BACKGROUND
To investigate the mechanisms for the emergence of identical sequences on ART, we identified 14 patients with clonal HIV sequences during long-term ART and determined their relationship to CD4+ T cell count and HIV DNA copy number.

METHODS
Single-genome pro-pol sequences from PBMCs were obtained from 14 subtype B–infected patients at the time of initiating ART and during suppression for 4–12 years. Clusters of identical sequences were identified and the proportions of identical sequences were plotted against baseline CD4+ T cell count and HIV DNA copy number and change in CD4+ T cell count on ART. Estimates for the total number of CD4+ T cells with clonal proviruses were determined by multiplying the fraction of identical sequences by the normalized HIV DNA copy per million CD4+ T cells and the estimated number of total body CD4+ T cells.

CONCLUSIONS
Analyses of the genetics of HIV proviruses during ART suggests a relationship between the total DNA copy number pre-ART and the change in the CD4+ T cell count on ART with the emergence of identical sequences during therapy in those patients initiating ART with very low CD4+ T cell copy number. This finding suggests that increasing numbers of CD4+ T cell copies on ART is due, in part, to the expansion of infected cells. Estimates on the number of CD4+ T cells carrying identical HIV proviruses suggest that infected cells expand massively before and during ART generating billions of new infected cells from a single initial infection event despite effective ART.

RESULTS
The fraction of identical sequences in PBMCs during long-term ART ranged from 7% to 55% of the total HIV DNA. In 3/13 patients who started therapy during chronic infection with T cell counts <100/μl, there was an apparent positive relationship between the change in CD4+ T cells following ART initiation and the emergence of identical sequences and a negative relationship with the HIV DNA copy number. There was no obvious relationship between the CD4+ T cell count or the HIV DNA copy number in patients who initiated ART during chronic infection with >100 CD4+ T cells/μl or in patients who initiated ART during early infection. Estimates of the total body number of CD4+ T cells carrying clonal HIV sequences ranged from 1.3×10^9 to 6.9×10^9.

Acknowledgements
We thank Conne Kinna, Sue Tomé, Fand Valerie Tumuiquit or administrative support, and Valerie Boltz, Ann Wiegand, Francesco Simonetti, Junko Hatori, and Shaun Hill for useful discussions.

# 390

Massive Expansion of HIV Infected Cells with Identical Proviruses in Patients on Suppressive ART

Mary F. Kearney1, Luke Smith1, Jonathan Spindler1, Charles Coomer1, Guillaume J. Besson2, Elizabeth M. Anderson1, Wei Shao1, John M. Coffin4, John W. Mellors2, and Frank Maldarelli1

1HIV Drug Resistance Program, National Cancer Institute, Frederick, MD, 2Division of Infectious Diseases, Department of Medicine, University of Pittsburgh, Pittsburgh, PA, 3AIDS and Cancer Virus Program, SAIC-Frederick, Inc., National Cancer Institute, Frederick, MD, 4Department of Molecular Biology and Microbiology, Tufts University, Boston MA