# Factors associated with virologic suppression in people living with HIV (PLWH) and tuberculosis in Brazil

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## BACKGROUND

- Data from national programs are key to evaluating antiretroviral therapy (ART) virologic effectiveness in real-life settings, particularly in people linving with HIV (PLWH) receiving treatment for tuberculosis (TB).
- The aim of the present study was to evaluate factors associated with HIV virologic suppression within the Brazilian national HIV/TB program.

## METHODS

- Retrospective cohort study conducted from January 2016 to June 2022
- Inclusion criteria: adult PLWH who started efavirenz, raltegravir or dolutegravir-based ART within 5 months before and 6 months after TB diagnosis
- Exclusion criteria:
  - participants without HIV-1 RNA available at ART initiation (window – 6 months to + 2 weeks) or at 1 year after ART initiation (window 9-18 months)
  - missing data on baseline characteristics (Figure 1)
- The primary endpoint was virologic success, defined as HIV-1 RNA< 1,000 copies/mL 1 year after ART initiation (window 9-18 months).
- We assessed determinants of HIV-1 RNA<1,000 copies/mL 1 year after ART initiation using a multivariate logistic regression.

## RESULTS

- 6,888 PLWH treated for TB were included in the analysis (Figure 1).
- **At ART initiation:**
  - median age was 36 (IQR: 29-45) years and 20.2% of participants were females
  - median CD4+ T-cell count and HIV-1 RNA were **127 (IQR: 48-295) cells/mm$^3$** and **5.1 (IQR 4.3-5.7) log$_{10}$ copies/mL**, respectively.
- 3,208/6,888 **(46.6%)** participants **initiated dolutegravir-**, 1,303/6,888 **(18.9%) raltegravir-**, 2,377/6,888 **(34.5%) efavirenz-based regimens**.

- **One year after ART initiation:**
  - 4,884/6,888 (**70.9%**) participants achieved **HIV-1 RNA< 1,000 copies/mL**
  - 4,177/6,888 (**60.6%**) participants achieved **HIV-1 RNA< 50 copies/mL**

- There were no major differences in the ART regimens used across Brazilian regions, with an increase of dolutegravir-based ART over time during the study period (figure 2).
- The multivariate analysis of factors associated with HIV-1 - RNA<1,000 copies/mL is reported in Table 1.

## In PWH treated for TB initiating dolutegravir, rather than efavirenz or raltegravir, was positively associated with virologic suppression 1 year after ART initiation

**Figure 1 : Study flow chart**




**Figure 2 : Education level, % of dolutegravir use and virological success at 1 year after ART initiation, across regions in Brazil, 2016-2021**




## DISCUSSION AND CONCLUSION

- In this analysis from the Brazilian national HIV/TB program, **dolutegravir-based** regimen was associated with higher odds of **virologic suppression** 1 year after ART initiation in PLWH treated for TB.
- Less advanced HIV disease (higher CD4 counts, lower HIV-1 RNA at baseline), older age, female sex and higher educational level were associated with ART effectiveness.
- There were no major differences in the type of ART used across regions.
- Our findings support the current recommendation of dolutegravir as first line choice for PWH treated for TB.
- These results also emphasize the need to offer stigma free interventions to improve access to care of the most vulnerable populations.

**Table 1: Multivariate analysis of factors associated with HIV-1 RNA<1,000 copies/mL**

| | Total | Virologic success | OR 95% CI | | | |
|---|---|---|---|---|---|---|
| | N | N (%) | OR | Lower 95% CI | Upper 95% CI | P |
| **Treatment** | | | | | | |
| Efavirenz | 2,377 | 1,630 (68.6) | 1 | | | |
| Raltegravir | 1,303 | 928 (71.2) | 1.07 | 0.93 | 1.24 | 0.324 |
| Dolutegravir | **3,208** | **2,326 (72.5)** | **1.25** | **1.11** | **1.40** | **<.0001** |
| **Region** | | | | | | |
| South-East | 2,427 | 1,752 (72.2) | 1 | | | |
| North | 927 | 637 (68.7) | 0.94 | 0.80 | 1.11 | 0.472 |
| North-East | 1,763 | 1,246 (70.7) | 0.95 | 0.83 | 1.08 | 0.425 |
| South | 1,369 | 958 (70.0) | 0.93 | 0.81 | 1.08 | 0.347 |
| Center-West | 402 | 291 (72.4) | 1.07 | 0.85 | 1.33 | 0.573 |
| **Sex** | | | | | | |
| Female | 1,392 | 1,000 (71.8) | 1 | | | |
| Male | **5,496** | **3,884 (70.7)** | **0.86** | **0.76** | **0.98** | **0.020** |
| **Age** | | | | | | |
| ≥35 | 3,863 | 2,799 (72.5) | 1 | | | |
| 25-34 | **2,215** | **1,526 (68.9)** | **0.79** | **0.71** | **0.88** | **<.0001** |
| 18-24 | **810** | **559 (69.0)** | **0.80** | **0.68** | **0.93** | **0.005** |
| **Educational level** | | | | | | |
| Complete fundamental schooling ≥ 9 years of school | 3,962 | 2,926 (73.9) | 1 | | | |
| Incomplete fundamental schooling < 9 years of school | **2,926** | **1,958 (66.9)** | **0.71** | **0.65** | **0.79** | **<.0001** |
| **Ethnicity** | | | | | | |
| Non-white | 4,698 | 3,294 (70.1) | 1 | | | |
| White | 2,190 | 1,590 (72.6) | 1.07 | 0.95 | 1.21 | 0.259 |
| **Baseline CD4 T cell count (/mm$^3$)** | | | | | | |
| <50 | 1,774 | 1,444 (64.5) | 1 | | | |
| 50 to 199 | **2,634** | **1,847 (70.1)** | **1.29** | **1.14** | **1.46** | **<.0001** |
| 200-349 | **1,055** | **758 (71.8)** | **1.46** | **1.24** | **1.71** | **<.0001** |
| ≥350 | **1,425** | **1,135 (79.6)** | **1.82** | **1.55** | **2.13** | **<.0001** |
| **Baseline HIV-1 RNA (copies/mL)** | | | | | | |
| ≥500,000 | 1,623 | 1,052 (64.8) | 1 | | | |
| <100,000 | **3,190** | **2,412 (75,6)** | **1.57** | **1.38** | **1.79** | **<.0001** |
| 100,000 to 499,999 | **2,075** | **1,420 (68,4)** | **1.80** | **1.08** | **1.40** | **0.002** |