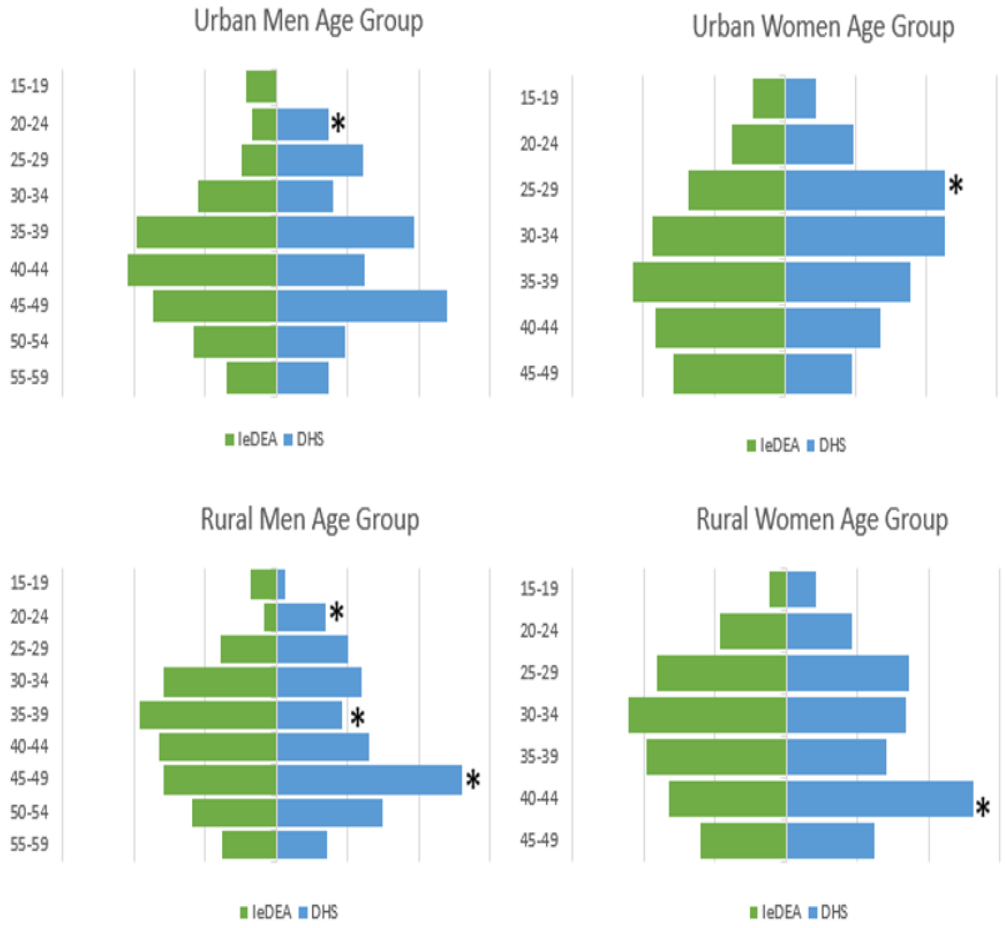
AIMS: To compare socio-demographic characteristics (gender, age, rural/urban residence, BMI, marital status) of Burundi and Rwanda IeDEA PLWH cohorts to population-representative samples from Demographic Health Surveys (DHS) to facilitate interpretation of generalizability of IeDEA findings in each country.

METHODS

- Comparison of socio-demographic characteristics of IeDEA patients with DHS respondents, using z-test and by estimating Cohen's effect size.
  - IeDEA cohorts: active patients within 12 month period of DHS fielding (defined as at least one visit to clinic during 12-month window for patients not on ART and 6-month window for patients on ART).
  - DHS samples: respondents who tested positive for HIV during survey and who reported receiving HIV test result in past year (as proxy for those in care).

Comparison of Central Africa IeDEA cohort characteristics to Demographic Health Surveys (*preliminary results*)

Age distributions of Rwanda IeDEA cohort and weighted 2015 Rwanda DHS sample of HIV+ men (age 15-59) and women (age 15-49) who reported having been previously tested for HIV and know result.



**Indicates significant p-value from two proportion z-test.*

- Sex and urban/rural stratified comparisons of age distributions of Burundi and Rwanda IeDEA cohorts with DHS samples indicates that IeDEA patient populations are quite similar to general populations of in-care PLHA.
- Some differences observed (e.g., age distribution of men living in rural areas in Rwanda).

Prevalence and predictors of elevated ALT in Central Africa IeDEA (CA-1705)

Aim

- To assess availability of liver-related biomarkers (ALT/AST) at Central Africa (CA)-IeDEA clinical sites and identify demographic and clinical predictors of elevated ALT/AST

Methods

- Data sources: Clinical data obtained from CA-IeDEA sites by October 2017
- Study population: 56,984 patients at 14 CA-IeDEA sites in 4 countries.
  - HIV-uninfected participants enrolled in CA-IeDEA PMTCT and TB programs were excluded
  - ART drugs reported at >1% of ART visits were included
- Outcome: Elevated ALT was defined as ALT>40 in males and ALT>31 in females
  - Model: Logistic regression with generalized estimating equations (GEE) to account for repeated measures

IeDEA

Prevalence and predictors of elevated ALT in Central Africa IeDEA (CA-1705)

- 29,699 (52%) of 56,984 CA-IeDEA patients had ≥1 ALT test during follow-up
  - The proportion of patients ever tested for ALT varied by country: Democratic Republic of Congo (69%); Republic of Congo (55%); Burundi (55%); Rwanda (38%) but not by sex or age
  - CA-IeDEA patients with ≥1 ALT test during follow-up had a median of 6 ALT measurements (IQR: 3-9)
- 20,093 (19%) of the 106,537 total ALT measurements from 29,699 patients were elevated (ALT>40 for men or ALT>31 for women)
- The median ALT level was 21 (IQR: 14-30)
  - Median ALT levels (range 18-30) differed across sites (Figure 1)
- Males had higher median ALT than females (24 vs. 20), but lower odds (OR: 0.80, 95% CI: 0.77, 0.85) of elevated ALT in multivariate analysis adjusted for repeated measures, site and age.
- Receipt of didanosine and emtricitabine were associated with elevated ALT in multivariate analysis adjusted for repeated measures, site, age and WHO stage (Figure 2).

Figure 1. ALT at CA-IeDEA sites

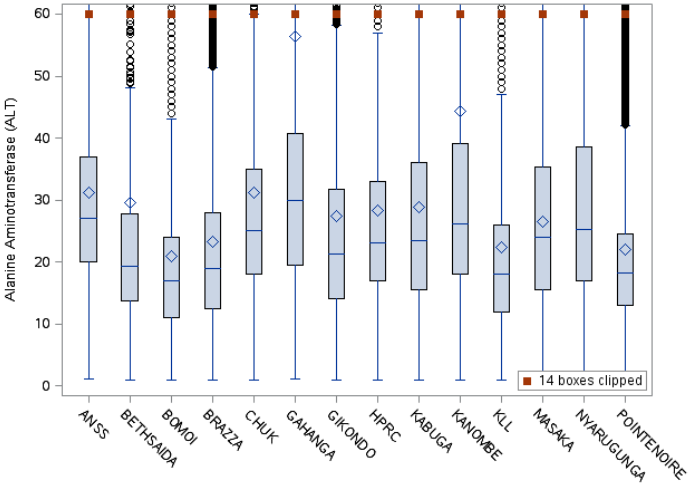
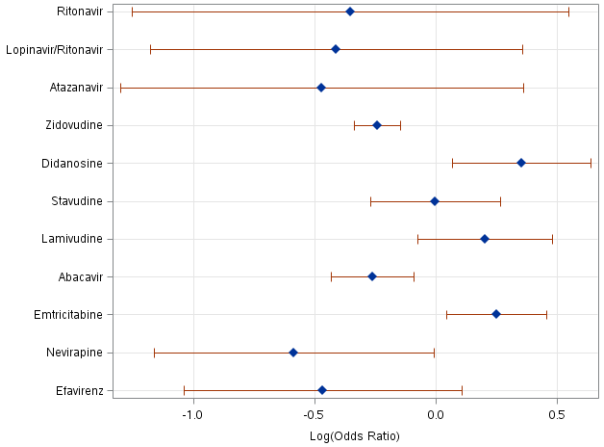


Figure 2. ART associations with elevated ALT



Kuniholm et al, CA-1705

IeDEA

East Africa IeDEA

2018 Research Highlights

Time to First-Line ART Failure and Time to Second-Line ART Switch in the IeDEA Pediatric Cohort

Background

- Globally, 49% of the estimated 1.8 million children living with HIV are accessing antiretroviral therapy (ART). There are limited data concerning long-term durability of first-line ART regimens and time to transition to second-line

Methods

- Children initiating ART at 2-14 years
- 208 sites in 30 Countries (Asia-Pacific and Africa)
- Outcomes of interest
  - First-line ART failure (clinical, immunologic, or virologic)
  - Change to second-line, attrition (death, LTP]
- Cumulative incidence computed for first-line failure and second-line initiation, with attrition as a competing event

Wools-Kaloustian et al. JAIDS 2018

IeDEA

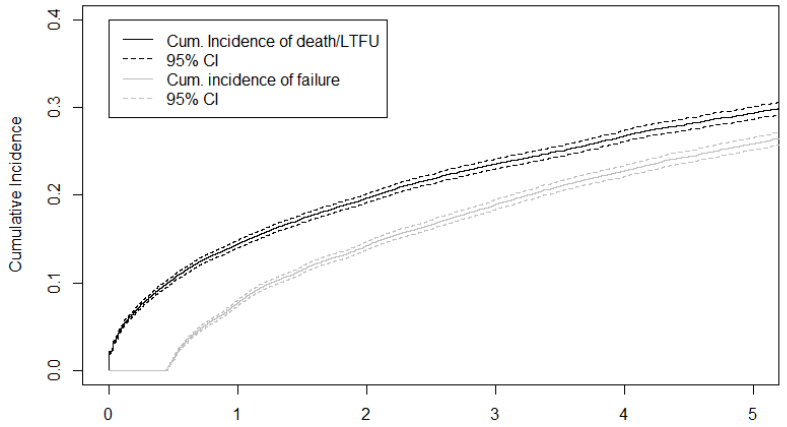
Time to First-Line ART Failure and Time to Second-Line ART Switch in the IeDEA Pediatric Cohort

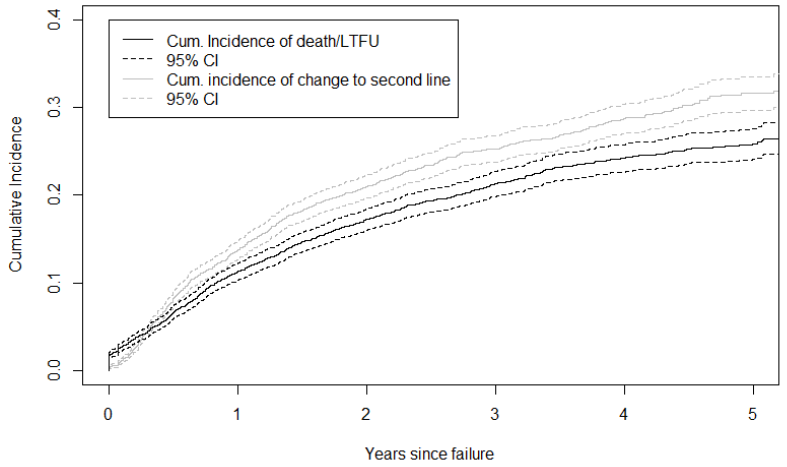
Results: (27,031 children)

- median age at ART: 6.7 years
- CD4% (≤5 years): 13.2%
- CD4 count (>5 years): 258 cells/µl
- ART: 94.4% NNRTI
- At 1-year: 7.7% failed and 14.4% attrition
- At 5-years: 25.9% failed and 29.4% attrition
- At 1-year after ART failure: 13.7% changed and 11.2% attrition
- At 5-years after ART Failure: 31.6% changed and 25.9% attrition

Conclusions:

- High rates of first-line failure and attrition 5 years after ART initiation
- Of children meeting failure criteria, only 1/3 were transitioned to second-line ART within five years





