HARTCENTRUM Noord Antwerpen

AZ Klina voluit voor zorg

Cardiovasculaire risicostratificatie in primaire preventie

Dr Jef Verheyen

Cardioloog - revalidatiearts AZ Klina

Symposium 28 oktober 2023

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Framingham Heart Study

- long-term, ongoing cohorte studie, i.o.v. Congres
  - 1948 : The Original Cohort
  - 5209 volwassenen
  - leeftijd 30 - 62 j, (eerst arts, vpl, gezondheidswerkers)
  - 20 j FU

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1960	Cigarette smoking found to increase the risk of heart disease
1961	Cholesterol level, blood pressure, and electrocardiogram abnormalities found to increase the risk of heart disease
1967	Physical activity found to reduce the risk of heart disease and obesity to increase the risk of heart disease
1970	High blood pressure found to increase the risk of stroke
1976	Menopause found to increase the risk of heart disease
1978	Psychosocial factors found to affect heart disease
1988	High levels of HDL cholesterol found to reduce risk of death
1994	Enlarged left ventricle (one of two lower chambers of the heart) shown to increase the risk of stroke
1996	Progression from hypertension to heart failure described
1998	Development of simple coronary disease prediction algorithm involving risk factor categories to allow physicians to predict multivariate coronary heart disease risk in patients without overt CHD
1999	Lifetime risk at age 40 years of developing coronary heart disease is one in two for men and one in three for women
2001	High-normal blood pressure is associated with an increased risk of cardiovascular disease, emphasizing the need to determine whether lowering high-normal blood pressure can reduce the risk of cardiovascular disease.
2002	Lifetime risk of developing high blood pressure in middle-aged adults is 9 in 10.
2002	Obesity is a risk factor for heart failure.
2004	Serum aldosterone levels predict future risk of hypertension in non-hypertensive individuals.
2005	Lifetime risk of becoming overweight exceeds 70 percent, that for obesity approximates 1 in 2.
2006	The National Heart, Lung and Blood Institute (NHLBI) of the National Institutes of Health announces a new genome-wide association study at the Framingham Heart Study in collaboration with Boston University School of Medicine to be known as the SHARe project (SNP Health Association Resource).

FRAMINGHAM RISK SCORE (FRS)

Estimation of 10-year Cardiovascular Disease (CVD) Risk

Date: ______________

Patient's Name: ______________________

Step 1[1]

In the "points" column enter the appropriate value according to the patient's age, HDL-C, total cholesterol, systolic blood pressure, and if they smoke or have diabetes. Calculate the total points.

Risk Factor		Risk Points Men	Risk Points Women	Points
Age				
30-34		0	0	
35-39		2	2	
40-44		5	4	
45-49		7	5	
50-54		8	7	
55-59		10	8	
60-64		11	9	
65-69		12	10	
70-74		14	11	
75+		15	12	
HDL-C (mmol/L)				
>1.6		-2	-2	
1.3-1.6		-1	-1	
1.2-1.29		0	0	
0.9-1.19		1	1	
<0.9		2	2	
Total Cholesterol				
<4.1		0	0	
4.1-5.19		1	1	
5.2-6.19		2	3	
6.2-7.2		3	4	
>7.2		4	5	
Smoker	Yes	4	3	
	No	0	0	
Diabetes	Yes	statin-indicated condition		
	No	0	0	
Total Points				

Systolic Blood Pressure (mmHg)	Men Not Treated	Men Treated	Women Not Treated	Women Treated	Points
<120	-2	0	-3	-1	
120-129	0	2	0	2	
130-139	1	3	1	3	
140-149	2	4	2	5	
150-159	2	4	4	6	
160+	3	5	5	7	

Step 2[1]

Using the total points from Step 1, determine the 10-year CVD risk (%).

Total Points	10-Year CVD Risk (%) Men	10-Year CVD Risk (%) Women
-3 or less	<1	<1
-2	1.1	<1
-1	1.4	1.0
0	1.6	1.2
1	1.9	1.5
2	2.3	1.7
3	2.8	2.0
4	3.3	2.4
5	3.9	2.8
6	4.7	3.3
7	5.6	3.9
8	6.7	4.5
9	7.9	5.3
10	9.4	6.3
11	11.2	7.3
12	13.2	8.6
13	15.6	10.0
14	18.4	11.7
15	21.6	13.7
16	25.3	15.9
17	29.4	18.51
18	>30	21.6
19	>30	24.8
20	>30	27.5
21+	>30	>30

* Double cardiovascular disease risk percentage for individuals between the ages of 30 and 59 without diabetes if the presence of a positive history of premature cardiovascular disease is present in a first-degree relative before 55 years of age for men and before 65 years of age for women. This is known as the modified Framingham Risk Score.

Step 3[1]

Using the total points from Step 1, determine heart age (in years).

Heart Age, y	Men	Women
<30	<0	<1
30	0	
31		1
32	1	
34	2	2
36	3	3
38	4	
39		4
40	5	
42	6	5
45	7	6
48	8	7
51	9	8
54	10	
55		9
57	11	
59		10
60	12	
64	13	11
68	14	12
72	15	
73		13
76	16	
79		14
>80	≥17	15+

Step 4[2,3]

Using 10-year CVD risk from Step 2, determine if patient is Low, Moderate or High risk. Indicate lipid and/or Apo B targets

