

Race and Gender Differences in HIV-1 RNA Viral load and CD4+ T-cell count in HIV-Infected Persons in Care



Oluwatosin Jaiyeoba, MD¹, Paul Nietert, PhD³, M.Sean Boger, MD, PharmD², Emma Kennedy, MPH², J. Michael Kilby, MD²

¹Obstetrics, Gynecology and Women's Health Institute, Cleveland Clinic, Cleveland OH, ²Division of Infectious Diseases, Medical University of South Carolina, Charleston SC,

³Department of Public Health Sciences, Medical University of South Carolina, Charleston SC.

Mailing address:
OB/GYN and WHI
6770 Mayfield Road #426
Mayfield Heights, OH 44124
jaiyeoo@ccl.org

Background

HIV infection rates remain especially high among US minorities; HIV prevalence among black women is >20x that of white women. We characterized HIV-infected patients in our clinic, and compared HIV-1 RNA viral loads (VL) and CD4+ T cell counts of different demographic groups, both at baseline and over years of follow-up from the index date. We hypothesized that minority women with HIV/AIDS in the southeast have lower CD4+ T cell count and higher HIV-1 RNA VL, and less favorable improvements over time in care, compared with males.

Methods

IRB-approved retrospective cohort study among persons in care at the Infectious Diseases clinic of the Medical University of South Carolina. We abstracted socio-demographic data and compared HIV-1 RNA VL and CD4+ T-cell count between 2005-2010.

Results

454 females and 779 males were sampled with a mean age of 45 and 47 years, respectively. In the female cohort, 72% were >40 years of age, 80% black, and 79% reported a monthly income of < \$1000. In the male cohort, 75% were >40 years of age, 61% black, 73% reported a monthly income of <\$1000.

A multivariate mixed model of CD4+ T-cell count with gender, race and time showed significant interactions (p=0.005), with CD4+ T-cell counts being generally higher and increasing to a slightly greater degree among whites than blacks in care.

Figure 1

An overall decrease in the percentage of patients who had VL >10,000 copies/ml was observed over time. White males had greater VL suppression than other groups at the index date and black males had greater reductions in VL over time in care, such that over years of follow-up VL suppression was more successful in men than women, regardless of race. CD4 counts were lower among blacks than whites at all time points, although black males demonstrated greater improvements in CD4 over time in care compared with black females.

Results

Figure 1
Multivariate Analysis between CD4 T-cell Count, Gender and Race Over Time

