Can we achieve universal and annual HIV testing with home-based campaigns?
Results from the ANRS 12249 TasP trial.

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Background

Universal and regular HIV testing for early HIV-diagnosis, which is the first step of the HIV cascade, is critical to reduce HIV incidence in high HIV prevalence settings. Home-based HIV counselling and testing campaigns (HBHCT) have been shown to be acceptable and successful, but little is known about the capacity of such strategy to re-test people regularly.

Objective

We aimed to describe time to, and factors associated with, repeat HIV testing through HBHCT conducted in rural South Africa between March 2012 and June 2016.

Methods

ANRS 12249 Treatment-as-Prevention (TasP) overview
Registration: ClinicalTrials.gov: NCT01509508; South African National Clinical Trials Register: DOH-27-0512-3974 (*Iwuji et al, Trials 2013; Orne-Gliemann et al, BMC Publ Health 2015*)
Ethical approval: Trial approved by the Biomedical Research Ethics Committee (BREC) of the University of KwaZulu-Natal (BFC 104/11) and the Medicines Control Council of South Africa.
Trial area: Hlabisa sub-district, rural KwaZulu-Natal province, 30% adult HIV prevalence in 2012.
Trial objective: Evaluate whether immediate ART offered to all HIV-positive individuals, identified through home-based HIV testing, reduces incidence.
Design: Two-arm cluster-randomized trial in 22 clusters.
Phased implementation: 2x2 clusters opened in 2012, an additional 2x3 in 2013 and additional 2x6 in 2014 – all clusters followed until June 2016.
Eligibility: Individuals aged 16 years and above, resident in the community (approx. 1000 individuals/cluster)

Home-based HIV testing procedures in TasP
In both arms, rapid HIV testing was offered approx. every six months to all eligible individuals in their homes by trained TasP fieldworkers.
Home visits took place between 8:00 A.M. and 4:30 P.M. weekly from Tuesday to Saturday. Where required, separate homestead visits took place between 10:00 A.M. and 6:30 P.M. from Thursday to Sunday to accommodate adults not contacted during the standard homestead visit times, mainly students and employed individuals.
Verbal consent to enter households was first obtained from the homestead owner. All eligible household members, who provided written informed consent received individual and confidential pre-test HIV counselling. Fieldworkers performed rapid HIV testing using a serial algorithm (add tests used) and administered a socio-demographic and sexual behaviour questionnaire. Individual post-test HIV counselling took place approximately 20mn, as per routine Department of Health procedures: provision of test results, counselling on the prevention of HIV acquisition for HIV-negative people and the implications of HIV infection for HIV-positive people.

Study population
Individuals who tested HIV-negative at home at least once within the TasP trial and observed at ≥1 day after first negative test.

Data collection at each HBHCT campaigns
HIV status. During each HBHCT campaigns, fieldworkers documented HIV test results in netbooks, which were synchronised at the end of each working time with the main trial database. HIV status was ascertained either through rapid HIV test or could also be self-reported.
Explanatory variables. Socio-demographic characteristics (sex, age, marital status, highest education level, professional status) and household's wealth assets index (defined in three categories: low, middle and high - in agreement with a principal component analysis considering sources of energy, amenities and access to drinking water and toilet facilities in this populations). Missing values were imputed using the FAMD (factorial analysis for mixed data) principal component method.

Statistical analysis
Times to repeat testing through HBHCT since first HIV-negative test: Estimated using Kaplan-Meier curves, with right censoring at the first HIV-positive rapid test, death, out-migration and end of the observation (last field visit that occurred at the individual's homestead).
Factors associated with the first repeat HBHCT since first HIV-negative test: Identified using Cox regression with time-dependent variables, and taking account of cluster effect.
All analyses were conducted with R software.

