

Review of Predicting Risk of Cardiovascular Disease EVENTS (PREVENT)

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Abstract

The PREVENT equations are contemporary risk prediction models developed to estimate 10- and 30-year risk of total cardiovascular disease (CVD), atherosclerotic cardiovascular disease (ASCVD), heart failure, coronary artery disease, and stroke in adults without established CVD (primary prevention). Derived from large, diverse US populations, PREVENT incorporates traditional risk factors along with kidney function and optional cardiovascular-kidney-metabolic (CKM) variables to improve individualized risk assessment. Compared with the prior Pooled Cohort Equations, PREVENT demonstrates improved calibration and broader applicability, including prediction of heart failure risk. These equations are now incorporated into recent US prevention guidelines to support risk-based primary prevention strategies, including lipid-lowering decisions using PREVENT-ASCVD risk and antihypertensive treatment decisions using PREVENT-total CVD risk. PREVENT generally yields lower estimated ASCVD risk than the prior Pooled Cohort Equations, likely reflecting improved calibration in contemporary populations. However, the downstream impact on treatment eligibility and the optimal treatment thresholds for PREVENT-based risk estimates remain areas of ongoing study.

II. HOW TO USE

When to Use

- Use in adults ages 30-79 years without established cardiovascular disease for primary prevention risk assessment. PREVENT estimates 10- and 30-year risk of total CVD, ASCVD, heart failure, coronary heart disease, and stroke.
- Use to support shared decision-making and guideline-based primary prevention risk stratification, including lipid-lowering discussions and hypertension management decisions.
- Optional variables can be used (albumin-creatinine ratio, A1c, and social deprivation index [SDI]) in this equation.

Pearls / Pitfalls

- Use this score to enhance discussions of patient-level interventions to prevent CVD. These estimates should inform, not replace, clinical judgment and shared decision-making.
- Risk estimates should be further refined with additional risk enhancers such as elevated Lp(a), apoB,

coronary artery calcium, and chronic inflammatory disease.

- In the derivation study, BMIs $<18.5 \text{ kg/m}^2$ and $\geq 40.0 \text{ kg/m}^2$ were excluded.
- Derived and validated using US-based cohorts, which limits generalizability to populations outside the United States.
- Risk thresholds differ by clinical application, such as for use in guiding lipid lowering therapy versus anti-hypertensive therapy consideration.
- In non-US settings, clinicians should consider locally recommended risk tools; for example, European guidelines commonly consider SCORE2, SCORE2-OP, and SCORE2-Diabetes rather than PREVENT.

Why to Use

- Provides more accurate and contemporary risk estimation compared with legacy models
- Incorporates cardiovascular-kidney-metabolic (CKM) risk factors, improving prediction of heart failure and total CVD
- Enables 30-year risk estimation, improving risk assessment in younger adults

- Does not include race as a predictor, unlike the Pooled Cohort Equations, and can optionally incorporate social deprivation index as a marker of social risk

III. NEXT STEPS

Advice

Use PREVENT risk estimates to support shared decision-making around cardiovascular prevention strategies. Risk estimates should be interpreted in the context of patient comorbidities (e.g., diabetes, CKD, obesity), risk-enhancing factors (e.g., family history, lipoprotein(a), inflammatory conditions, coronary artery calcium score), and patient preferences and treatment goals

Consider both 10-year and 30-year risk, particularly in younger patients, where long-term risk may better inform early preventive strategies.

Management

Risk estimates should be part of a comprehensive discussion with patients undergoing primary prevention risk assessment. Total CVD includes ASCVD and heart failure while ASCVD includes coronary heart disease and stroke.

For lipid-lowering decisions, the 2026 ACC/AHA dyslipidemia guideline supports the following interpretation of 10-year PREVENT-ASCVD risk:

Low risk: $<3\%$

Borderline risk: 3% to $<5\%$

Intermediate risk: 5% to $<10\%$

High risk: $\geq 10\%$

For hypertension management, the 2025 AHA/ACC hypertension guideline uses 10-year PREVENT-total CVD risk with a threshold of $\geq 7.5\%$ as an increased-risk marker in treatment decision-making.

Coronary artery calcium (CAC), risk-enhancing factors, comorbidities, and patient preferences can help refine risk and guide treatment decisions when the PREVENT-based estimate alone does not clearly resolve management.

Critical Actions

- PREVENT was developed for primary prevention risk assessment in adults without established cardiovascular disease. Do not use in patients with established ASCVD, as this equation's risk estimation is not applicable
- Evaluate for secondary causes of dyslipidemia or elevated risk when appropriate
- Ensure management of modifiable risk factors (lipids, blood pressure, glycemia, smoking) regardless of calculated risk

- Reassess risk over time as clinical status and risk factors change

IV. EVIDENCE

Evidence Appraisal

The PREVENT equations were derived and externally validated using contemporary US population-based and clinical datasets, including approximately 3.3 million adults for derivation and 3.3 million adults for validation. The equations estimate 10- and 30-year risk of total CVD, ASCVD, heart failure, coronary heart disease, and stroke, and include traditional risk factors plus kidney function, with optional CKM-related inputs such as HbA1c, urine albumin-creatinine ratio, and social deprivation index. Compared with the prior Pooled Cohort Equations, PREVENT demonstrates similar discrimination but improved calibration for ASCVD risk, with estimated risks generally 40% to 50% lower than PCE estimates for the same risk factor profile.

Compared with the Pooled Cohort Equations, PREVENT has several practical clinical considerations. It begins risk estimation at age 30 rather than 40 years, estimates both 10- and 30-year risk, removes race as an input, incorporates kidney function, optionally incorporates CKM and social-risk variables, and provides estimates for heart failure and total CVD in addition to ASCVD. In practice, PREVENT-ASCVD estimates are often lower than Pooled Cohort Equation estimates, but this should not be interpreted automatically as risk underestimation; rather, it may reflect improved calibration for contemporary populations in whom older equations have been criticized for overestimating risk.

The 2026 ACC/AHA dyslipidemia guideline recommends PREVENT-ASCVD for 10-year ASCVD risk estimation in adults aged 30–79 years without ASCVD or subclinical atherosclerosis, using low, borderline, intermediate, and high-risk thresholds of $<3\%$, 3% to $<5\%$, 5% to $<10\%$, and $\geq 10\%$, respectively. Separately, the 2025 AHA/ACC hypertension guideline incorporates PREVENT-total CVD risk, with $\geq 7.5\%$ used as an increased-risk threshold relevant to antihypertensive treatment decisions. These guideline uses are related but not interchangeable: PREVENT-ASCVD is used for ASCVD-focused lipid prevention, whereas PREVENT-total CVD includes both ASCVD and heart failure and is used in hypertension risk stratification.

Limitations include derivation and validation in US cohorts, uncertain generalizability to non-US populations, and the need to interpret risk estimates alongside clinical judgment, risk-enhancing factors, and patient preferences.

