

## SUPPLEMENTAL DIGITAL CONTENT

**Figure S1:** Two multivariate uncertainty analyses to assess the robustness of the key results. The analyses were conducted with respect to the key structural parameters in the model, including the behavioral and HIV progression parameters; and the level of HIV  $\log_{10}$  viral load (VL) per HIV stage. Each of the analyses was implemented for 500 runs of the model using Monte Carlo sampling from uniform probability distributions for the uncertainty in the parameters of the model. Panel (A) shows the impact of the uncertainty in the structural parameters of the model. Panel (B) shows the outcome of a combined uncertainty analysis with respect to the uncertainty in both the structural parameters of the model and the level of  $\log_{10}$  VL per HIV stage, simultaneously.

Both uncertainty analyses show that the result of *stable* population  $\log_{10}$  VL before the implementation of an antiretroviral therapy (ART) intervention is not affected by the uncertainty in the model's structural parameters or actual level of  $\log_{10}$  VL per HIV stage. Though the average population  $\log_{10}$  VL may vary depending on parameter choices for the actual level of  $\log_{10}$  VL per HIV stage, it is consistently virtually stable before the onset of the ART intervention.

Both uncertainty analyses also show that although the scale of the decline in population  $\log_{10}$  VL post-ART is somewhat sensitive to the uncertainty in the actual level of  $\log_{10}$  VL per HIV stage and other model parameters, the result of *considerable* decline in population  $\log_{10}$  VL post-ART is robust regardless of the uncertainty in these parameters.

