

## SUPPLEMENTAL MATERIAL

for

**American Heart Association’s Life’s Simple 7 lifestyle recommendations,  
polygenic risk, and lifetime risk of coronary heart disease**

### TABLE OF CONTENTS

<b>Supplemental Table 1. Baseline characteristics of the study population according to Life’s Simple 7 score.....</b>	<b>2</b>
<b>Supplemental Table 2. Remaining lifetime risk for CHD according to Life’s Simple 7 cardiovascular health factors in all participants.....</b>	<b>3</b>
<b>Supplemental Table 3. Relative risk of incident CHD by individual LS7 health factors in the total study population.....</b>	<b>4</b>
<b>Supplemental Table 4. CHD-free years and Overall Survival according to polygenic risk and Life’s Simple 7.....</b>	<b>5</b>
<b>Supplemental Table 5. Lifetime risk and years free of CHD according to polygenic risk and Life’s Simple 7, by race and sex.....</b>	<b>6</b>
<b>Supplemental Table 6. Lifetime risk of CHD according to polygenic risk and Life’s Simple 7*.....</b>	<b>7</b>
<b>Supplemental Table 7: Lifetime risk of CHD according to polygenic risk and family history of CHD*.....</b>	<b>8</b>
<b>Supplemental Figure 1. Relative risk of CHD according to polygenic risk and Life’s Simple 7 according to race.....</b>	<b>9</b>
<b>Supplemental Figure 2. Years free of CHD and Overall Survival according to polygenic risk and lifestyle stratified by sex.....</b>	<b>10</b>

**Supplemental Table 1. Baseline characteristics of the study population according to Life's Simple 7 score**

Baseline Characteristics	Ideal LS7 (N=3,100)	Intermediate LS7 (N=6,853)	Poor LS7 (N=733)	P*	Trend P†
Age, median [min,max]	52.0 [45.0, 65.0]	54.0 [45.0, 66.0]	55.0[45.0, 66.0]	<0.001	<0.001
Female, n (%)	1942 (62.6%)	3686 (53.8%)	456 (62.2%)	<0.001	<0.001
Family History of CHD‡				0.04	0.07
No	1883 (60.7%)	3984 (58.1%)	411 (56.1%)		
Yes	905 (29.2%)	2163 (31.6%)	212 (28.9%)		
Yes, premature CHD	272 (8.8%)	563 (8.2%)	73 (10.0%)		
BMI				<0.001	<0.001
Poor	137 (4.4%)	2129 (31.1%)	500 (68.2%)		
Intermediate	1052 (33.9%)	3015 (44.0%)	195 (26.6%)		
Ideal	1911 (61.6%)	1709 (24.9%)	38 (5.2%)		
Blood pressure				<0.001	<0.001
Poor	138 (4.5%)	2132 (31.1%)	515 (70.3%)		
Intermediate	647 (20.9%)	2454 (35.8%)	168 (22.9%)		
Ideal	2315 (74.7%)	2267 (33.1%)	50 (6.8%)		
Blood Sugar				<0.001	<0.001
Poor	20 (0.6%)	562 (8.2%)	269 (36.7%)		
Intermediate	645 (20.8%)	3131 (45.7%)	361 (49.2%)		
Ideal	2435 (78.5%)	3160 (46.1%)	103 (14.1%)		
Total Cholesterol				<0.001	<0.001
Poor	242 (7.8%)	2060 (30.1%)	449 (61.3%)		
Intermediate	1065 (34.4%)	2700 (39.4%)	214 (29.2%)		
Ideal	1793 (57.8%)	2093 (30.5%)	70 (9.5%)		
Physical Activity				<0.001	<0.001
Poor	293 (9.5%)	2959 (43.2%)	608 (82.9%)		
Intermediate	757 (24.4%)	1783 (26.0%)	96 (13.1%)		
Ideal	2050 (66.1%)	2111 (30.8%)	29 (4.0%)		
Diet				<0.001	<0.001
Poor	471 (15.2%)	2414 (35.2%)	388 (52.9%)		
Intermediate	2299 (74.2%)	4204 (61.3%)	337 (46.0%)		
Ideal	330 (10.6%)	235 (3.4%)	8 (1.1%)		
Smoking					
Poor	218 (7.0%)	2070 (30.2%)	429 (58.5%)	<0.001	<0.001
Intermediate	59 (1.9%)	200 (2.9%)	21 (2.9%)		
Ideal	2823 (91.1%)	4583 (66.9%)	283 (38.6%)		

BMI: body mass index, HDL: high-density lipoproteins, LS7, life's simple 7

\* P values determined using Pearson's chi-square tests and Kruskal-Wallis tests for categorical and continuous variables, respectively.