Wools-Kaloustian et al. JAIDS 2018

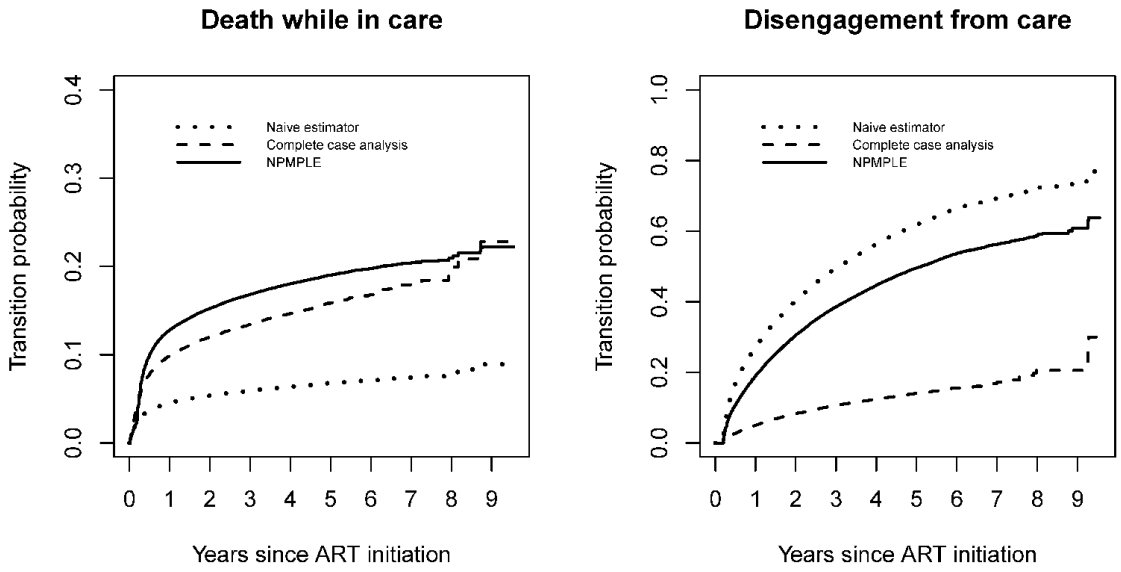
Nonparametric Inference for Markov Processes with Missing Absorbing State

- **Background**
  - Use of routine programmatic data **leads to death under-reporting** from HIV programs in sub-Saharan Africa
  - The use of loss-to-follow-up as an outcome leads to biased results because this outcome represents a mix of:
    - Disengagement from care
    - **Unreported deaths**
    - Silent transfer to other clinics
  - To address this issue, tracing of patients lost to program was undertaken at the Academic Model Providing Access to Healthcare (AMPATH) in order to determine outcomes including measurement of mortality in the presence of death underreporting (**incomplete death ascertainment**)

Bakoyannis et al. Statistica Sinica 2019, In press

IeDEA

Nonparametric Inference for Markov Processes with Missing Absorbing State



- Death under-reporting (dotted lines) leads to a **significant underestimation of mortality** and an **overestimation of disengagement form HIV care**
- Even if deaths found through tracing are included in the analysis without further adjustment, (complete-case analysis - dashed lines) both mortality and disengagement from HIV care are **under-estimated**
- The proposed nonparametric maximum pseudolikelihood estimator* (NPMPLE, solid lines) provides the **most reliable estimates** under **incomplete death ascertainment** and patient tracing.

Bakoyannis et al. Statistica Sinica 2019, In press

IeDEA

Adherence to antiretroviral therapy in a clinical cohort of HIV-infected children in East Africa

Objective

- To describe antiretroviral therapy (ART) adherence and associated factors for the large, HIV-infected pediatric cohort in East Africa IeDEA

Methods

- EA IeDEA cohort clinical data from HIV-infected children within 4 clinical care programs (with 26 clinical sites) in Kenya, Uganda, and Tanzania
- Children were less than 13 years of age, had to have initiated ART and had an adherence measure
- Programs used one of 3 adherence measures:
  - 7-day quantitative recall
  - 7-day categorical recall
  - Clinician pill counts
- Hierarchical, three-level, logistic-regression model to examine adherence, with observations nested within patient, and patients within the 26 sites providing pediatric HIV data

Vreeman et al, PLOS One, 2018

IeDEA

Adherence to antiretroviral therapy in a clinical cohort of HIV-infected children in East Africa

Results

- 3,304 children, enrolled in care for median of 1.8 years
- Median age at ART initiation 5.5 years ([IQR] 3.0–8.5 years)
- "Good" adherence, as reported by each clinic's measures, was extremely high, remaining on average above 90% throughout all years of follow-up
- Longer time on ART was associated with higher adherence (aOR–per log-transformed week on ART: 1.095, 95% CI: 1.052–1.150
- Patients enrolled in higher-volume programs exhibited higher rates of clinician-assessed adherence (aOR per log-500 patients: 1.174, 95% CI:1.108–1.245)
- Significant site-level variability in reported adherence was observed (0.28), with even higher variability among patients (0.71)
- In a sub-analysis, being an orphan at start of ART was strongly associated with lower ART adherence rates (aOR: 0.919, 95% CI: 0.864–0.976)

Conclusion: *Although ART adherence appears to be very good among children in East Africa, HIV care systems in resource-limited settings must continue to measure, sustain, and improve ART adherence. Reliable, valid, affordable measurement strategies for routine adherence measurement are urgently needed.*

Vreeman et al, PLOS One 2018

IeDEA

Adolescent pregnancy at ART Initiation: A critical barrier to retention on ART

Background

- Adolescence and pregnancy are potential risk factors for Loss to Follow-up LTFU while on ART
- The objective of this analysis was to quantify the impact of age, pregnancy, and site-level factors on LTFU

Methods

- Data Source: routine clinical data on patients initiating ART 2000-2014 in IeDEA East Africa
- Definitions
  - Young Adolescents 10-14
  - Older Adolescents 15-19
  - Adults $\geq$ 20 years
  - LTFU: no clinic visit for ≥ 6 months after ART initiation
- Analysis
  - Compared adolescent and adult LTFU after ART initiation using competing-risk methods (death as a competing event)
  - Patient- and site-level correlates of LTFU after ART initiation were examined using cause-specific hazards models

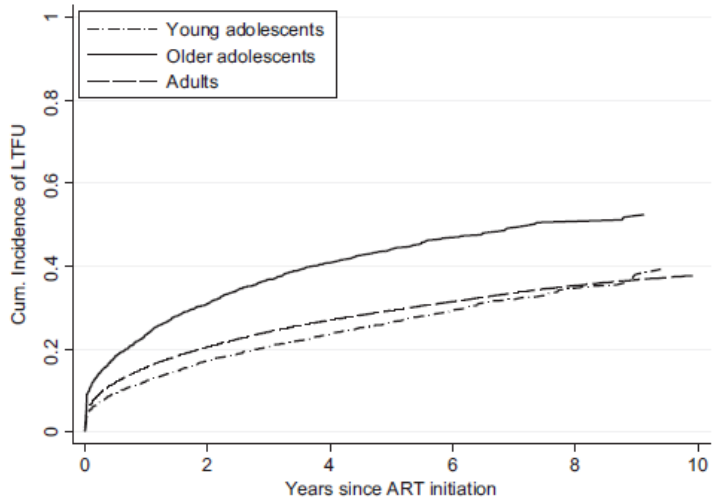
Nuwagaba-Biribonwoha et al. JIAS 2018

IeDEA

Adolescent pregnancy at ART Initiation: A critical barrier to retention on ART

Results

- **Total:** 138,387 - YA 2,496; OA 2,955; Adults 132,936
- **Pregnant at ART initiation:** YA 0.7%; OA 22.3% 22.3%; Adults 8.3%



- **5 year CI of ART LTFU:** YA 26.6% (24.6-28.6); OA 44.1% (41.8-46.3); Adults 29.3% (29.1-29.6)
- **aHR (95% CI) LTFU referent Adults:** YA 0.77 (0.69-0.86); OA 1.54 (1.41-1.68)
- **aHR (95% CI) LTFU referent Male:** women pregnant 1.20 (1.14-1.27); non-pregnant 0.90 (0.88-0.93)
- **LTFU hazard among OA driven by pregnant** aHR 2.42 (1.98-2.95) and **non-pregnant women**, and 1.51 (1.27-1.80) compared to men
- **Facility Factors**
  - Tertiary vs primary-care clinics aHR 0.61 (0.56-0.67)
  - Integrated adult and adolescent services and food provision aHR 0.93 (0.89-0.97) vs nonintegrated and food provision
  - Patient support groups aHR 0.77 (0.66-0.90)
  - Group adherence counselling aHR 0.61 (0.57-0.67)
- **Conclusions**
  - Significantly higher LTFU after ART initiation among OA as compared to either YA or adults
  - Significant impact of pregnancy on LTFU among OA

Nuwagaba-Biribonwoha et al. JIAS 2018

IeDEA

Trends Over Time for Adolescents Enrolling in HIV Care in Kenya, Tanzania, and Uganda From 2001–2014

Background

- The data needed to understand the characteristics and outcomes, over time, of adolescents enrolling in HIV care in East Africa are limited.

Methods

- retrospective cohort of individuals enrolling in HIV care as younger adolescents (10–14 years) and older adolescents (15–19 years) from 2001–2014 in Kenya, Tanzania and Uganda
- Outcomes of interest
  - Proportion of adolescents among all adults enrolling in care over time
  - Change in baseline CD4 counts over time
- 12-month attrition after enrollment/pre-ART initiation and post-ART attrition estimated by Kaplan–Meier method; attrition defined as composite of death/LTFU

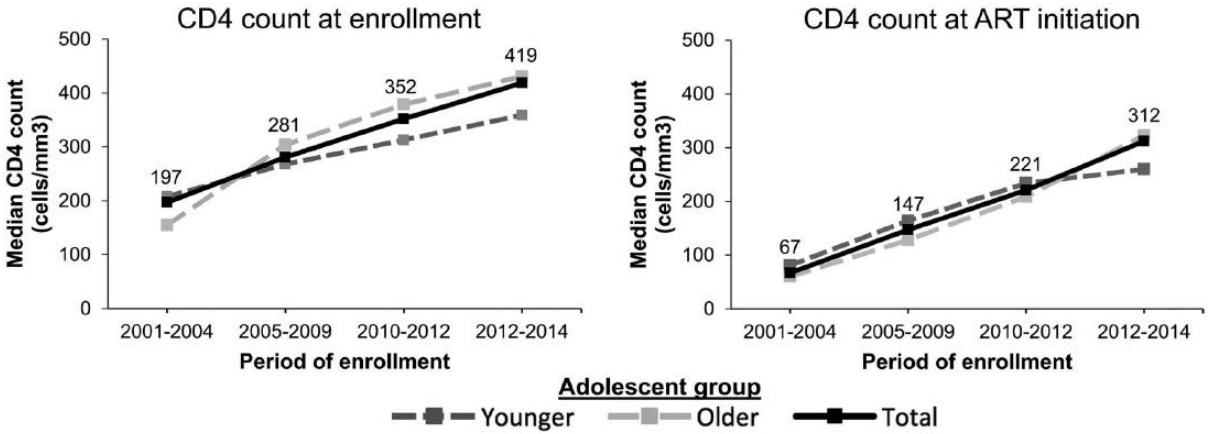
Apondi et al. JAIDS 2018

IeDEA

Trends Over Time for Adolescents Enrolling in HIV Care in Kenya, Tanzania, and Uganda From 2001–2014

Results:

- 6,344 adolescents 10-19 years enrolled in HIV care from 2001-2014
- The proportion of adolescents enrolling among all individuals ≥ 10 years of age increased from 2.5% (2001–2004) to 3.9% (2013–2014; P<0.0001)
- Median CD4 counts at enrollment and ART initiation increased over time for younger and older adolescents



- 12-month attrition increased from 2001-2004 to 2012-2014 for all adolescents after enrollment/pre-ART initiation (4.7% vs. 12.0%, P<0.001) and post-ART initiation (18.7% vs. 31.2%, P<0.001)

Conclusions:

- Earlier adolescent enrollment and ART initiation over time, but also higher attrition before and after ART initiation over time.

