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Performance of Cardiovascular Risk Prediction Models Among People Living With HIV: A Systematic Review and Meta-analysis

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Abstract

Importance: Extant data on the performance of cardiovascular disease (CVD) risk score models in people living with HIV have not been synthesized.

Objective: To synthesize available data on the performance of the various CVD risk scores in people living with HIV.

Data sources: PubMed and Embase were searched from inception through January 31, 2021.

Study selection: Selected studies (1) were chosen based on cohort design, (2) included adults with a diagnosis of HIV, (3) assessed CVD outcomes, and (4) had available data on a minimum of 1 CVD risk score.

Data extraction and synthesis: Relevant data related to study characteristics, CVD outcome, and risk prediction models were extracted in duplicate. Measures of calibration and discrimination are presented in tables and qualitatively summarized. Additionally, where possible, estimates of discrimination and calibration measures were combined and stratified by type of risk model.

Main outcomes and measures: Measures of calibration and discrimination.

Results: Nine unique observational studies involving 75 304 people (weighted average age, 42 years; 59 490 male individuals [79%]) living with HIV were included. In the studies reporting these data, 86% were receiving antiretroviral therapy and had a weighted average CD4+ count of 449 cells/μL. Included in the study were current smokers (50%), patients with diabetes (5%), and patients with hypertension (25%). Ten risk prediction scores (6 in the general population and 4 in the HIV-specific population) were analyzed. Most risk scores had a moderate performance in discrimination (C statistic: 0.7-0.8), without a significant difference in performance between the risk scores of the general and HIV-specific populations. One of the HIV-specific risk models (Data Collection on Adverse Effects of Anti-HIV Drugs Cohort 2016) and 2 of the general population risk models (Framingham Risk Score [FRS] and Pooled Cohort Equation [PCE] 10 year) had the highest performance in discrimination. In general, models tended to underpredict CVD risk, except for FRS and PCE 10-year scores, which were better calibrated. There was substantial heterogeneity across the studies, with only a few studies contributing data for each risk score.

Conclusions and relevance: Results of this systematic review and meta-analysis suggest that general population and HIV-specific CVD risk models had comparable, moderate discrimination ability in people living with HIV, with a general tendency to underpredict risk. These results reinforce the current recommendations provided by the American College of Cardiology/American Heart Association guidelines to consider HIV as a risk-enhancing factor when estimating CVD risk.

Conflict of interest statement

Conflict of Interest Disclosures: Drs Jutkowitz and Erqou reported receiving grants from the Department of Veterans Affairs during the conduct of the study. Drs Jutkowitz, Rudolph, and Erqou reported receiving funding from the VA Evidence Synthesis Program to conduct systematic reviews. Drs Sullivan, Rudolf, Wu, and Erqou reported receiving research funding from the VA Health Services Research and Development Center of Innovation in Long Term Services and Supports. Dr Erqou reported receiving grants from the VISN 1 Career Development Award, Lifespan Cardiovascular Institute, the Center for AIDS

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