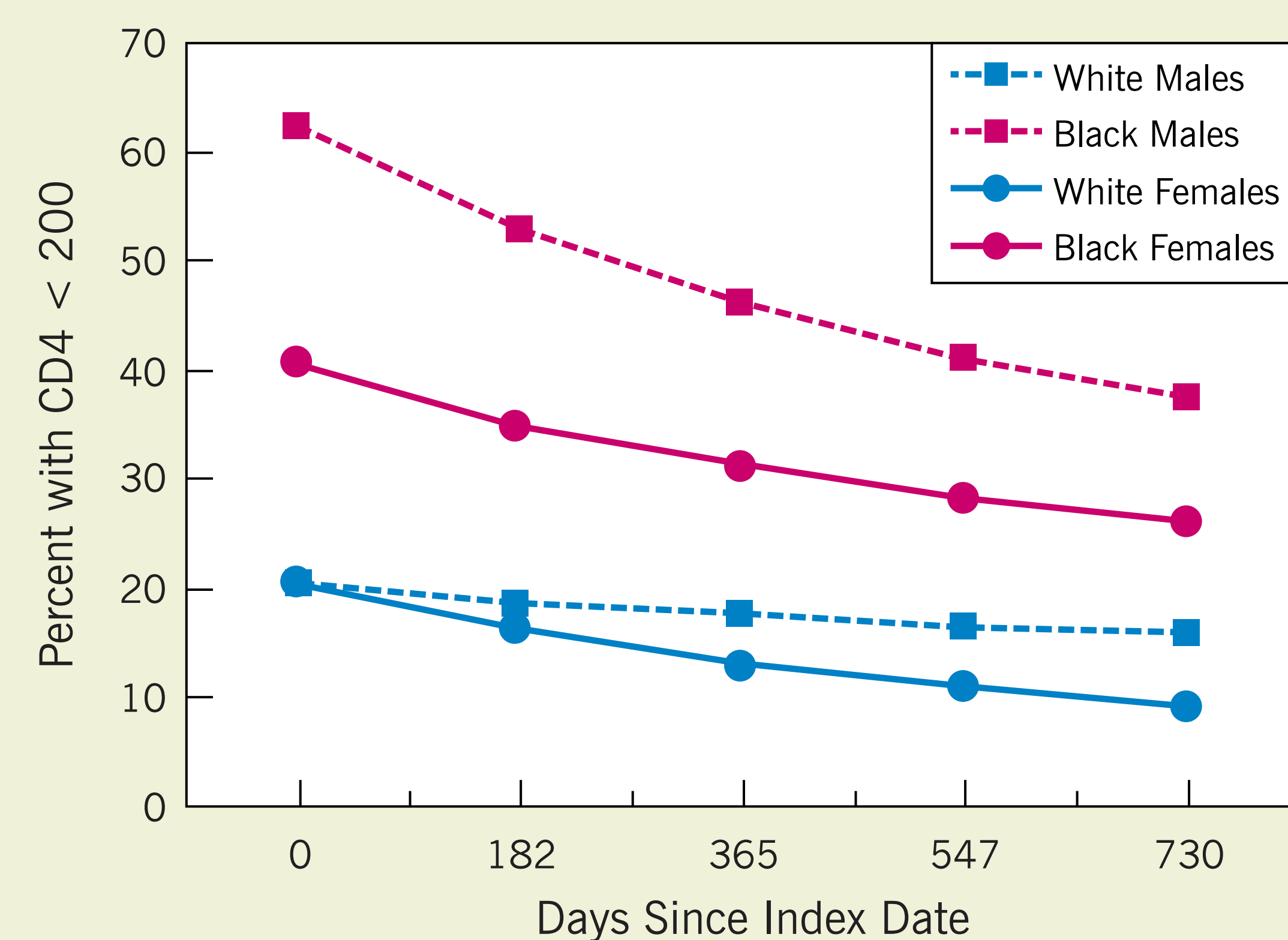


Figure 2
HIV-1 RNA VL Overtime by Race and Gender

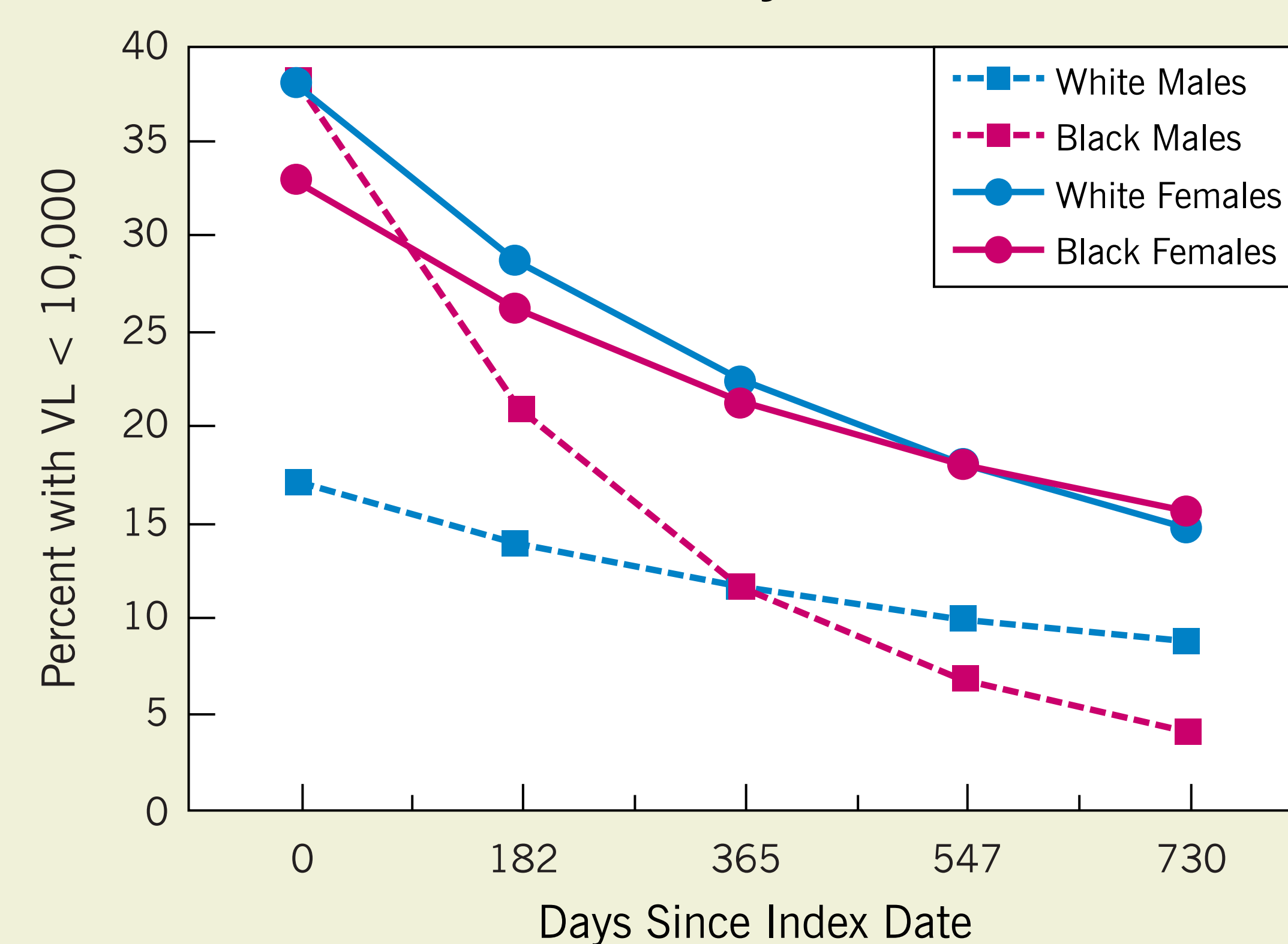


Figure 3
HIV-1 RNA VL Overtime by Race and Gender

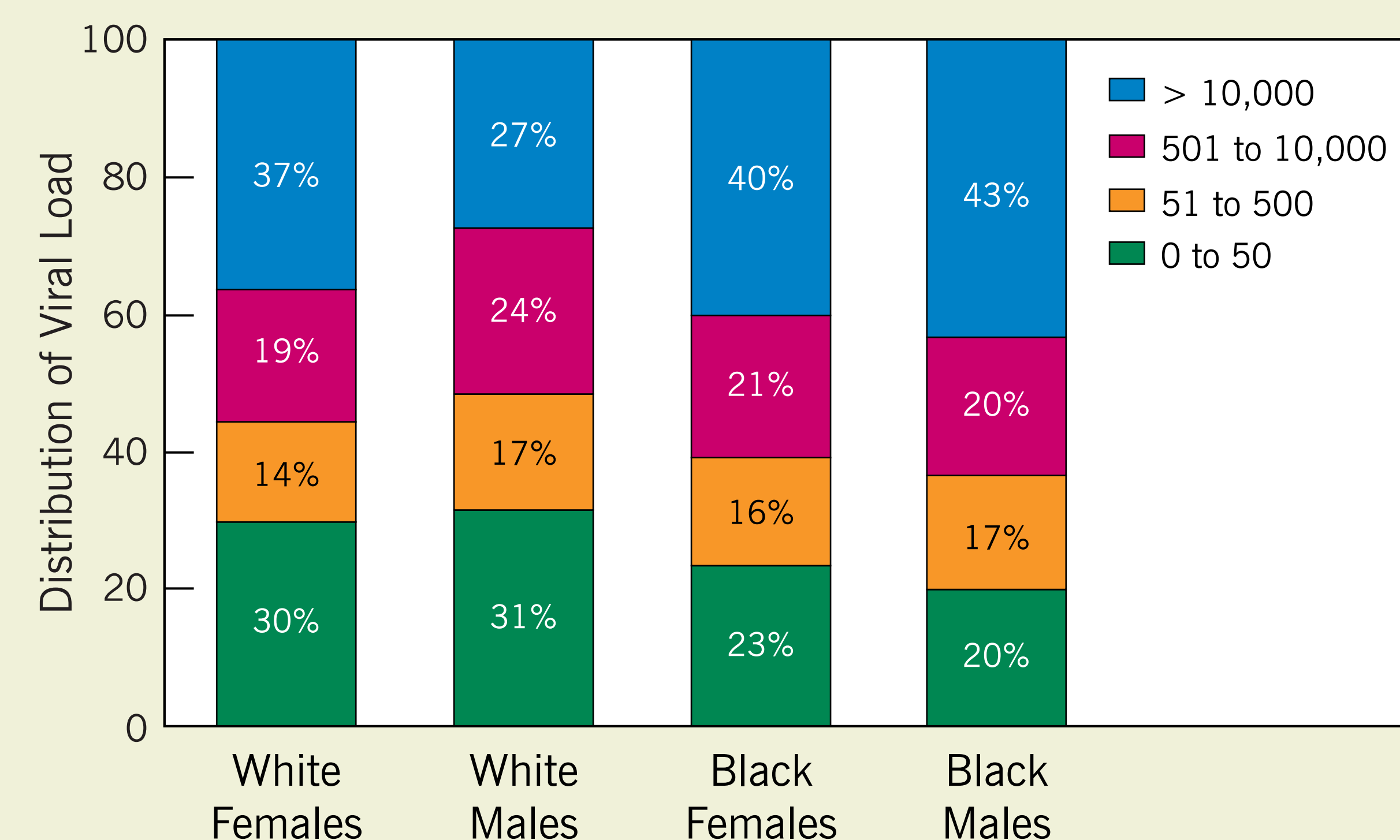


Table 1
Characteristics of HIV Infected Men in Our Clinic from 2005-2010

Men	Characteristics of Men by Race									
	Total (N=779)	Black (N=472) 60.6%		White (N=259) 33.2%		Hispanic (N=38) 4.9%		American native/Alaskan (N=4) 0.5%		Others (N=6) 0.8%
Age in years	(n) (%)	(n) (%)	(n) (%)	(n) (%)	(n) (%)	(n) (%)	(n) (%)	(n) (%)	(n) (%)	(n) (%)
≤30	69 8.9	38 8.0	7 2.7	4 10.5	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