Apondi et al. JAIDS 2018

IeDEA Southern Africa
2018 Research Highlights

Assessing the association between changing NRTIs when initiating second-line ART and treatment outcomes

TABLE 2. Hazard Ratios and 95% Confidence Intervals of Second-Line Virologic Failure Among South African Patients, Using Cox Proportional-Hazards Models Adjusted for Propensity Scores

	Second-Line NRTI			
First-Line NRTI	AZT	d4T	TDF	ABC
AZT	(ref)	(x)	0.25 (0.11, 0.57)	1.08 (0.49, 2.37)
d4T	1.19 (0.85, 1.68)	(ref)	0.70 (0.42, 1.16)	(x)
TDF	0.35 (0.13, 0.96)	(x)	(ref)	(x)

ref = reference category, compared with other estimates in the row.
x = Sample size too small.

- Among patients in South Africa initiated on zidovudine (AZT), the adjusted hazard ratio for second-line virologic failure was 0.25 (95% confidence interval: 0.11 to 0.57) for those switching to tenofovir (TDF) vs. remaining on AZT.
- Among patients in South Africa initiated on TDF, switching to AZT in second line was associated with reduced second-line failure (adjusted hazard ratio = 0.35 [95% confidence interval: 0.13 to 0.96]).
- In Zambia, where viral load monitoring was not available, results were less conclusive.
- Changing NRTI in second line was associated with better clinical outcomes in South Africa.

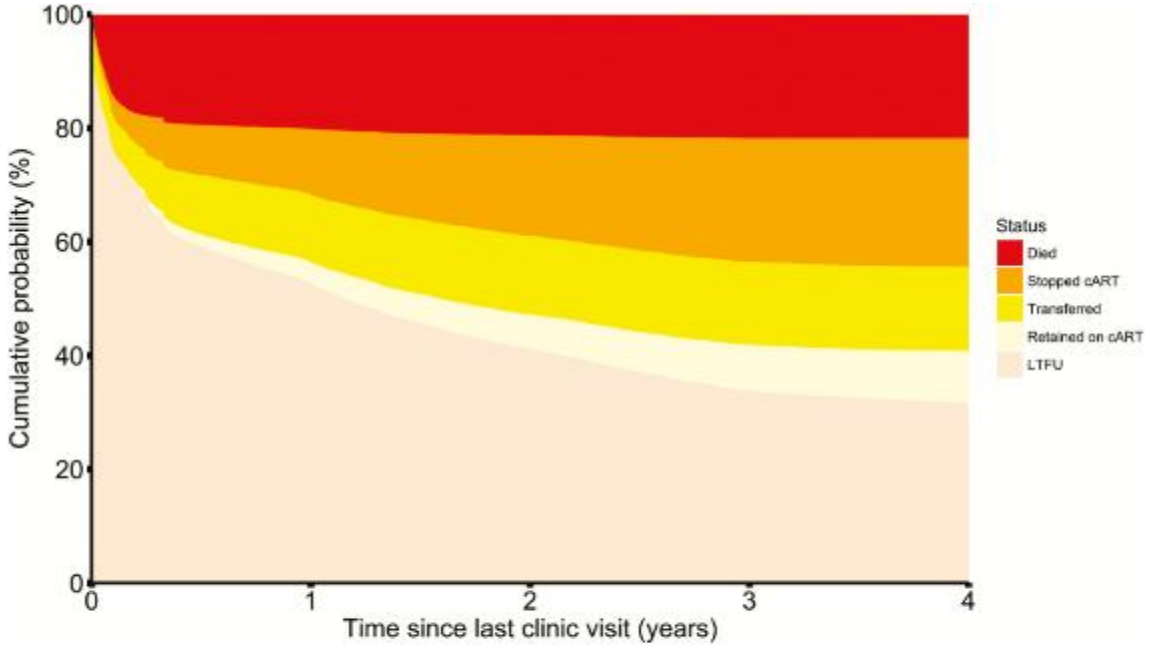
Rohr J et al. J Acquir Immune Defic Syndr. 2018 Apr;77(4):413-416.

Point-of-Care Urine Ethyl Glucuronide Testing to Detect Alcohol Use Among HIV-Hepatitis B Virus Coinfected Adults in Zambia

- Among 211 HIV-hepatitis B virus coinfected participants (40.8% women)
  - 44 (20.8%) lifetime abstainers
  - 32 (15.2%) former drinkers
  - 135 (64.0%) current drinkers, including 106 (50.2%) with unhealthy drinking per alcohol use disorders identification test consumption (AUDITC).
- Eighty-seven (41.2%) were urine Ethyl glucuronide positive
  - 64 of 65 (98.5%) who drank ≤ 3 days prior
  - 17 of 134 (12.7%) underreported
- Past drinking (versus lifetime abstinence) and longer time on antiretrovirals (≥ 12 months) were associated with underreporting.
- These data support further use of point-of-care alcohol biomarkers in HIV and hepatitis research and clinical settings.

Vinikoor MJ et al. AIDS Behav. 2018 Jul;22(7):2334-2339.

Outcomes of Patients Lost to Follow-up in African Antiretroviral Therapy Programs: Individual Patient Data Meta-analysis



Died	20.2 (19.3 - 21.1)	21.3 (20.3 - 22.2)	21.8 (20.8 - 22.7)	21.8 (20.8 - 22.7)
Stopped cART	11.6 (10.8 - 12.3)	17.7 (16.8 - 18.6)	21.7 (20.7 - 22.6)	22.6 (21.6 - 23.6)
Transferred	11.9 (11.1 - 12.6)	13.8 (13.0 - 14.6)	14.6 (13.8 - 15.4)	14.8 (14.0 - 15.6)
Retained on cART	4.0 (3.5 - 4.4)	6.1 (5.5 - 6.6)	8.1 (7.5 - 8.8)	9.2 (8.5 - 9.8)
LTFU	52.4 (51.2 - 53.5)	41.1 (40.0 - 42.2)	33.8 (32.7 - 34.9)	31.6 (30.6 - 32.7)
Patients followed	3870	3034	2494	2333

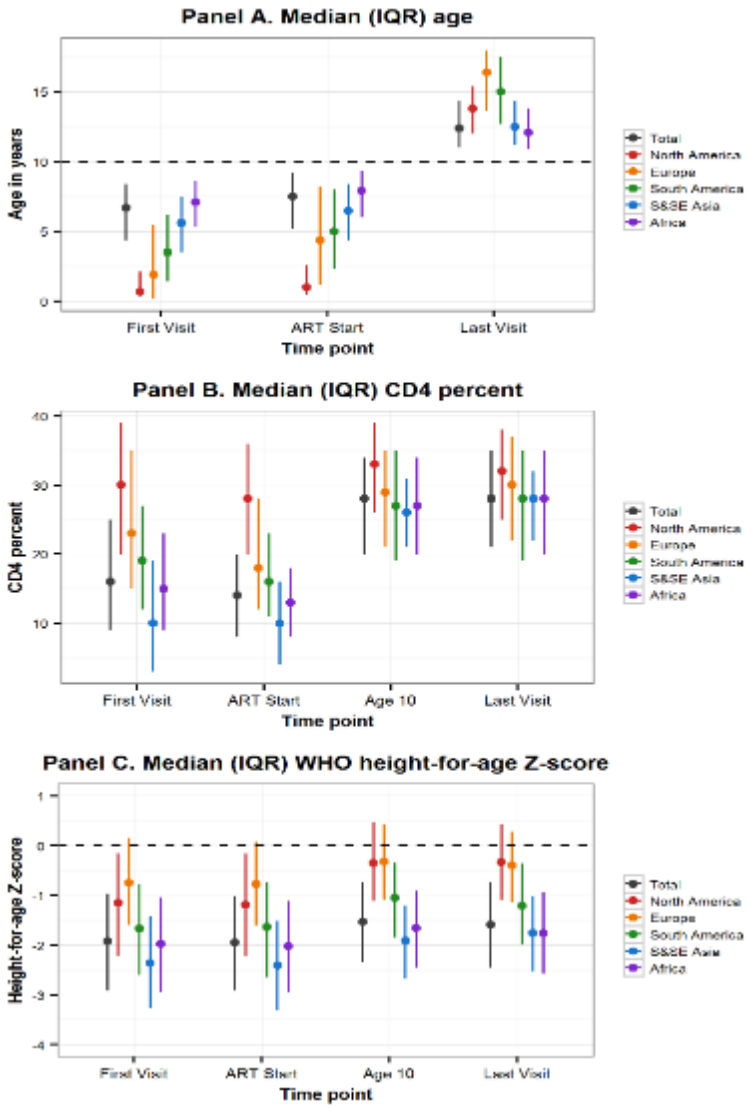
Figure: Cumulative incidence plot of the outcomes in patients lost to follow-up (LTFU).

- Individual patient data meta-analysis of 7377 lost to follow-up patients from 9 antiretroviral treatment programs in 8 African countries.
- Four years after the last clinic visit, about one-fifth of patients LTFU had died, a similar proportion had stopped treatment, one-sixth had silently transferred to another clinic, and about one-third were not found.
- Mortality was associated with male sex, more advanced disease, and shorter combination antiretroviral therapy (cART) duration.

Chammartin F et al. Clin Infect Dis. 2018 Jun. 67(11): 1643–1652

The epidemiology of adolescents living with perinatally acquired HIV (APH): a cross-region global cohort analysis

Figure: Comparison by region of characteristics at key time points

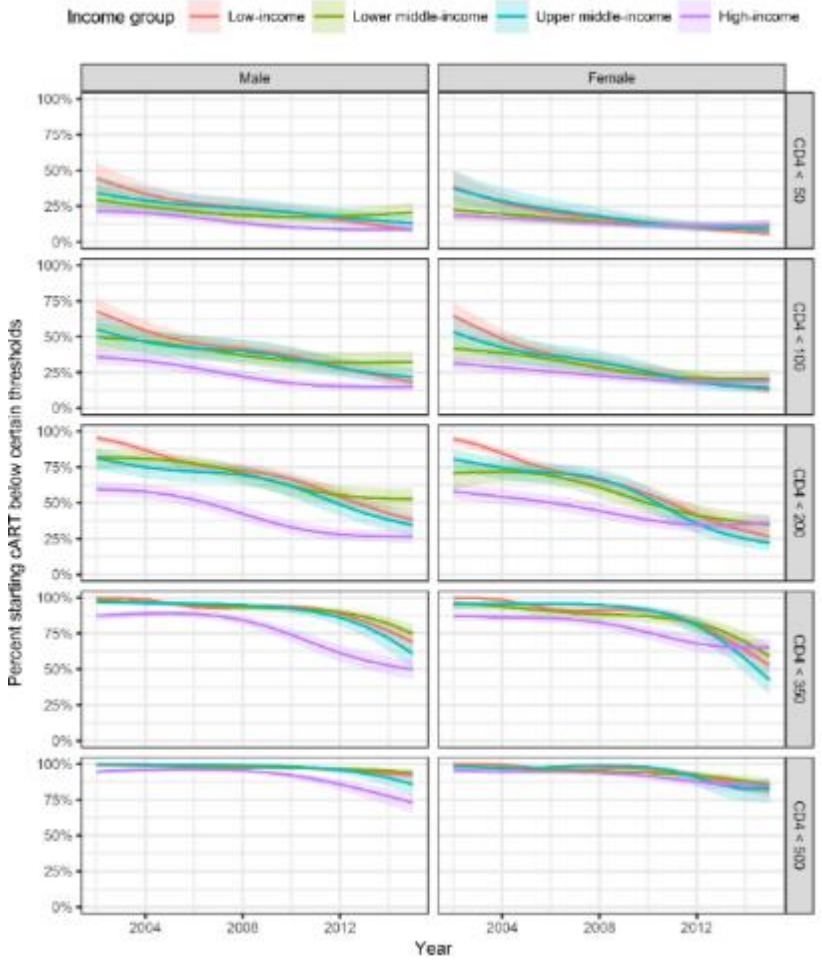


- 12 cohort networks (5 regions & 51) pooled through CIPHER: 38,187 APH
- Observation started 1982 in Europe and 1996 in Africa, continuing until at least 2014, total 112,976 person-years of follow-up 10-19 years
- In Europe and North America, APH entered care earlier and experienced less severe growth impairment during adolescence compared to South America, South & Southeast Asia and sub-Saharan Africa
- Despite probable under-ascertainment, mortality higher in sub-Saharan Africa, South & Southeast Asia and South America than in Europe.