Risk Level[1]	Initiate Treatment If:	Primary Target (LDL-C)	Alternate Target
High FRS ≥20%	• Consider treatment in all (Strong, High)	• ≤2 mmol/L or ≥50% decrease in LDL-C (Strong, Moderate)	• Apo B ≤0.8 g/L or • Non-HDL-C ≤2.6 mmol/L (Strong, High)
Intermediate FRS 10-19%	• LDL-C ≥3.5 mmol/L (Strong, Moderate) • For LDL-C <3.5 mmol/L consider if: – Apo B ≥1.2 g/L – OR Non-HDL-C ≥4.3 mmol/L (Strong, Moderate) • [illegible]	• ≤2 mmol/L or ≥50% decrease in LDL-C (Strong, Moderate)	• Apo B ≤0.8 g/L or • Non-HDL-C ≤2.6 mmol/L (Strong, Moderate)
Low FRS <10%	• statins generally not indicated	• statins generally not indicated	• statins generally not indicated
Statin-indicated conditions**	• Clinical atherosclerosis • Abdominal aortic aneurysm • Diabetes mellitus Age ≥40 years 15 year duration for age ≥30 years (DM1) Microvascular disease • Chronic kidney disease (age ≥50 years) eGFR <60 mL/min/1.73 m² or ACR >3 mg/mmol		

Lipid targets: LDL-C ______________ or Apo B ______________

[illegible footnotes]

Canadian Cardiovascular Society

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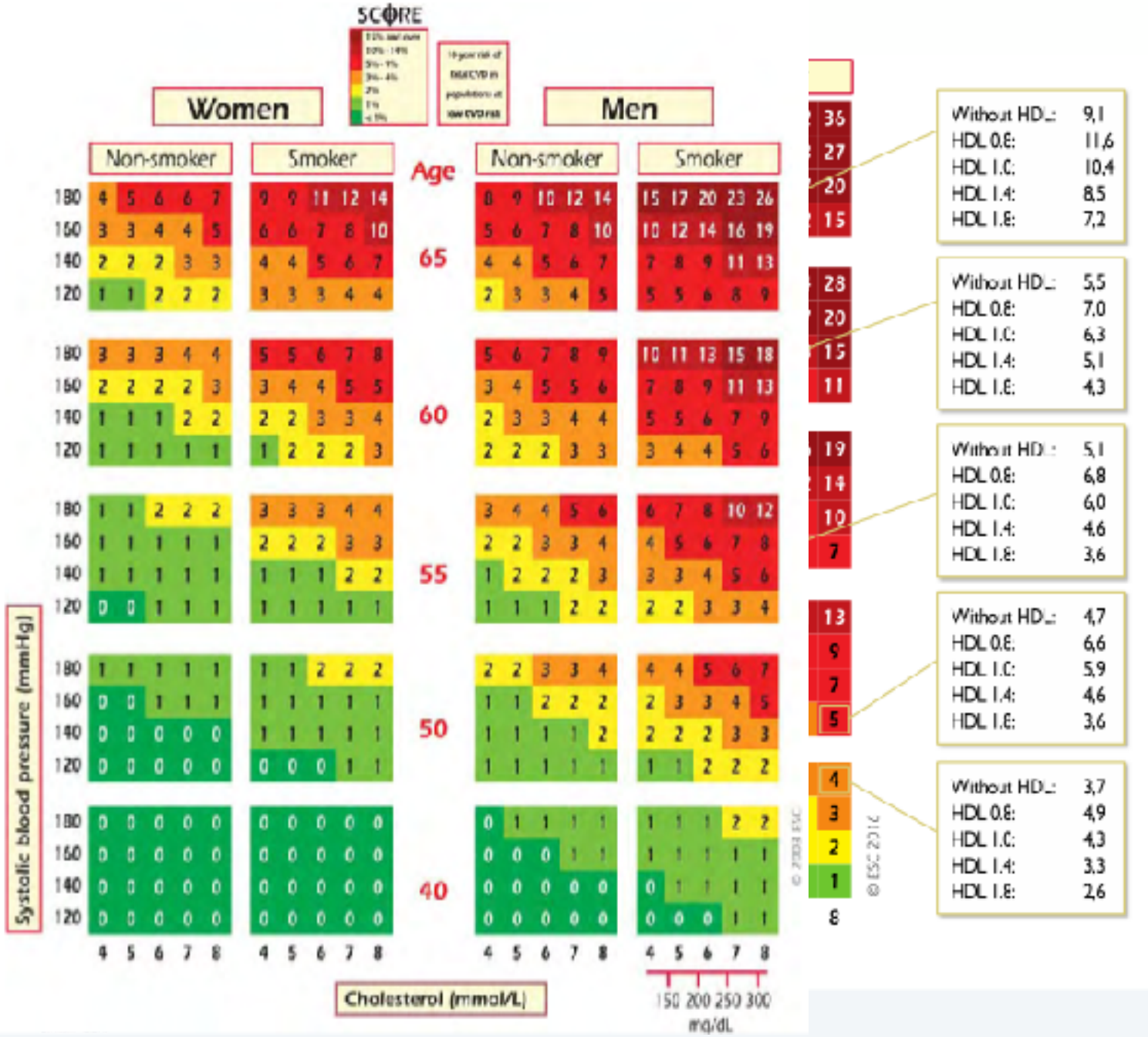
SCORE
Women
Men
Non-smoker
Smoker
Non-smoker
Smoker
Age
65
60
55
50
40
Systolic blood pressure (mmHg)
Cholesterol (mmol/L)
150 200 250 300
mg/dL
Without HDL: 9,1
HDL 0.8: 11,6
HDL 1.0: 10,4
HDL 1.4: 8,5
HDL 1.8: 7,2
Without HDL: 5,5
HDL 0.8: 7,0
HDL 1.0: 6,3
HDL 1.4: 5,1
HDL 1.8: 4,3
Without HDL: 5,1
HDL 0.8: 6,8
HDL 1.0: 6,0
HDL 1.4: 4,6
HDL 1.8: 3,6
Without HDL: 4,7
HDL 0.8: 6,6
HDL 1.0: 5,9
HDL 1.4: 4,6
HDL 1.8: 3,6
Without HDL: 3,7
HDL 0.8: 4,9
HDL 1.0: 4,3
HDL 1.4: 3,3
HDL 1.8: 2,6

