

# Losses to follow-up in the first year of HAART in a multi-national cohort collaboration from resource-constrained settings

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## Background

Retaining patients in care is crucial to the success of antiretroviral treatment (ART) programmes.

## Objective

• To describe losses to follow-up (LTFU) among adults in their first year of HAART in a network of HIV treatment programmes in lower-income countries.

## Methods

### Study Population:

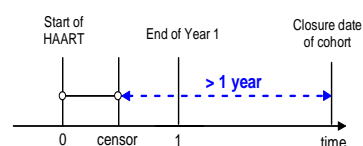
#### The ART-LINC Collaboration

The Antiretroviral Therapy in Lower Income Countries (ART-LINC) Collaboration is a multinational collaborative network of clinics treating HIV-infected individuals with antiretroviral therapy<sup>1,2</sup>. For this study, 18 centres in 16 countries in Africa, Brazil, India, and Thailand contributed data.

Included in the analysis were all previously ART-naïve individuals who initiated treatment with a minimum of 3 drugs on a known date, were aged at least 16 years, with known gender and age. The analysis of LTFU in the first year was restricted to those with at least 1 day of follow-up.

### Outcome Measures:

• Lost to follow-up (LTFU) was defined as when the last visit for a given patient was within 12 months of treatment initiation, and there was at least 12 more months of potential follow-up time prior to the last available date in that centre's database (i.e. closure of the centre database)



- Active tracing centres were those who used the telephone or home visits to contact patients who missed appointments.
- Passive tracing were those who relied on word of mouth for knowledge of a patient's vital status.

### Statistics:

- Factors associated with no follow-up: logistic regression
  - To account for clustering on clinic, robust standard errors were computed.
- LTFU in first year: Weibull proportional hazards model
  - Shared frailty (random effect) on clinic was taken into account
- Multiple imputation methods (sampling from 20 datasets) were used to account for missing data on clinical stage (n=2450) and baseline CD4 (n=1134).
  - Results combined with Rubin's rules

### Publications by the ART-LINC Collaboration:

1. "Cohort Profile: Antiretroviral Therapy in Lower Income Countries (ART-LINC): international collaboration of treatment cohorts" in *International Journal of Epidemiology* 2005; 34:979-986.
2. "Mortality of HIV-1 infected patients in the first year of antiretroviral therapy: comparison between low-income and high-income settings" in *The Lancet* 2006; 367: 817-24.

## Results

Of 5258 individuals with complete sociodemographic information, there were 463 individuals with zero days of follow-up (Table 1) and they were less likely to be female and using a protease inhibitor (Table 2). Of those with at least 1 day of follow-up, there were 22% LTFU in the 1<sup>st</sup> year (Table 1), and they were more likely to be younger and to have a lower baseline CD4 (Table 3). Table 4 shows that those LTFU in both active and passive follow-up centres had lower CD4 cell counts at baseline. Table 5 shows that among patients with at least one additional year of follow-up following their last visit in the first year, 28% only return after an absence of at least one year.

Table 1. Eligible patients and numbers LTFU

	Total N (%) with complete socio-demographics	N (%) with zero follow-up	N with at least one day of follow-up	N (%) LTFU among those with at least one day
Active Follow-up	2735 (52%)	283 (10%)	2452	387 (16%)
Passive Follow-up	2523 (48%)	180 (7%)	2343	662 (28%)
Total	5258	463 (9%)	4795	1049 (22%)

Table 2. Factors associated with having zero follow-up time following HAART initiation

Predictor	Odds Ratio (95% CI)
Age 16-29 years	1
30-39	1.17 (0.81-1.67)
40-49	1.27 (0.81-2.00)
≥ 50 years	1.94 (1.04-3.62)
Sex Male	1
Female	0.78 (0.63-0.97)
Initial treatment regimen NNRTI-based	1
PI-based	0.42 (0.24-0.73)
Other triple	0.24 (0.04-1.43)
Year HAART initiated (per year)	1.22 (0.86-1.73)
Baseline CD4 count/μL ≥ 50 cells	1
25-49 cells	1.61 (1.11-2.33)
<25 cells	1.82 (1.27-2.59)
Clinical stage at baseline No AIDS	1
AIDS	0.84 (0.53-1.32)
Active follow-up procedures No	1
Yes	1.93 (0.30-12.46)

Table 3. Predictors of being LTFU in the first year of HAART (given that patient has had at least one follow-up visit)

Predictor	Hazard Ratio (95% CI)
Age 16-29 years	1
30-39	0.78 (0.66-0.92)
40-49	0.92 (0.76-1.10)
≥ 50 years	0.72 (0.56-0.93)
Sex Male	1
Female	1.00 (0.88-1.14)
Initial treatment regimen NNRTI-based	1
PI-based	1.30 (0.98-1.71)
Other triple	1.26 (0.92-1.72)
Year HAART initiated (per year)	1.86 (1.71-2.02)
Baseline CD4 count/μL ≥ 50 cells	1
25-49 cells	1.21 (0.98-1.50)
<25 cells	1.51 (1.21-1.88)
Clinical stage at baseline No AIDS	1
AIDS	1.01 (0.74-1.36)
Active follow-up procedures No	1
Yes	1.22 (0.15-10.12)

Table 4. Baseline CD4 of those lost to follow-up compared to those not lost to follow-up

Tracing system	LTFU	Not LTFU
Active follow up	106 cells/μL	121 cells/μL
Passive follow up	59 cells/μL	120 cells/μL

Table 5. Time until return from last patient visit in year 1 for patients with at least one further year of follow-up

	All programmes (N, %)	Active Follow-up (N, %)	Passive Follow-up (N, %)
Eligible	2984	1457	1527
1-6 months	1652 (55%)	1012 (69%)	640 (42%)
7-12 months	497 (17%)	261 (18%)	236 (15%)
>12 months	835 (28%)	184 (13%)	651 (43%)

## Conclusions

While 9% of patients have no follow-up visits following HAART initiation, there is additionally a high proportion of patients (22%) who after their 1<sup>st</sup> visit become LTFU during their 1<sup>st</sup> year on treatment.

Lower baseline CD4 is strongly associated with LTFU, suggesting that some of those lost will have died. Men are more likely to have zero follow-up post-HAART initiation, though not more likely to be LTFU once they have had a 1<sup>st</sup> visit. LTFU increase with calendar time, suggesting that as the number of patients initiating HAART increases, the capacity of centres to retain them in care may be limited.

Although many patients do not return for their scheduled appointments, a significant proportion do eventually return.

### The Antiretroviral Therapy in Lower Income Countries (ART-LINC) Collaboration

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