Because the Pooled Cohort Equations have been criticized for overestimating ASCVD risk in contemporary populations, lower PREVENT-ASCVD estimates may

The model coefficients to calculate 10-year total CVD risk are as follows:

Variable	Transformation	Female	Male
Age, years	$\text{cage} = (\text{age} - 55)/10$	0.7939329	0.7688528
Cholesterol, mmol/L	$\text{cnhdl} = \text{tc} - \text{hdl} - 3.5$	0.0305239	0.0736174
	$\text{chdl} = (\text{hdl} - 1.3)/0.3$	-0.1606857	-0.0954431
SBP	$\text{csbp} = (\min(\text{SBP}, 110) - 110)/20$	-0.2394003	-0.4347345
	$\text{csbp2} = (\max(\text{SBP}, 110) - 130)/20$	0.3600781	0.3362658
Diabetes	yes = 1, no = 0	0.8667604	0.7692857
Current smoker	yes = 1, no = 0	0.5360739	0.4386871
eGFR	$\text{cegfr} = (\min(\text{eGFR}, 60) - 60)/-15$	0.6045917	0.5378979
	$\text{cegfr2} = (\max(\text{eGFR}, 60) - 90)/-15$	0.0433769	0.0164827
Using antihypertensive drugs	yes = 1, no = 0	0.3151672	0.288879
Using statins	yes = 1, no = 0	-0.1477655	-0.1337349
SBP*antihypertensive interaction	$\text{csbp2} * \text{antihypertensive}$	-0.0663612	-0.0475924
Cholesterol*statin interaction	$\text{cnhdl} * \text{statin}$	0.1197879	0.150273
Age*cholesterol interaction	$\text{cage} * \text{cnhdl}$	-0.0819715	-0.0517874
	$\text{cage} * \text{chdl}$	0.0306769	0.0191169
Age*SBP interaction	$\text{cage} * \text{csbp2}$	-0.0946348	-0.1049477
Age*diabetes interaction	$\text{cage} * \text{diabetes}$	-0.27057	-0.2251948
Age*smoking interaction	$\text{cage} * \text{smoking}$	-0.078715	-0.0895067
Age*eGFR interaction	$\text{cage} * \text{cegfr}$	-0.1637806	-0.1543702
Constant		-3.307728	-3.031168

represent improved calibration rather than underestimation. At the same time, applying PREVENT within prior treatment frameworks could reduce the number of adults meeting risk-based eligibility for lipid lowering therapy or antihypertensive therapy, as modeled in an observational analysis by Diao et al. The 2026 ACC/AHA dyslipidemia guideline partly addresses this by using lower PREVENT-ASCVD risk thresholds than prior Pooled Cohort Equation-based categories. Nevertheless, the optimal treatment thresholds for PREVENT-based estimates have not been prospectively validated, and risk estimates should be interpreted alongside risk-enhancing factors, CAC when appropriate, comorbidities, and patient preferences.

Formula

$$\text{Risk, \%} = e^x / (1 + e^x) * 100,$$

$$\text{where } x = \sum[\beta * (\text{transformed variables})]$$

Base 10-Year Total CVD Risk for Women

$$x = -3.307728 + 0.7939329 * (\text{age} - 55)/10 + 0.0305239 * (\text{TC} - \text{HDL} - 3.5) - 0.1606857 * (\text{HDL} - 1.3)/0.3 - 0.2394003 * (\min(\text{SBP}, 110) - 110)/20 + 0.3600781 * (\max(\text{SBP}, 110) - 130)/20 + 0.8667604 * (\text{if diabetes}) + 0.5360739 * (\text{if current smoker}) + 0.6045917 * (\min(\text{eGFR}, 60) - 60)/-15 + 0.0433769 * (\max(\text{eGFR}, 60) - 90)/-15 + 0.3151672 * (\text{if using anti-hypertensive medication}) - 0.1477655 * (\text{if using statin}) - 0.0663612 * (\text{if using anti-hypertensive medication}) * (\max(\text{SBP}, 110) - 130)/20 + 0.1197879 * (\text{if using statin}) * (\text{TC} - \text{HDL} - 3.5) - 0.0819715 * (\text{age} - 55)/10 * (\text{TC} - \text{HDL} - 3.5) + 0.0191169 * (\text{age} - 55)/10 * (\text{HDL} - 1.3)/0.3 - 0.1049477 * (\text{age} - 55)/10 * (\max(\text{SBP}, 110) - 130)/20 - 0.2251948 * (\text{age} - 55)/10 * (\text{if diabetes}) - 0.0895067 * (\text{age} - 55)/10 * (\text{if current smoker}) - 0.1543702 * (\text{age} - 55)/10 * (\min(\text{eGFR}, 60) - 60)/-15$$

$$55)/10 * (\text{TC} - \text{HDL} - 3.5) + 0.0306769 * (\text{age} - 55)/10 * (\text{HDL} - 1.3)/0.3 - 0.0946348 * (\text{age} - 55)/10 * (\max(\text{SBP}, 110) - 130)/20 - 0.27057 * (\text{age} - 55)/10 * (\text{if diabetes}) - 0.078715 * (\text{age} - 55)/10 * (\text{if current smoker}) - 0.1637806 * (\text{age} - 55)/10 * (\min(\text{eGFR}, 60) - 60)/-15$$

Base 10-Year Total CVD Risk for Men

$$x = -3.031168 + 0.7688528 * (\text{age} - 55)/10 + 0.0736174 * (\text{TC} - \text{HDL} - 3.5) - 0.0954431 * (\text{HDL} - 1.3)/0.3 - 0.4347345 * (\min(\text{SBP}, 110) - 110)/20 + 0.3362658 * (\max(\text{SBP}, 110) - 130)/20 + 0.7692857 * (\text{if diabetes}) + 0.4386871 * (\text{if current smoker}) + 0.5378979 * (\min(\text{eGFR}, 60) - 60)/-15 + 0.0164827 * (\max(\text{eGFR}, 60) - 90)/-15 + 0.288879 * (\text{if using anti-hypertensive medication}) - 0.1337349 * (\text{if using statin}) - 0.0475924 * (\text{if using anti-hypertensive medication}) * (\max(\text{SBP}, 110) - 130)/20 + 0.150273 * (\text{if using statin}) * (\text{TC} - \text{HDL} - 3.5) - 0.0517874 * (\text{age} - 55)/10 * (\text{TC} - \text{HDL} - 3.5) + 0.0191169 * (\text{age} - 55)/10 * (\text{HDL} - 1.3)/0.3 - 0.1049477 * (\text{age} - 55)/10 * (\max(\text{SBP}, 110) - 130)/20 - 0.2251948 * (\text{age} - 55)/10 * (\text{if diabetes}) - 0.0895067 * (\text{age} - 55)/10 * (\text{if current smoker}) - 0.1543702 * (\text{age} - 55)/10 * (\min(\text{eGFR}, 60) - 60)/-15$$