CIPHER Global Cohort Collaboration, Slogrove et al. PLoS Med. 2018;15(3):e1002514

Global trends in CD4 count at start of ART: collaborative study of treatment programs

Figure 1. Percentage starting cART with CD4 <50, 100, 200, 350, and 500 cells/µL (rows) by sex (columns) and country income group (colors).



Data from IeDEA & COHERE (all continents)
Multiple imputation of missing CD4 cell counts
Aggregation of data by country, calendar year and sex, calculation of several outcomes:

- median CD4
- % starting with <50, <100 and <200 cells/µL
- weighting that consisted of 2 parts:
  - accounting for uncertainty of estimated median
  - accounting for TRUE number that started ART in specific country and year
- weighted (generalized) additive mixed models.
- sensitivity analyses

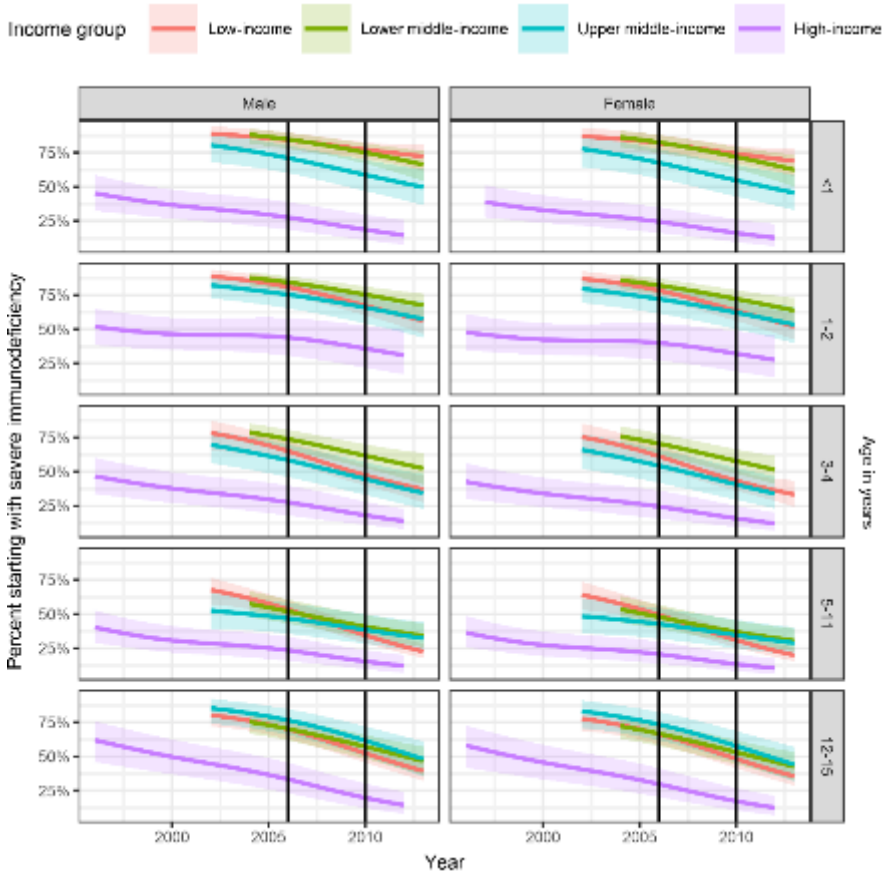
Results:

- 9511,855 adult patients, 16 LIC, 11 LMIC, 9 UMIC, 19 HIC
- 30% missing CD4s
- Increase in median CD4, but generally <350 cells/µL in 2015.
- Higher increases in females compared to males
  - except in HIC where males had higher increases
- some plateaus recently (especially in HIC)
  - for % of patients starting below different CD4 thresholds.

The IeDEA and COHERE Cohort Collaboration. Clin Infect Dis. 2017;66(6):893-903

Global temporal changes in the proportion of children with advanced disease at the start of combination antiretroviral therapy in the era of changing criteria for treatment initiation

Figure. Percentage of children starting ART with severe immunodeficiency by sex (columns), age (rows), and country income group (colors).



Background

- In previous years guidelines of WHO on when to start ART depended on different CD4 measures.

Aim

- Description of temporal trends in CD4 measures at the start of ART in children by income-group, age and sex.
- Examination of effect of WHO guidelines on reducing proportion of children starting ART with advanced disease.

Methods

- Data from IeDEA, COHERE, PHACS and IMOAACT 219C.
- Multiple imputation of missing CD4 measures by predictive mean matching.
- Outcomes: Median CD4 count and %; proportion starting with severe immunodeficiency
- Weighing of data cells with weight that consisted of 2 parts:
  - Accounting for uncertainty of estimated median
  - Accounting for TRUE number of patients that have started ART in a specific country and year
- Weighted (generalized) additive mixed models to model temporal trends in CD4 measures
- Piecewise regression model to examine impact of WHO initiation guidelines

Results

- 52,153 children from 14 LIC, 8 LMIC, 5 UMIC, 5HIC.
- Decrease in children starting with severe immunodeficiency from 2004 to 2013 in all income groups.
- By 2013 – at least 50% of children started ART without severe immunodeficiency in all country income groups.
- Annual decreases in percentage starting with severe immunodeficiency after WHO guidelines revision in 2006 (LIC, LMIC and UMIC) and 2010 (all income-groups).

Panayidou K et al. J Int AIDS Soc 2018, 21:e25200

IeDEA West Africa Collaboration

2018 Research Highlights

Publication # 1: Alcohol use in the IeDEA West Africa collaboration

High prevalence of binge drinking among people living with HIV in four African countries

Nouaman M, Vinikoor M, Seydi M, Ekouevi D, Coffie P, Mulenga L, Tanon A, Egger M, Dabis F, Jaquet A, Wandeler A for the IeDEA Southern and West Africa collaboration. J Int AIDS Soc. 2018 Dec;21(12):e25202.

Objective

- Document alcohol consumption patterns among PLHIV from four countries in West and Southern Africa
- Compare the prevalence binge drinking among the PLHIV participating in our study with estimates from the corresponding general population (WHO data)

Methods

- The AUDIT-C administered to PLHIV attending clinics in Côte d'Ivoire, Togo, Senegal and Zambia trough previous cross-sectional studies on liver fibrosis prevalence studies*
- Hazardous drinking defined as an AUDIT-C score ≥4 for men or ≥3 for women
- Binge drinking: ≥6 drinks at least once per month
- Binge drinking was compared to estimates from the general population using estimates from the World Health Organization

Publication # 1: Alcohol use in the IeDEA West Africa collaboration

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Results

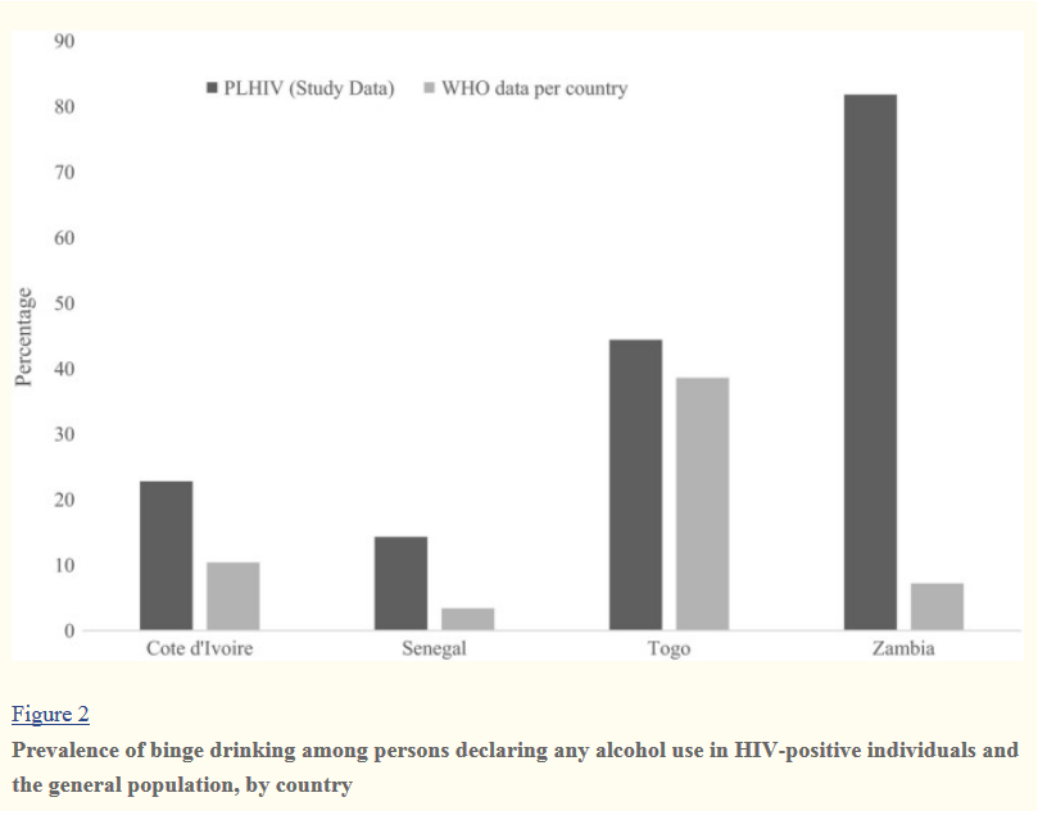


Figure 2

Prevalence of binge drinking among persons declaring any alcohol use in HIV-positive individuals and the general population, by country

- Diversity in drinking patterns across settings and subpopulations
- High prevalence of excessive alcohol consumption among HIV-positive populations in four African countries compared to general population
- Interventions to reduce excessive alcohol use are urgently needed to optimize adherence in the era of universal ART

Publication # 2: Women's Health in IeDEA West Africa

High incidence of pregnancies among among HIV-positive women on ART, especially among those without immediate desire for procreation. The WETIV-R cohort study in Abidjan, Ivory Coast (Submitted)

Tiendrebeogo T, Arikawa S, Messou E, Horo A, Zahui A, Yao A, Minga A, Renaud Becquet.

Background

Better understanding of reproductive health (RH) of HIV-positive women of childbearing age on ART is essential for better care of these women and their unborn children.

Objective

- To estimate pregnancy incidence among HIV-positive women on ART and assess the association of this incidence with pregnancy desire

Methods

- HIV + women on ART for less than 24 months, aged 18-49 years were included in the WETIV-R cohort at two HIV clinics in Abidjan between 2016 and 2017 and followed for 5 years.
- A package of care targeting all dimensions of RH was offered to these women at each quarterly HIV follow-up visits, including pregnancy tests routinely performed at each visit (more than 99% accepted).
- We described here immediate pregnancy desire (e.g. in the next 12 months) and estimated by a Poisson regression model, the pregnancy incidence rate (IR) over 12 months of observation and its association with immediate pregnancy desire.

Publication # 2: Women's Health in IeDEA West Africa

Results

- 478 women were included in this analysis of which characteristics at inclusion were:
  - Median CD4 count = 353 cells / mm3 (IQR = 215-498)
  - Median age = 35 years (IQR=30-39)
  - Median number of previous pregnancies=3 (IQR=2-3)
  - 70% were living with a male partner
- Condom use and modern contraceptive methods (injectable, pill, implant, intrauterine device) were infrequent at inclusion: 25% and 4%, respectively.
- 60% of women who had a sexual partner shared their HIV status with him.
- 71% of women reported having a pregnancy desire and 36% of them an immediate pregnancy desire.
- Prevalence of unmet need for family planning (non-use of contraception among those with a partner but no immediate pregnancy desire) was as high as 58%.
- The pregnancy IR at 12 months was 9.22 pregnancies per 100 Women-Years (95% CI: 6.74-12.62).
- It was as high among women with delayed pregnancy desire or no desire [13.53 (95% CI: 8.63-21.22)] than among those with immediate pregnancy desire [8.45 (95% CI: 4.91 -14,56)]
  - Hazard ratio adjusted for age and education level= 0.94 (95% CI = 0.44-1.98).