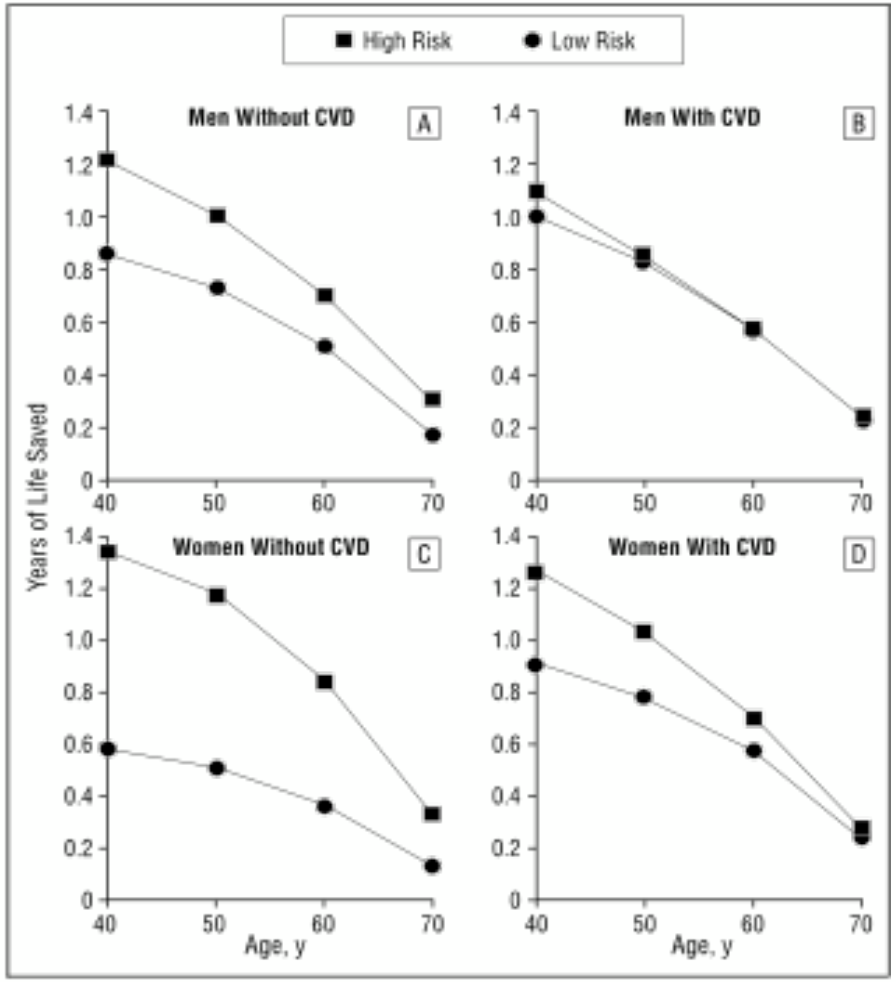

Figure 2. *Forecasted years of life saved following treatment of hypertension in subjects with cardiovascular disease (CVD). High-risk subjects are those who smoke cigarettes and have a low-density lipoprotein (LDL) cholesterol level of 4.9 mmol/L (189 mg/dL) and high-density lipoprotein (HDL) cholesterol level of 1.0 mmol/L (39 mg/dL) (LDL/HDL=4.9). Low-risk subjects are those who do not smoke cigarettes and have an LDL cholesterol level of 3.85 mmol/L (149 mg/dL) and an HDL cholesterol level of 1.1 mmol/L (43 mg/dL) (LDL/HDL=3.5) with blood pressure of 120/80 mm Hg or lower.*

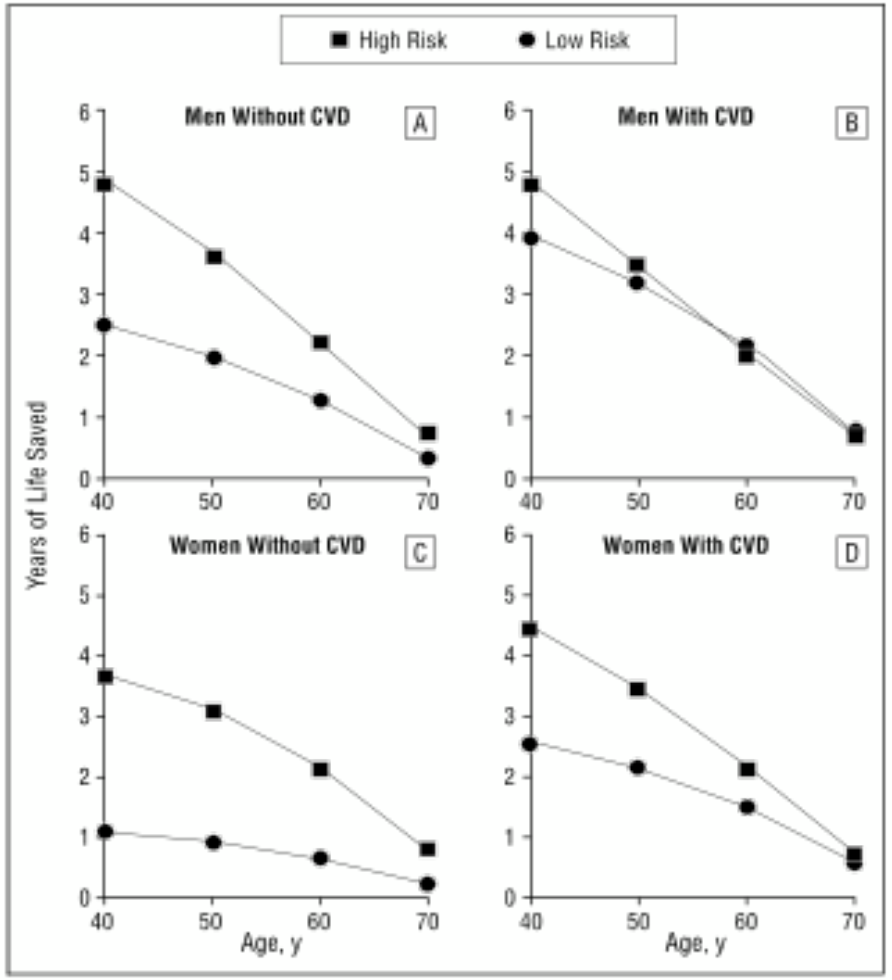

Figure 3. *Forecasted years of life saved following lipid level modification in subjects with cardiovascular disease (CVD). High-risk subjects are those who smoke cigarettes and have a blood pressure of at least 160/100 mm Hg. Low-risk subjects are those who do not smoke cigarettes and have a blood pressure of 120/80 mm Hg or lower.*