Base 10-Year ASCVD Risk for Women

$$x = -3.819975 + 0.719883 * (\text{age} - 55)/10 + 0.1176967 * (\text{TC} - \text{HDL} - 3.5) - 0.151185 * (\text{HDL} - 1.3)/0.3 - 0.0835358 * (\min(\text{SBP}, 110) - 110)/20 + 0.3592852 * (\max(\text{SBP}, 110) - 130)/20 + 0.8348585 * (\text{if diabetes}) + 0.4386871 * (\text{if current smoker}) + 0.5378979 * (\min(\text{eGFR}, 60) - 60)/-15 + 0.0164827 * (\max(\text{eGFR}, 60) - 90)/-15 + 0.288879 * (\text{if using anti-hypertensive medication}) - 0.1337349 * (\text{if using statin}) - 0.0475924 * (\text{if using anti-hypertensive medication}) * (\max(\text{SBP}, 110) - 130)/20 + 0.150273 * (\text{if using statin}) * (\text{TC} - \text{HDL} - 3.5) - 0.0517874 * (\text{age} - 55)/10 * (\text{TC} - \text{HDL} - 3.5) + 0.0191169 * (\text{age} - 55)/10 * (\text{HDL} - 1.3)/0.3 - 0.1049477 * (\text{age} - 55)/10 * (\max(\text{SBP}, 110) - 130)/20 - 0.2251948 * (\text{age} - 55)/10 * (\text{if diabetes}) - 0.0895067 * (\text{age} - 55)/10 * (\text{if current smoker}) - 0.1543702 * (\text{age} - 55)/10 * (\min(\text{eGFR}, 60) - 60)/-15$$

diabetes) + 0.4831078*(if current smoker) + 0.4864619*(min(eGFR, 60) - 60)/-15 + 0.0397779*(max(eGFR, 60) - 90)/-15 + 0.2265309*(if using anti-hypertensive medication) - 0.0592374*(if using statin) - 0.0395762*(if using anti-hypertensive medication)*(max(SBP, 110) - 130)/20 + 0.0844423*(if using statin)*(TC - HDL - 3.5) - 0.0567839*(age - 55)/10*(TC - HDL - 3.5) + 0.0325692*(age - 55)/10*(HDL - 1.3)/0.3 - 0.1035985*(age - 55)/10*(max(SBP, 110) - 130)/20 - 0.2417542*(age - 55)/10*(if diabetes) - 0.0791142*(age - 55)/10*(if current smoker) - 0.1671492*(age - 55)/10*(min(eGFR, 60) - 60)/-15

Base 10-Year ASCVD Risk for Men

x = -3.500655 + 0.7099847*(age - 55)/10 + 0.1658663*(TC - HDL - 3.5) - 0.1144285*(HDL - 1.3)/0.3 - 0.2837212*(min(SBP, 110) - 110)/20 + 0.3239977*(max(SBP, 110) - 130)/20 + 0.7189597*(if diabetes) + 0.3956973*(if current smoker) + 0.3690075*(min(eGFR, 60) - 60)/-15 + 0.0203619*(max(eGFR, 60) - 90)/-15 + 0.2036522*(if using anti-hypertensive medication) - 0.0865581*(if using statin) - 0.0322916*(if using anti-hypertensive medication)*(max(SBP, 110) - 130)/20 + 0.114563*(if using statin)*(TC - HDL - 3.5) - 0.0300005*(age - 55)/10*(TC - HDL - 3.5) + 0.0232747*(age - 55)/10*(HDL - 1.3)/0.3 - 0.0927024*(age - 55)/10*(max(SBP, 110) - 130)/20 - 0.2018525*(age - 55)/10*(if diabetes) - 0.0970527*(age - 55)/10*(if current smoker) - 0.1217081*(age - 55)/10*(min(eGFR, 60) - 60)/-15

Base 10-Year Heart Failure Risk for Women

x = -4.310409 + 0.8998235*(age - 55)/10 - 0.4559771*(min(SBP, 110) - 110)/20 + 0.3576505*(max(SBP, 110) - 130)/20 + 1.038346*(if diabetes) + 0.583916*(if current smoker) - 0.0072294*(min(BMI, 30) - 25)/5 + 0.2997706*(max(BMI, 30) - 30)/5 + 0.7451638*(min(eGFR, 60) - 60)/-15 + 0.0557087*(max(eGFR, 60) - 90)/-15 + 0.3534442*(if using anti-hypertensive medication) - 0.0981511*(if using anti-hypertensive medication)*(max(SBP, 110) - 130)/20 - 0.0946663*(age - 55)/10*(max(SBP, 110) - 130)/20 - 0.3581041*(age - 55)/10*(if diabetes) - 0.1159453*(age - 55)/10*(if current smoker) - 0.003878*(max(BMI, 30) - 30)/5 - 0.1884289*(age - 55)/10*(min(eGFR, 60) - 60)/-15

Base 10-Year Heart Failure Risk for Men

x = -3.946391 + 0.8972642*(age - 55)/10 - 0.6811466*(min(SBP, 110) - 110)/20 + 0.3634461*(max(SBP, 110) - 130)/20 + 0.923776*(if di-

abetes) + 0.5023736*(if current smoker) - 0.0485841*(min(BMI, 30) - 25)/5 + 0.3726929*(max(BMI, 30) - 30)/5 + 0.6926917*(min(eGFR, 60) - 60)/-15 + 0.0251827*(max(eGFR, 60) - 90)/-15 + 0.2980922*(if using anti-hypertensive medication) - 0.0497731*(if using anti-hypertensive medication)*(max(SBP, 110) - 130)/20 - 0.1289201*(age - 55)/10*(max(SBP, 110) - 130)/20 - 0.3040924*(age - 55)/10*(if diabetes) - 0.1401688*(age - 55)/10*(if current smoker) + 0.0068126*(max(BMI, 30) - 30)/5 - 0.1797778*(age - 55)/10*(min(eGFR, 60) - 60)/-15

Base 10-Year Coronary Heart Disease Risk for Women

x = -4.608751 + 0.7587146*(age - 55)/10 + 0.1810949*(TC - HDL - 3.5) - 0.2014507*(HDL - 1.3)/0.3 - 0.0881827*(min(SBP, 110) - 110)/20 + 0.3547731*(max(SBP, 110) - 130)/20 + 0.9045358*(if diabetes) + 0.5410917*(if current smoker) + 0.5198725*(min(eGFR, 60) - 60)/-15 + 0.0325935*(max(eGFR, 60) - 90)/-15 + 0.2010642*(if using anti-hypertensive medication) - 0.036195*(if using statin) - 0.0891238*(if using anti-hypertensive medication)*(max(SBP, 110) - 130)/20 + 0.0750716*(if using statin)*(TC - HDL - 3.5) - 0.0683256*(age - 55)/10*(TC - HDL - 3.5) + 0.0484755*(age - 55)/10*(HDL - 1.3)/0.3 - 0.0898086*(age - 55)/10*(max(SBP, 110) - 130)/20 - 0.2569041*(age - 55)/10*(if diabetes) - 0.0786607*(age - 55)/10*(if current smoker) - 0.1597513*(age - 55)/10*(min(eGFR, 60) - 60)/-15

