

Background and Objective

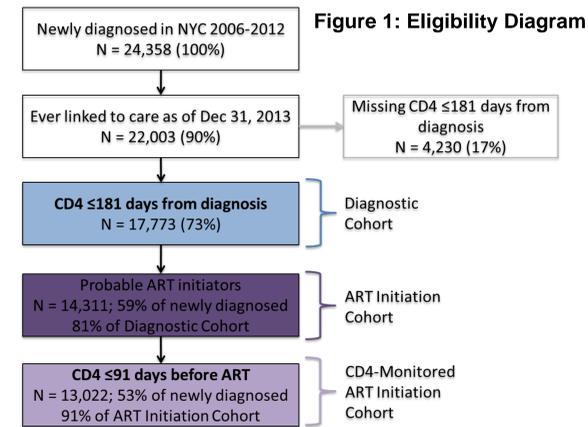
- Many US jurisdictions, including New York City (NYC), support and promote immediate ART initiation among persons with HIV (PWH) and have implemented geographically targeted HIV testing campaigns to facilitate earlier HIV diagnosis.
- A major aim of the test-and-treat approach is to reduce the time from HIV infection to ART initiation.
- CD4 count at ART initiation on a population level is a marker of the timing of treatment initiation relative to infection.
- We used population-based data on CD4 cell count at HIV diagnosis and ART initiation to estimate the rate at which efforts aimed at reducing the time from infection to diagnosis and ART initiation are progressing.

Data Source and Analytic Cohorts

Data Source: We used laboratory (CD4, viral load (VL)) data reported to NYC HIV Surveillance on PWH age ≥13 years diagnosed during 2006-2012.

Variable Definitions:

- **CD4 count at diagnosis:** First CD4 count within 6 months of diagnosis.
- **Probable ART initiation following HIV diagnosis:** The occurrence of: (1) a ≥1-log drop in VL over a 3-month period; or (2) a detectable VL followed by an undetectable VL (<400 copies/mL).
 - Date of probable ART initiation: The mid-point between two VLs bracketing the first occurrence of either (1) or (2) above.
- **CD4 count at ART initiation:** The last CD4 within the 3 months before the estimated date of ART initiation.



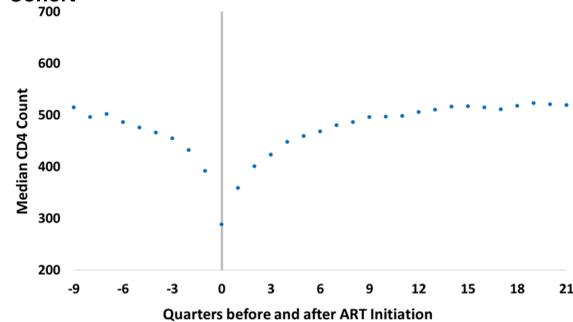
Methods

Descriptive analysis: Demographic characteristics and median CD4 count (with inter-quartile range) were calculated for the Diagnostic Cohort.

Validation of ART Measure: To assess the validity of the probable ART initiation definition, we plotted median CD4 counts before and after the date of ART initiation.

Median CD4 Plots: To assess trends in median CD4 and 95% confidence intervals, we used quantile regression with a third order polynomial for time.

Figure 2. Validation of ART Measure: Median CD4 Counts by Quarter before and after ART Initiation Among CD4-Monitored ART Initiation Cohort