Arch Intern Med. 1998;158:655-662

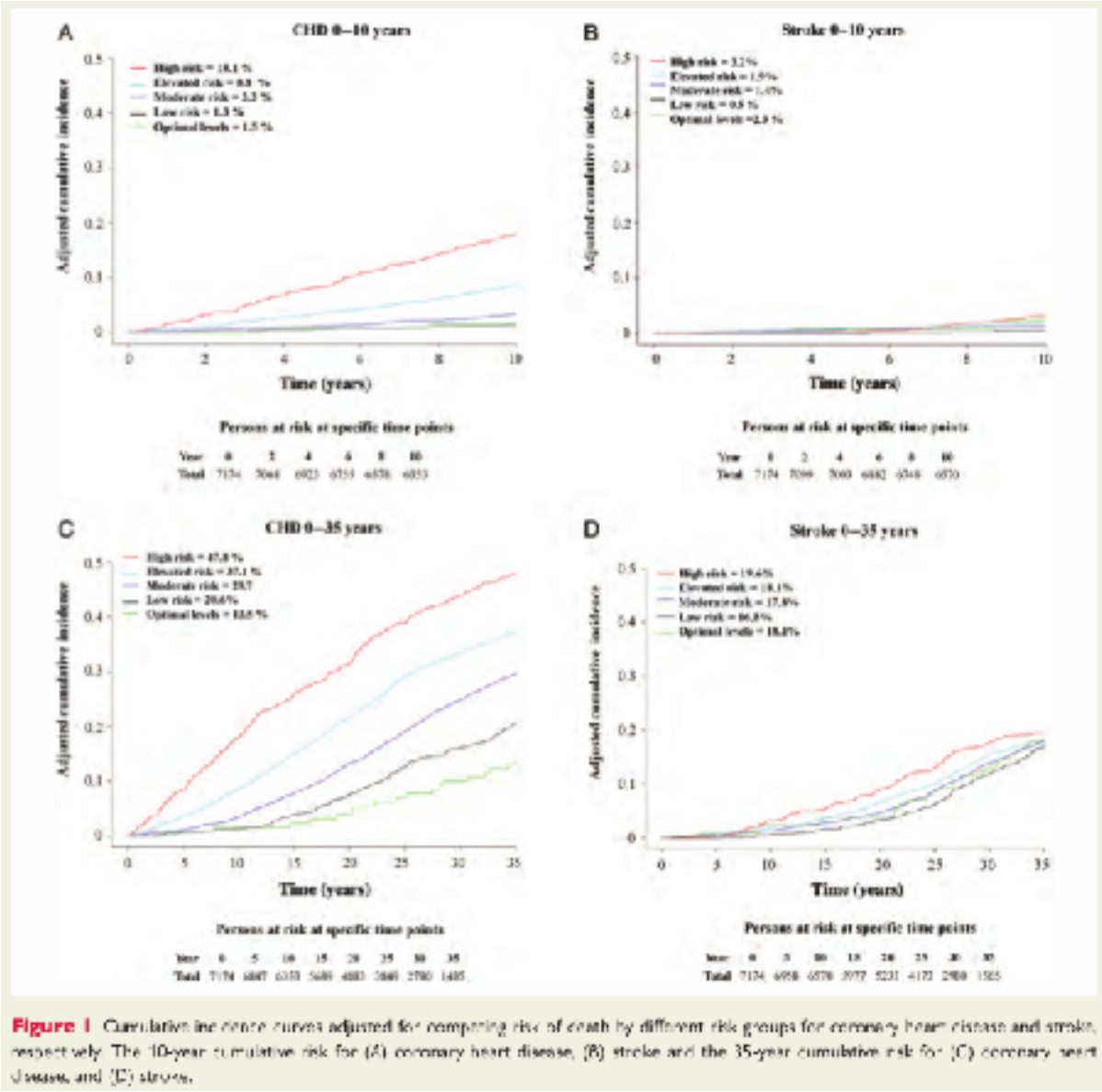

Figure 1 Cumulative incidence curves adjusted for competing risk of death by different risk groups for coronary heart disease and stroke, respectively. The 10-year cumulative risk for (A) coronary heart disease, (B) stroke and the 35-year cumulative risk for (C) coronary heart disease, and (D) stroke.