†P values for trend determined using Jonckheere-Terpstra test for ordinal categorical or continuous variables and Cochran-Armitage tests for binary variables.

‡ Family History is missing for 220 individuals (37 with a poor Life's Simple 7, 143 with an intermediate Life's Simple 7 and 40 with an ideal Life's Simple 7)

**Supplemental Table 2. Remaining lifetime risk for CHD according to Life's Simple 7 cardiovascular health factors in all participants**

<b>LS7 Health Factor</b>	<b>Category</b>	<b>Lifetime Risk (95% CI)</b>
Blood Sugar		
	Ideal	23.4% (21.7-25.1)
	Intermediate	30.5% (27.5-33.6)
	Poor	42.4% (38.1-47.1)
Total Cholesterol		
	Ideal	21.6% (19.7-23.6)
	Intermediate	28.3 (26.3-30.5)
	Poor	35.2 (31.5-39.2)
Blood pressure		
	Ideal	21.1 (19.3-23)
	Intermediate	29.9 (26.8-33.3)
	Poor	34.1 (31.7-36.7)
BMI		
	Ideal	20.7 (18.8-22.7)
	Intermediate	31.3 (28.7-34.2)
	Poor	30.6 (28.3-33)
Physical activity		
	Ideal	26.3 (22.9-30.1)
	Intermediate	28.7 (26.1-31.6)
	Poor	28.8 (26.8-30.8)
Healthy diet		
	Ideal	19.4 (15.6-24)
	Intermediate	27.5 (25.4-29.6)
	Poor	29.2 (27-31.6)
Smoking		
	Ideal	26.9 (24.5-29.3)
	Intermediate	30.6 (22.3-41)
	Poor	30 (27.9-32.3)
Abbreviations: BMI: body mass index, LS7: Life's Simple 7		

**Supplemental Table 3. Relative risk of incident CHD by individual LS7 health factors in the total study population\***

<b>Cardiovascular Health Factors</b>	<b>HR (95% CI)</b>	<b>P</b>
<b>Blood Sugar</b>		
Ideal	0.93 (0.85-1.03)	0.16
Intermediate	Ref	
Poor	1.68 (1.46-1.94)	1.9x10 <sup>-13</sup>
<b>Total Cholesterol</b>		
Ideal	0.72 (0.65-0.80)	6.4x10 <sup>-9</sup>
Intermediate	Ref	
Poor	1.23 (1.11-1.37)	3.3x10 <sup>-5</sup>
<b>Blood Pressure</b>		
Ideal	0.81 (0.73-0.90)	0.0002
Intermediate	ref	
Poor	1.25 (1.12-1.40)	7.9x10 <sup>-5</sup>
<b>BMI</b>		
Ideal	0.80 (0.71-0.89)	3.7x10 <sup>-5</sup>
Intermediate	Ref	
Poor	1.07 (0.96-1.18)	0.25
<b>Physical Activity</b>		
Ideal	0.84 (0.75-0.94)	0.002
Intermediate	ref	
Poor	0.97 (0.87-1.09)	0.61
<b>Healthy Diet</b>	ref	
Ideal	0.80 (0.64-1.01)	0.056
Intermediate	Ref	
Poor	1.03 (0.94-1.13)	0.56
<b>Smoking</b>		
Ideal	0.96 (0.73-1.27)	0.77
Intermediate	Ref	
Poor	1.36 (1.03-1.81)	0.06
BMI: body mass index, CHD: coronary heart disease, CI: confidence interval, HR: hazard ratio, LS7: Life's Simple 7 * HR (95% CI) and <i>p</i> values were calculated using Fine and Gray sub-distribution hazard regression which account for the competing risk of non-CHD death and adjust for all components, polygenic risk score, family history, sex, and study center		