Base 10-Year Coronary Heart Disease Risk for Men

x = -4.156753 + 0.7423283*(age - 55)/10 + 0.2572109*(TC - HDL - 3.5) - 0.1820374*(HDL - 1.3)/0.3 - 0.3174515*(min(SBP, 110) - 110)/20 + 0.312778*(max(SBP, 110) - 130)/20 + 0.7485249*(if diabetes) + 0.3912047*(if current smoker) + 0.376487*(min(eGFR, 60) - 60)/-15 + 0.0193687*(max(eGFR, 60) - 90)/-15 + 0.1588199*(if using anti-hypertensive medication) - 0.0494555*(if using statin) - 0.0577851*(if using anti-hypertensive medication)*(max(SBP, 110) - 130)/20 + 0.0809765*(if using statin)*(TC - HDL - 3.5) - 0.0517872*(age - 55)/10*(TC - HDL - 3.5) + 0.0489033*(age - 55)/10*(HDL - 1.3)/0.3 - 0.0850404*(age - 55)/10*(max(SBP, 110) - 130)/20 - 0.2107552*(age - 55)/10*(if diabetes) - 0.1206397*(age - 55)/10*(if current smoker) - 0.07795*(age - 55)/10*(min(eGFR, 60) - 60)/-15

Base 10-Year Stroke Risk for Women

x = -4.409199 + 0.6907849*(age - 55)/10 + 0.0534279*(TC - HDL - 3.5) - 0.1055109*(HDL -

$$1.3)/0.3 - 0.113078*(\min(\text{SBP}, 110) - 110)/20 + 0.3665217*(\max(\text{SBP}, 110) - 130)/20 + 0.8013721*(\text{if diabetes}) + 0.4187039*(\text{if current smoker}) + 0.4539767*(\min(\text{eGFR}, 60) - 60)/-15 + 0.0515087*(\max(\text{eGFR}, 60) - 90)/-15 + 0.2494624*(\text{if using anti-hypertensive medication}) - 0.0798829*(\text{if using statin}) - 0.0079039*(\text{if using anti-hypertensive medication})*(\max(\text{SBP}, 110) - 130)/20 + 0.0833101*(\text{if using statin})*(TC - HDL - 3.5) - 0.0409242*(age - 55)/10*(TC - HDL - 3.5) + 0.016994*(age - 55)/10*(HDL - 1.3)/0.3 - 0.1191213*(age - 55)/10*(\max(\text{SBP}, 110) - 130)/20 - 0.2480549*(age - 55)/10*(\text{if diabetes}) - 0.0998063*(age - 55)/10*(\text{if current smoker}) - 0.1759075*(age - 55)/10*(\min(\text{eGFR}, 60) - 60)/-15$$

Base 10-Year Stroke Risk for Men

$$x = -4.20881 + 0.722513*(age - 55)/10 + 0.0263348*(TC - HDL - 3.5) - 0.0248959*(HDL - 1.3)/0.3 - 0.268104*(\min(\text{SBP}, 110) - 110)/20 + 0.3474634*(\max(\text{SBP}, 110) - 130)/20 + 0.684699*(\text{if diabetes}) + 0.3874844*(\text{if current smoker}) + 0.3877827*(\min(\text{eGFR}, 60) - 60)/-15 + 0.0201965*(\max(\text{eGFR}, 60) - 90)/-15 + 0.232963*(\text{if using anti-hypertensive medication}) - 0.1178935*(\text{if using statin}) + 0.0120926*(\text{if using anti-hypertensive medication})*(\max(\text{SBP}, 110) - 130)/20 + 0.155739*(\text{if using statin})*(TC - HDL - 3.5) + 0.0141928*(age - 55)/10*(TC - HDL - 3.5) - 0.0111745*(age - 55)/10*(HDL - 1.3)/0.3 - 0.1155391*(age - 55)/10*(\max(\text{SBP}, 110) - 130)/20 - 0.2123743*(age - 55)/10*(\text{if diabetes}) - 0.0824133*(age - 55)/10*(\text{if current smoker}) - 0.180789*(age - 55)/10*(\min(\text{eGFR}, 60) - 60)/-15$$

Base 30-Year Total CVD Risk for Women

$$x = -1.318827 + 0.5503079*(age - 55)/10 - 0.0928369*[(age - 55)/10]^2 + 0.0409794*(TC - HDL - 3.5) - 0.1663306*(HDL - 1.3)/0.3 - 0.1628654*(\min(\text{SBP}, 110) - 110)/20 + 0.3299505*(\max(\text{SBP}, 110) - 130)/20 + 0.6793894*(\text{if diabetes}) + 0.3196112*(\text{if current smoker}) + 0.1857101*(\min(\text{eGFR}, 60) - 60)/-15 + 0.0553528*(\max(\text{eGFR}, 60) - 90)/-15 + 0.2894*(\text{if using anti-hypertensive medication}) - 0.075688*(\text{if using statin}) - 0.056367*(\text{if using anti-hypertensive medication})*(\max(\text{SBP}, 110) - 130)/20 + 0.1071019*(\text{if using statin})*(TC - HDL - 3.5) - 0.0751438*(age - 55)/10*(TC - HDL - 3.5) + 0.0301786*(age - 55)/10*(HDL - 1.3)/0.3 - 0.0998776*(age - 55)/10*(\max(\text{SBP}, 110) - 130)/20 - 0.3206166*(age - 55)/10*(\text{if diabetes}) - 0.1607862*(age - 55)/10*(\text{if current smoker}) - 0.1450788*(age - 55)/10*(\min(\text{eGFR}, 60) - 60)/-15$$

Base 30-Year Total CVD Risk for Men

$$x = -1.148204 + 0.4627309*(age - 55)/10 - 0.0984281*[(age - 55)/10]^2 + 0.0836088*(TC - HDL - 3.5) - 0.1029824*(HDL - 1.3)/0.3 - 0.2140352*(\min(\text{SBP}, 110) - 110)/20 + 0.2904325*(\max(\text{SBP}, 110) - 130)/20 + 0.5331276*(\text{if diabetes}) + 0.2141914*(\text{if current smoker}) + 0.1155556*(\min(\text{eGFR}, 60) - 60)/-15 + 0.0603775*(\max(\text{eGFR}, 60) - 90)/-15 + 0.232714*(\text{if using anti-hypertensive medication}) - 0.0272112*(\text{if using statin}) - 0.0384488*(\text{if using anti-hypertensive medication})*(\max(\text{SBP}, 110) - 130)/20 + 0.134192*(\text{if using statin})*(TC - HDL - 3.5) - 0.0511759*(age - 55)/10*(TC - HDL - 3.5) + 0.0165865*(age - 55)/10*(HDL - 1.3)/0.3 - 0.1101437*(age - 55)/10*(\max(\text{SBP}, 110) - 130)/20 - 0.2585943*(age - 55)/10*(\text{if diabetes}) - 0.1566406*(age - 55)/10*(\text{if current smoker}) - 0.1166776*(age - 55)/10*(\min(\text{eGFR}, 60) - 60)/-15$$