Conclusion

- Unlike the pregnancy rate usually based on women declaration, the one calculated here was based on repeated pregnancy tests every 3 months and was therefore more reliable.
  - Declarative pregnancy incidence at the same sites was 2.71 pregnancies per 100 Women-Years (95% CI: 2.53-2.89). (Burgos JAIDS 2014)
- The pregnancy IR was very high, particularly among women without an immediate ED, despite efforts to improve reproductive health of HIV positive women being followed in this cohort.

Publication # 3: Cancer in IeDEA West Africa

Etiology of hepatocellular carcinoma in West Africa, a case-control study

Jaquet A, Tchounga B, Tanon A, Bagny A, Ekouevi D, Traore A, Sasco A, Maiga M, Dabis F.
***Int J Cancer*, 2018;143(4):869-77.**

Objective

- Estimate association between Hepatocellular carcinoma (HCC) and selected factors including alcohol use, HCV, HBV and HIV infection

Methods

- A case control (1:2) study was conducted in referral hospitals of Abidjan (Cote d'Ivoire), Bamako (Mali) and Lome (Togo)
- All participants underwent a standardized abdominal ultrasound and a serum α-fetoprotein measurement
- Cases were matched with controls on age, gender and participating referral hospital
- HIV, HBV and HCV serology tests were systematically performed. Alcohol use was assessed using the AUDIT questionnaire (a score >7 defined hazardous drinking).
- Conditional logistic regression model estimated the associations by the Odds Ratio (OR) with its 95% confidence interval (CI)
- Population attributable risk (PAR) for HCC

Publication # 3: Cancer in IeDEA West Africa

Results

Factors associated with hepatocellular carcinoma in Abidjan, Bamako and Lome, 2014-2015

	Controls	Cases	Adjusted analysis		PAR
	(n=320)	(n=160)			
	n (%)	n (%)	OR (95% CI)	p	(%)
HBs antigen test				$<10^{-4}$	
Negative	289 (90.3)	48 (30.0)	1		
Positive	31 (9.7)	112 (70.0)	62.5 (20.5 – 190.7)		85.6
HCV antibody test				$<10^{-4}$	
Negative	305 (95.3)	116 (72.5)	1		
Positive	15(4.7)	44 (27.5)	35.9 (10.0 – 130.3)		62.1
Alcohol use				0.04	
No/moderate use	304 (95.0)	134 (83.7)	1		
Hazardous drinking*	16 (5.0)	26 (16.3)	4.5 (1.1 – 18.5)		15.0
HIV antibody test				0.89	
Negative	311 (97.2)	153 (95.6)	1		
Positive	9 (2.8)	7 (4.4)	1.2 (0.1 – 10.4)		

Discussion

- The fraction of HCC potentially preventable by the elimination of HBV infection was particularly high and quite homogeneous across participating countries
- No association reported between HIV infection and HCC
- Synergic effect of hazardous drinking and HBV infection was reported towards HCC

Publication # 4: Children (IeDEA West Africa MR lead)

MR108: Access to antiretroviral therapy in HIV-infected children aged 0–19 years in the International Epidemiology Databases to Evaluate AIDS (IeDEA) Global Cohort Consortium, 2004–2015: A prospective cohort study

Desmonde *et al* (2018) PLoS Medicine, 15(5): e1002565

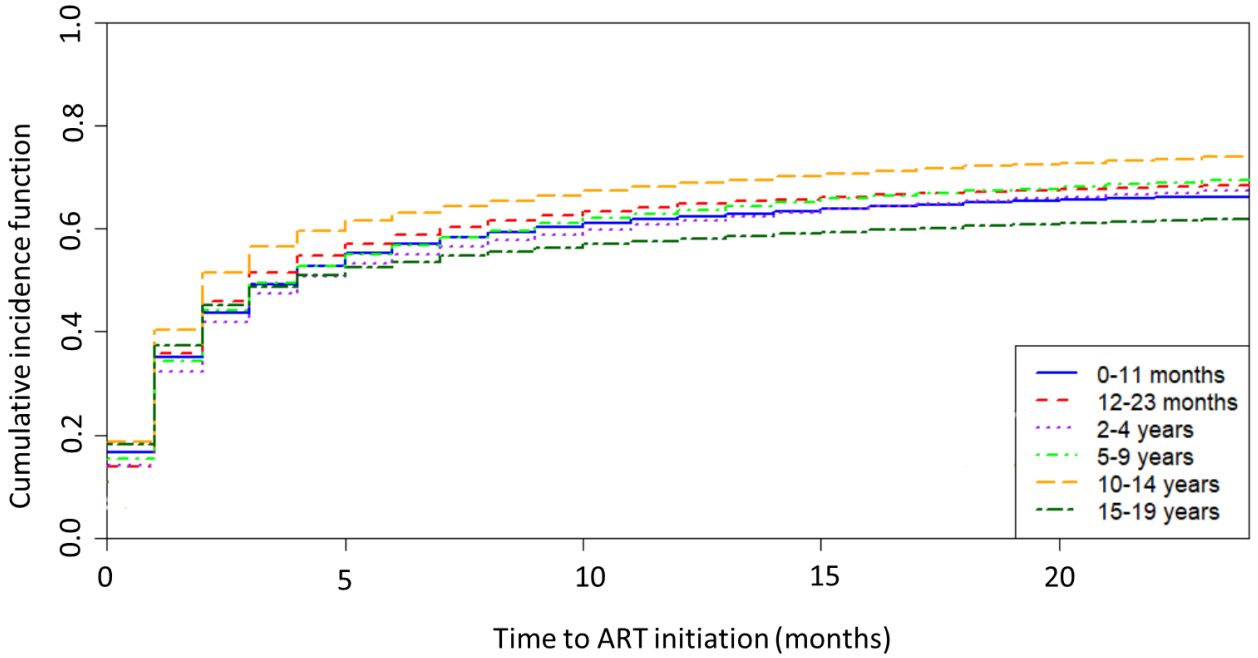
- Introduction: In low/middle-income countries, the attrition across the continuum of care for HIV-infected children between their HIV diagnosis, linkage to care, and ART initiation is not well characterized.
- Objective: To describe time from enrollment into HIV care to ART initiation in HIV-infected children within the IeDEA Global Cohort Consortium
- Inclusion criteria:
  - All children aged 0-19 years ART naïve at enrolment
- Statistical analyses:
  - Cumulative incidence function (CIF) of ART initiation with death and loss-to-follow-up as competing risks
  - Time to ART initiation and associated factors since enrolment in care or HIV diagnosis when this was available (Fine and Gray model)

Publication # 4: Children (IeDEA West Africa MR lead)

MR108: Access to antiretroviral therapy in HIV-infected children aged 0–19 years in the International Epidemiology Databases to Evaluate AIDS (IeDEA) Global Cohort Consortium, 2004–2015: A prospective cohort study

Desmonde *et al* (2018) PLoS Medicine, 15(5): e1002565

Figure: Cumulative incidence function (CIF) for ART initiation by age at enrolment among 135,479 HIV-infected pre-ART children



- The 24-month CIF for ART initiation was 68.2% (95% CI: 67.9%–68.4%)
- In multivariate analyses, ART initiation rates were lower in sub-Saharan Africa compared to the other regions, and children aged <1 year and those aged 15–19 years were the least likely to initiate treatment.

Publication # 5: Adolescents (IeDEA West Africa MR lead)

MR82 : Stunting and growth development for adolescents with perinatally acquired HIV: differential evolution for males and females. A multiregional analysis from the IeDEA global pediatric collaboration.

Jesson J *et al.*, currently in submission to JIAS

- Objective: To describe growth evolution and its associated factors for adolescents with perinatally acquired HIV (PHA), investigating differences between males and females
- Inclusion criteria:
  - Adolescents with documented perinatal HIV acquisition or entered in care before 10 years of age
  - ART-treated adolescents
  - With at least one height data between 10 and 16 y and followed in care until at least 14y of age
- Statistical analyses:
  - Comparison of the characteristics at ART initiation and 10 years of age between males and females
  - Growth during adolescence described using growth velocity curves and Height-for-Age Z-score (HAZ)
  - Associated factors to HAZ evolution with linear mixed models, using multiple imputation for missing data

Publication # 5: Adolescents (IeDEA West Africa MR lead)

MR82 : Stunting and growth development for adolescents with perinatally acquired HIV: differential evolution for males and females. A multiregional analysis from the IeDEA global pediatric collaboration.

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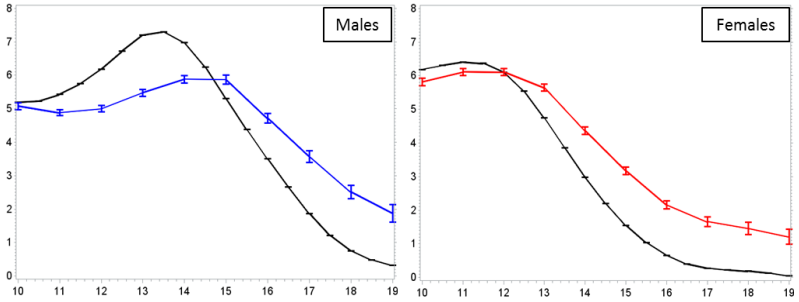


Figure 1: Mean height gain/cm/year between 10 and 19 years of age compared to the WHO child growth standards (black)

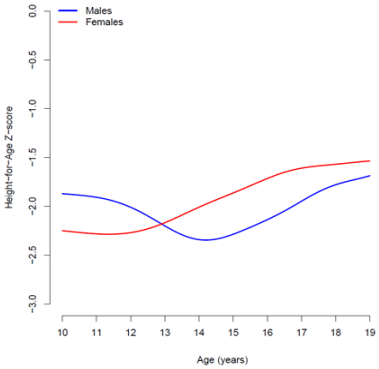


Figure 2: Height-for-Age Z-score evolution between 10 and 19 years of age, adjusted estimates of the imputed mixed model.

	Age	10	11	12	13	14	15	16	17	18	19
Males	% HAZ<-2	34.4	37.5	42.3	51.0	52.6	48.1	43.0	35.4	31.4	27.0
Females	% HAZ<-2	39.5	41.9	40.3	35.4	29.2	25.1	21.1	18.3	15.5	15.3

Among 8737 ART-treated adolescents with perinatally acquired HIV from sub-Saharan Africa, Asia-Pacific and CCASANet:

- 41% were stunted (Height-for-Age Z-score <-2 SD) at ART initiation, at least a third during early adolescence.
- Growth differed between males and females, resulting in higher prevalence of stunting for males
- Associated factors to poor growth were older age at ART initiation and low CD4 count over time.
- Except for growth, males and females did not differ by access to HIV care, malnutrition at ART initiation, CD4 count or region

=> Factors influencing growth differences in this population have to be further investigated.

NA-ACCORD
2018 Research Highlights

Reduced Cancer Survival Among Adults With HIV and AIDS-Defining Illnesses Despite No Difference in Cancer Stage at Diagnosis

Grover S, et al. J *Acquir Immune Defic Syndr* 2018;79(4):421-9.

- **Background:** It is not known whether immune dysfunction is associated with increased risk of death after cancer diagnosis in persons with HIV (PWH). AIDS-defining illness (ADI) can signal significant immunosuppression. Our objective was to determine differences in cancer stage and mortality rates in PWH with and without history of ADI.
- **Methods:**
  - Adult PWH with anal, oropharynx, cervical, lung cancers, or Hodgkin lymphoma diagnoses from 2000 to 2009 in North America. Cancer diagnoses were validated through a standardized abstraction protocol that included manual review of medical records and pathology reports or linkage to cancer registries to collect cancer site and staging information for each case.
  - Deaths were ascertained using medical record abstraction and linkage to the National Death Index, the Social Security Death Index, and Canadian provincial registries.
  - ADI was defined by the 26 diagnoses that designated a person as having high risk of immunosuppression and morbidity according to the expanded surveillance criteria established by the CDC in 1993.
  - Models are adjusted for age, sex, race, cigarette smoking, CD4 T-lymphocyte count, ART initiation year, and cancer stage.
- **Results:** Among 81,865 PWH observed for cancer outcomes between January 1, 2000, and December 31, 2009, 814 were diagnosed with the type-specific cancers of interest. These included cancers of the anus (162, 20%), lung (444, 55%), oropharynx (114, 14%), cervix (5, 0.6%), and Hodgkin lymphoma (89, 11%).