Results Narrative

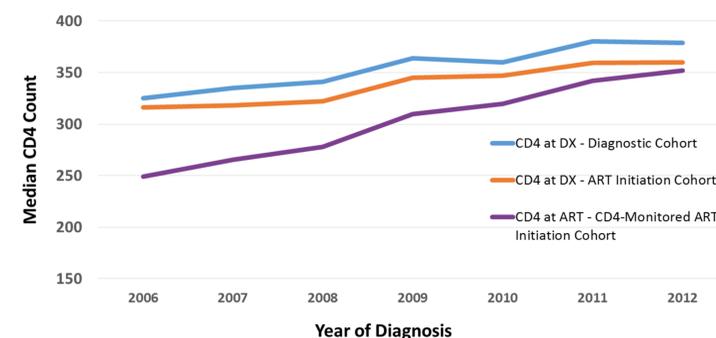
- Of the 17,773 persons with a CD4 count within 6 months of diagnosis (Table 1), a majority were aged 20-29, black or Hispanic race/ethnicity, and male sex.
- The overall median CD4 count at diagnosis increased from 325 cells/μL in 2006 to 379 cells/μL in 2012 (mean: 7.7 cells/year) (Figure 3), while the median CD4 count at ART initiation increased from 178 cells/μL in 2006 to 402 cells/μL in 2013 (mean: 28 cells/year).
- All demographic and risk subgroups experienced increases in CD4 at diagnosis and ART initiation during 2006-2013, although median CD4 were consistently lower for women, blacks, Hispanics, IDU, and heterosexuals (Figure 4). In 2012, over half of PWH were diagnosed at CD4 count >379 cells/μL, and 56% of persons who initiated ART in 2012 were diagnosed that year compared to 48% in 2006.

Results

Table 1: Demographic Characteristics and Median CD4 Count at Diagnosis among the Diagnostic Cohort

	Total	N (%) 17,733 (100)	Median CD4 (IQR) 354 (367)
Age			
13 – 19		784 (4.4)	436 (248)
20 – 29		5,055 (28.5)	416 (302)
30 – 39		4,617 (26.0)	363 (362)
40 – 49		4,293 (24.2)	306 (414)
50 – 59		2,151 (12.1)	235 (361)
60+		833 (4.7)	187 (308)
Sex			
Male		13,521 (76.3)	358 (355)
Female		4,212 (23.8)	336 (397)
Race/Ethnicity			
Black		8,084 (45.6)	334 (372)
Hispanic		5,731 (32.3)	350 (358)
White		3,289 (18.6)	415 (355)
Risk			
MSM		8,530 (48.1)	400 (315)
IDU		984 (5.6)	337 (398)
Heterosexual		4,267 (24.1)	320 (389)
Year of diagnosis			
2006		2,686 (15.2)	325 (377)
2007		2,712 (15.3)	335 (375)
2008		2,716 (15.3)	341 (378)
2009		2,578 (14.5)	364 (354)
2010		2,396 (13.5)	360 (349)
2011		2,392 (13.5)	381 (353)
2012		2,253 (12.7)	379 (360)

