(CVD) risk chart development, evaluation, and validation

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Abstract

In this protocol, we aimed to show the step-by.step procedures used to develop, evaluate and validate (CVD) risk charts.

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https://www.protocols.io/view/cvd-risk-chart-development-evaluation-and-validat-j7rcrm6

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Protocol

Step 1.

Definition of endpoint (event/outcome)

Step 2.

Definition of at-risk population

Step 3.

Follow-up time

Risk factor selection

Step 4.

- Literature review
- Expert-based

Mathematical modeling

Step 5.

- Using Cox proportional hazard regression
- A broad set of risk factors were independently assessed.
- The most important risk factors were then hierarchically included in the model based on the higher hazard ratio and significance.

Cardiologists' opinion

Step 6.

IF the selected risk factors are not acceptable,

GOTO
-> go to step #5

Estimation (relative and absolute risks)

Step 7.

Performance assessment

Step 8.

- Discrimination (AUROC, Harrell's C indices)
- Calibration (Nam-D'Agostino chi-square test)
- Overall bias (predefined risk threshold for incidence)

Internal validation

Step 9.

- The 10-fold cross-validation
- Bootstrapping

• Risk function formula

Step 10.

Outputs

Step 11.

Online web-based prediction tool:

JavaScript and Bootstrap (PARS example: http://www.prognosis.ir/Pars/)

Offline Android app:

Android Studio and API level 19 (PARS example: http://www.prognosis.ir/Pars/Android/PARS.zip)

Risk chart:

Color-coded (CVD) probabilities (PARS example: Manuscript address)