Base 30-Year ASCVD Risk for Women

$$x = -1.974074 + 0.4669202*(age - 55)/10 - 0.0893118*[(age - 55)/10]^2 + 0.1256901*(TC - HDL - 3.5) - 0.1542255*(HDL - 1.3)/0.3 - 0.0018093*(\min(\text{SBP}, 110) - 110)/20 + 0.322949*(\max(\text{SBP}, 110) - 130)/20 + 0.6296707*(\text{if diabetes}) + 0.268292*(\text{if current smoker}) + 0.100106*(\min(\text{eGFR}, 60) - 60)/-15 + 0.0499663*(\max(\text{eGFR}, 60) - 90)/-15 + 0.1875292*(\text{if using anti-hypertensive medication}) + 0.0152476*(\text{if using statin}) - 0.0276123*(\text{if using anti-hypertensive medication})*(\max(\text{SBP}, 110) - 130)/20 + 0.0736147*(\text{if using statin})*(TC - HDL - 3.5) - 0.0521962*(age - 55)/10*(TC - HDL - 3.5) + 0.0316918*(age - 55)/10*(HDL - 1.3)/0.3 - 0.1046101*(age - 55)/10*(\max(\text{SBP}, 110) - 130)/20 - 0.2727793*(age - 55)/10*(\text{if diabetes}) - 0.1530907*(age - 55)/10*(\text{if current smoker}) - 0.1299149*(age - 55)/10*(\min(\text{eGFR}, 60) - 60)/-15$$

Base 30-Year ASCVD Risk for Men

$$x = -1.736444 + 0.3994099*(age - 55)/10 - 0.0937484*[(age - 55)/10]^2 + 0.1744643*(TC - HDL - 3.5) - 0.120203*(HDL - 1.3)/0.3 - 0.0665117*(\min(\text{SBP}, 110) - 110)/20 + 0.2753037*(\max(\text{SBP}, 110) - 130)/20 + 0.4790257*(\text{if diabetes}) + 0.1782635*(\text{if current smoker}) - 0.0218789*(\min(\text{eGFR}, 60) - 60)/-15 + 0.0602553*(\max(\text{eGFR}, 60) - 90)/-15 + 0.1421182*(\text{if using anti-hypertensive medication}) + 0.0135996*(\text{if using statin}) - 0.0218265*(\text{if using anti-hypertensive medication})*(\max(\text{SBP}, 110) - 130)/20 + 0.1013148*(\text{if using statin})*(TC - HDL - 3.5) - 0.0312619*(age - 55)/10*(TC - HDL - 3.5) + 0.020673*(age -$$

$$55)/10*(\text{HDL} - 1.3)/0.3 - 0.0920935*(\text{age} - 55)/10*(\max(\text{SBP}, 110) - 130)/20 - 0.2159947*(\text{age} - 55)/10*(\text{if diabetes}) - 0.1548811*(\text{age} - 55)/10*(\text{if current smoker}) - 0.0712547*(\text{age} - 55)/10*(\min(\text{eGFR}, 60) - 60)/-15$$

Base 30-Year Heart Failure Risk for Women

$$x = -2.205379 + 0.6254374*(\text{age} - 55)/10 - 0.0983038*[(\text{age} - 55)/10]^2 - 0.3919241*(\min(\text{SBP}, 110) - 110)/20 + 0.3142295*(\max(\text{SBP}, 110) - 130)/20 + 0.8330787*(\text{if diabetes}) + 0.3438651*(\text{if current smoker}) + 0.0594874*(\min(\text{BMI}, 30) - 25)/5 + 0.2525536*(\max(\text{BMI}, 30) - 30)/5 + 0.2981642*(\min(\text{eGFR}, 60) - 60)/-15 + 0.0667159*(\max(\text{eGFR}, 60) - 90)/-15 + 0.333921*(\text{if using anti-hypertensive medication}) - 0.0893177*(\text{if using anti-hypertensive medication})*(\max(\text{SBP}, 110) - 130)/20 - 0.0974299*(\text{age} - 55)/10*(\max(\text{SBP}, 110) - 130)/20 - 0.404855*(\text{age} - 55)/10*(\text{if diabetes}) - 0.1982991*(\text{age} - 55)/10*(\text{if current smoker}) - 0.0035619*(\max(\text{BMI}, 30) - 30)/5 - 0.1564215*(\text{age} - 55)/10*(\min(\text{eGFR}, 60) - 60)/-15$$

Base 30-Year Heart Failure Risk for Men

$$x = -1.95751 + 0.5681541*(\text{age} - 55)/10 - 0.1048388*[(\text{age} - 55)/10]^2 - 0.4761564*(\min(\text{SBP}, 110) - 110)/20 + 0.30324*(\max(\text{SBP}, 110) - 130)/20 + 0.6840338*(\text{if diabetes}) + 0.2656273*(\text{if current smoker}) + 0.0833107*(\min(\text{BMI}, 30) - 25)/5 + 0.26999*(\max(\text{BMI}, 30) - 30)/5 + 0.2541805*(\min(\text{eGFR}, 60) - 60)/-15 + 0.0638923*(\max(\text{eGFR}, 60) - 90)/-15 + 0.2583631*(\text{if using anti-hypertensive medication}) - 0.0391938*(\text{if using anti-hypertensive medication})*(\max(\text{SBP}, 110) - 130)/20 - 0.1269124*(\text{age} - 55)/10*(\max(\text{SBP}, 110) - 130)/20 - 0.3273572*(\text{age} - 55)/10*(\text{if diabetes}) - 0.2043019*(\text{age} - 55)/10*(\text{if current smoker}) - 0.0182831*(\max(\text{BMI}, 30) - 30)/5 - 0.1342618*(\text{age} - 55)/10*(\min(\text{eGFR}, 60) - 60)/-15$$

Base 30-Year Coronary Heart Disease Risk for Women

$$x = -2.733866 + 0.4912423*(\text{age} - 55)/10 - 0.0917078*[(\text{age} - 55)/10]^2 + 0.1878256*(\text{TC} - \text{HDL} - 3.5) - 0.2035703*(\text{HDL} - 1.3)/0.3 - 0.0030222*(\min(\text{SBP}, 110) - 110)/20 + 0.3111757*(\max(\text{SBP}, 110) - 130)/20 + 0.6803247*(\text{if diabetes}) + 0.3215313*(\text{if current smoker}) + 0.1252615*(\min(\text{eGFR}, 60) - 60)/-15 + 0.0414579*(\max(\text{eGFR}, 60) - 90)/-15 + 0.1561303*(\text{if using anti-hypertensive medication}) + 0.0384138*(\text{if using statin}) - 0.0795531*(\text{if using anti-hypertensive medication})*(\max(\text{SBP}, 110) - 130)/20 + 0.0635262*(\text{if using statin})*(\text{TC} - \text{HDL} - 3.5) - 0.0637665*(\text{age} - 55)/10*(\text{TC} - \text{HDL} - 3.5) + 0.0474074*(\text{age} -$$

$$55)/10*(\text{HDL} - 1.3)/0.3 - 0.0876484*(\text{age} - 55)/10*(\max(\text{SBP}, 110) - 130)/20 - 0.2803099*(\text{age} - 55)/10*(\text{if diabetes}) - 0.1513626*(\text{age} - 55)/10*(\text{if current smoker}) - 0.1130454*(\text{age} - 55)/10*(\min(\text{eGFR}, 60) - 60)/-15$$

