SUPPLEMENTAL MATERIAL

Technical Appendix

Probabilities of development of a CVD event in the 30-year risk horizon adjusted for the competing risk of non-CVD death based on significant risk factors were calculated following the developments presented in[33] and adapted to our situation. We outline them below.

For CVD event define $\lambda_{CVD}(t)$ to be the instantaneous hazard function and $\Lambda_{CVD}(t)$ the cumulative hazard function. Similarly, define the equivalent quantities, $\lambda_{DTH}(t)$ and $\Lambda_{DTH}(t)$, for the death outcome. Now define the probability of not failing from either cause as $S(t) = \exp[-(\Lambda_{CVD}(t)+\Lambda_{DTH}(t))]$ and the cumulative incidence function for CVD event (the probability of experiencing CVD event before time t) as $I_{CVD}(t) = \int_0^t \lambda_{CVD}(u)S(u)du$. This quantity is estimated at 30 years of follow-up as:

$$\hat{I}_{CVD}(30) = \sum_{t_i<30} \hat{\lambda}_{CVD}(t_i)\hat{S}(t_{i-1}) \qquad \text{(A1)}$$

where t_i, $i = 1,\ldots,n_{EV}$ are the ordered event times and $t_0 = 0$. The quantities under the summation are estimated as:

$$\hat{S}(t_{i-1}) = \exp[-(\hat{\Lambda}_{CVD}(t_{i-1}) + \hat{\Lambda}_{DTH}(t_{i-1}))] = \hat{S}_{CVD}(t_{i-1}) \cdot \hat{S}_{DTH}(t_{i-1}) \qquad \text{(A2)}$$

where the last two survival functions are taken directly from the standard Cox models for CVD events and non-CVD deaths, treating the other outcome as censoring event;

$$\hat{\lambda}_{CVD}(t_i) = \hat{\Lambda}_{CVD}(t_i) - \hat{\Lambda}_{CVD}(t_{i-1}) = -\log(\hat{S}_{CVD}(t_i)) + \log(\hat{S}_{CVD}(t_{i-1})). \qquad \text{(A3)}$$

In our application we used the risk factors significant in the CVD models in the models for non-CVD death. The recursive nature of formula (A1) makes it impossible to give a closed form solution for the estimated risk.

Appendix Table
Hazard ratios* with 95% confidence intervals for 30-year risk of full CVD

Variables	Main Model	Simple Model
Male Sex	1.41 (1.23, 1.62)	1.72 (1.51, 1.96)
Age	1.98 (1.83, 2.14)	2.05 (1.90, 2.21)
Systolic Blood Pressure	1.27 (1.19, 1.35)	1.24 (1.16, 1.32)
Antihypertensive Treatment	1.69 (1.31, 2.17)	1.70 (1.32, 2.19)
Smoking	1.81 (1.60, 1.05)	1.99 (1.76, 2.25)
Diabetes	1.98 (1.49, 2.65)	2.22 (1.66, 2.95)
Total cholesterol	1.24 (1.16, 1.33)	-
HDL cholesterol	0.77 (0.72, 0.82)	-
Body Mass Index	-	1.18 (1.10, 1.26)

*Hazard ratios for continuous risk factors are given per 1 standard deviation increase in the natural logarithm. All p-values were less or equal to 0.01.

Title for the interactive risk calculator:

30-year risk of cardiovascular disease

Legend:

Hard CVD includes coronary death, myocardial infarction and fatal and non-fatal stroke.

Full CVD includes hard CVD plus coronary insufficiency, angina pectoris, transient ischemic attack, intermittent claudication and congestive heart failure.