Results

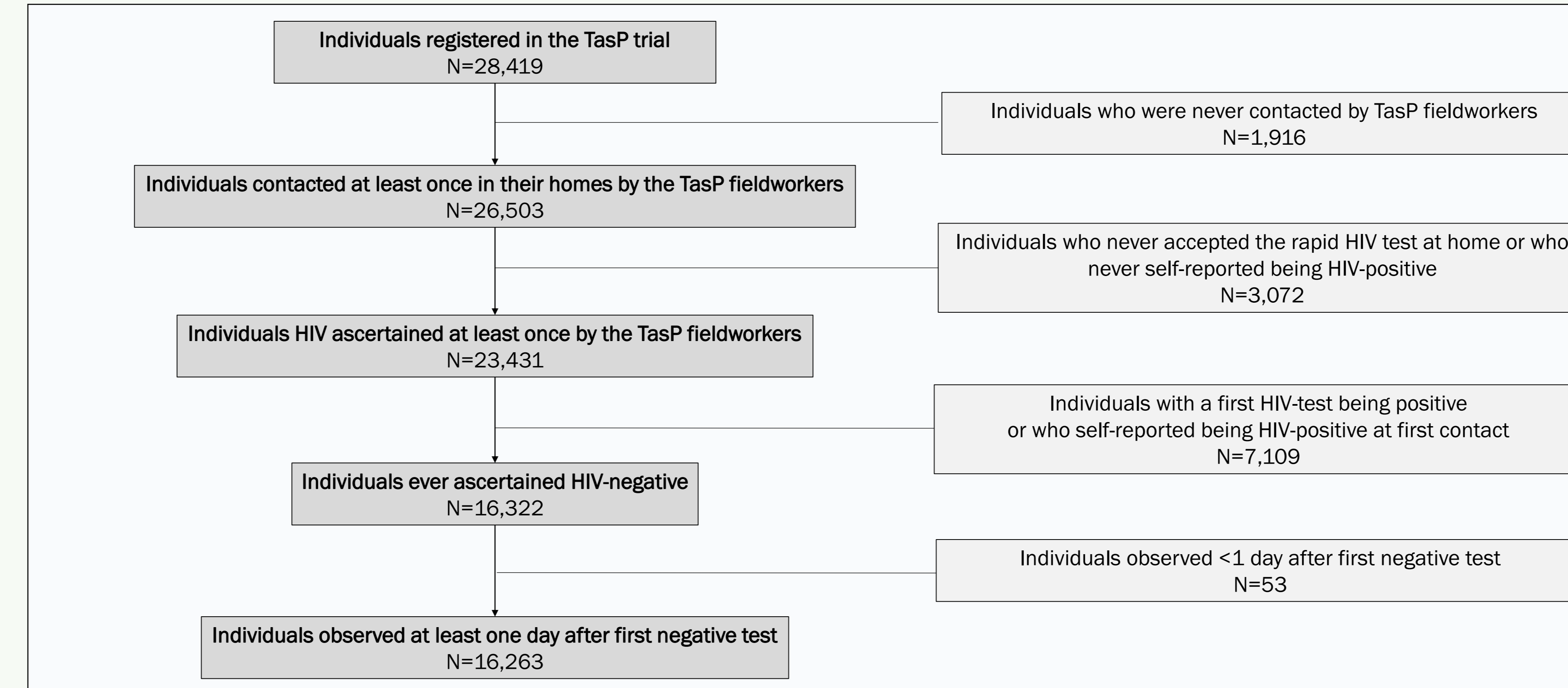### Figure 1. Population selection (ANRS 2249 TasP trial)

Individuals registered in the TasP trial
N=28,419

Individuals who were never contacted by TasP fieldworkers
N=1,916

Individuals contacted at least once in their homes by the TasP fieldworkers
N=26,503

Individuals who never accepted the rapid HIV test at home or who never self-reported being HIV-positive
N=3,072

Individuals HIV ascertained at least once by the TasP fieldworkers
N=23,431

Individuals with a first HIV-test being positive or who self-reported being HIV-positive at first contact
N=7,109

Individuals ever ascertained HIV-negative
N=16,322

Individuals observed <1 day after first negative test
N=53

Individuals observed at least one day after first negative test
N=16,263

Table 1. Population description at first HIV-negative test (ANRS 12249 TasP trial), N=16263

		n	%
Sex	Female	10063	61.9
	Male	6200	38.1
Age	<30 years old	8497	52.3
	30-59 years old	4818	29.6
	≥60 years old	2948	18.1
Education level	Primary or less	6369	39.2
	Some secondary	6170	37.9
	At least completed secondary	3724	22.9
Activity	Employed	1255	7.7
	Student	4538	27.9
	Looking for work	3018	18.6
	Other inactive	7452	45.8
Marital status	Never been married	11157	68.6
	Engaged	743	4.6
	Married	3224	19.8
	Divorced / Separated / Widowed	1139	7.0
Wealth asset	Low	5314	32.7
	Middle	6878	42.3
	High	4071	25.0

