HIV infection is associated with an increased risk of cardiovascular disease (CVD) events and may therefore need to be considered. Until very recently, the Framingham Heart Study was the only CVD risk assessment tool validated for use in HIV-infected populations, CVD risk prediction equations have been developed [3, 4, 5, 6, 7, 8]. Among participants with any length of follow-up after 1 January 2002, we applied four CVD risk equations to the HOPS data to estimate 10-year risks of CVD events and predict risk of events in a large diverse cohort of HIV-infected adults in the U.S. We expected four risk prediction equations to determine if they accurately estimate events and predict risks of event in a large diverse cohort of HIV-infected adults in the U.S.

METHODS

Data source and population

We analyzed longitudinal data from the HIV Outpatient Study (HOPS) participants in care at 10 HIV specialty clinics in the U.S. as of 30 September 2013 who met the following criteria:

- had at least one year of follow-up after 1 January 2002
- had at least one total cholesterol measurement and at least two systolic blood pressure measurements
- had at least one total cholesterol measurement and at least two systolic blood pressure measurements and an LDL cholesterol measurement
- had at least one total cholesterol measurement and at least two systolic blood pressure measurements and an LDL cholesterol measurement and an HDL cholesterol measurement
- had at least one total cholesterol measurement and at least two systolic blood pressure measurements and an LDL cholesterol measurement and an HDL cholesterol measurement and a triglyceride measurement
- had at least one total cholesterol measurement and at least two systolic blood pressure measurements and an LDL cholesterol measurement and an HDL cholesterol measurement and a triglyceride measurement and a glucose measurement
- had at least one total cholesterol measurement and at least two systolic blood pressure measurements and an LDL cholesterol measurement and an HDL cholesterol measurement and a triglyceride measurement and a glucose measurement and a body mass index measurement
- had at least one total cholesterol measurement and at least two systolic blood pressure measurements and an LDL cholesterol measurement and an HDL cholesterol measurement and a triglyceride measurement and a glucose measurement and a body mass index measurement and an estimated glomerular filtration rate measurement
- had at least one total cholesterol measurement and at least two systolic blood pressure measurements and an LDL cholesterol measurement and an HDL cholesterol measurement and a triglyceride measurement and a glucose measurement and a body mass index measurement and an estimated glomerular filtration rate measurement and a smoking status measurement
- had at least one total cholesterol measurement and at least two systolic blood pressure measurements and an LDL cholesterol measurement and an HDL cholesterol measurement and a triglyceride measurement and a glucose measurement and a body mass index measurement and an estimated glomerular filtration rate measurement and a smoking status measurement and a diastolic blood pressure measurement
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- had at least one total cholesterol measurement and at least two systolic blood pressure measurements and an LDL cholesterol measurement and an HDL cholesterol measurement and a triglyceride measurement and a glucose measurement and a body mass index measurement and an estimated glomerular filtration rate measurement and a smoking status measurement and a diastolic blood pressure measurement and a diabetes status measurement and a creatinine clearance measurement and a history of CVD event and a history of diabetes status
- had at least one total cholesterol measurement and at least two systolic blood pressure measurements and an LDL cholesterol measurement and an HDL cholesterol measurement and a triglyceride measurement and a glucose measurement and a body mass index measurement and an estimated glomerular filtration rate measurement and a smoking status measurement and a diastolic blood pressure measurement and a diabetes status measurement and a creatinine clearance measurement and a history of CVD event and a history of diabetes status and a proportion of non-white race

All analyses were performed among the entire sample with any length of follow-up from their entry into the HOPS until 30 September 2013. Sensitivity analysis was used to determine if models performed better among persons with longer length of follow-up.

RESULTS

Table 1. Characteristics and antiretroviral exposure of patients in the HIV Outpatient Study (HOPS), January 2002 – September 2013.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All HOPS participants (n=2,392)</th>
<th>HOPS participants with ≥10 years of follow-up (n= 725)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, median (IQR) years</td>
<td>48.8 (47.4 50.1)</td>
<td>48.8 (47.4 50.1)</td>
</tr>
<tr>
<td>Male sex, n (%)</td>
<td>1,003 (41.9)</td>
<td>322 (44.3)</td>
</tr>
<tr>
<td>White, n (%)</td>
<td>909 (38.8)</td>
<td>254 (35.0)</td>
</tr>
<tr>
<td>Other, n (%)</td>
<td>384 (16.5)</td>
<td>106 (14.4)</td>
</tr>
<tr>
<td>Current smoking, n (%)</td>
<td>1,033 (43.0)</td>
<td>325 (44.2)</td>
</tr>
<tr>
<td>Diabetes mellitus, n (%)</td>
<td>233 (9.8)</td>
<td>62 (8.6)</td>
</tr>
<tr>
<td>Hypertension, n (%)</td>
<td>1,183 (49.0)</td>
<td>372 (51.3)</td>
</tr>
<tr>
<td>Total cholesterol, median (IQR) mg/dL</td>
<td>170 (127–210)</td>
<td>170 (127–210)</td>
</tr>
<tr>
<td>HDL cholesterol, median (IQR) mg/dL</td>
<td>40 (31–53)</td>
<td>40 (31–53)</td>
</tr>
<tr>
<td>Family history of cardiovascular disease, n (%)</td>
<td>28 (1.2)</td>
<td>9 (1.2)</td>
</tr>
<tr>
<td>Abuse/seed use at baseline, n (%)</td>
<td>654 (27.3)</td>
<td>186 (25.4)</td>
</tr>
<tr>
<td>Menstrual use at baseline, n (%)</td>
<td>341 (14.3)</td>
<td>105 (14.3)</td>
</tr>
<tr>
<td>Baseline eGFR, median (IQR) mL/min/1.73 m²</td>
<td>54.6 (22.6 84.2)</td>
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</tr>
</tbody>
</table>

Baseline characteristics:
- CVD risk factors: total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides, systolic and diastolic blood pressures, current smoking, diabetes mellitus, and hypertension
- Race: white, other
- Sex: male, female
- Smoking status: current smoking, former smoking, never smoking
- Total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides
- Systolic and diastolic blood pressures
- Current smoking: yes, no
- Diabetes mellitus: yes, no
- Hypertension: yes, no
- Race: white, non-white
- Sex: male, female
- Smoking status: current, former, never
- Total cholesterol, HDL cholesterol, LDL cholesterol, triglycerides
- Systolic and diastolic blood pressures

All analyses were performed among the entire sample with any length of follow-up from their entry into the HOPS until 30 September 2013. Sensitivity analysis was used to determine if models performed better among persons with longer length of follow-up.

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All analyses were performed among the entire sample with any length of follow-up from their entry into the HOPS until 30 September 2013. Sensitivity analysis was used to determine if models performed better among persons with longer length of follow-up.