Zimbabwe, Malawi and Zambia in 2015-16, we examined the association between PVL and viral load suppression (VLS) and the probability of at least one recent HIV-1 infection in the surveys' smallest geographic sampling unit, an enumeration area (EA).

Methods: Viral load (VL) and limiting-antigen avidity enzyme immunoassay (LAg-Avidity EIA) testing were performed on all HIV-1 positive (+) samples. Recent HIV cases were defined by World Health Organization criteria (LAg-Avidity EIA < 1.5 ODn and HIV RNA > 1000 c/mL), and VLS as HIV RNA < 1000 c/mL. PVL was defined as the arithmetic mean of $\log_{10}$ HIV RNA of HIV+ individuals in the EA, and ART coverage as prevalence of self-reported current ART use. We used logistic regression adjusted for EA-level variables, e.g., HIV prevalence, population size and mean age of the female population, to estimate the probability of one recent HIV-1 infection.

Results: Among 1,510 EAs across the three surveys, a total of 58,366 adults aged 15-59 years resided in 1,374 (91%) EAs that had at least one HIV+ adult consenting to an interview and blood draw. Among the 1,374 EAs, 92.65%, 6.99% and 0.04% had 0, 1 and 2 recent HIV-1 cases, respectively. Mean VLS prevalence across these EAs was 63.5% (95% confidence intervals (CI) 62-65%).

In multivariable analysis, PVL, particularly among those unaware of their HIV+ status, was associated with a recent HIV-1 case in that EA (adjusted odds ratio [AOR]: 1.44, 95% CI 1.22-1.70, p < 0.001). VLS prevalence was inversely correlated with recent infections (AOR: 0.17, 95% CI 0.08-0.37, p < 0.001). On average, every 1% increase in VLS in an EA decreased the predicted probability of one recent infection by 8%.

Conclusions: We found a strong association between PVL and VLS prevalence with recent HIV-1 infection at the EA level in three southern African countries with generalized HIV epidemics. These results suggest expanding and maintaining high levels of VLS may be key to HIV epidemic control in these three countries.

TUAC0103

Temporal trends of population viral suppression in the context of Universal Test and Treat: Results from the ANRS 12249 TasP trial in rural South Africa

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Background: The universal test-and-treat strategy (UTT) aims to maximize the proportion of all people living with HIV (PLWHIV) on antiretroviral treatment (ART) and virally suppressed in a community, i.e. to reach population viral suppression (PVS). The ANRS 12249 TasP trial did not demonstrate an impact of universal ART on HIV incidence at population level (Lancet HIV 2017). Here, we investigated whether PVS improved during the course of the trial: differentially by arm, according to trial interventions or contextual changes.

Methods: The TasP cluster-randomized trial (2012-2016) implemented six-monthly repeated home-based HIV counselling and testing (RHBCT) and referral of PLWHIV to local HIV clinics in 2×11 clusters opened sequentially. ART was initiated according to national guidelines in control clusters vs. regardless of CD4 count in intervention clusters.

Test results, clinic visits, ART prescriptions, viral loads, CD4 counts, migrations and deaths were used to produce information on residency status, HIV status and HIV care status for each participant. PVS was computed daily and per cluster among all resident PLWHIV (≥16, including those not in care). We used a mixed linear model to explore the relation between PVS with calendar time, time since cluster opening, trial arm and interaction between arm and time since cluster opening, adjusting on sociodemographic changes at cluster level.

Results: 8,646 PLWHIV were observed. Between January 1st, 2013 and January 1st, 2016, PVS increased significantly in both arms (intervention: 29.0% to 46.2%, +17.2, p< 0.001; control: 32.4% to 44.6%, +12.2, p < 0.001), but difference in temporal variation (+5.0%) was not significant (p=0.175). According to adjusted model (figure) this increase was mainly attributable to RHBCT (measured by time since cluster opening). They were also some effect due to contextual changes (measured by calendar time). The effect attributable to universal ART (interaction term) was limited.

Conclusions: Although suboptimal, the UTT strategy implemented in TasP trial improved PVS over time. As it was mainly due to RHBCT rather than universal ART, it did not induce differences between arms, explaining the null effect observed on cumulative incidence, the main trial finding. Changes in ART initiation guidelines alone are not enough to significantly increase PVS.

TUAC0104

Trends in percent time spent viremic among persons newly diagnosed with HIV, San Francisco, CA, USA, 2008 - 2016

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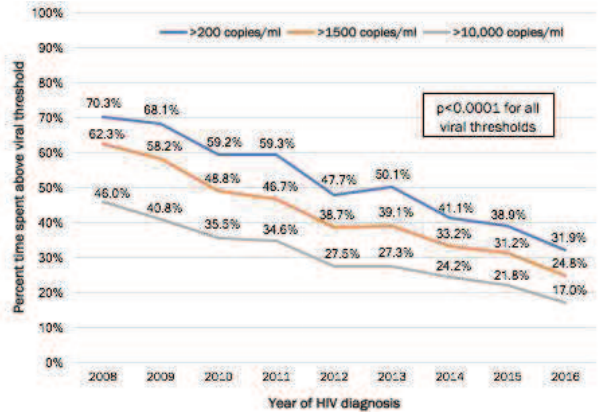
Background: The risk of sexual HIV transmission increases when HIV viral load (VL) is above 1500 copies/mL. As such, persons newly diagnosed with HIV are at greater risk of transmission until they initiate ART and achieve sustained viral suppression. We sought to examine trends in time spent above three viral thresholds among persons newly diagnosed with HIV in San Francisco (SF).

Methods: We analyzed data from the HIV surveillance registry. Persons were included if they were diagnosed with HIV during 2008-2016, were SF resident at time of diagnosis, alive 12 months after HIV diagnosis and had ≥2 VL tests within 12 months after diagnosis. Consecutive VL pairs were used to calculate percent of person-time (pPT) spent above 200 copies/mL (pPT>200), 1500 copies/mL (pPT>1500) and 10000 copies/mL (pPT>10000) for the 12 months after HIV diagnosis. Multivariate zero-inflated negative binomial regression was used to assess trends in year of diagnosis and time spent above each viral threshold, while controlling for covariates (gender, transmission category, race/ethnicity, age, housing status, CD4+ lymphocyte count, health insurance type, and time from HIV diagnosis to ART initiation).

Results: Of the 3336 new HIV diagnoses from 2008-2016, 2556 (77%) met inclusion criteria for analysis. Overall, persons newly HIV diagnosed spent 53.6% of pPT>200, 44.1% pPT>1500, and 31.7% pPT>10000. By year, pPT>200 decreased from 70.3% in 2008 to 31.9% in 2016, pPT>1500 decreased from 62.3% in 2008 to 24.8% in 2016 and pPT>10000 decreased from 46.0% in 2008 to 17.0% in 2016 (p< 0.0001 for each threshold; see Figure).



[Percent time spent above each viral threshold during 12 months after HIV diagnosis by year of HIV diagnosis, San Francisco, CA, 2008-2016.]