Base 30-Year Coronary Heart Disease Risk for Men

$$x = -2.376762 + 0.4171209*(\text{age} - 55)/10 - 0.0949994*[(\text{age} - 55)/10]^2 + 0.2651913*(\text{TC} - \text{HDL} - 3.5) - 0.1879446*(\text{HDL} - 1.3)/0.3 - 0.0971746*(\min(\text{SBP}, 110) - 110)/20 + 0.258931*(\max(\text{SBP}, 110) - 130)/20 + 0.4956463*(\text{if diabetes}) + 0.1728844*(\text{if current smoker}) - 0.0091955*(\min(\text{eGFR}, 60) - 60)/-15 + 0.0578155*(\max(\text{eGFR}, 60) - 90)/-15 + 0.0939196*(\text{if using anti-hypertensive medication}) + 0.0508921*(\text{if using statin}) - 0.0486024*(\text{if using anti-hypertensive medication})*(\max(\text{SBP}, 110) - 130)/20 + 0.0669478*(\text{if using statin})*(\text{TC} - \text{HDL} - 3.5) - 0.0533361*(\text{age} - 55)/10*(\text{TC} - \text{HDL} - 3.5) + 0.0461425*(\text{age} - 55)/10*(\text{HDL} - 1.3)/0.3 - 0.0812234*(\text{age} - 55)/10*(\max(\text{SBP}, 110) - 130)/20 - 0.216315*(\text{age} - 55)/10*(\text{if diabetes}) - 0.1749197*(\text{age} - 55)/10*(\text{if current smoker}) - 0.0241467*(\text{age} - 55)/10*(\min(\text{eGFR}, 60) - 60)/-15$$

Base 30-Year Stroke Risk for Women

$$x = -2.62078 + 0.4366978*(\text{age} - 55)/10 - 0.0873673*[(\text{age} - 55)/10]^2 + 0.0586334*(\text{TC} - \text{HDL} - 3.5) - 0.1069016*(\text{HDL} - 1.3)/0.3 - 0.0317106*(\min(\text{SBP}, 110) - 110)/20 + 0.3272741*(\max(\text{SBP}, 110) - 130)/20 + 0.5841726*(\text{if diabetes}) + 0.2045681*(\text{if current smoker}) + 0.0765812*(\min(\text{eGFR}, 60) - 60)/-15 + 0.0603226*(\max(\text{eGFR}, 60) - 90)/-15 + 0.2087816*(\text{if using anti-hypertensive medication}) - 0.0095137*(\text{if using statin}) + 0.0014436*(\text{if using anti-hypertensive medication})*(\max(\text{SBP}, 110) - 130)/20 + 0.0720012*(\text{if using statin})*(\text{TC} - \text{HDL} - 3.5) - 0.0361779*(\text{age} - 55)/10*(\text{TC} - \text{HDL} - 3.5) + 0.015888*(\text{age} - 55)/10*(\text{HDL} - 1.3)/0.3 - 0.1179062*(\text{age} - 55)/10*(\max(\text{SBP}, 110) - 130)/20 - 0.2710221*(\text{age} - 55)/10*(\text{if diabetes}) - 0.1702836*(\text{age} - 55)/10*(\text{if current smoker}) - 0.1320992*(\text{age} - 55)/10*(\min(\text{eGFR}, 60) - 60)/-15$$

Base 30-Year Stroke Risk for Men

$$x = -2.458022 + 0.4003448*(\text{age} - 55)/10 - 0.0935927*[(\text{age} - 55)/10]^2 + 0.0309419*(\text{TC} - \text{HDL} - 3.5) - 0.0280763*(\text{HDL} - 1.3)/0.3 - 0.047704*(\min(\text{SBP}, 110) - 110)/20 + 0.2925734*(\max(\text{SBP}, 110) - 130)/20 + 0.4236823*(\text{if diabetes}) + 0.1675238*(\text{if current smoker}) - 0.0009216*(\min(\text{eGFR}, 60) - 60)/-15 +$$

$0.0575221 * (\max(\text{eGFR}, 60) - 90) / -15 + 0.1685514 * (\text{if using anti-hypertensive medication}) - 0.020829 * (\text{if using statin}) + 0.0230042 * (\text{if using anti-hypertensive medication}) * (\max(\text{SBP}, 110) - 130) / 20 + 0.1413652 * (\text{if using statin}) * (\text{TC} - \text{HDL} - 3.5) + 0.0145411 * (\text{age} - 55) / 10 * (\text{TC} - \text{HDL} - 3.5) - 0.0149606 * (\text{age} - 55) / 10 * (\text{HDL} - 1.3) / 0.3 - 0.1118468 * (\text{age} - 55) / 10 * (\max(\text{SBP}, 110) - 130) / 20 - 0.2152953 * (\text{age} - 55) / 10 * (\text{if diabetes}) - 0.1339295 * (\text{age} - 55) / 10 * (\text{if current smoker}) - 0.1225081 * (\text{age} - 55) / 10 * (\min(\text{eGFR}, 60) - 60) / -15$

ACR 10-Year Total CVD Risk for Women

$x = -3.738341 + 0.7969249 * (\text{age} - 55) / 10 + 0.0256635 * (\text{TC} - \text{HDL} - 3.5) - 0.1588107 * (\text{HDL} - 1.3) / 0.3 - 0.2255701 * (\min(\text{SBP}, 110) - 110) / 20 + 0.3396649 * (\max(\text{SBP}, 110) - 130) / 20 + 0.8047515 * (\text{if diabetes}) + 0.5285338 * (\text{if current smoker}) + 0.4803511 * (\min(\text{eGFR}, 60) - 60) / -15 + 0.0434472 * (\max(\text{eGFR}, 60) - 90) / -15 + 0.2985207 * (\text{if using anti-hypertensive medication}) - 0.1497787 * (\text{if using statin}) - 0.0742889 * (\text{if using anti-hypertensive medication}) * (\max(\text{SBP}, 110) - 130) / 20 + 0.106756 * (\text{if using statin}) * (\text{TC} - \text{HDL} - 3.5) - 0.0778126 * (\text{age} - 55) / 10 * (\text{TC} - \text{HDL} - 3.5) + 0.0306768 * (\text{age} - 55) / 10 * (\text{HDL} - 1.3) / 0.3 - 0.0907168 * (\text{age} - 55) / 10 * (\max(\text{SBP}, 110) - 130) / 20 - 0.2705122 * (\text{age} - 55) / 10 * (\text{if diabetes}) - 0.0830564 * (\text{age} - 55) / 10 * (\text{if current smoker}) - 0.1389249 * (\text{age} - 55) / 10 * (\min(\text{eGFR}, 60) - 60) / -15 + 0.1793037 * (\text{if ACR available}) * \ln(\text{ACR}) + 0.0132073 * (\text{if ACR missing})$

