Prevent-new Cardiovascular Risk Estimation

Several cardiovascular risk estimation calculators were developed in US and in Europe. Many of them helped to estimate the 10 year risk of developing cardiovascular disease.

In 2023, American heart Association and American College of cardiology developed a new calculator called PREVENT (PREDICTING RISK OF CARDIOVASCULAR DISEASE EVENTS) which estimates 10 year and 30 year risk of developing cardiovascular disease, including atherosclerotic cardiovascular disease and heart failure.

It is the first tool to combine, cardiovascular, kidney and metabolic health measures to guide primary prevention focused treatment decisions.

PREVIOUS RISK CALCULATORS DEVELOPED IN US:

FRAMINGHAM RISK SCORE: This was the first risk calculator developed to help primary prevention for cardiovascular disease in 1998. The calculator used data from the Framingham heart study, one of the first longitudinal study evaluating cardiovascular disease.

THE POOLED COHORT EQUATIONS (PCEs) RISK CALCULATOR: This was developed by American College of cardiology and American Heart Association in 2013 largely replace the Framingham risk calculator. PCEs added DATA concerning fatal and non-fatal CVD, making it more comprehensive compared with the Framingham score. PCEs consistently over estimated the risk.

PREVENT (PREDICTING RISK OF CARDIOVASCULAR DISEASE EVENTS) app was developed in 2023 from large observational cohort study of more than 6.5 million US adults, making it more applicable to the current US population compared with the previous calculators which rely on older studies.

Additionally, the PREVENT app includes the use of estimated glomerular, filtration rate, urine albumin to creatine ratio, ZIP Code (as a surrogate factor for social economic factors) and hemoglobin A1c. PREVENT app also includes an option for assessing the risk of developing heart failure, and in addition helps to calculate 10 and 30 year risk estimates

COMPONENTS OF PREVENT RISK CALCULATOR This include; Age Gender Smoking status Systolic blood pressure Total cholesterol level HDL cholesterol level BMI (basil, metabolic index) Diabetic status eGFR (Estimated Glomerular filtration rate-available in your comprehensive metabolic panel) Hemoglobin A1c Anti-hypertensive medication use Statin medication use

This calculator helps to estimate the 10 year and 30 year risk of developing cardiovascular disease and heart failure in people between the ages of 30 and 79.

Based on calculated risk, The following estimations could be made: Less than 5% = Low risk 5 to 7.5% = Borderline risk 7.5 to 20%. = Intermediate risk. More than 20% = high risk Generally, speaking, patients with 10 year risk of greater than 7.5%, needs to be on statin therapy depending upon their LDL level.

In People with 10 year risk less than 7.5%, use of statin therapy depends on presence of other risk factors. Patients with diabetes as well as those with LDL level greater than 190 mg/dL, needs to be on statin therapy irrespective of their risk score. Patients who have elevated Lipo protein(a) level needs to be on statin therapy, irrespective of their LDL level.

This is because Lp(a) is stickier and is more atherogenic(higher tendency to cause atherosclerosis) then LDL cholesterol. People with elevated Lp(a) should also consider taking low-dose aspirin.

There has been a recent paradigm shift with the selected use of imaging with a coronary artery calcium score (CAC) to define atherosclerotic cardiovascular disease risk estimation and the initiation of preventive medication and life style changes.

ADVANTAGES OF PREVENT SCORE PREVENT score was done using a large sample size, including over 6 million individuals compared to only over 48,000 participants in the previous PCE. PREVENT model removes race from the risk prediction.

Given the increasing prevalence of cardiovascular disease among the younger population (age less than 40), the PREVENT equation includes age 30 to 39, enabling earlier risk identification and a greater opportunity for providing preventive advice, such as healthy lifestyle and possibly earlier use of drug therapy. This also includes eGFR as a risk modifier.

Major improvement in the model is the inclusion of heart failure as a primary outcome. Inpatients who develop heart failure, over 60% of patients have history of atherosclerotic cardiovascular disease.

In summary, risk calculators including PREVENT is only a guideline and at the individual level, decision to treat goes far beyond population studies like PREVENT. Individual should also consider additional factors such as family history, lifestyle, and presence of cardiovascular disease risk enhancers.

These risk enhancers include: family history of premature cardiovascular disease, chronic kidney disease, persistent LDL cholesterol greater than 160 mg/dL or triglycerides greater than 175 mg/dL, elevated Lp(a) level, high risk racial/ethnic groups (Such as we Indians), inflammatory conditions, such as rheumatoid arthritis, HIV, Lupus and factors unique to women (pre-eclampsia, premature menopause, polycystic ovarian syndrome).

If there is still uncertainty in the use of preventive interventions, a coronary calcium score (CAC) can be used for additional help.

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