Singapore-modified Framingham Risk Score 2023 (SG-FRS-2023)

This resource accompanies the ACE Clinical Guidances "Lipid management: focus on cardiovascular risk" and "Hypertension – tailoring the management plan to optimise BP control" (published on 15 December 2023).

Please refer to pages 2 and 3 for the SG-FRS-2023 score sheet for men, and pages 4 and 5 for the score sheet for women.

Background

➢ The SG-FRS estimates the likelihood of non-fatal myocardial infarction or coronary death in asymptomatic individuals without medical conditions that confer high risk (such as cardiovascular disease or diabetes mellitus).

➢ In 2023, the SG-FRS was recalibrated to improve its predictive performance. The recalibrated SG-FRS-2023 supersedes the last published version found in the Ministry of Health Clinical Practice Guidelines (MOH-CPG) for Lipids (2016). For full details, refer to MOH Circular No. 88/2023.

Practice reminders

➢ As a result of recalibration, the 10-year risk score tables were updated (Table A2 and A4), while the points allocated for individual risk factors remain unchanged (Table A1 and A3). Estimated 10-year CV risk scores are overall lower compared to the previous version published in 2016.

➢ The risk score is not applicable to individuals with cardiovascular disease, familial hypercholesterolaemia, diabetes mellitus, or chronic kidney disease (defined as estimated glomerular filtration rate [eGFR] <60 mL/min/1.73m^2 and/or albumin creatinine ratio [ACR] ≥ 3 mg/mmol).

➢ Clinical judgment is advised in using risk scores as a factor of consideration in tailoring lipid management for any individual, as predictive tools are estimates derived from population data.

➢ SG-FRS-2023 does not predict ischaemic stroke or total ASCVD as an endpoint.

RECALIBRATED SINGAPORE-MODIFIED FRAMINGHAM RISK SCORE 2023 (SG-FRS-2023)

Table A1. Score sheet for points allocated to age, total and HDL cholesterol levels, smoking status and systolic blood pressure in men.

Age	Points
20-34	-9
35-39	-4
40- 44	0
45-49	3
50-54	6
55-59	8
60-64	10
65-69	11
70-74	12
75-79	13

Allocate points based on person's age, total and HDL cholesterol levels, smoking status and systolic blood pressure. Check the total points against table A2 for estimate of that person's 10-year CAD risk.

Total Cholesterol mmol/L (mg/dL)	Points				
	Age 20-39	Age 40-49	Age 50-59	Age 60-69	Age 70-79
<4.1 (160)	0	0	0	0	0
4.1-5.1 (160-199)	4	3	2	1	0
5.2-6.1 (200-239)	7	5	3	1	0
6.2-7.2 (240-279)	9	6	4	2	1
≥7.3 (280)	11	8	5	3	1

Smoking	Points				
	Age 20-39	Age 40-49	Age 50-59	Age 60-69	Age 70-79
Non-smoker	0	0	0	0	0
Smoker	8	5	3	1	1

HDL Cholesterol mmol/L (mg/dL)	Points
≥1.6 (60)	-1
1.3-1.5 (50-59)	0
1.0-1.2 (40-49)	1
<1.0 (40)	2

Systolic BP* (mmHg)	Points	
	If untreated	If treated
<120	0	0
120-129	0	1
130-139	1	2
140-159	1	2
≥160	2	3

BP = blood pressure

Table A2. Score sheet for the estimation of 10-year coronary artery disease risk in men based on the recalibrated SG-FRS-2023 model.