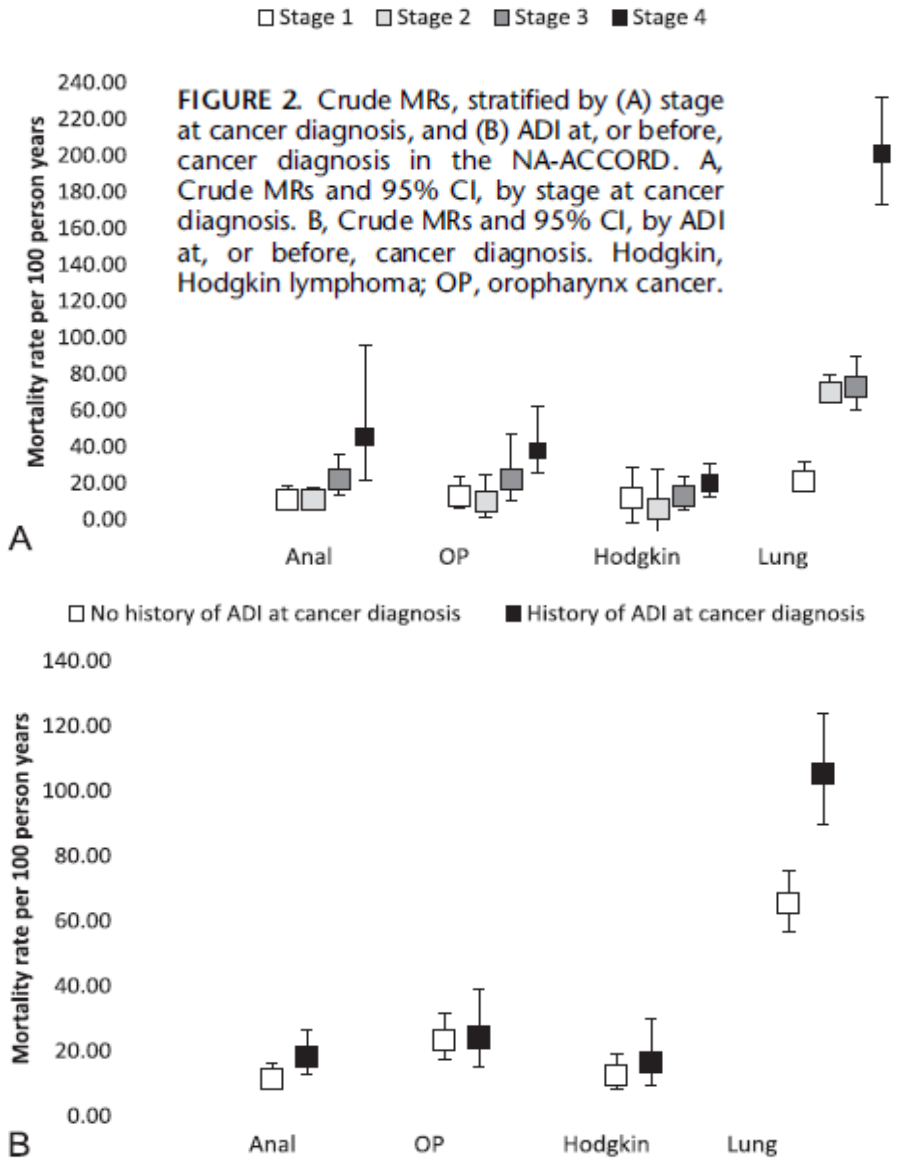


FIGURE 2. Crude MRs, stratified by (A) stage at cancer diagnosis, and (B) ADI at, or before, cancer diagnosis in the NA-ACCORD. A, Crude MRs and 95% CI, by stage at cancer diagnosis. B, Crude MRs and 95% CI, by ADI at, or before, cancer diagnosis. Hodgkin, Hodgkin lymphoma; OP, oropharynx cancer.

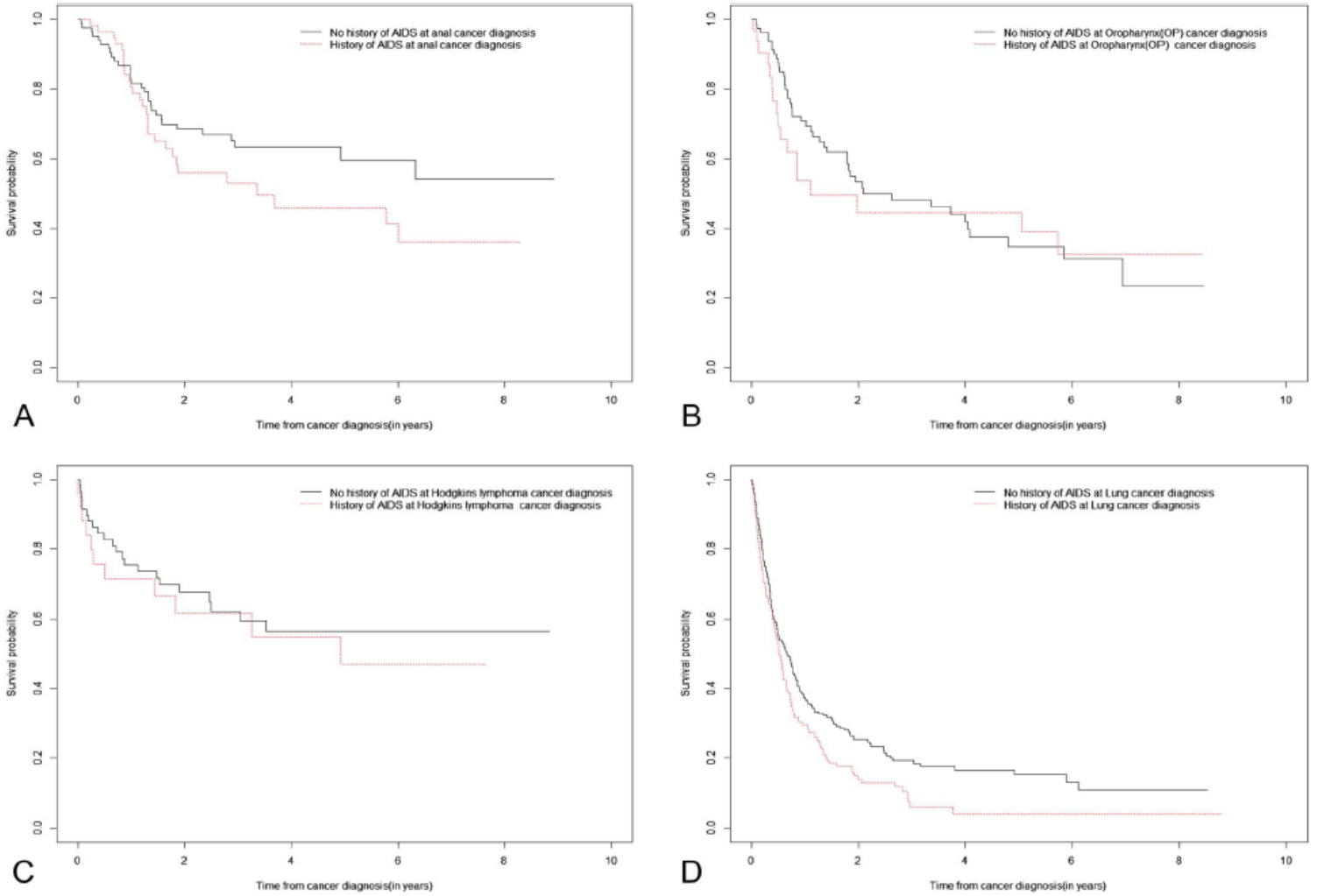


FIGURE 3. Kaplan–Meier survival estimates and log-rank test for a difference in survival after type-specific cancer diagnosis, by history of ADI at cancer diagnosis in the NA-ACCORD. A, Anal cancer ($P = 0.08$). B, Oropharynx cancer ($P = 0.92$). C, Hodgkin lymphoma ($P = 0.45$). D, Lung cancer ($P = 0.0001$).

Conclusion: **PWH with a history of ADI at lung cancer diagnosis had higher mortality and poorer survival after diagnosis compared to those without.** Although not statistically significant, the findings of increased mortality and decreased survival among those with ADI (vs. without) were consistent for all other cancers, suggesting the need for further investigations into the role of HIV-related immune suppression and cancer outcomes.

Recent Abacavir Use Increases Risk of Type 1 and Type 2 Myocardial Infarctions Among Adults With HIV

Elion RA, et al. *J Acquir Immune Def Syndr* 2018;78(1):62-72

- **Background:** There is persistent confusion as to whether abacavir (ABC) increases the risk of myocardial infarction (MI), and whether such risk differs by type 1 (T1MI) or 2 (T2MI) MI in adults with HIV.
- **Methods:**
  - In adult PWH in North America, determined incident MIs ascertained using standardized procedures and verified by a central expert adjudication committee.
  - Classified into T1MI or T2MI according to 3rd Universal Definition of Myocardial Infarction criteria (*J Am Coll Cardiol*. 2012;60:1581–1598).
  - Discrete time marginal structural models addressed channeling biases and time-dependent confounding to estimate crude hazard ratio (HR) and adjusted hazard ratio (aHR) and 95% confidence intervals; analyses were performed for T1MI and T2MI separately. A sensitivity analysis evaluated whether Framingham risk score (FRS) modified the effect of ABC on MI occurrence.

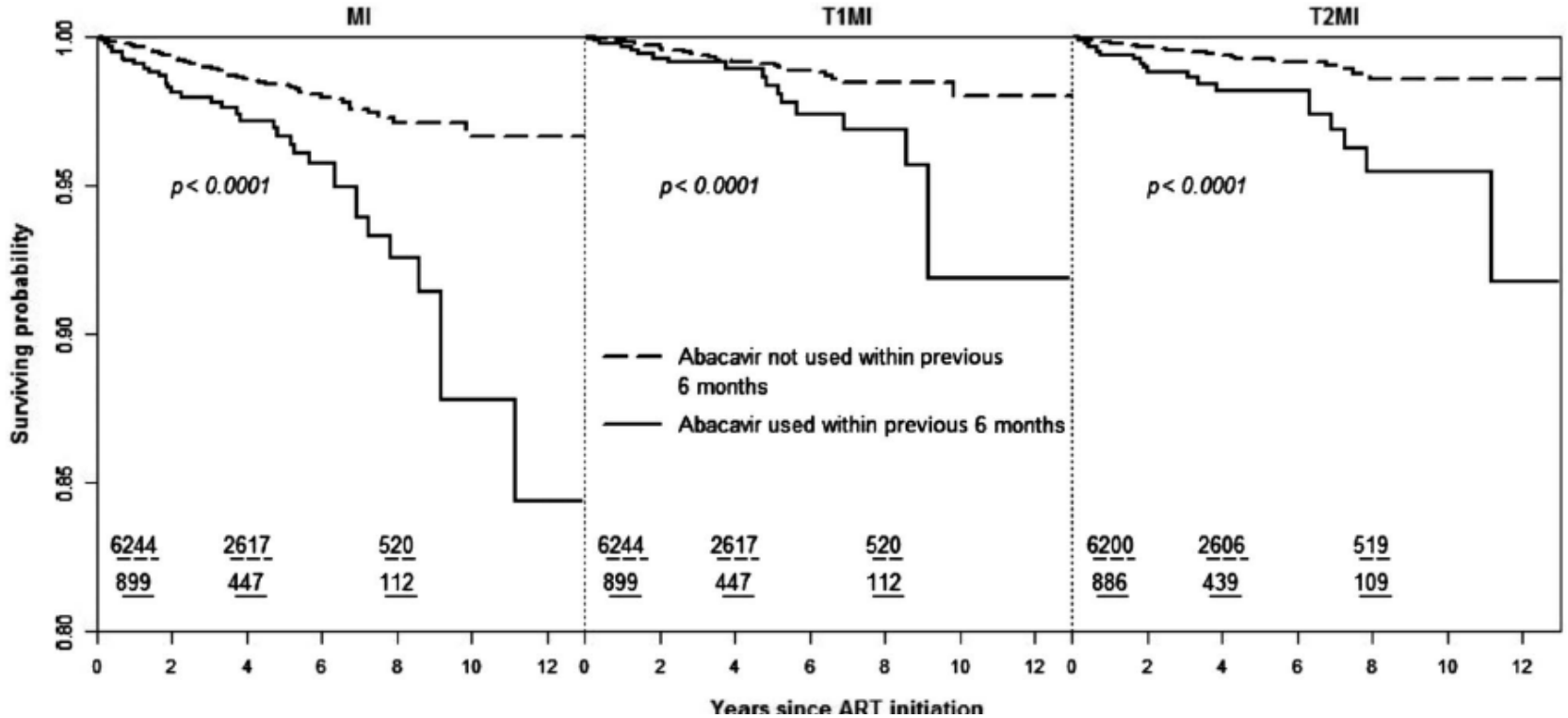


TABLE 2. Estimated Crude HR and aHR and 95% Confidence Intervals (95% CI) from Marginal Structural Models for the Risk of MI After ART Initiation, Overall and by MI Type, N = 8265 and n = 123 MIs (n = 65 Type 1 and n = 58 Type 2) (the *Italic* Point Estimates are Plotted in Fig. 3)

