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Background

- HIV-infected persons are at elevated risk of cardiovascular disease (CVD)
- Statin guidelines provide important guidance for determining whether to recommend statin therapy to HIV-infected patients
- Building on the 2004 Adult Treatment Panel III (ATP III) guidelines, two contemporary guidelines for the management of dyslipidemia and prevention of CVD were issued by the American College of Cardiology/American Heart Association (ACC/AHA) and the National Lipid Association (NLA)
- The 2013 ACC/AHA guidelines identify four groups of patients expected to benefit from statins (those with CVD, LDL-C ≥ 190 mg/dL, diabetes, or an estimated 10-year CVD risk $\geq 7.5\%$ using the Pooled Cohort Equations), and does not support the use of specific cholesterol targets
- The 2014 NLA guidelines specify the concentrations of non-HDL-C and LDL-C above which individuals should be considered for statin therapy for each of four CVD risk stratification categories – determined by the presence of ‘very high-risk’ and ‘high-risk’ conditions, the number of CVD risk factors (HIV infection may be counted), and quantitative risk scoring – and specifies non-HDL-C and LDL-C target goals for each risk category

Objectives

- Compare proportions of HIV-infected patients who were eligible for statin therapy based on three dyslipidemia treatment guidelines
- Assess statin prescribing practices and examine prescribing gaps
- Evaluate patients’ therapeutic responses to newly prescribed statins
- Identify demographic, behavioral, and clinical predictors of being newly prescribed statin therapy and achieving statin treatment goals

Methods

- Used socio-demographic, clinical, and laboratory data documented in outpatient electronic medical record systems from Jan 2011-Jan 2016 and abstracted as part of the DC Cohort study, an ongoing, prospective, multi-center observational cohort study of HIV-infected patients in Washington, DC
- Calculated proportions of patients who were (1) eligible for statin therapy based on ATP III, ACC/AHA, and NLA guidelines, and based on ≥ 1 guideline, (2) prescribed a statin (among eligible patients), and (3) achieved NLA-specified non-HDL-C treatment goals after six months of a new prescription
- Multivariable Cox proportional hazards regression with time-updated covariates used to identify predictors of (1) receiving a new statin prescription and (2) achieving NLA non-HDL-C treatment goals
- Missing data were multiply imputed for HIV transmission category (2%), smoking (18%), and recreational drug use (36%)

Results

Figure 1. Flowchart of selection of DC Cohort study participants.

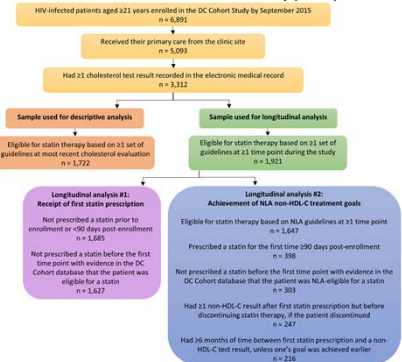


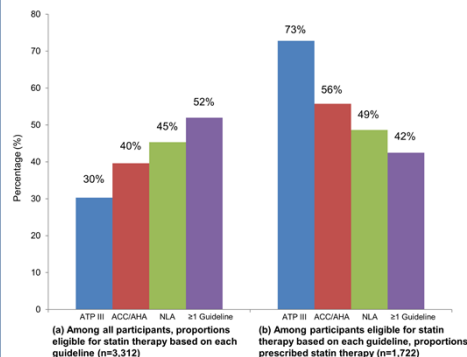
Table 1. Characteristics of HIV-infected primary care patients (n=3,312).