ACR 10-Year Total CVD Risk for Men

$x = -3.510705 + 0.7768655 * (\text{age} - 55) / 10 + 0.0659949 * (\text{TC} - \text{HDL} - 3.5) - 0.0951111 * (\text{HDL} - 1.3) / 0.3 - 0.420667 * (\min(\text{SBP}, 110) - 110) / 20 + 0.3120151 * (\max(\text{SBP}, 110) - 130) / 20 + 0.698521 * (\text{if diabetes}) + 0.4314669 * (\text{if current smoker}) + 0.3841364 * (\min(\text{eGFR}, 60) - 60) / -15 + 0.009384 * (\max(\text{eGFR}, 60) - 90) / -15 + 0.2676494 * (\text{if using anti-hypertensive medication}) - 0.1390966 * (\text{if using statin}) - 0.0579315 * (\text{if using anti-hypertensive medication}) * (\max(\text{SBP}, 110) - 130) / 20 + 0.1383719 * (\text{if using statin}) * (\text{TC} - \text{HDL} - 3.5) - 0.0488332 * (\text{age} - 55) / 10 * (\text{TC} - \text{HDL} - 3.5) + 0.0200406 * (\text{age} - 55) / 10 * (\text{HDL} - 1.3) / 0.3 - 0.102454 * (\text{age} - 55) / 10 * (\max(\text{SBP}, 110) - 130) / 20 - 0.2236355 * (\text{age} - 55) / 10 * (\text{if diabetes}) - 0.089485 * (\text{age} - 55) / 10 * (\text{if current smoker}) - 0.1321848 * (\text{age} - 55) / 10 * (\min(\text{eGFR}, 60) - 60) / -15 + 0.1887974 * (\text{if ACR available}) * \ln(\text{ACR}) + 0.0916979 * (\text{if ACR missing})$

A1c 10-Year Total CVD Risk for Women

$x = -3.306162 + 0.7858178 * (\text{age} - 55) / 10 + 0.0194438 * (\text{TC} - \text{HDL} - 3.5) - 0.1521964 * (\text{HDL} - 1.3) / 0.3 - 0.2296681 * (\min(\text{SBP}, 110) - 110) / 20 + 0.3465777 * (\max(\text{SBP}, 110) - 130) / 20 + 0.5366241 * (\text{if diabetes}) + 0.5411682 * (\text{if current smoker}) + 0.5931898 * (\min(\text{eGFR}, 60) - 60) / -15 + 0.0472458 * (\max(\text{eGFR}, 60) - 90) / -15 + 0.3158567 * (\text{if using anti-hypertensive medication}) - 0.1535174 * (\text{if using statin}) - 0.0687752 * (\text{if using anti-hypertensive medication}) * (\max(\text{SBP}, 110) - 130) / 20 + 0.1054746 * (\text{if using statin}) * (\text{TC} - \text{HDL} - 3.5) - 0.0761119 * (\text{age} - 55) / 10 * (\text{TC} - \text{HDL} - 3.5) + 0.0307469 * (\text{age} - 55) / 10 * (\text{HDL} - 1.3) / 0.3 - 0.0905966 * (\text{age} - 55) / 10 * (\max(\text{SBP}, 110) - 130) / 20 - 0.2241857 * (\text{age} - 55) / 10 * (\text{if diabetes}) - 0.080186 * (\text{age} - 55) / 10 * (\text{if current smoker}) - 0.1667286 * (\text{age} - 55) / 10 * (\min(\text{eGFR}, 60) - 60) / -15 + 0.1338348 * (\text{if diabetes}) * A1c + 0.1622409 * (\text{if no diabetes}) * A1c - 0.0142496 * (\text{if A1c missing})$

A1c 10-Year Total CVD Risk for Men

$x = -3.040901 + 0.7699177 * (\text{age} - 55) / 10 + 0.0605093 * (\text{TC} - \text{HDL} - 3.5) - 0.0888525 * (\text{HDL} - 1.3) / 0.3 - 0.417713 * (\min(\text{SBP}, 110) - 110) / 20 + 0.3288657 * (\max(\text{SBP}, 110) - 130) / 20 + 0.4759471 * (\text{if diabetes}) + 0.4385663 * (\text{if current smoker}) + 0.5334616 * (\min(\text{eGFR}, 60) - 60) / -15 + 0.0206431 * (\max(\text{eGFR}, 60) - 90) / -15 + 0.2917524 * (\text{if using anti-hypertensive medication}) - 0.1383313 * (\text{if using statin}) - 0.0482622 * (\text{if using anti-hypertensive medication}) * (\max(\text{SBP}, 110) - 130) / 20 + 0.1393796 * (\text{if using statin}) * (\text{TC} - \text{HDL} - 3.5) - 0.0463501 * (\text{age} - 55) / 10 * (\text{TC} - \text{HDL} - 3.5) + 0.0205926 * (\text{age} - 55) / 10 * (\text{HDL} - 1.3) / 0.3 - 0.1037717 * (\text{age} - 55) / 10 * (\max(\text{SBP}, 110) - 130) / 20 - 0.1737697 * (\text{age} - 55) / 10 * (\text{if diabetes}) - 0.0915839 * (\text{age} - 55) / 10 * (\text{if current smoker}) - 0.1637039 * (\text{age} - 55) / 10 * (\min(\text{eGFR}, 60) - 60) / -15 + 0.13159 * (\text{if diabetes}) * A1c + 0.1295185 * (\text{if no diabetes}) * A1c - 0.0128373 * (\text{if A1c missing})$

SDI 10-Year Total CVD Risk for Women

$x = -3.461564 + 0.7754083 * (\text{age} - 55) / 10 + 0.0221756 * (\text{TC} - \text{HDL} - 3.5) - 0.1650828 * (\text{HDL} - 1.3) / 0.3 - 0.2180808 * (\min(\text{SBP}, 110) - 110) / 20 + 0.3381188 * (\max(\text{SBP}, 110) - 130) / 20 + 0.8624372 * (\text{if diabetes}) + 0.4663953 * (\text{if current smoker}) + 0.5919004 * (\min(\text{eGFR}, 60) - 60) / -15 + 0.0516821 * (\max(\text{eGFR}, 60) - 90) / -15 + 0.3182166 * (\text{if using anti-hypertensive medication}) - 0.1460816 * (\text{if using statin}) - 0.0574455 * (\text{if using anti-hypertensive medication}) * (\max(\text{SBP}, 110) - 130) / 20 + 0.1302287 * (\text{if using statin}) * (\text{TC} - \text{HDL} - 3.5) - 0.083509 * (\text{age} - 55) / 10 * (\text{TC} - \text{HDL} - 3.5) + 0.0282181 * (\text{age} -$