	Outcome: Type 1 and Type 2 MI				Outcome: Type 1 MI		Outcome: Type 2 MI	
	HR	95% CI	aHR	95% CI	aHR	95% CI	aHR	95% CI
Prescription of ABC in the past 6 mo								
No	1.00	—	1.00	—	1.00	—	1.00	—
Yes	**2.66**	**1.81 to 3.90**	***1.84***	***1.17 to 2.91***	***1.62***	***1.01 to 2.94***	***2.11***	**1.08 to *4.29***
CD4 count (cells/mm³)								
≥350	1.00	—	1.00	—	1.00	—	1.00	—
200–349	0.93	0.53 to 1.64	0.97	0.54 to 1.75	0.78	0.40 to 1.74	1.56	0.52 to 4.45
<200	**1.89**	**1.15 to 3.10**	1.66	0.97 to 2.81	1.21		**3.23**	**1.28 to 9.14**
History of clinical AIDS diagnosis								
No	1.00	—	1.00	—	1.00	—	1.00	—
Yes	**2.33**	**1.62 to 3.34**	**1.54**	**1.03 to 2.29**	1.06	0.61 to 1.86	**2.14**	**1.30 to 4.11**

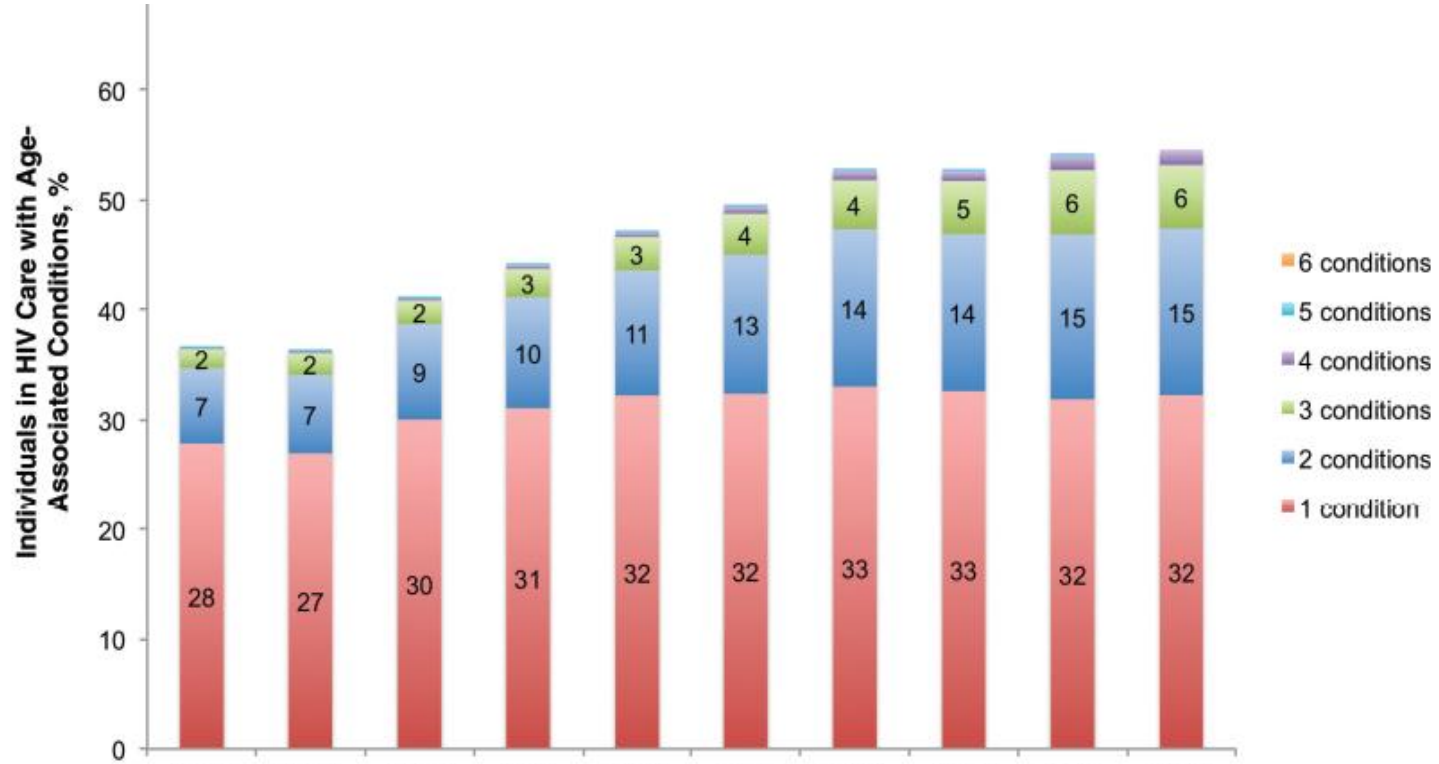
Results: Eight thousand two hundred sixty-five adults who initiated antiretroviral therapy contributed 29,077 person-years and 123 MI events (65 T1MI and 58 T2MI). Median follow-up time was 2.9 (interquartile range 1.4–5.1) years.

Conclusions: Recent ABC use was associated with MI after adjustment for known risk factors and for FRS. However, screening for T1MI risks may not identify all or even most persons at risk of ABC use-associated MIs.

Multimorbidity Among Persons Living with Human Immunodeficiency Virus in the United States

Wong C, et al. *Clin infect Dis* 2018;66(8):1230-8

- **Background:** Age-associated conditions are increasingly common among persons living with human immunodeficiency virus (HIV) (PLWH). A longitudinal investigation of their accrual is needed given their implications on clinical care complexity. We examined trends in the co-occurrence of age-associated conditions among PLWH receiving clinical care, and differences in their prevalence by demographic subgroup.
- **Methods:**
  - Adult PWH followed in HIV outpatient clinics were antiretroviral therapy–exposed PLWH receiving clinical care (ie, ≥1 CD4 count) in the United States during 2000–2009.
  - Multimorbidity was time-varying, considered as irreversible, and defined as having ≥2: hypertension, diabetes mellitus, chronic kidney disease, hypercholesterolemia, end-stage liver disease, or non–AIDS-related cancer.
  - Covariates: Sex, race/ethnicity (defined as non-Hispanic white, non-Hispanic black, Hispanic, or "other"), and risk factor for HIV transmission (MSM, IDU, heterosexual contact, or other). Age, calendar year, and annual CD4 cell count (median CD4 within a calendar year) were time-varying.
  - Standardized adjusted prevalence ratios (aPR) and 95% confidence intervals (CIs) comparing demographic subgroups were obtained by Poisson regression with robust error variance, using generalized estimating equations for repeated measures.



Conditions, No.	2000 n	2001 n	2002 n	2003 n	2004 n	2005 n	2006 n	2007 n	2008 n	2009 n
	4172	6325	8365	9121	9733	10 861	11 166	12 277	9074	3705
1	1162	1705	2512	2833	3137	3517	3687	4004	2892	1195
2	287	452	727	923	1108	1375	1601	1756	1363	562
3	73	126	179	234	296	405	499	592	530	214
4	2	8	16	30	39	69	96	111	120	52
5	0	1	1	1	1	1	8	10	8	3
6	0	0	0	0	0	0	0	0	1	0

Figure 1. Crude annual prevalence of age-associated conditions among antiretroviral therapy–experienced persons living with human immunodeficiency virus and receiving clinical care (N = 22 969). Numbers within bars denote percentages. Abbreviation: HIV, human immunodeficiency virus.

Results: The study included 22,969 patients followed for a median of 3.8 years (interquartile range [IQR], 2.0–5.9 years) Among 22,969 adults, 79% were male, 36% were black, and the median baseline age was 40 years (interquartile range, 34–46 years). Between 2000 and 2009, multimorbidity (>2 conditions) prevalence increased from 8.2% to 22.4% (P trend < .001).

Conclusions: Multimorbidity prevalence has increased among PLWH. Comorbidity prevention and multi-subspecialty management of increasingly complex healthcare needs will be vital to ensuring that they receive needed care.

Cancer burden attributable to cigarette smoking among HIV-infected people in North America

Altekruse SF, et al. *AIDS*2018;32:513-21

- **Background:** With combination-antiretroviral therapy, HIV-infected individuals live longer with an elevated burden of cancer. Given the high prevalence of smoking among HIV-infected populations, we examined the risk of incident cancers attributable to ever smoking cigarettes.
- **Methods:**
  - Adult PWH from North America cancer-free <6 months after cohort enrollment from 2000-2015.
  - Categories of cancer included in analyses were all cancers combined, smoking-related cancers, and non-smoking related cancers.
  - Covariates: demographic characteristics, baseline HIV disease markers (CD4 and HIV RNA), ART exposure, and medical comorbidities.
  - Cigarette smoking status (time fixed, ever versus never) was available as either observed or imputed data for all 52,441 participants. Observed data on ever versus never smoking status were available for 39,309 patients (75%) and data on ever versus never smoking status were imputed for 13,132 patients in the analytic cohort (25%). Data were assembled on the contribution of smoking to the incidence of first cancers for each cohort from electronic medical records, chart reviews, and patient reports.
  - Cox proportional hazard models were used to estimate adjusted hazard ratios (aHR) and 95% confidence intervals (CI) (lower or upper bound) associated with ever versus never smoking for specified cancer outcomes. PAFs were calculated with a SAS macro (Laaksonen et al. J Stat Softw 2011; 43:1–25) As follow-up ended at the time of first cancer diagnosis, all PAF estimates describe the proportional contribution of smoking to the incidence of first cancers.

Results: The analytic data set included 52,441 HIV-infected people, of whom 2,306 (4%) were diagnosed with cancer. Median participant follow-up was 3.8 years, interquartile range: 1.5–8.1 years. The incidence rate of all cancer combined during 270,136 person-years was 8.53/1000.

Table 2. Hazard ratios and population attributable fractions for cancer associated with ever smoking cigarettes.

			Hazard ratios associated with ever smoking cigarettes				Population-attributable fractions associated with ever smoking cigarettes			
Cancer diagnosis	No.	Cigarette smoking prevalence, patients diagnosed with cancer (%)	HR	95% CI	aHR[a]	95% CI	PAF (%)	95% CI	aPAF (%)[a]	95% CI
All cancers combined	2306	79	1.41	(1.26, 1.58)	1.33	(1.18, 1.49)	22	(15, 27%)	19	(13, 25%)
Smoking-related	666	88	2.65	(2.07, 3.39)	2.31	(1.80, 2.98)	54	(43, 62%)	50	(39, 59%)
Lung cancer	214	99	21.73	(6.87, 68.71)	17.80	(5.60, 56.63)	95	(84, 98%)	94	(82, 98%)
Smoking-related, excluding lung cancer	452	83	1.77	(1.37, 2.28)	1.59	(1.22, 2.06)	35	(20, 47%)	31	(16, 44%)
Not smoking-related	1640	75	1.16	(1.02, 1.32)	1.12	(0.98, 1.28)	10	(2, 17%)	9	(1, 16%)
Kaposi's sarcoma	289	74	1.07	(0.81, 1.41)	1.03	(0.77, 1.38)	5	(−15, 22%)	3	(−19, 20%)
Non-Hodgkin lymphoma	307	79	1.45	(1.06, 1.98)	1.35	(0.98, 1.86)	25	(7, 40%)	22	(2, 38%)
Anal cancer	211	82	1.60	(1.11, 2.30)	1.57	(1.08, 2.28)	33	(11, 49%)	32	(9, 49%)

aHR, adjusted HR; aPAF, adjusted PAF; ART, antiretroviral therapy; CI, confidence interval; HR, hazard ratio; NA-ACCORD, North American AIDS Cohort Collaboration on Research and Design; No., number; PAF, population-attributable fraction.
[a]Hazard ratios were adjusted for age, sex, race, HIV risk group, hepatitis B and hepatitis C infections, baseline $CD4^+$ cell count and HIV RNA level, AIDS diagnosis at baseline, ART use prior to enrollment in NA-ACCORD, and stage 4 chronic kidney disease.

