New risk calculator to save many more lives from heart attack and stroke

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A new risk calculator will better predict people at high risk of heart and circulatory diseases years before they strike, and is ready for use across the UK and Europe, according to research published today in the journal *European Heart Journal*.

The risk calculator, SCORE2, will be adopted by the upcoming European Guidelines on Cardiovascular Disease Prevention in Clinical

Practice, and enables doctors across Europe to predict who's at risk of having a heart attack or stroke in the next 10 years with greater accuracy.

The researchers say this new prediction tool will help save many more people across Europe from having a potentially deadly heart attack or stroke, ultimately saving lives. People who are flagged as having an increased risk can be put on personalized preventative treatment, such a statins, or will receive lifestyle advice to lower their risk.

Researchers from the University of Cambridge played a leading role in a major collaborative effort involving around 200 investigators to develop SCORE2. Researchers across Europe analyzed data from nearly 700,000 participants—mostly middle-aged—from 45 different studies. The tool has also been tailored for use in different European countries.

Participants had no prior history of heart and circulatory disease when they were recruited to the studies, and in the 10 years they were followed up, 30,000 had a 'cardiovascular event' – including fatal or non-fatal heart attack or stroke.

The risk tool was then statistically 'recalibrated," by using regional-specific cardiovascular and risk factor data from 10.8 million people, to more accurately estimate cardiovascular risk for populations split into four European risk regions. The tool uses known risk factors for heart and circulatory diseases such as age, sex, cholesterol levels, blood pressure and smoking.

This is a much-needed upgrade from the previous prediction tool that was developed using data before 1986 and underestimated the cardiovascular risk in some countries. The new SCORE2 risk calculator now accounts for current trends in heart and circulatory diseases, can predict both fatal and non-fatal conditions and is adaptable to countries with different levels of risk.

The researchers say that this upgrade will better estimate the cardiovascular risk amongst younger people, and will improve how treatment is tailored for older people and those in high-risk regions across Europe.

Professor Emanuele Di Angelantonio at the University of Cambridge British Heart Foundation (BHF) Center of Research Excellence, said: "This risk tool is much more powerful and superior than what doctors have used for decades. It will fit seamlessly into current prevention programs with substantial real-world impact by improving the prevention of cardiovascular diseases across Europe before they strike."

Dr. Lisa Pennells, also at Cambridge's BHF Center of Research Excellence, said: "This project was a highly collaborative effort that has brought together key experts and extensive data sources to develop improved risk prediction tools for cardiovascular disease for use across the UK and Europe.

"A key feature is that our calculators are relevant to current day rates of cardiovascular disease in different regions of Europe. Importantly, our methods allow them to be easily updated using routinely collected data in the future to ensure they stay relevant as trends in heart and circulatory diseases change."

This study was carried out by the SCORE2 Working Group and the European Society of Cardiology Cardiovascular Risk Collaboration. It was supported by organizations including the British Heart Foundation, the Medical Research Council, National Institute for Health Research Cambridge Biomedical Research Center and Health Data Research UK.

Professor Sir Nilesh Samani, Medical Director at the BHF and cardiologist, said: "Heart and circulatory diseases are the world's biggest killers, impacting the lives of 7.6 million people across the UK alone.

"This new risk tool is a major advance and will save many more people from developing heart attacks, stroke and heart disease, all of which develop silently over many years and strike without warning. It will be the new gold standard for doctors to determine which patients are at the highest risk of these conditions, and enable tailored treatment and lifestyle advice to be given much earlier."

More information: SCORE2 risk prediction algorithms: new models to estimate 10-year risk of cardiovascular disease in Europe, *European Heart Journal* (2021). DOI: 10.1093/eurheartj/ehab309

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