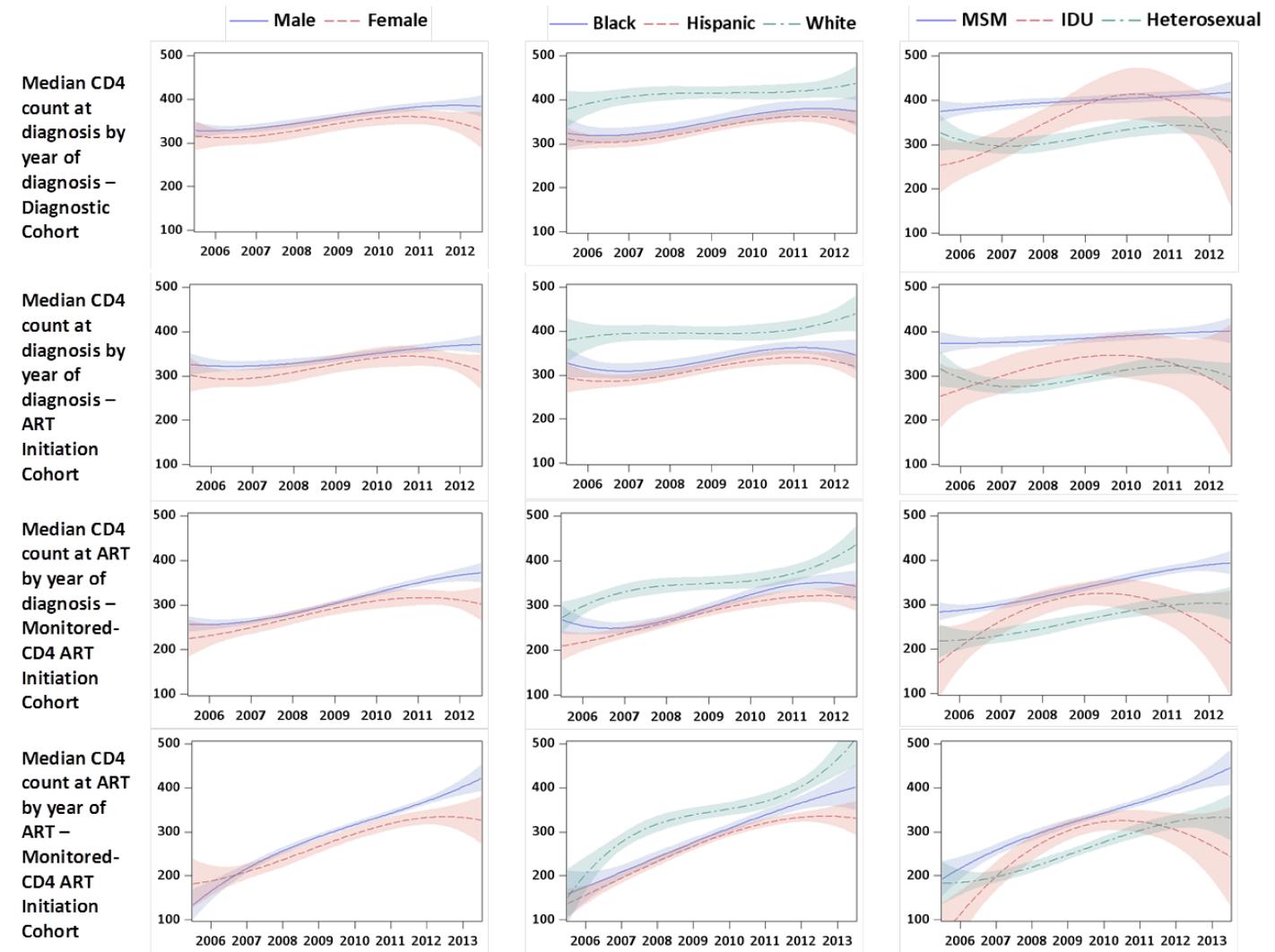
Figure 3. Actual Median CD4 at Diagnosis (DX) and ART Initiation by Year of Diagnosis



Notes: MSM: Men who have sex with men; IDU: Injection drug use (includes MSM/IDU); DX: Diagnosis; IQR: Interquartile range; Ever linked to care: CD4/VL reported to surveillance after diagnosis

Results (Continued)

Figure 4. Predicted Median CD4 and 95% Confidence Intervals at Diagnosis (DX) and ART Initiation by Subgroups



Strengths and Limitations

- Surveillance data are population-based and longitudinal data allow for analysis of trends over time.
- Analysis excludes persons without CD4 count within 6 months of diagnosis.
- First CD4 count after diagnosis among persons with acute HIV infection may be low.
- Recently diagnosed persons may be excluded from ART Initiation Cohort due to short post-diagnosis observation period.

Conclusions

- Surveillance data indicate that the time from HIV infection to ART initiation has been reduced substantially among newly diagnosed NYC PWH, possibly due to local testing campaigns and changes in clinical practice.
- Median CD4 at diagnosis among NYC PWH is increasing, but more slowly than median CD4 at ART initiation. Additional efforts are needed to achieve earlier HIV diagnosis and linkage to care.
- Overall, NYC PWH are benefitting from recommendations to initiate ART immediately after diagnosis. However, persistent disparities in median CD4 at ART initiation among certain subgroups (women, blacks, Hispanics, IDU, and heterosexuals) highlight the need for targeted intervention.
- Use of CD4 as a time-sensitive metric can complement HIV care continuum indicators and help target and evaluate efforts aimed at earlier diagnosis and ART initiation.

Next Steps

- Undertake additional validation work on ART measures using surveillance lab data.
- Update analysis to include persons without CD4 at diagnosis in the ART Initiation and CD4-Monitored ART Initiation Cohorts.
- Examine ART initiation among cohorts with equal follow-up time after HIV diagnosis.
- Examine trends in CD4 at ART initiation within additional subgroups (e.g., MSM by race/ethnicity).