31-40	129 16.6	70 14.8	45 17.4	16 42.1	1 25.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
41-50	279 35.8	137 29.0	95 36.7	10 26.3	2 50.0	5 83.3	0 0.0	0 0.0	0 0.0	0 0.0
51-60	216 27.7	159 33.7	86 33.2	3 7.9	1 25.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
≥61	86 11.0	68 14.4	26 10.0	5 13.2	0 0.0	1 16.7	0 0.0	0 0.0	0 0.0	1 16.7
Health Insurance										
Medicaid	116 14.9	87 18.4	24 9.3	2 5.3	0 0.0	3 50.0	0 0.0	0 0.0	0 0.0	3 50.0
Medicare	203 26.0	132 28.0	62 23.9	7 18.4	0 0.0	2 33.3	0 0.0	0 0.0	0 0.0	2 33.3
Private Insurance	141 18.1	61 12.9	76 29.3	2 5.3	1 25.0	1 16.7	0 0.0	0 0.0	0 0.0	1 16.7
Ryan White grant	319 41.0	192 40.7	97 37.5	27 71.0	3 75.0	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00
Selfpay/uninsured	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00
Monthly Income(\$)										
none	375 48.1	240 50.9	119 46.0	11 29.0	2 50.0	3 50.0	0 0.0	0 0.0	0 0.0	3 50.0
<1000	195 25.0	127 26.9	53 20.5	12 31.6	2 50.0	1 16.7	0 0.0	0 0.0	0 0.0	1 16.7
1000-1999	150 19.3	83 17.6	52 20.0	13 34.2	0 0.0	2 33.3	0 0.0	0 0.0	0 0.0	2 33.3
2000-2999	40 5.1	15 3.2	24 9.3	1 2.6	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
≥ 3000	19 2.4	7 1.5	11 4.2	1 2.6	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0