55)/10*(HDL - 1.3)/0.3 - 0.0952647*(age - 55)/10*(max(SBP, 110) - 130)/20 - 0.2718966*(age - 55)/10*(if diabetes) - 0.0641738*(age - 55)/10*(if current smoker) - 0.1717026*(age - 55)/10*(min(eGFR, 60) - 60)/-15 + 0.1442776*(if SDI 4-6) + 0.2421409*(if SDI 7-10) + 0.1885076*(if SDI missing)

SDI 10-Year Total CVD Risk for Men

$x = -3.159572 + 0.7756377*(age - 55)/10 + 0.0715325*(TC - HDL - 3.5) - 0.0976775*(HDL - 1.3)/0.3 - 0.5186614*(min(SBP, 110) - 110)/20 + 0.3235653*(max(SBP, 110) - 130)/20 + 0.7722496*(if diabetes) + 0.3761129*(if current smoker) + 0.5180893*(min(eGFR, 60) - 60)/-15 + 0.0118451*(max(eGFR, 60) - 90)/-15 + 0.2634094*(if using anti-hypertensive medication) - 0.1455263*(if using statin) - 0.0367013*(if using anti-hypertensive medication)*(max(SBP, 110) - 130)/20 + 0.1617785*(if using statin)*(TC - HDL - 3.5) - 0.0507669*(age - 55)/10*(TC - HDL - 3.5) + 0.0178356*(age - 55)/10*(HDL - 1.3)/0.3 - 0.1059337*(age - 55)/10*(max(SBP, 110) - 130)/20 - 0.2236755*(age - 55)/10*(if diabetes) - 0.0723216*(age - 55)/10*(if current smoker) - 0.1548205*(age - 55)/10*(min(eGFR, 60) - 60)/-15 + 0.0889119*(if SDI 4-6) + 0.291897*(if SDI 7-10) + 0.1508151*(if SDI missing)$

Full 10-Year Total CVD Risk for Women

$x = -3.860385 + 0.7716794*(age - 55)/10 + 0.0062109*(TC - HDL - 3.5) - 0.1547756*(HDL - 1.3)/0.3 - 0.1933123*(min(SBP, 110) - 110)/20 + 0.3071217*(max(SBP, 110) - 130)/20 + 0.496753*(if diabetes) + 0.466605*(if current smoker) + 0.4780697*(min(eGFR, 60) - 60)/-15 + 0.0529077*(max(eGFR, 60) - 90)/-15 + 0.3034892*(if using anti-hypertensive medication) - 0.1556524*(if using statin) - 0.0667026*(if using anti-hypertensive medication)*(max(SBP, 110) - 130)/20 + 0.1061825*(if using statin)*(TC - HDL - 3.5) - 0.0742271*(age - 55)/10*(TC - HDL - 3.5) + 0.0288245*(age - 55)/10*(HDL - 1.3)/0.3 - 0.0875188*(age - 55)/10*(max(SBP, 110) - 130)/20 - 0.2267102*(age - 55)/10*(if diabetes) - 0.0676125*(age - 55)/10*(if current smoker) - 0.1493231*(age - 55)/10*(min(eGFR, 60) - 60)/-15 + 0.1361989*(if SDI 4-6) + 0.2261596*(if SDI 7-10) + 0.1804508*(if SDI missing) + 0.1645922*(if ACR available)*ln(ACR) + 0.0198413*(if ACR missing) + 0.1298513*(if diabetes)*A1c + 0.1412555*(if no diabetes)*A1c - 0.0031658*(if A1c missing)$

Full 10-Year Total CVD Risk for Men

$x = -3.631387 + 0.7847578*(age - 55)/10 + 0.0534485*(TC - HDL - 3.5) - 0.0911282*(HDL - 1.3)/0.3 - 0.4921973*(min(SBP, 110) - 110)/20 +$

$0.2972415*(max(SBP, 110) - 130)/20 + 0.4527054*(if diabetes) + 0.3726641*(if current smoker) + 0.3886854*(min(eGFR, 60) - 60)/-15 + 0.0081661*(max(eGFR, 60) - 90)/-15 + 0.2508052*(if using anti-hypertensive medication) - 0.1538484*(if using statin) - 0.0474695*(if using anti-hypertensive medication)*(max(SBP, 110) - 130)/20 + 0.1415382*(if using statin)*(TC - HDL - 3.5) - 0.0436455*(age - 55)/10*(TC - HDL - 3.5) + 0.0199549*(age - 55)/10*(HDL - 1.3)/0.3 - 0.1022686*(age - 55)/10*(max(SBP, 110) - 130)/20 - 0.1762507*(age - 55)/10*(if diabetes) - 0.0715873*(age - 55)/10*(if current smoker) - 0.1428668*(age - 55)/10*(min(eGFR, 60) - 60)/-15 + 0.0802431*(if SDI 4-6) + 0.275073*(if SDI 7-10) + 0.144759*(if SDI missing) + 0.1772853*(if ACR available)*ln(ACR) + 0.1095674*(if ACR missing) + 0.1165698*(if diabetes)*A1c + 0.1048297*(if no diabetes)*A1c - 0.0230072*(if A1c missing)$

Model Notes

Valid input ranges should follow the original model implementation. PREVENT was developed for adults aged 30-79 years. BMI is used only for heart failure risk estimation, and individuals with BMI <18.5 kg/m² or ≥40 kg/m² were excluded from the derivation analysis. The minimum accepted UACR value is 0.1 mg/g. If your laboratory reports a value lower than this for UACR, enter 0.1mg/g.

BMI is only used as a predictor for the heart failure risk calculation. Per study authors, the indicated range was chosen based on past work in the Pooled Cohort Equations to Prevent Heart Failure (PCP-HF) study.

Due to the use of age as a time scale, 30-year risk may be overestimated.

FACTS & FIGURES

Model Notes

The minimum uACR value accepted by the model is 0.1mg/g. If your laboratory reports a value lower than this, enter 0.1mg/g.

BMI is only used as a predictor for the heart failure risk calculation. Per study authors, the indicated range was chosen based on past work in the Pooled Cohort Equations to Prevent Heart Failure (PCP-HF) study.

Due to the use of age as a time scale, 30-year risk may be overestimated.

LITERATURE

Original/Primary

<https://www.abajournals.org/doi/10.1161/CIRCULATIONAHA.123.067626>

Khan SS, Matsushita K, Sang Y, et al. Development and validation of the american heart association predicting risk of cardiovascular disease events (Prevent) equations. *Circulation*. Published online November 10, 2023:CIRCULATIONAHA.123.067626.

Validation

<https://www.ahajournals.org/doi/10.1161/CIRCULATIONAHA.123.067626>

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Guidelines

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