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External Validation of Score2-diabetes in Hong Kong: a Regionally Representative Cohort Study

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Introduction

In people with diabetes the 2023 ESC Guidelines recommend SCORE2-Diabetes for predicting 10-year cardiovascular disease (CVD) risk.

Objective

This study aimed to validate SCORE2-Diabetes in Hong Kong and to assess its generalisability across age groups and renal function subgroups.

Table. Performance of SCORE2-diabetes models in the Hong Kong population

	Female	Male
C-index (95% CI)		
SCORE2-Diabetes	0·731 (0·730 - 0·733)	0·703 (0·699 - 0·707)
Observed/Expected ratio (95% CI)		
Uncalibrated model	0·994 (0·973 - 1·016)	1·001 (0·979 - 1·022)
European recalibrated models		
Low-risk region	1·209 (1·183 - 1·235)	1·130 (1·106 - 1·155)
Moderate-risk region	0·921 (0·902 - 0·941)	0·849 (0·831 - 0·867)
High-risk region	0·563 (0·551 - 0·575)	0·691 (0·676 - 0·705)
Very-high-risk region	0·367 (0·360 - 0·375)	0·478 (0·468 - 0·488)
Asia-Pacific recalibrated models		
Low-risk region	1·143 (1·118 - 1·167)	0·772 (0·756 - 0·789)
Moderate-risk region	0·602 (0·589 - 0·615)	0·563 (0·551 - 0·575)
High-risk region	0·387 (0·378 - 0·395)	0·421 (0·412 - 0·430)
Very-high-risk region	0·334 (0·327 - 0·342)	0·378 (0·370 - 0·386)

Results and findings

Of 108,726 Hong Kong patients with T2DM (mean follow-up: 8.6 years), 14,644 (13·5%) developed CVD. The C-index of uncalibrated SCORE2-Diabetes was 0·731 (95% confidence interval [CI]: 0·730 - 0·733) in females and 0·703 (95% CI 0·699 - 0·707) in males, with Observed-to-Expected ratios of 0·994 (95% CI 0·973 - 1·016) and 1·001 (95% CI 0·979 - 1·022), respectively (Table). Recalibration to the European low-risk-region underestimated CVD risk in both sexes, whereas the Asia-Pacific recalibration underestimated risk in females but overestimated risk in males (Figure). All regional recalibrations did not improve overall reclassification. Discrimination was moderate for patients aged 40-69 years and those with G1-G2 CKD (C-index: 0·618 - 0·691). Model performance declined in the elderly (age ≥70 years) and in patients with CKD grades 3-5.

Ethical Approval: This study was approved by the Institutional Review Boards of The University of Hong Kong/Hospital Authority Hong Kong West Cluster (Reference no. IRB UW 24-210), which allowed analysis of HADCL data without additional consent. **Funding:** None.

Methods

This study utilised administrative data derived from the Hong Kong RAMP-DM cohort (2009–2011), comprising patients with type 2 diabetes mellitus (T2DM) aged 40–89 years who had no prior history of CVD. Cardiovascular endpoints included non-fatal myocardial infarction (MI), non-fatal ischaemic stroke (IS), and fatal CVD. Subgroup analyses were stratified by age decade and chronic kidney disease (CKD) staging.

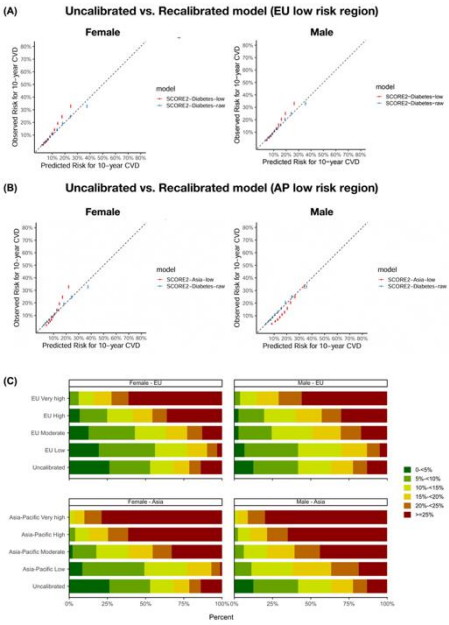

Figure. Calibration of SCORE2-Diabetes in Hong Kong

Conclusions

The SCORE2-Diabetes predicts CVD risk in the Hong Kong population. Its discrimination and calibration ability is less accurate in older adults and patients with advanced CKD. It is important to validate and recalibrate SCORE2-Diabetes before routine clinical implementation.

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