Conclusions: Among HIV-infected persons, approximately one-fifth of all incident cancer, including half of smoking-related cancer, and 94% of lung cancer diagnoses could potentially be prevented by eliminating cigarette smoking. Cigarette smoking could contribute to some cancers that were classified as nonsmoking-related cancers in this report. Enhanced smoking cessation efforts targeted to HIV-infected individuals are needed.

One size fits (n)One: The influence of sex, age, and sexual HIV acquisition risk on racial/ethnic disparities in the HIV Care Continuum

Desir F, et al. *Clin Infect Dis* 2018; E-pub ahead of print

- **Background:** The US National HIV/AIDS Strategy established goals to reduce disparities in retention in HIV care, ART use, and viral suppression. The impact of sex, age, and sexual HIV acquisition risk (i.e. heterosexual vs. same-sex contact) on the magnitude of HIV-related racial/ethnic disparities is not well understood.
- **Methods:**
  - Adult PWH entering HIV care in an NA-ACCORD contributing clinical cohort from 2004-2014 were included.
  - Using a longitudinal approach, we estimated the mean percentage of person-time spent receiving HIV care, on ART, and virally suppressed in the first 5 years after entry into care
    - Receiving care / In care: ≥1 HIV care visit or CD4 count or HIV RNA measurement in 12 months
    - On ART: being in care and having been prescribed effective ART for ≥ 1 month
    - Viral suppression: HIV RNA ≤200 copies/mL at the most recent measurement in the last 12 months
  - Participants were followed from entry into care until date of death, 5 years after entry, cohort close date, or 31 Dec 2014
  - Nonparametric cumulative incidence curves were created for 9 possible stages from ART initiation to engagement, disengagement, viral suppression, and loss of suppression

Results: The analytic data set included 11,510 MSM, 3,835 men who have sex with women (MSW), and 4,176 women. Most MSM where White (51%), whereas most women were Black (70%) as were most MSW (61%).

Men who have sex with Men (35% Black, 51% White)

Table 2. Adjusted[a] racial differences among men who have sex with men in the mean percentage (%, [95% CI]) of person-time spent in HIV care, on ART, and with VS in the first 5 years after HIV care entry, overall and by age, NA-ACCORD, 2004-2014.

		Black	Hispanic	White	% Difference: Black vs. White	% Difference: Hispanic vs. White	% Difference: Hispanic vs. Black
	Age, y	(N = 4,034) %	(N = 1,576) %	(N = 5,900) %			
In care	Overall	75.3 (74 to 76.5)	75.8 (73.2 to 78.5)	75.2 (74.2 to 76.2)	0.1 (–1.5 to 1.6)	0.6 (–2.2 to 3.4)	0.5 (–2.4 to 3.4)
	18–29	74.5 (72.6 to 76.4)	72.9 (68.5 to 77.1)	72.5 (70.4 to 74.6)	2 (–0.9 to 4.8)	0.4 (–4.3 to 5.4)	–1.6 (–6.5 to 3.1)
	30–39	74.9 (72.6 to 77.1)	78.2 (75.1 to 81.2)	74.2 (72.6 to 75.8)	0.7 (–2.2 to 3.4)	**4 (0.6 to 7.3)**	3.3 (–0.6 to 7)
	40–49	76.5 (73.6 to 79.3)	79.3 (74.2 to 84.7)	77.8 (76.2 to 79.3)	–1.3 (–4.6 to 2.1)	1.5 (–3.8 to 6.9)	2.8 (–3.2 to 9)
	≥50	75.5 (70.4 to 80.3)	75.7 (65.3 to 83.7)	81.9 (79.8 to 84)	**–6.3 (–11.7 to –1.3)**	–6.2 (–17 to 2)	0.2 (–11.6 to 9.1)
On ART	Overall	54 (52.2 to 55.7)	56.9 (53.7 to 60.2)	55.2 (54 to 56.3)	–1.1 (–3.4 to 0.7)	1.8 (–1.5 to 5.2)	2.9 (–0.8 to 6.5)
	18–29	53.7 (51.6 to 55.8)	52.2 (46.7 to 57.7)	50.2 (47.6 to 52.4)	**3.6 (0.3 to 6.8)**	2 (–4.1 to 8.3)	–1.6 (–7.5 to 4.8)
	30–39	54.5 (51.6 to 57.3)	59.7 (55.5 to 63)	53.5 (51.5 to 55.5)	1 (–2.6 to 4.4)	**6.2 (1.5 to 10.2)**	5.2 (0 to 9.8)
	40–49	53.3 (49.7 to 56.7)	63.5 (58.6 to 68.4)	59.9 (58 to 61.8)	**–6.6 (–10.5 to –2.7)**	3.6 (–1.5 to 9)	**10.2 (3.9 to 16.4)**
	≥50	55.9 (49.1 to 61.7)	58.7 (44.4 to 68.2)	66.9 (64.2 to 69.4)	**–11 (–18.1 to –4.6)**	–8.2 (–22.6 to 1.9)	2.8 (–12.4 to 14.6)
VS	Overall	40.1 (38.4 to 41.7)	47.2 (44 to 50.5)	44.8 (43.7 to 45.9)	**–4.7 (–6.7 to –2.8)**	2.4 (–0.9 to 5.9)	**7.1 (3.6 to 10.6)**
	18–29	40.6 (38.5 to 42.7)	42.9 (37.9 to 47.9)	40.1 (37.6 to 42.5)	0.4 (–2.8 to 3.6)	2.7 (–2.9 to 8.5)	2.3 (–3.3 to 8)
	30–39	39 (35.8 to 41.8)	49.4 (45.2 to 53.3)	43.4 (41.3 to 45.2)	**–4.4 (–7.9 to –1)**	**6.1 (1.4 to 10.4)**	**10.4 (5 to 15.4)**
	40–49	39.4 (36.2 to 42.6)	52.1 (46 to 58.1)	48.5 (46.4 to 50.2)	**–9.1 (–12.5 to –5.1)**	3.6 (–2.3 to 9.8)	**12.7 (5.6 to 19.3)**
	≥50	47.2 (40.8 to 52.6)	50.9 (37.1 to 60.8)	56.9 (54.2 to 59.3)	**–9.7 (–16.8 to –3.6)**	–6 (–19.9 to 3.3)	3.7 (–11.4 to 15.4)

[a] Adjusted for age, history of injection drug use, CD4 count, HIV RNA, and site at HIV care entry.

Abbreviations: CI, confidence interval; ART, antiretroviral therapy; VS, viral suppression.

Bold denotes statistical significance.

Legend:

≤–12% | –12% to –9% | –9% to –6% | –6% to –3% | –3% to 0% | 0% to 3% | 3% to 6% | 6% to 9% | 9% to 12% | ≥12%

Women (70% Black, 20% White)

Table 3. Adjusted[a] racial differences among women in the mean percentage (%, [95% CI]) of person-time spent in HIV care, on ART, and with VS in the first 5 years after HIV care entry overall and by age, NA-ACCORD, 2004-2014.

		Black	Hispanic	White	% Difference: Black vs. White	% Difference: Hispanic vs. White	% Difference: Hispanic vs. Black
	Age, y	(N = 4,034) %	(N = 1,576) %	(N = 5,900) %			
In care	Overall	75 (73.7 to 76.2)	74.6 (71 to 78.3)	69.9 (66.9 to 73.1)	**5.1 (1.6 to 8.3)**	4.7 (–0.3 to 9.8)	–0.4 (–4 to 3.6)
	18–29	72.7 (70 to 75.1)	78.3 (69.8 to 85.6)	66.2 (61.9 to 71.6)	**6.4 (0.7 to 11.1)**	**12 (1.1 to 20.2)**	5.6 (–3.2 to 13.3)
	30–39	74.2 (71.9 to 76.5)	74 (66.7 to 81.4)	78.2 (70.6 to 82.7)	–4 (–9 to 4.3)	–4.2 (–12.1 to 6.9)	–0.2 (–7.8 to 7.6)
	40–49	76.1 (74 to 78.1)	78.4 (72.4 to 83.9)	72.5 (67.2 to 77.6)	3.5 (–1.9 to 9)	5.9 (–1.7 to 13.7)	2.3 (–3.4 to 7.8)
	≥50	76.7 (73.9 to 79.6)	81.4 (74.2 to 86.7)	67.8 (60.6 to 75.4)	**9 (0.7 to 16.7)**	**13.6 (3.4 to 22.7)**	4.7 (–3.5 to 11.1)
On ART	Overall	53.6 (52 to 55)	55.4 (51.1 to 59.2)	49.5 (45.8 to 53.1)	4.1 (0 to 7.9)	**5.9 (0.6 to 10.8)**	1.8 (–2.4 to 5.9)
	18–29	49.5 (46.1 to 52.8)	52.1 (44.4 to 61.6)	42.8 (37 to 47.5)	**6.6 (1.3 to 13.6)**	**9.2 (0.4 to 20.4)**	2.6 (–5.5 to 12.9)
	30–39	52.9 (50 to 56)	56.3 (47.8 to 63.2)	60.4 (49 to 66.1)	–7.4 (–13.7 to 4.3)	–4 (–14.1 to 9.9)	3.4 (–6 to 10.9)
	40–49	55.1 (52.2 to 57.9)	57.3 (49.2 to 63.2)	51.3 (44.6 to 58.1)	3.8 (–3.4 to 11.2)	6.1 (–4.3 to 15.2)	2.2 (–6 to 8.9)
	≥50	57.1 (53.9 to 60.4)	62.8 (50.2 to 69.8)	52 (43.8 to 59.4)	5.1 (–2.8 to 13.4)	10.8 (–4.8 to 21.1)	5.6 (–7.2 to 13.8)
VS	Overall	37.3 (35.9 to 38.7)	40.8 (36.5 to 44.5)	35.4 (32.1 to 38.8)	1.9 (–1.9 to 5.3)	**5.3 (0 to 10.4)**	3.4 (–1.1 to 7.5)
	18–29	28.9 (26 to 32)	37.3 (29.8 to 44.8)	23.8 (18 to 30.3)	5.1 (–2.4 to 11.1)	**13.5 (2.7 to 22.5)**	8.4 (0 to 16.3)
	30–39	37.3 (34.4 to 40.1)	42.7 (33.6 to 49.4)	46.5 (34.5 to 51.8)	–9.2 (–15 to 3.1)	–3.8 (–13.6 to 9.9)	5.4 (–4 to 13)
	40–49	39.2 (36.8 to 41.7)	40.6 (33.8 to 46.4)	37.3 (30.8 to 44.2)	2 (–5.1 to 8.7)	3.3 (–6.2 to 12.1)	1.3 (–5.7 to 7.6)
	≥50	44.2 (41 to 47.2)	48.8 (35.9 to 55.7)	39.7 (32.6 to 47)	4.5 (–3.4 to 12.3)	9.1 (–6.5 to 18.5)	4.6 (–8.9 to 12.6)

[a] Adjusted for age, history of injection drug use, CD4 count, HIV RNA, and site at HIV care entry.

Abbreviations: CI, confidence interval; ART, antiretroviral therapy; VS, viral suppression.

Bold denotes statistical significance.

Legend:

≤–12% | –12% to –9% | –9% to –6% | –6% to –3% | –3% to 0% | 0% to 3% | 3% to 6% | 6% to 9% | 9% to 12% | ≥12%

Conclusions: Racial/ethnic differences in HIV care persist in the specified populations defined by sex, age, and sexual HIV acquisition risk. Clinical and public health interventions that jointly target these demographic factors are needed.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