Prediction of Cardiovascular Risk among PWH: Comparing the PREVENT and Pooled Cohort Equations

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BACKGROUND

- People with HIV (PWH) are at higher risk of atherosclerotic cardiovascular disease (ASCVD).
- Current risk prediction tools underestimate risk among PWH.
- New US guidelines incorporate risk in statin recommendations for PWH.
- The new **P**redicting **R**isk of cardiovascular disease **EVENT**s (PREVENT) equations have not been studied among PWH.

METHODS

Design: Observational study using electronic health records

Participants: All people with diagnosed HIV ages 40-75 without CVD at 23 primary care and HIV clinics in San Francisco, California from 2019-2024

Main Measures: Predicted 10-year ASCVD risk using PREVENT & pooled cohort equations (PCE) and percentage with predicted risk >5%.

Statistical Approach: We compared predicted risk between the two equations using the Wilcoxon Signed Rank test. We compared statin recommendation using Fisher's Exact test.

RESULTS

2853 PWH had complete data for both PCE and PREVENT. The median predicted risk was 7.7% (IQR 3.7, 14.0) by PCE and 3.3% (IQR 1.9, 5.4) by PREVENT (p<0.0001).

Table 1. Participant Characteristics

		N=2853
Age	Years	57 [50, 63]
Natal Sex	Natal Sex: Male	2395 (83.9%)
	Natal Sex: Female	458 (16.1%)
Gender Identity	Female	379 (13.3%)
	Male	2125 (74.5%)
	Transgender Female	82 (2.9%)
	Transgender Male	5 (0.2%)
	Other	47 (1.6%)
Race Ethnicity	Asian	275 (9.6%)
	Black	537 (18.8%)
	Hispanic/Latino	689 (24.2%)
	Native American	87 (3.0%)
	Pacific Islander/Hawaiian	29 (1.0%)
	White	1466 (51.4%)
	Other	640 (22.4%)
Health System	UCSF	1034 (36.2%)
	SFDPH	1819 (63.8%)
Insurance	Private	664 (23.3%)
	Medicaid	1205 (42.2%)
	Medicare	922 (32.3%)
	Uninsured	58 (2.0%)

*categorial variables are reported as n(%) and continuous as median (interquartile range)

		N=2853
HIV Factors	Antiretroviral Therapy	2552 (89.4%)
	Undetectable Viral Load	2418 (84.8%)
	Viral Load (if detectable), Copies/mL	175 [48, 6700]
	CD4, Cells/mL,	564 [382, 791]
CVD Risk Factors	Hypertension	1462 (51.2%)
	SBP, mm Hg	126 [116, 136]
	Dyslipidemia	1701 (59.6%)
	Total Cholesterol, mg/dL	169 [145, 196]
	LDL, mg/dL	92 [71, 114]
	HDL Cholesterol, mg/dL	47.0 [40, 56]
	Diabetes	582 (20.4%)
	Hemoglobin A1c, %	5.40 [5.1, 5.7]
	Current Tobacco	754 (26.4%)
	Former Tobacco	963 (33.8%)
	Never Tobacco	1136 (39.8%)
	Chronic Kidney Disease	549 (19.2%)
	eGFR, mL/min/1.73 m^2	67 [55, 82]
	Obesity	585 (20.5%)
	Body Mass Index, kg/m^2	26 [23, 30]
Medication Classes	Antihypertensive	816 (28.6%)
	Statin	1118 (39.2%)
	Aspirin	233 (8.2%)

PREVENT predicts lower ASCVD risk than PCE for 97% of PWH. 58% fewer would be strongly recommended for statins.

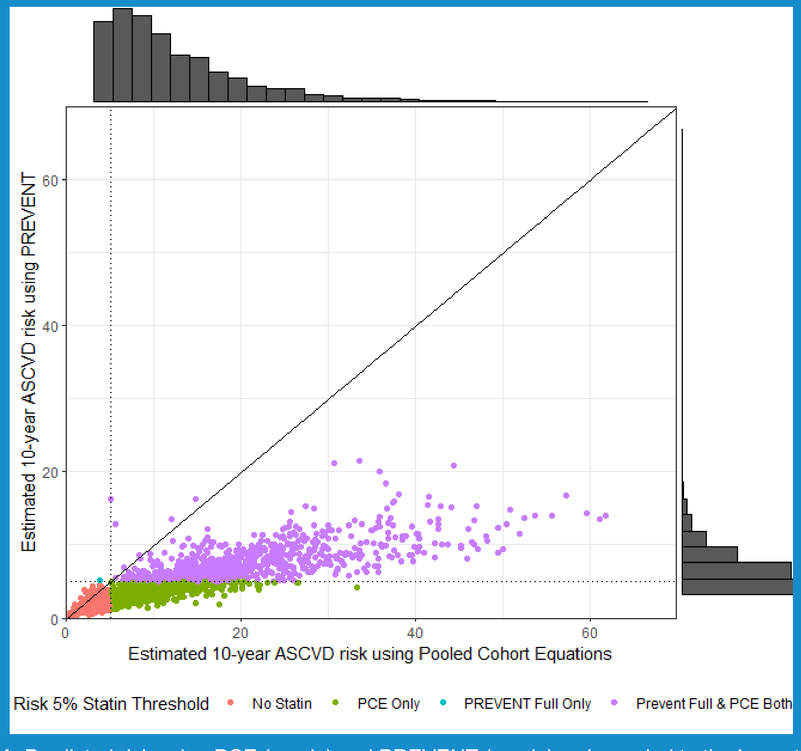


Figure 1: Predicted risk using PCE (x-axis) and PREVENT (y-axis), color coded to the impact on statin therapy. Histograms show predicted risk using PREVENT is compressed compared to PCE. Solid line (y=x) represents the expected average if both equations were calibrated the same.

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Differences by Sex and Race/Ethnicity



Figure 2 Legend: Boxplots of the difference in predicted risk (PREVENT-PCE) by groups of interest.

The difference between equations is greater for males vs. females (-6.9% vs -3.7 %; p<0.0001) and greater among Black individuals (-8.9 % vs. -6.3 % overall; p<0.0001).

Statin Implications Using Guideline's Risk Thresholds

Table 2a. 5% Threshold for Statin

PCE \ PREVENT	No Statin	Statin	Total
No Statin	933	1	934
Statin	1104	815	1919 (**67.3%**)
Total	2037	816 (**28.6%**)	2853

Table 2b. 20% Threshold for High-Potency Statin

PCE \ PREVENT	No Statin	Statin	Total
No or Moderate Potency Statin	2481	0	2481
High Potency Statin	368	4	372 (**13.0%**)
Total	2849	4 (**0.1%**)	2853

- Fewer PWH would be strongly recommended statins using PREVENT (28.6%) compared to PCE (67.3%).
- Almost none (0.1% vs 13%) would be recommended high potency statins with PREVENT.

Table 3. Implications for Hypothetical Patients

	PCE		PREVENT	
	Predicted 10-year risk	Statin Recommended	Predicted 10-year risk	Statin Recommended
55-year-old Black man with treated hypertension	12.4%	Yes	4.0%	No
65-year-old white woman with untreated hypertension (SBP=145 mm Hg) who smokes	12.1%	Yes	4.8%	No
65-year-old Black woman with hyperlipidemia (Total cholesterol=320 mg/dl)	11.1%	Yes	4.4%	No

CONCLUSIONS

- The PREVENT equations predict much lower 10-year ASVCD risk for PWH compared to PCE.
- Using new guidelines, 58% fewer PWH would be strongly recommended for statins using PREVENT compared to PCE.