European Heart Journal (2013) 34, 1068–1074

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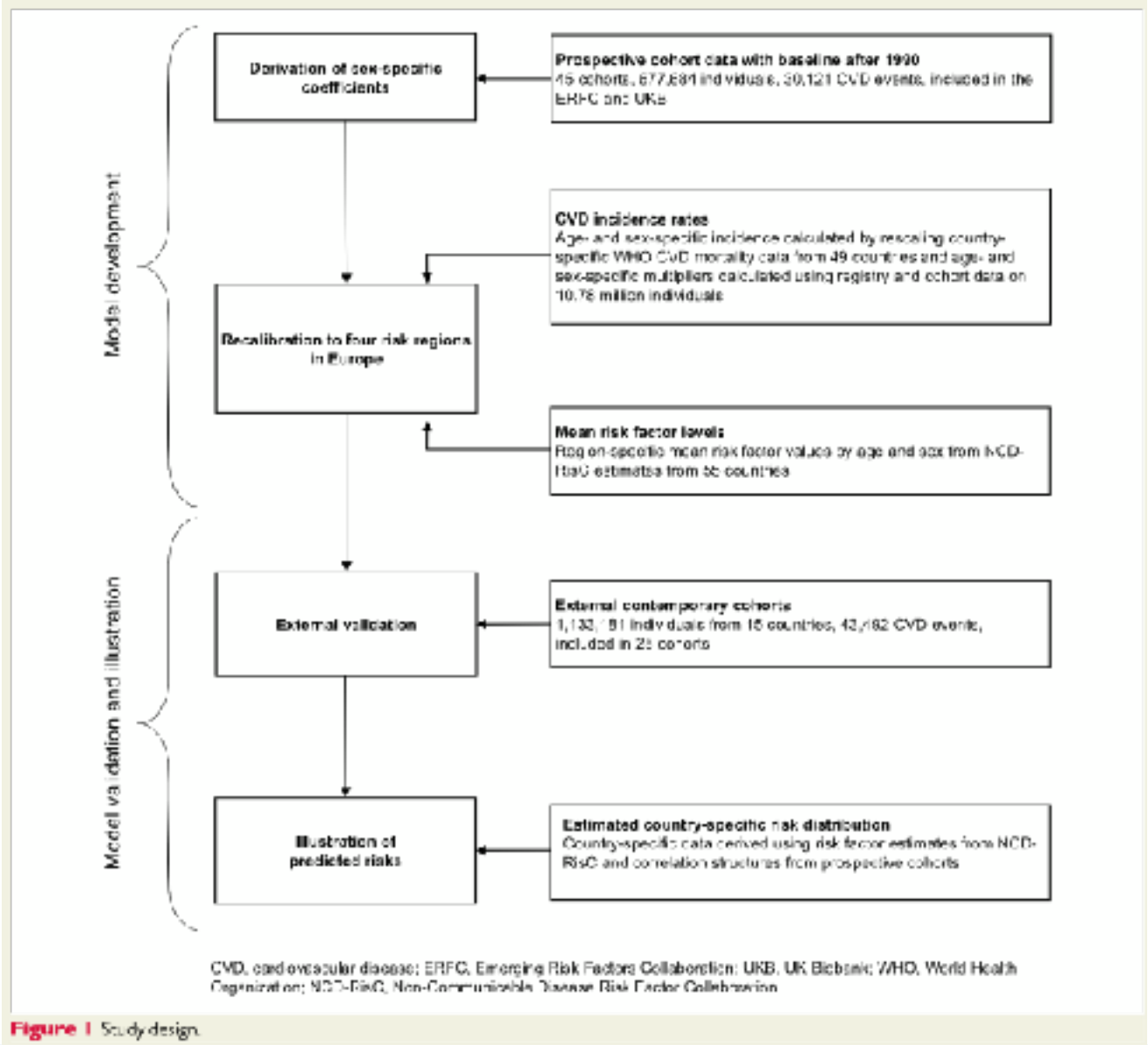
SCORE : beter in voorspellen CAD vs stroke



CVD, cardiovascular disease; ERFC, Emerging Risk Factors Collaboration; UKB, UK Biobank; WHO, World Health Organization; NCD-RisC, Non-Communicable Disease Risk Factor Collaboration

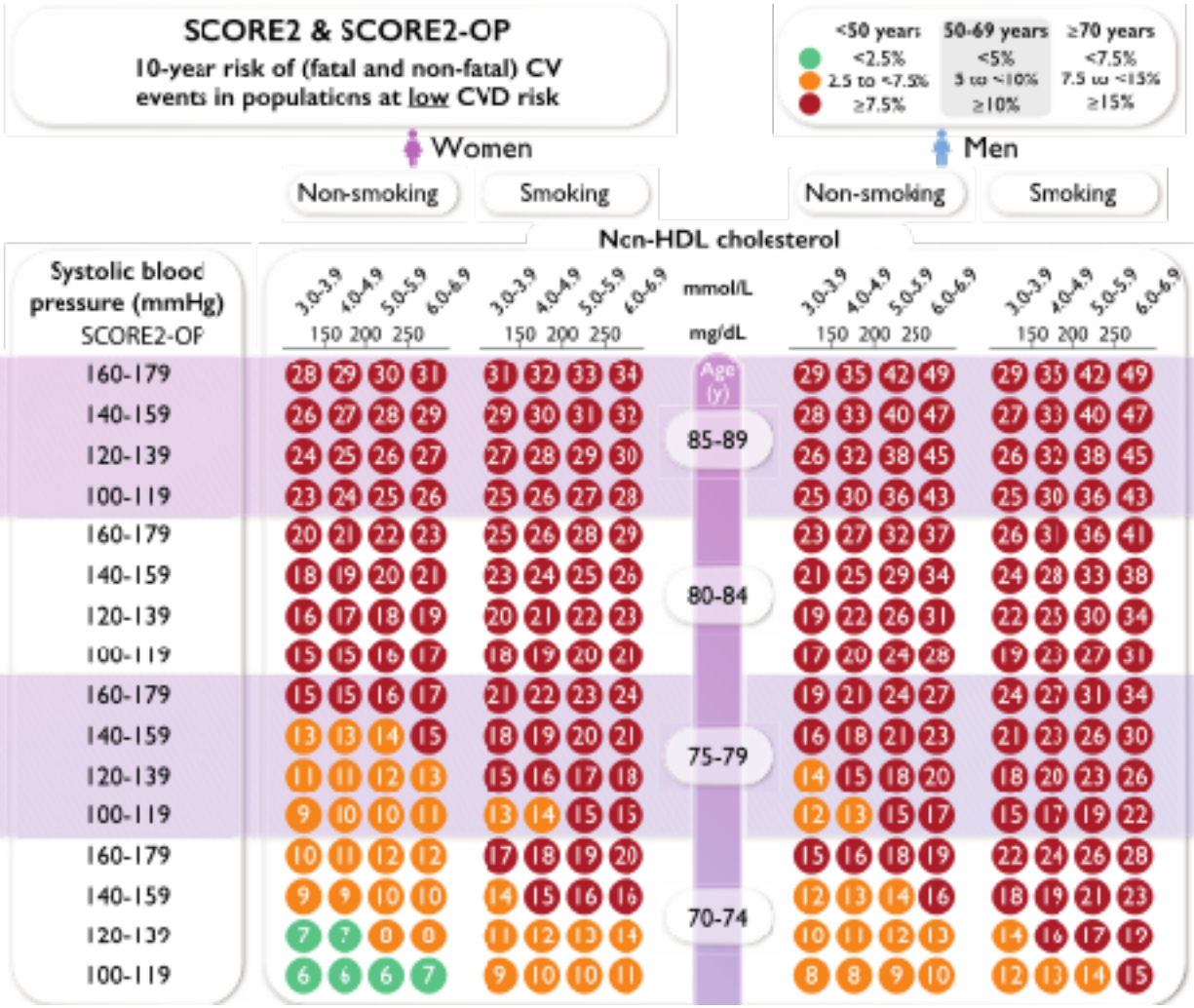
Figure 1 Study design.