Total Points	10-Year Risk (%) from recalibrated SG-FRS-2023		
	Chinese	Malay	Indian
-5	<1%	<1%	<1%
-4	<1%	<1%	<1%
-3	<1%	<1%	<1%
-2	<1%	<1%	<1%
-1	<1%	<1%	<1%
0	<1%	<1%	<1%
1	<1%	<1%	1%
2	<1%	1%	1%
3	<1%	1%	1%
4	1%	1%	1%
5	1%	1%	2%
6	1%	2%	2%
7	1%	2%	3%
8	2%	3%	4%
9	2%	3%	5%
10	3%	4%	6%
11	3%	5%	7%
12	4%	7%	10%
13	5%	9%	12%
14	7%	11%	15%
15	9%	14%	19%
16	11%	18%	24%
17	14%	22%	30%
18	18%	28%	37%
19	23%	34%	45%
20	28%	42%	54%

Table A3. Score sheet for points allocated to age, total and HDL cholesterol levels, smoking status and systolic blood pressure in women.

Age	Points
20-34	-7
35-39	-3
40-44	0
45-49	3
50-54	6
55-59	8
60-64	10
65-69	12
70-74	14
75-79	16

Allocate points based on person's age, total and HDL cholesterol levels, smoking status and systolic blood pressure. Check the total points against table A4 for estimate of that person's 10-year CHD risk.

Total Cholesterol mmol/L (mg/dL)	Points				
	Age 20-39	Age 40-49	Age 50-59	Age 60-69	Age 70-79
<4.1 (160)	0	0	0	0	0
4.1-5.1 (160-199)	4	3	2	1	1
5.2-6.1 (200-239)	8	6	4	2	1
6.2-7.2 (240-279)	11	8	5	3	2
≥7.3 (280)	13	10	7	4	2

Smoking	Points				
	Age 20-39	Age 40-49	Age 50-59	Age 60-69	Age 70-79
Non-smoker	0	0	0	0	0
Smoker	9	7	4	2	1

HDL Cholesterol mmol/L (mg/dL)	Points
≥1.6 (60)	-1
1.3-1.5 (50-59)	0
1.0-1.2 (40-49)	1
<1.0 (40)	2

Systolic BP* (mmHg)	Points	
	If untreated	If treated
<120	0	0
120-129	1	3
130-139	2	4
140-159	3	5
≥160	4	6

BP = blood pressure

Table A4. Score sheet for the estimation of 10-year coronary artery disease risk in women based on the recalibrated SG-FRS-2023 model.

Total Points	10-Year Risk (%) from recalibrated SG-FRS-2023		
	Chinese	Malay	Indian
0	<1%	<1%	<1%
1	<1%	<1%	<1%
2	<1%	<1%	<1%
3	<1%	<1%	<1%
4	<1%	<1%	<1%
5	<1%	<1%	<1%
6	<1%	<1%	<1%
7	<1%	<1%	<1%
8	<1%	<1%	<1%
9	<1%	<1%	1%
10	<1%	1%	1%
11	<1%	1%	1%
12	<1%	1%	1%
13	1%	1%	2%
14	1%	1%	2%
15	1%	2%	3%
16	1%	2%	3%
17	2%	3%	4%
18	2%	4%	6%
19	3%	5%	7%
20	4%	7%	10%
21	5%	9%	12%
22	7%	11%	16%
23	8%	14%	20%
24	11%	18%	25%
25	14%	23%	31%
26	18%	29%	39%
27	22%	36%	47%

These risk scores are derived from the Framingham-based NCEP ATP III 10-Year Risk Score Tables which have been recalibrated using data from the Singapore Population Health Studies – Multi-ethnic Cohort Phase 1 (MEC1) and National Registry of Diseases Office. This recalibration (SG-FRS-2023) was carried out as part of a collaboration between investigators at the Singapore Ministry of Health and Saw Swee Hock School of Public Health, National University of Singapore and National University Health System.

Source*: Lim, C.G.Y. et al. (2023). Recalibrated Singapore-Modified Framingham Risk Score 2023 (SG-FRS-2023).https://blog.nus.edu.sg/sphs/files/2023/10/2023_Recalibrated_Singapore-Modified_Framingham_Risk_Score_SG-FRS-2023_report.pdf*