Cardiovascular risk prediction in type 2 diabetes: a comparison of 22 risk scores in primary care setting

K.D. Dziopa¹, F.W.A. Asselbergs¹, J.G. Gratton², N.C. Chaturvedi², A.F.S. Schmidt²
¹University College of London, Health Data Research UK and Institute of Health Informatics, London, United Kingdom; ²University College of London, Institute of Cardiovascular Science, London, United Kingdom

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People with type 2 diabetes (T2DM) remain at high risk for cardiovascular disease (CVD). CVD treatment initiation and intensification are guided by risk prediction algorithms. The majority of CVD risk prediction tools have not been validated in T2DM.

We compared the performance of general and diabetes specific cardiovascular risk prediction scores for cardiovascular disease (CVD including coronary heart disease and stroke), CVD+ (including atrial fibrillation and heart failure), and their individual components, in type 2 diabetes patients (T2DM). Scores were identified through a systematic review and included irrespective of the type of predicted CVD, or inclusion of T2DM patients. Performance was assessed in a contemporary sample of 203,172 UK T2DM. We identified 22 scores: 11 derived in the general population, 9 in T2DM patients, and 2 excluded T2DM patients. Over 10 years follow-up, 63,000 events occurred. The RECODE score, derived in people with T2DM, performed best for both CVD (c-statistic 0.731 (0.728,0.734), and CVD+ (0.732 (0.729,0.735)). Calibration slopes (1 indicates perfect calibration) ranged from 0.38 (95% CI 0.37; 0.39) to 1.05 (95% CI 1.03; 1.07). A simple, population specific recalibration process considerably improved performance, now ranging between 0.98 and 1.03. Risk scores performed badly in people with pre-existing CVD (c-statistic ~0.55).

CVD risk prediction scores performed worse in T2DM than in the general population, irrespective of derivation population, and of original predicted outcome. Scores performed especially poorly in patients with established CVD. A simple population specific recalibration markedly improved score performance and is recommended for future use.