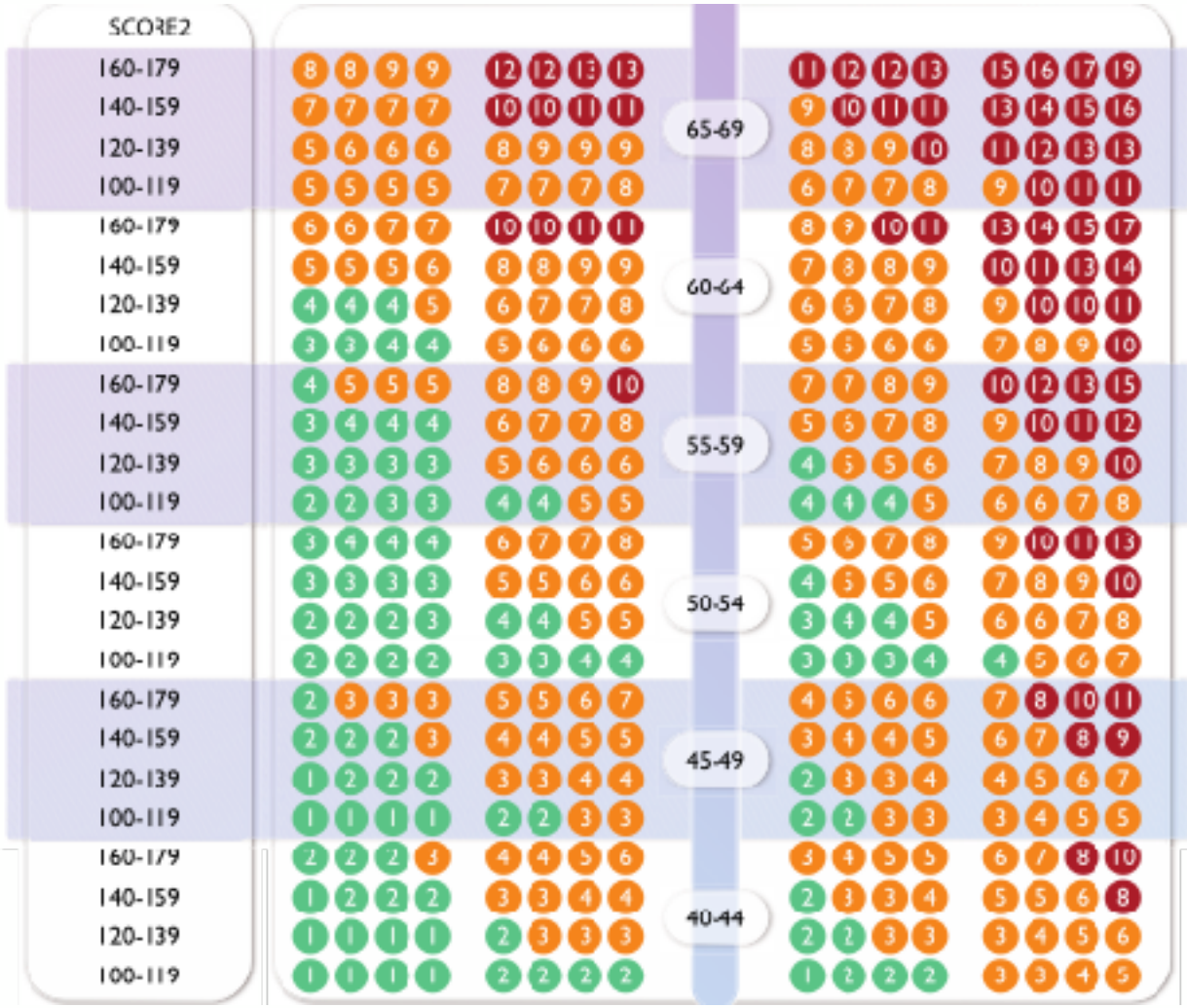
SCORE 2

Eindpunt : fatal en non fatal CVD

Table 1 Summary of available data used in SCORE2 risk model derivation

	N (%) or mean (SD)
Total participants	677 684
Male sex	300 735 (44%)
Age (years)	57 (9)
Current smoker	101 211 (15%)
Systolic blood pressure (mmHg)	136 (19)
Diabetes mellitus	31 413 (5%)
Total cholesterol (mmol/L)	5.8 (1.1)
HDL-cholesterol (mmol/L)	1.4 (0.4)
Follow-up (years, median (5th/95th percentile))	10.7 (5.0–18.6)
Cardiovascular events	30 121
Non-cardiovascular deaths	33 809