Variable	All patients (n=3,312)	Eligible for statin (n=1,722)	Prescribed statin (n=731)
Age, years (median, IQR)	52 (44-58)	56 (50-61)	57 (51-63)
Age ≥ 60 years	21%	30%	39%
Male sex at birth	78%	80%	83%
Non-Hispanic Black	79%	80%	76%
Publicly insured ¹	76%	80%	78%
Current smoker ¹	47%	48%	39%
Hypertension	50%	71%	75%
Diabetes	19%	34%	35%
BMI ≥ 30	30%	36%	37%
Non-HDL-C ≥ 160 mg/dL	17%	28%	27%
HDL-C < 40 mg/dL	26%	31%	29%
Protease inhibitor use	45%	46%	43%
HIV viral load ≥ 200 copies/mL	15%	11%	8%

¹ Among 2,731 patients with non-missing smoking data (18% missing).

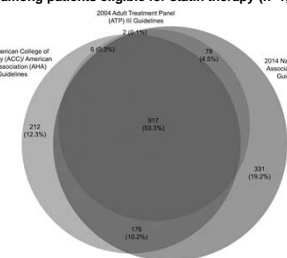
Results (continued)

Figure 2. Proportions of HIV-infected patients who were eligible for statin therapy and who were prescribed statin therapy (n=3,312).



- After HIV infection was counted as a major CVD risk factor in the NLA risk stratification algorithm, 51% were eligible for NLA guidelines, resulting in 57% being eligible based on ≥ 1 guideline

Figure 3. Concordance of statin recommendations based on three guidelines among patients eligible for statin therapy (n=1,722).



Results (continued)

- Among 216 patients newly prescribed statin therapy with available cholesterol results pre-/post-prescription, 53% achieved their NLA non-HDL-C goal after six months
- The median decrease in non-HDL-C was 43 mg/dL (IQR: 17-73)

Table 2. Significant predictors of being newly prescribed statin therapy (n=1,627; 1,886 person-years).

Covariate	Adjusted HR (95% CI) [*]	p
Age (per 5-year increase)	1.16 (1.08-1.26)	<0.001
BMI ≥ 30 (vs. <25)	1.50 (1.07-2.11)	0.019
Diabetes	1.35 (1.03-1.79)	0.033
Hepatitis C coinfection	0.67 (0.45-1.00)	0.049

^{*}Hazard ratios (HRs) were adjusted for the variables shown, sex at birth, race/ethnicity, HIV transmission category, type of health insurance, history of smoking, history of recreational drug use, depression, recent CD4 count, recent HIV viral load, study site, and lipid test results (total cholesterol, LDL-C, HDL-C, and triglycerides).

Table 3. Significant predictors of achieving non-HDL-C goals after being newly prescribed statin therapy (n=216; 308 person-years).

Covariate	Adjusted HR (95% CI) [*]	p	Fully adjusted HR (95% CI) ^{**}	p
Depression	0.56 (0.35-0.92)	0.022	0.63 (0.39-1.03)	0.066
Hepatitis C coinfection	2.08 (1.17-3.69)	0.012	1.87 (1.06-3.32)	0.032
Protease inhibitor-based regimen	0.61 (0.40-0.93)	0.023	0.72 (0.47-1.11)	0.13

^{*}Hazard ratios (HRs) were adjusted for the variables shown, age, sex at birth, race/ethnicity, type of health insurance, BMI, AIDS diagnosis, recent CD4 count, recent CVD count, and recent HIV viral load.

^{**}The fully adjusted model also adjusted for the reduction in non-HDL-C needed to achieve one's goal.

Conclusions

- Approximately half of a citywide cohort of HIV-infected primary care patients had documented evidence of having an indication for statin therapy based on current United States guidelines
- The largest number of patients were eligible based on the NLA guidelines
- A sizable proportion of patients who were eligible for statin therapy did not receive statin prescriptions
- Opportunities remain for the expansion of the use of statin therapy to treat dyslipidemia and prevent CVD among HIV-infected patients
- Many patients who were newly prescribed statin therapy did not achieve their non-HDL-C treatment goals after six months
- Greater compliance with recommended statin prescribing practices may reduce CVD risk among HIV-infected individuals