Table 2
Characteristics of HIV Infected Women in our Clinic from 2005-2010

Women	Characteristics of Women by Race									
	Total (N=453)	Black (N=360) 79.5%		White (N=69) 15.2%		Hispanic (N=18) 4%		American native/Alaskan (N=1) 0.2%		Others (N=5) 1.1%
Age in years	(n) (%)	(n) (%)	(n) (%)	(n) (%)	(n) (%)	(n) (%)	(n) (%)	(n) (%)	(n) (%)	(n) (%)
≤30	37 8.2	28 7.8	8 11.6	1 5.6	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
31-40	91 20.1	69 19.2	10 14.5	12 66.7	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
41-50	156 34.4	130 36.1	21 30.4	3 16.7	1 100.0	1 20.0	0 0.0	0 0.0	0 0.0	1 20.0
51-60	126 27.8	99 27.5	23 33.3	2 11.0	0 0.0	2 40.0	0 0.0	0 0.0	0 0.0	2 40.0
≥61	43 9.5	34 9.4	7 10.2	0 0.0	0 0.0	2 40.0	0 0.0	0 0.0	0 0.0	2 40.0
Health Insurance										
Medicaid	150 33.1	128 35.6	19 27.5	2 11.0	1 100.0	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00
Medicare	89 19.7	75 20.8	12 17.4	1 5.6	0 0.0	1 20.0	0 0.0	0 0.0	0 0.0	1 20.0
Private Insurance	71 15.7	51 14.2	17 24.6	1 5.6	0 0.0	2 40.0	0 0.0	0 0.0	0 0.0	2 40.0
Ryan White grant	141 31.1	105 29.2	20 29.0	14 77.8	0 0.0	2 40.0	0 0.0	0 0.0	0 0.0	2 40.0
Selfpay/uninsured	2 0.4	1 0.2	1 1.5	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
Monthly Income(\$)										
none	229 50.5	178 49.4	35 50.7	14 77.8	1 100.0	1 20.0	0 0.0	0 0.0	0 0.0	1 20.0
<1000	129 28.5	101 28.1	21 30.4	4 22.2	0 0.0	3 60.0	0 0.0	0 0.0	0 0.0	3 60.0
1000-1999	77 17.0	67 18.6	9 13.0	0 0.0	0 0.0	1 20.0	0 0.0	0 0.0	0 0.0	1 20.0
2000-2999	12 2.7	9 2.5	3 4.4	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0
≥ 3000	6 1.3	5 1.4	1 1.5	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0	0 0.0

Discussion

Results demonstrate disparity in the HIV-1 RNA VL and CD4+ T-cell count between men and women and also between whites and blacks. The CD4+ T-cell counts of black men and women at entry into care was lower than that of their white counterparts and remained at a disadvantage over years in care. Further studies are needed to understand factors contributing to these disparities.