

# Load to guide antiretroviral therapy initiation to prevent HIV-1 transmission.

[Murnane PM](#), [Hughes JP](#), [Celum C](#), [Lingappa JR](#), [Mugo N](#), [Farquhar C](#), Kiarie J, [Wald A](#), [Baeten JM](#); [Partners in Prevention HSV/HIV Transmission Study Team](#).

## Abstract

### BACKGROUND:

Current WHO guidelines recommend antiretroviral therapy (ART) initiation at CD4 counts  $\geq 350$  cells/ $\mu$ L. Increasing this threshold has been proposed, with a primary goal of reducing HIV-1 infectiousness. Because the quantity of HIV-1 in plasma is the primary predictor of HIV-1 transmission, consideration of plasma viral load in ART initiation guidelines is warranted.

### METHODS:

Using per-sex-act infectivity estimates and cross-sectional sexual behavior data from 2,484 HIV-1 infected persons with CD4 counts  $>350$  enrolled in a study of African heterosexual HIV-1 serodiscordant couples, we calculated the number of transmissions expected and the number potentially averted under selected scenarios for ART initiation: i) CD4 count  $<500$  cells/ $\mu$ L, ii) viral load  $\times 10,000$  or  $\times 50,000$  copies/mL and iii) universal treatment. For each scenario, we estimated the proportion of expected infections that could be averted, the proportion of infected persons initiating treatment, and the ratio of these proportions.

### RESULTS:

Initiating treatment at viral load  $\times 50,000$  copies/mL would require treating 19.8% of infected persons with CD4 counts  $>350$  while averting 40.5% of expected transmissions (ratio 2.0); treating at viral load  $\times 10,000$  copies/mL had a ratio of 1.5. In contrast, initiation at CD4 count  $<500$  would require treating 41.8%, while averting 48.4% (ratio 1.1).

### CONCLUSION:

Inclusion of viral load in ART initiation guidelines could permit targeting ART resources to HIV-1 infected persons who have a higher risk of transmitting HIV-1. Further work is needed to estimate costs and feasibility.