Figure 2. Times to repeat testing through HBHCT since first HIV-negative test (ANRS 12249 TasP trial)

From the first HIV-negative test (Figure 2), the probability of
- one repeat HIV test after one year = 75.4%
- two repeat HIV tests after two years = 78.3%
- three repeat HIV tests after three years = 84.0%

Factors associated with first repeat HIV testing were **being female, being older than 30 years old, not having completed secondary school education, not working, being engaged** (versus never being engaged) (Figure 3).
There was no association with wealth asset and randomisation arm.
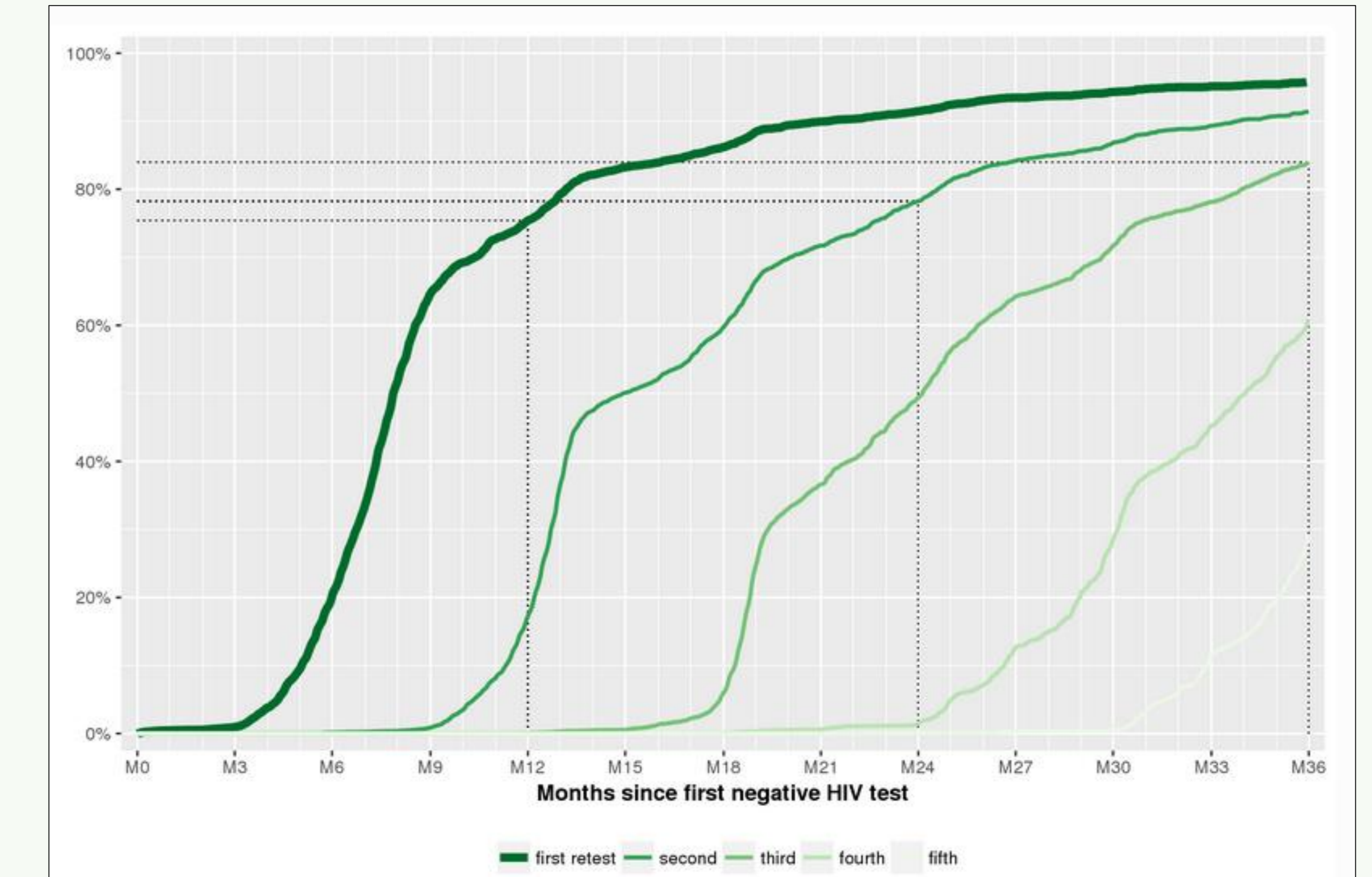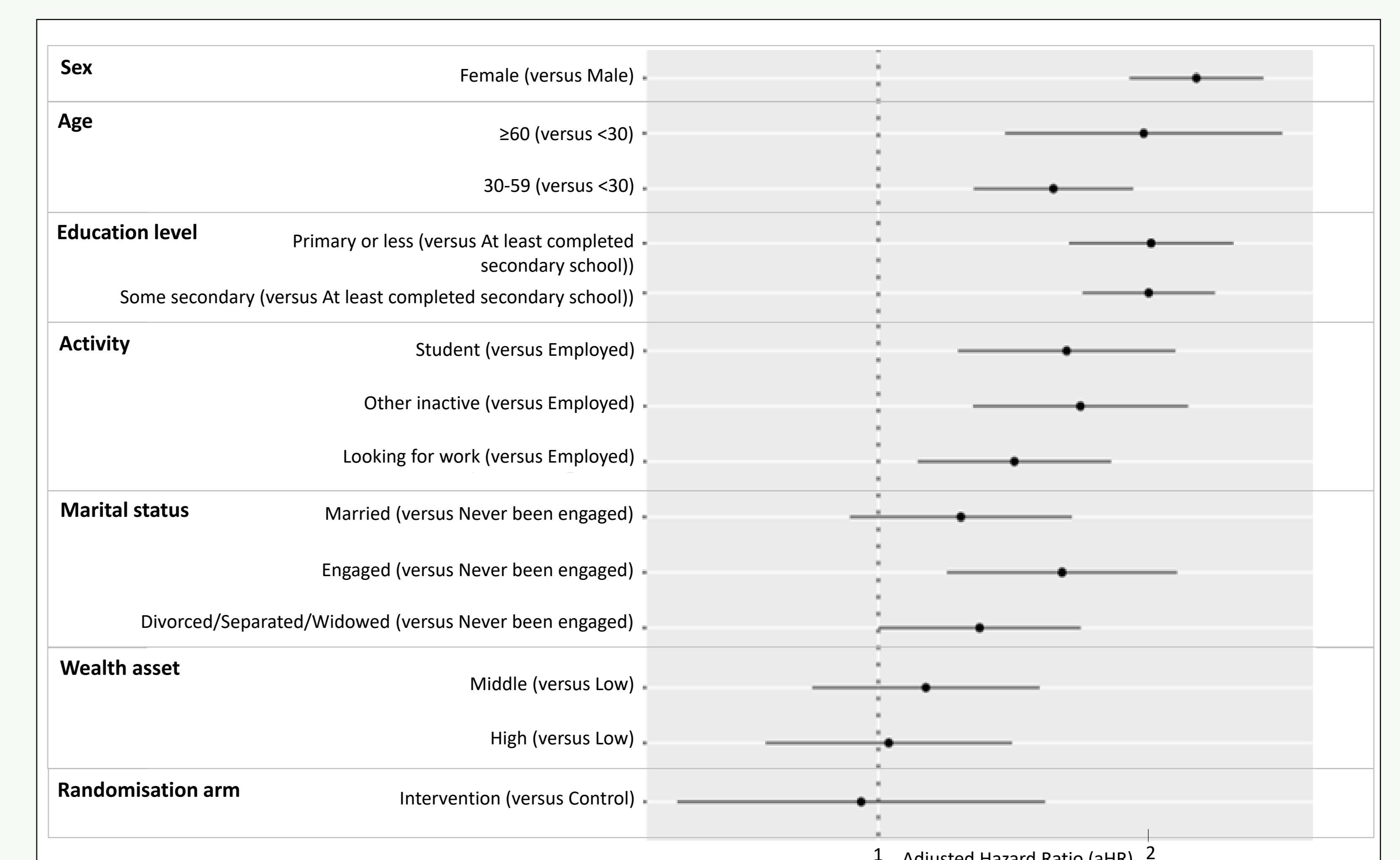
Table 2. Factors associated with first repeat HBHCT since first HIV-negative test (ANRS 12249 TasP trial), N=16263

Conclusion

In a rural and hyper-endemic region of South Africa, **repeat HBHCT campaigns are acceptable and may contribute to reaching universal HIV testing targets**. Yet, maximising HIV testing coverage will require a **combination of clinic-based and community-based strategies**, and special efforts to reach men, young individuals and those with a high level of education or employed.