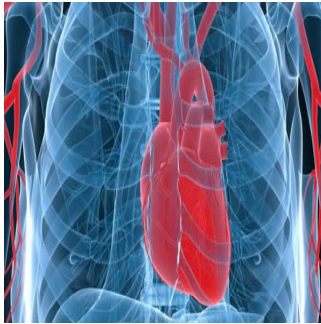## Clinical Calculators Over-estimate Risk of Heart Attack

According to results of a study by investigators at John Hopkins and other institutions, most risk calculators used by clinicians to gauge a patient's chances of suffering a heart attack overestimate its likelihood. The new findings appear in *Annals of Internal Medicine* and suggest that four of the five widely used clinical calculators considerably overrate the risk of heart attack.

Most physicians rely on standardised risk assessment systems or algorithms to determine whether a patient needs care with daily aspirin and cholesterol-lowering drugs. The algorithms calculate heart attack probability using factors like age, gender, smoking history, cholesterol levels, blood pressure, diabetes etc.

These new findings stem from an ongoing study known as the Multi-Ethnic Ethnic Study of Atherosclerosis, or MESA, following some 7,000 men and women nationwide, ages 45 to 84, from different ethnic backgrounds without pre-existing cardiovascular disease. The study team compared the number of predicted versus actual heart attacks and strokes among 4200 MESA participants.

Four of of five risk scores analysed in the study overestimated risk by anywhere from 37 to 154 percent in men and 8 to 67 percent in women. The new calculator by the American Heart Association also overestimated risk by 86 percent in men and by 67 percent in women. The least flawed prediction of heart attack was generated by the Reynolds risk score which overestimated risk by 9 percent in men and underestimated it by 21 percent in women.

These results highlight the perils of over-reliance on standardised algorithms. The research team highlights the importance of individualised risk assessment that should consider additional variables including other medical conditions, family history of early heart disease, level of physical activity, and the amount of calcium build-up in the heart's vessels.

"Our results reveal a lack of predictive accuracy in risk calculators and highlight an urgent need to re-examine and fine-tune our existing risk assessment techniques," says senior investigator Michael Blaha, M.D., M.P.H., director of clinical research at the Johns Hopkins Ciccarone Center for the Prevention of Heart Disease.

The American Heart Association's guidelines recommend that people who face a 7.5 percent risk of suffering a heart attack within 10 years should consider preventive therapy with a cholesterol-lowering agent. However, when using the risk assessment calculators, risk overestimation could potentially put patients with a relatively low-risk profile into the "consider treatment" group. That is why it is important that patients who show borderline scores should be further assessed with tests like CT scans that can visualise the degree of calcification in the arteries of their heart.

Additional risk-assessment could be a tiebreaker to resolve the "to treat or not to treat" dilemma. Therefore, such assessment should be considered in all patients with marginal risk scores.

Andrew Paul DeFilippis, M.D., M.Sc., assistant professor of medicine at the University of Louisville and adjunct assistant professor of medicine at the Johns Hopkins Ciccarone Center for the Prevention of Heart Disease, states that it is important to explore the impact of multiple cardiovascular risk factors on risk score accuracy as this kind of analysis can generate important insights as to which new variables should be considered to develop new risk scores for patients.