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Background

- HIV-1 transmission is rare or absent if HIV RNA in plasma is suppressed to <1000 copies/ml.
- Therefore, individuals at least 6 months on virologic successful cART may discontinue condom use in a stable relationship.
- However, even after successful viral suppression is reached, periods of viremia may occur, during which the risk of transmission may be higher.

Objectives:

- Estimate the annual probability and riskfactors of periods of viremia (above 50 and 1000 copies/ml) in HIV-1 infected individuals who had been successfully treated for at least 6 months.

Methods

Patients selected from the national observational ATHENA cohort with:

- HIV-1 infection through either homosexual or heterosexual contact.
- On 31 December 2008, 2 prior plasma viral load measurements <50 HIV RNA copies/ml spanning at least 6 months.
- No intermittent measurements ≥50 copies/ml.
- Without history of sexually transmitted infections (chlamydia, LGV, gonorrhoea, syphilis).

Outcome:

- Viremia above 50 and 1000 copies/ml in 2009 on cART (for at least 6 months).

Statistical analysis:

- Logistic regression models adjusted for age, last CD4 cell count, years on suppressive cART (all at the end of 2008), risk group, region of origin and type of HIV RNA assay.

Results

- In total, 4460 individuals were selected. Characteristics at the end of 2008 are shown in Table 1.

		N (%)
Total		4440 (100)
Gender / Risk group	MSM	2775 (62.5)
	Male heterosexual	744 (16.8)
	Female	921 (20.7)
Region of origin	W-Europe/N-America	3008 (67.4)
	Sub Saharan Africa	738 (16.6)
	Other	694 (15.6)
Age on 31 December 2008 (years)		46.1 (39.8-52.9)
Duration of suppression <50 HIV RNA copies/ml (years)		3.4 (1.9-5.6)
CD4 cell count (cells/mm³)		550 (410-740)

Table 1. Baseline characteristics of 4460 on stable suppressive cART for at least 6 months at the end of 2008.

- In 2009, 338 (7.6%) had at least one HIV RNA ≥50 copies/ml and 55 (1.2%) had levels ≥1000 copies/ml.
- The probability of viremia ≥50 and ≥1000 decreased significantly with longer time on suppressive cART, see Figure 1.

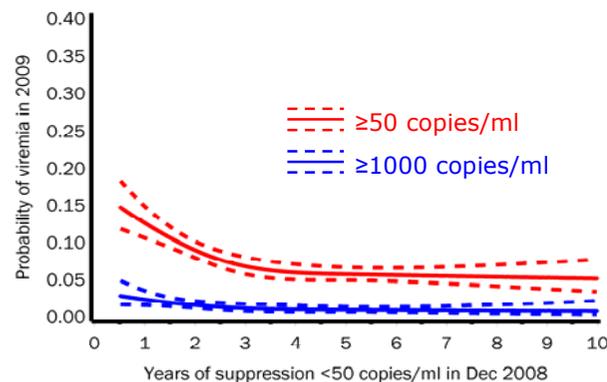


Figure 1. Annual risk an 95% confidence interval of observed viremia in 2009 according to years on suppressive cART.

	≥50 copies/ml OR (95% CI)	≥1000 copies/ml OR (95% CI)
Gender/risk group		
MSM	1.29 (0.90-1.83)	1.61 (0.70-3.72)
Male heterosexual	1.70 (1.20-2.41)	1.49 (0.71-3.14)
Female	1.00	1.00
Region of origin		
W-Europe/N-America	1.00	1.00
Sub Saharan Africa	1.90 (1.32-2.73)	5.21 (2.30-11.78)
Other	1.03 (0.74-1.44)	2.12 (1.00-4.50)
Years on suppressive cART (<50 copies/ml)		
<1	1.00	
1-2.5	0.70 (0.49-1.00)	
2.5-5	0.43 (0.29-0.63)	
≥5	0.35 (0.23-0.52)	
For every year longer		0.87 (0.76-0.99)
Type of HIV RNA assay		
TaqMan v2.0	1.75 (1.38-2.21)	
Other	1.00	

Table 2. Adjusted odds ratios and 95% CI's for the probability of observing viremia ≥50 and ≥1000 copies/ml in 2009.

- Furthermore, the annual risk of viremia in 2009 differed significantly according to risk group, region of origin and type of HIV RNA assay (see Table 2).
- Median time between previous HIV RNA test and first test ≥50 copies/ml was 4.2 months (IQR 3.5-6.0).

Conclusions

- Although periods of viremia between 50 and 1000 copies/ml occur frequently, the annual risk of high level viremia >1000 copies/ml in 2009 was low in patients on stable suppressive cART for at least 6 months.
- Individuals from sub-Saharan Africa and with shorter time on suppressive cART are at higher risk of viremia.
- These results may be helpful in modeling the impact of not using condoms on HIV transmission.