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20-Year Survival Outcomes of the First Pediatric HIV Cohort Initiating ART in Haiti: 2003 to 2024

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BACKGROUND

Nearly three million children and adolescents are living with HIV globally, most in low-income countries. With antiretroviral therapy (ART) expansion, increasing numbers of children survive into young adulthood, but data on long-term outcomes are limited.

METHODS

In this retrospective cohort study of children 0-18 years who initiated ART in Haiti between 2003 and 2010 and have >15 years of follow up, long-term survival was estimated using: (1) standard Kaplan-Meier curves; (2) sensitivity analyses assuming varying proportions of participants loss to follow-up (LTF) or transferred had died; and (3) inverse probability weighting (IPW) models that weighted individuals by their baseline probability of remaining in care to adjust for informative LTF.

RESULTS

Clinical characteristics at ART initiation - Of 1,142 children who tested HIV positive, 579 (51%) initiated ART. 98% initiated AZT-3TC-EFV or NVP.

Characteristic	N (%)
Sex (F)	312 (54)
HIV Transmission Route	
Perinatal	510 (88)
Behavioral	69 (12)
Age at HIV diagnosis (years)	
Mean (SD)	6.8 (4.6)
Median (IQR)	6.2 (2.8-10.6)
0-<2 years	108 (19)
2-6 years	171 (30)
6-11 years	169 (29)
12-18 years	131 (23)
Age at ART Initiation (years)	
Mean (SD)	7.4 (4.7)
Median (IQR)	7.0 (4.0-11.0)
0-<2 years	76 (13)
2-6 years	197 (34)
6-11 years	167 (29)
12-18 years	139 (24)
CD4 cells/mm³ at ART initiation	
Mean (SD)	575.4 (571.9)
Median (IQR)	408.5 (149.0-809.5)
≤200 cells/mm³	169 (30)
200-≤350 cells/mm³	86 (15)
>350 cells/mm³	305 (54)
Missing	19 (3)

The 20-year survival outcomes of 48-64% in the first cohort of children initiating ART from 2003-2010 in Haiti is consistent with long-term survival observed in high-income settings. It demonstrates the durability of global treatment investments and the capacity of public HIV programs in low-resource settings to provide life-saving care over decades.

FIGURE 1. 10- and 20-Year Survival Estimates from Kaplan-Meier, IPW, and Sensitivity Analyses Assuming Moderate and Worst-Case Mortality

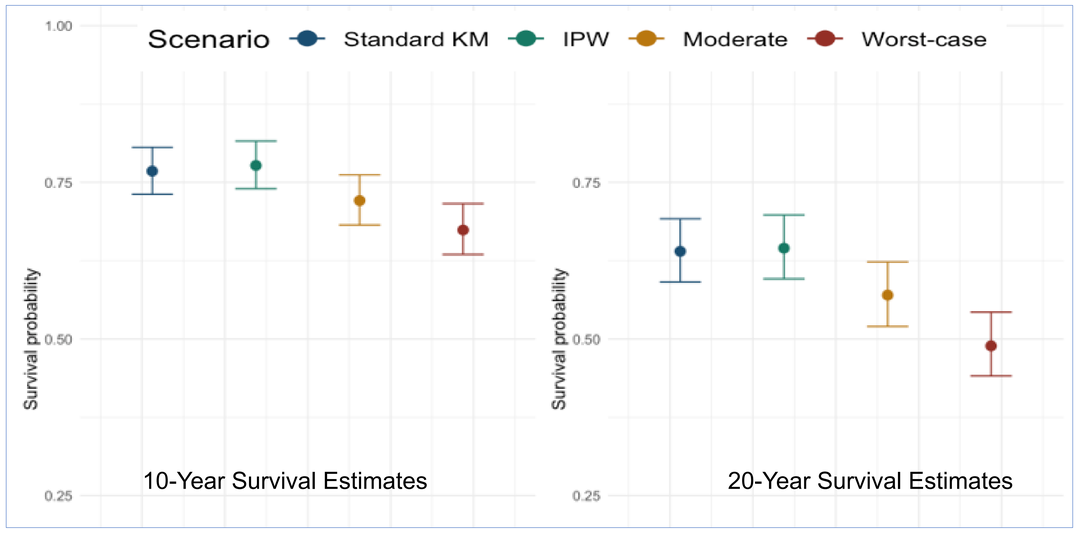


TABLE 2. Characteristics Associated with Survival 20-Years from ART Initiation

Characteristic	Crude HR (95%CI)	p	Adjusted HR (95% CI)	p
Sex (F)	1.01 (0.73-1.38)	>0.90	0.94 (0.68-1.29)	0.70
Age at ART Initiation	1.01 (0.97-1.04)	0.70	0.97 (0.93-1.01)	0.12
Year ART Initiation				
2003-2005	-		-	
2006-2010	0.82 (0.59-1.12)	0.20	0.78 (0.56-1.07)	0.12
CD4 cells/mm³ at ART initiation				
≤200 cells/mm³	-		-	
200-≤350 cells/mm³	0.64 (0.40-1.01)	0.06	0.62 (0.39-0.99)	0.04
>350 cells/mm³	0.45 (0.32-0.63)	<0.01	0.38 (0.26-0.56)	<0.01
Incident TB	1.11 (0.72-1.71)	0.60	1.09 (0.71-1.68)	0.70

RESULTS CONTINUED

Long-term survival estimates – Of 513 participants with >15 years follow up and 220 participants with >20 years, Kaplan-Meier survival was 76% (95% CI: 73%–81%) at 10 years and 64% (95% CI: 59%–69%) at 20 years. IPW yielded similar estimates of 78% (95% CI: 74%–82%) and 64% (95% CI: 60%–70%), respectively. In sensitivity analyses assuming 'moderate' unreported mortality (2% mortality among transfers and 25% among LTF) survival declined to 72% (95% CI: 68%–76%) at 10 years and 57% (95% CI: 57%–62%) at 20 years. Under 'worst case' assumptions (10% mortality among transfers and 50% among LTF), survival was 67% (95% CI: 64%–72%) at 10 years and 49% (95% CI: 44%–54%) at 20 years.

Among those who died (n=152), median age at death was 14 years (IQR 7-17). In a time-varying Cox model, among adolescents, each additional year of follow-up was associated with a 31% increase in the hazard of death, whereas mortality risk among children remained relatively stable over time.

TABLE 3. Characteristics of 20-Year Survivors In Care

Clinical and Demographic Characteristics	N=146
Female	72 (49%)
Current age, median (IQR)	25.9 (22.3-29.0)
Age at ART initiation, median (IQR)	6 (3-10)
Years on ART, median (IQR)	18.2 (15.6-20.5)
ART Treatment	
Viral load <1000 copies/ml	97 (66%)
≥ 2 ART regimen changes	107 (74%)
Current ART regimen INSTI-based	143 (98%)

CONCLUSIONS 20-year survival outcomes of 48-64% in the first cohort of children in Haiti initiating ART from 2003-2010 demonstrates long-term success of HIV programs in low-resource settings. However, emerging chronic health and psychological needs of these children and adolescents as they transition into adulthood are important to address.

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