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SCORE 2 kaarten

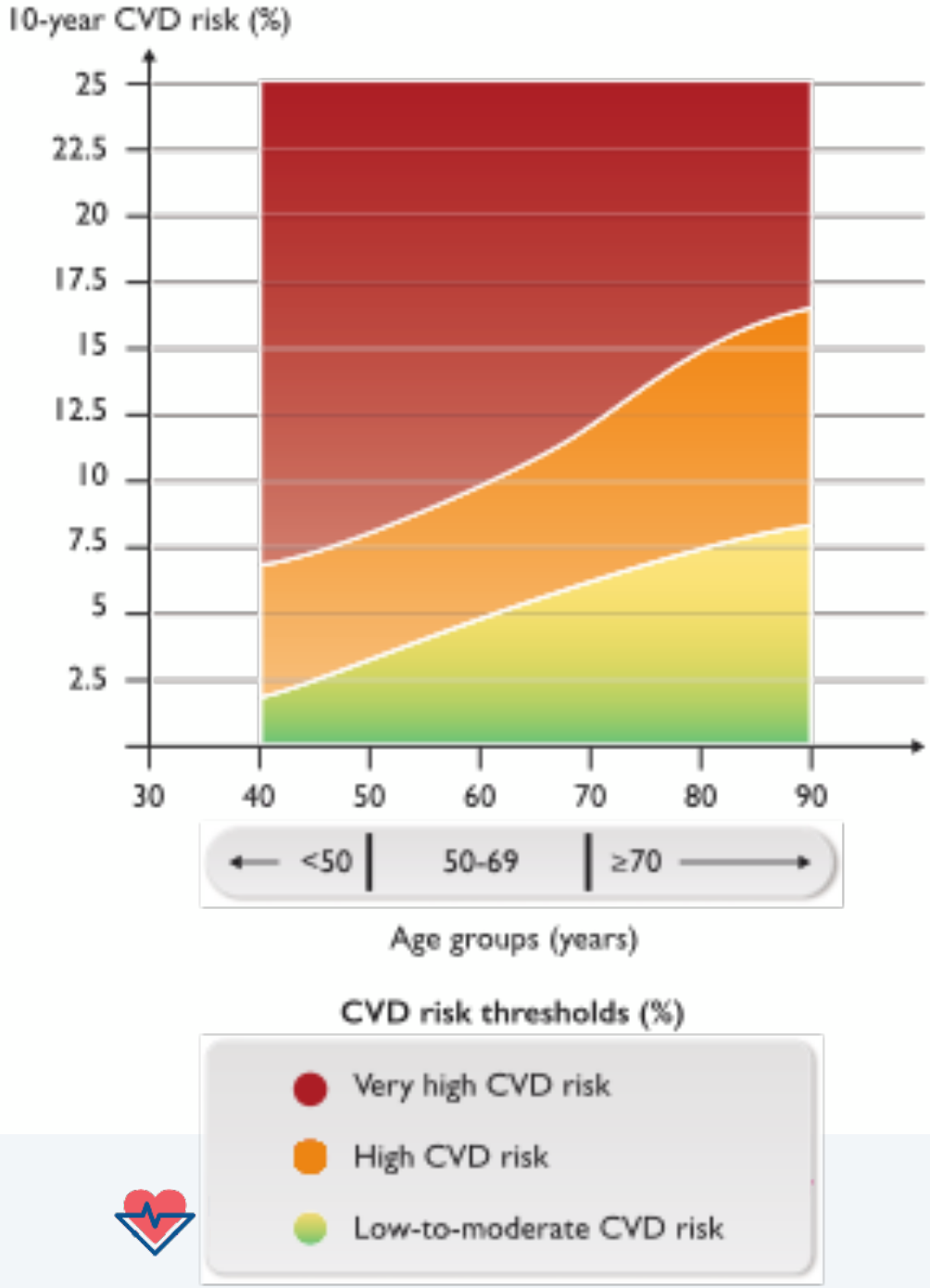


Table 5 **Cardiovascular disease risk categories based on SCORE2 and SCORE2-OP in apparently healthy people according to age**

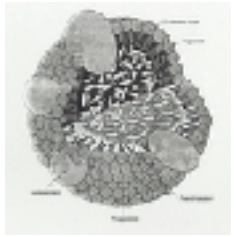
	<50 years	50–69 years	≥70 years[a]
Low-to-moderate CVD risk: risk factor treatment generally not recommended	<2.5%	<5%	<7.5%
High CVD risk: risk factor treatment should be considered	2.5 to <7.5%	5 to <10%	7.5 to <15%
Very high CVD risk: risk factor treatment generally recommended[a]	≥7.5%	≥10%	≥15%

