SCORE2-LAC: Cardiovascular Risk Assessment in Latin America and the Caribbean

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Cardiovascular risk identification and quantification is a cornerstone of prevention. When performed reliably using appropriate criteria for the population being assessed, risk estimation helps guiding more effective preventive interventions, tailored to different risk strata and focused on priority modifiable factors.

How should cardiovascular risk be assessed?

Several tools are available for cardiovascular risk assessment. These were developed primarily for European populations, including Systematic COronary Risk Evaluation (SCORE), SCORE2, and SCORE2 – Older Persons (SCORE2-OP);[1] US populations, including the Framingham risk score[2] and the PREVENT™ equations;[3] and, more recently, Asia-Pacific populations, including SCORE2 Asia-Pacific.[4]

However, these scores are frequently used in populations for which they were neither developed nor recalibrated or validated. This practice may compromise the accuracy of cardiovascular risk estimates.

What is SCORE2 ?

SCORE2,[1] an update of the original SCORE model,[5] was developed for European populations and estimates the 10-year probability of fatal and nonfatal cardiovascular events in apparently healthy individuals aged 40-69 years without previous cardiovascular disease (CVD) or diabetes. The model incorporates age, sex, systolic blood pressure (BP), smoking status, total cholesterol, and high-density lipoprotein (HDL) cholesterol. In the risk charts, the lipid profile is represented by non-HDL cholesterol.

SCORE2-OP[1] was developed for individuals aged ≥ 70 years, allowing cardiovascular risk estimation in older age groups.

The SCORE2 and SCORE2-OP risk charts support clinical judgment. When assessing risk in individuals without previous CVD or diabetes, the estimated risk categories can guide informed, shared decision-making. These tools also facilitate communication about the influence of modifiable factors, such as smoking and elevated BP, on estimated risk and about the importance of smoking cessation and BP control.

Because SCORE2 does not account for all factors associated with cardiovascular risk, considering risk modifiers not included in the model may help refine the assessment and, when appropriate, reclassify the estimated risk. This approach is particularly relevant for individuals initially classified as being at low or moderate risk.[6]

What is SCORE2-LAC?

In Latin America and the Caribbean (LAC), the availability of cardiovascular risk prediction models adapted to local populations remained limited. Although tools recalibrated for the region were already available, risk assessment frequently relied on scores developed for European or North American populations. Potential inaccuracies arising from this use are compounded by regional heterogeneity in the prevalence of risk factors, such as smoking, hypertension, and obesity as well as in cardiovascular mortality, demographic characteristics, socioeconomic determinants, and access to health care.

More recently, following the development of SCORE2 Asia-Pacific,[4] SCORE2-LAC[7] was developed by recalibrating SCORE2 for LAC populations. This advance supports clinical assessment and cardiovascular prevention in the region by estimating the 10-year risk of cardiovascular death, nonfatal myocardial infarction, or nonfatal stroke in apparently healthy individuals aged 40-69 years without previous CVD or diabetes.

Recalibration adapts risk estimates to a specific epidemiological context by accounting for the population's cardiovascular risk during a given period. Risk estimates were recalibrated based on cardiovascular event incidence and regional risk factor distributions, while retaining the original SCORE2 coefficients. Countries were grouped into four risk regions (low, moderate, high, and very high) according to their age- and sex-standardized cardiovascular mortality rates.

This process involved researchers from several countries through a collaboration between the European Society of Cardiology and the Inter-American Society of Cardiology. Recalibration used data sources that included more than 40 million individuals and 1.26 million cardiovascular events. External validation was performed in 11 cohorts from seven LAC countries, comprising 132,512 individuals and 3,938 cardiovascular events.[7]

Key methodological features of SCORE2-LAC[7] include the use of large datasets, external validation, and accounting for

Keywords

Cardiovascular Diseases; Risk Assessment; Risk Factors; Primary Prevention.

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Manuscript received September 25, 2026, revised manuscript September 25, 2026, accepted September 25, 2026

DOI: https://doi.org/10.36660/abc.20260813i

the competing risk of noncardiovascular death. Nevertheless, despite satisfactory discrimination, uncertainty remains inherent in individual risk estimates.

What comes next?

As noted above, SCORE2 and SCORE2-OP[1] do not account for all factors relevant to cardiovascular risk assessment. Their interpretation should consider risk modifiers not included in the models as well as clinical conditions that may limit their applicability or directly determine the risk category, such as chronic kidney disease.[8]

The incorporation of additional clinical variables, biomarkers, and imaging parameters is being investigated for the development of new scores, including the future SCORE3. The aim is to refine and personalize risk estimates, reducing the likelihood of underestimation.

Recalibrating SCORE2[1] for African populations through the SCORE2-Africa project is also under discussion. This initiative poses even greater challenges than those encountered during the development of SCORE2-LAC because of limited data, heterogeneity in cardiovascular risk factor distributions, barriers to health care access, and insufficient investment in cardiovascular health across the continent.

Using models with a common structure, recalibrated and validated for different epidemiological contexts, may facilitate comparisons of cardiovascular risk estimates across countries. These data may also inform policies aimed at improving equity in cardiovascular prevention and care.

Currently, one of the main challenges for SCORE2-LAC[7] is its consistent and widespread implementation in clinical practice. Prospective assessments in new population samples beyond those used for model development and validation are also needed, along with monitoring of model performance and evaluation of its clinical utility and contribution to prevention strategies.

SCORE2-LAC[7] may support the development of more standardized cardiovascular risk registries with large samples and consistent follow-up. Integrating epidemiological data from different LAC countries could make these registries more representative and improve the comparability and reliability of their data.

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