

## Background

- Increasing availability of new antiretrovirals has led guidelines to adopt suppression of HIV to levels below 50 copies/mL as the aim of treatment in all patients following 1<sup>st</sup> line failure.
- We performed an analysis within the ATHENA HIV observational cohort of factors associated with successful resuppression after starting 2<sup>nd</sup> line cART following 1<sup>st</sup> line cART virological failure

## Methods

### Patient selection

- Participants in the ATHENA national observational cohort
- ART-naïve, and ≥16 years at start cART
- Start cART ≥1996
- With virological failure, (confirmed HIV-RNA >400 copies/mL after ≥24 weeks on cART)
- Starting a new cART regimen, HIV RNA subsequently measured with an assay with lower detection limit of ≤50 copies/ml

### Outcome

- Virological success (confirmed HIV RNA >50 copies/ml on second line cART within one year after start 2<sup>nd</sup> line cART).

### Statistical analysis

- Kaplan-Meier plots
- Unadjusted and adjusted Cox proportional hazard regression models
- Adjusted for gender, transmission risk group, region of origin, timing of 2<sup>nd</sup> line cART after 1<sup>st</sup> line failure, age, changing the NRT backbone (starting ≥1 new NRTI), CD4 cell count and HIV RNA at the start of 2<sup>nd</sup> line cART, HIV RNA assay type

## Baseline

Initiation of 2 <sup>nd</sup> line cART	
<b>Total</b>	417
<b>Male</b>	312 (75%)
<b>Transmission risk group</b>	
MSM	190 (46%)
Heterosexual	183 (44%)
other	44 (10%)
<b>Region of origin</b>	
Europe, N-America	219 (53%)
Caribbean, S-America	65 (16%)
Sub Sahara Africa	118 (28%)
other	15 (3%)
<b>Age</b>	Mean 36 (16-68)
<b>Days till switch cART</b>	
Mean	210 (84-668)
<b>CD4 cells/mm<sup>3</sup></b>	
Median (IQR)	478 (287-705)
<b>RNA log<sub>10</sub></b>	
Median (IQR)	3.5(2.8-4.5)

Table 1. Demographic and clinical characteristics at the start of 2<sup>nd</sup> cART

## Results

- Within one year 70% (95% CI 65-74%) managed to resuppress <50 copies/ml
- However, this depended on CD4 cell count at the start of 2<sup>nd</sup> line cART (see Figure).
- In multivariate analyses (see Table 2), switching with a higher CD4 cell count (p=0.0003) and lower HIV-RNA (p<0.0001) and born in Sub Sahara Africa (p=0.009) was associated with a shorter time to resuppression
- 30% of those with resuppression on 2<sup>nd</sup> line cART experienced recurrent failure within 3 years

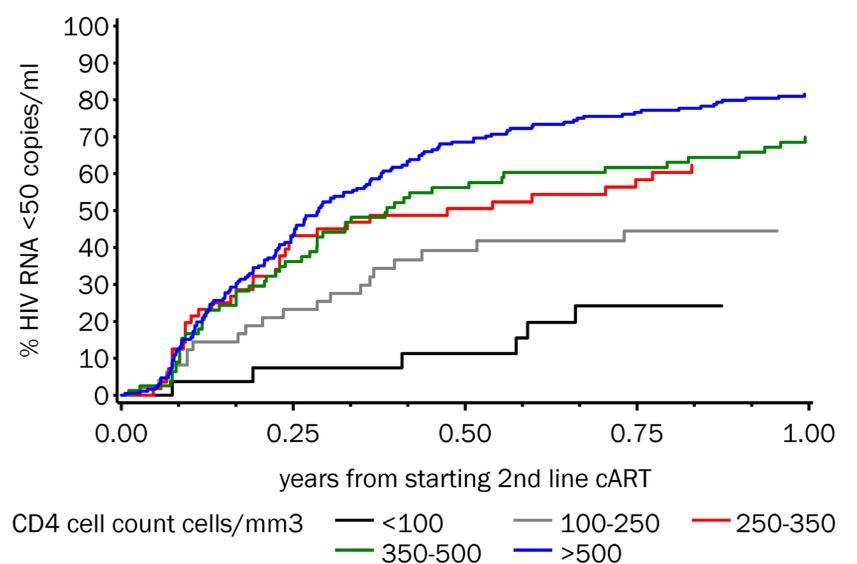


Figure. Kaplan-Meier estimates of the percentage of patients with virological success after starting 2<sup>nd</sup> line cART according to CD4 cell counts at time of switch to 2<sup>nd</sup> cART

Characteristic	Univariate analysis		Multivariate analysis	
	Hazard ratio	95% CI	Hazard ratio	95% CI
<b>Sex (male vs female)</b>	0.85	0.66-1.08	1.23	0.90-1.74
<b>Transmission risk group</b>				
MSM	1 (reference)		1 (reference)	
Heterosexual	0.63	0.50-0.78	0.79	0.56-1.11
other	0.55	0.58-0.80	0.68	0.46-1.01
<b>Region of origin</b>				
Europe, N-America	1 (reference)		1 (reference)	
Caribbean, S-America	0.85	0.65-1.11	0.94	0.70-1.27
Sub Sahara Africa	0.60	0.46-0.77	0.61	0.43-0.87
<b>Days till switch cART</b>				
<500	1 (reference)		1 (reference)	
>500	0.88	0.71-1.10	0.88	0.71-1.10
<b>Age (per 10 years more)</b>	1.20	0.83-1.71	1.01	0.89-1.14
<b>Switch backbone</b>	0.85	0.68-1.06	0.86	0.68-1.07
<b>CD4 cell count (per 100 cells/mm<sup>3</sup> higher)</b>	1.09	1.05-1.12	1.09	1.06-1.13
<b>HIV RNA (per 1 log<sub>10</sub> copies/ml higher)</b>	1.37	1.20-1.57	0.74	0.67-0.82

Table 2. Hazard ratio's and 95% CI's obtained with uni-, and multivariable Cox regression analysis

## Conclusions

- A substantial proportion of patients virologically failing 1<sup>st</sup> line cART did not achieve resuppression of HIV
- A significant proportion experienced recurrent failure after resuppression
- Patients with lower CD4 cell count and higher HIV RNA at initiation of 2<sup>nd</sup> line cART were at increased risk of virological failure on 2<sup>nd</sup> line cART
- Patients born in Sub Saharan Africa also proved to have an increased risk of virological failure, possibly due to lesser adherence