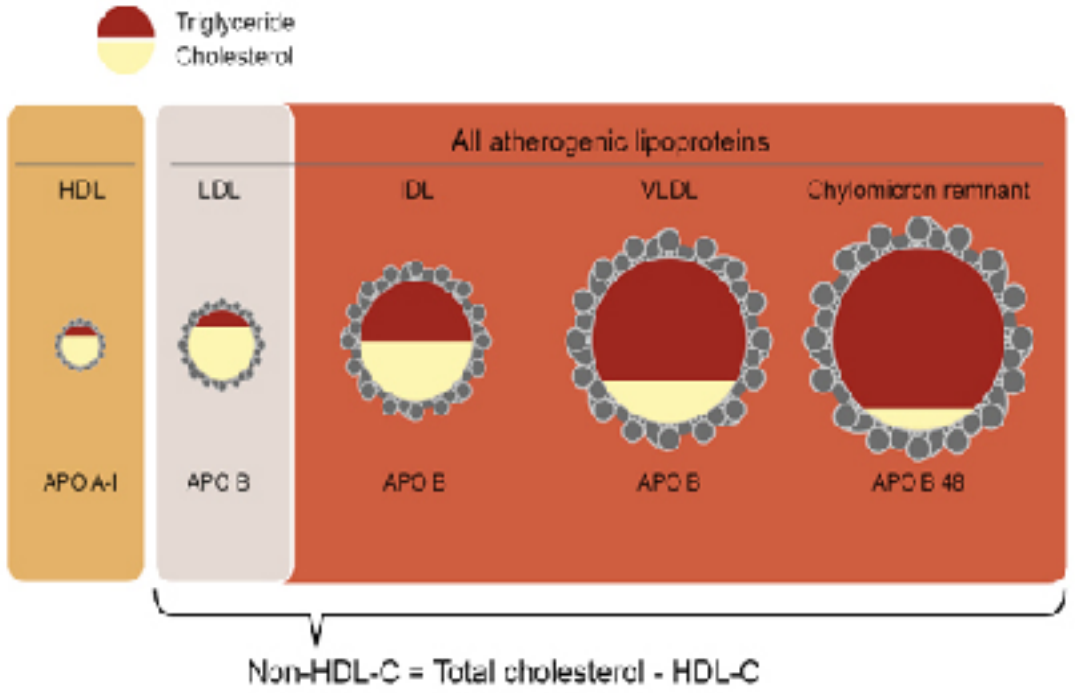
SCORE 2

Non HDL
apolipoproteïnen

- Functie :
  - Stabiliseren lipidenmembraan
  - Cofactor voor enzymes die rol spelen in lipidenmetabolisme
  - transport en redistributie van lipiden naar verschillende weefsels (receptoren)

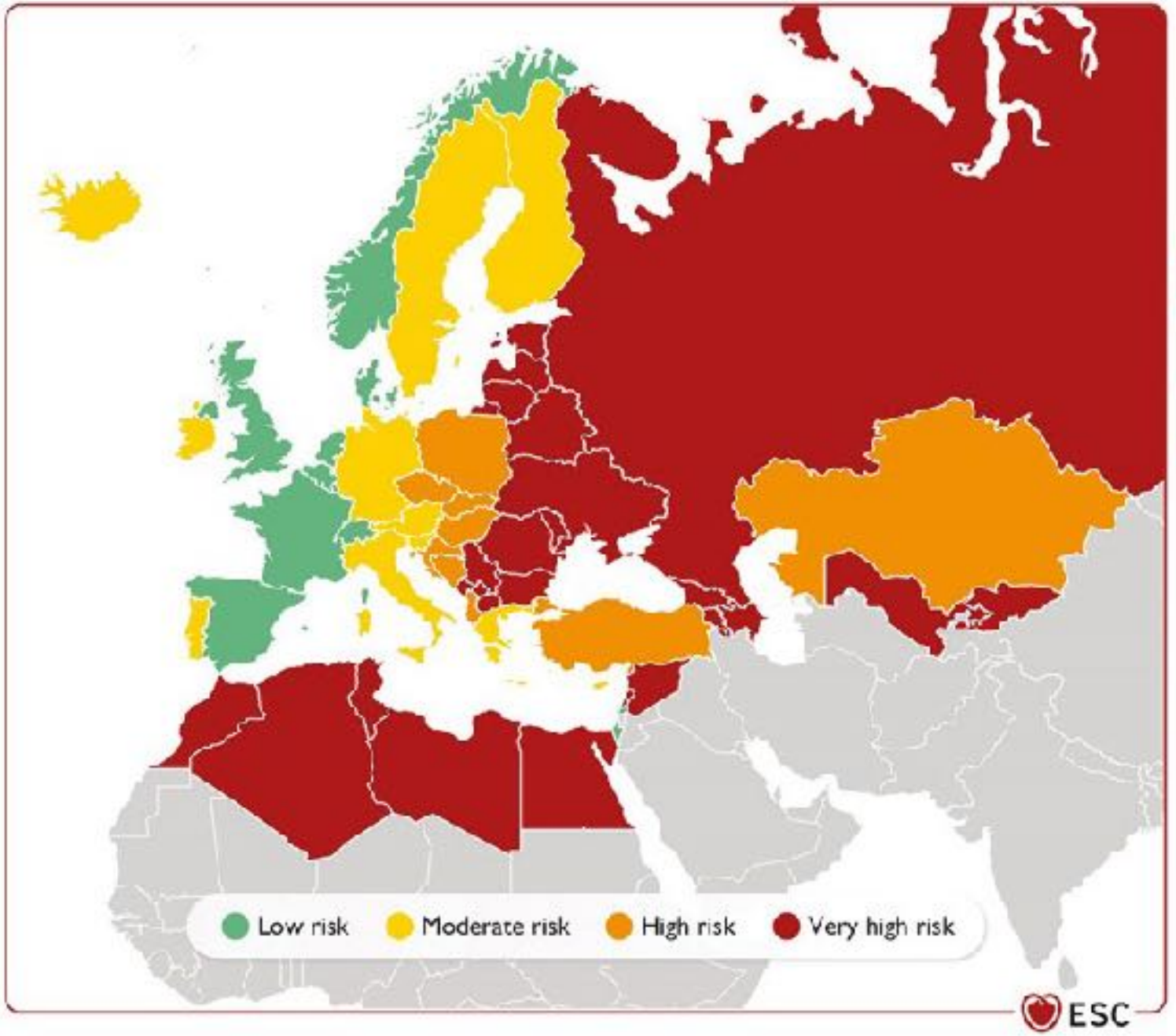
- Subtypes
  - ApoB (atherogeen) :
    - B100 (lever) : VLDL, IDL, LDL – bindt op LDL receptor
    - B48 (darmen) : chilomicronen
  - ApoA1 (lever-darm): chilomicronen, HDL





- Friedewald formule (mg/dl):
  LDL = TC – HDL – (TG/5)

- rol triglyceridenmetabolisme bij obesitas, metabool syndroom, DM II



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Wat missen we nog ?

- ~~**Diabetes mellitus**~~
- ~~**Familiale hypercholesterolemie**~~
- ~~**Nierlijden**~~

- Familiaal risico (1e graads verwanten)
- Voorgeschiedenis van hypertensieproblemen tijdens zwangerschap
- Lipoproteïne (a)
- Obesitas, slaapapneu
- Alcohol, druggebruik, stress, depressie, …
- Sedentaire levensstijl
- …

Aanpak - take home

E 2(OP) kaarten :

voor leeftijd,
≠ target)

epaalt” targets

ardio.org/guidelines

ig
ij mannen, 50 j bij vrouwen bij gekende risicofactor(en)
behandelde patiënt.