**Supplemental Table 4. CHD-free years and Overall Survival according to polygenic risk and Life's Simple 7**

	Total Study Population		White Americans		Black Americans	
	Mean CHD-free years RMST ± SE	Overall Survival (years) RMST ± SE	Mean CHD-free years RMST ± SE	Overall Survival (years) RMST ± SE	Mean CHD-free years RMST ± SE	Overall Survival (years) RMST ± SE
<b>PRS</b>						
Low	81.5 ± 0.328	83.5 ± 0.283	81.9 ± 0.358	84.0 ± 0.321	80.1 ± 0.703	81.8 ± 0.584
Intermediate	79.3 ± 0.197	82.6 ± 0.160	79.6 ± 0.219	83.1 ± 0.175	78.2 ± 0.439	80.5 ± 0.368
High	76.6 ± 0.506	81.9 ± 0.400	76.5 ± 0.549	82.6 ± 0.299	77.2 ± 1.107	79.7 ± 1.131
<b>LS7</b>						
Ideal	83.8 ± 0.252	86.1 ± 0.226	83.8 ± 0.267	86.2 ± 0.236	83.9 ± 0.853	84.5 ± 0.832
Intermediate	78.1 ± 0.237	81.9 ± 0.187	77.9 ± 0.268	82.3 ± 0.168	78.7 ± 0.473	81.0 ± 0.438
Poor	70.3 ± 0.774	75.7 ± 0.508	68.2 ± 1.305	75.6 ± 0.754	72.3 ± 0.885	75.8 ± 0.704
CHD: coronary heart disease, LS7: life's simple 7, PRS: polygenic risk score, RMST: Irwin's restricted mean survival time, SE: standard error						

**Supplemental Table 5. Lifetime risk and years free of CHD according to polygenic risk and Life's Simple 7, by race and sex\***

	Total Population		White Americans		Black Americans	
PRS	Male	Female	Male	Female	Male	Female
Low	28% (23.7%-32.8%)	12.5% (10.1%-15.4%)	29.1% (24.0%-35.0%)	11.6% (9.2%-14.5%)	23.4% (16.3%-32.9%)	13.4% (8.7%-20.4%)
Years free of CHD	79.1 ± 0.522	83.4 ± 0.415	79.4 ± 0.58	84.1 ± 0.41	78.3 ± 1.01	81.4 ± 0.95
Intermediate	37.4% (33.6%-41.6%)	19.2% (17.4%-21.2%)	41.0% (35.3%-47.3%)	17.8% (15.8%-20.1%)	28.0% (23.4%-33.4%)	23.1% (19.5%-27.3%)
Years free of CHD	76.6± 0.294	81.4± 0.261	76.7 ± 0.33	82.2 ± 0.29	75.9 ± 0.69	79.2 ± 0.56
High	37.4% (33.6%-41.6%)	28.6% (24.9%-32.7%)	51.3% (46.2%-56.6%)	30.0% (25.7%-34.9%)	35.0% (27.1%-44.3%)	25.5% (19.3%-33.4)
Years free of CHD	72.5± 0.805	79.7± 0.617	71.4 ± 1.19	80.0 ± 0.47	75.9 ± 1.17	78.2 ± 2.24
LS7						
Ideal	28.0% (24.7%-31.5%)	9.3% (7.1%-12.0%)	29.5% (26.0%-33.3%)	9.0% (6.9%-11.7%)	8.4% (4.1%-17.0%)	17.2% (5.8%-44.6%)
Years free of CHD	80.5 ± 0.453	85.9± 0.301	80.4 ± 0.48	85.9 ± 0.31	81.6 ± 1.04	85.0 ± 1.12
Intermediate	39.4% (36.3%-42.8%)	22.4% (20.5%-24.3%)	43.1% (38.9%-47.5%)	22.7% (20.6%-24.9%)	27.5% (23.4%-32.2%)	21.1% (17.8%-24.9%)
Years free of CHD	75.5± 0.348	80.3 ± 0.318	75.2 ± 0.439	80.7 ± 0.29	77.0 ± 0.59	79.8 ± 0.69
Poor	51.6% (44.3%-59.3%)	37.3% (31.8%-43.4%)	53.9% (43.7%-64.7%)	41.9% (33.1%-52.1%)	49.4% (38.9%-60.9%)	33.3% (26.7%-41.0%)
Years free of CHD	67.2± 1.196	72.4 ± 0.931	66.2 ± 1.87	70.2 ± 1.616	68.4 ± 1.35	73.9 ± 1.12
LS7: Life's Simple 7, PRS: polygenic risk score						
*Data are cumulative incidence functions and 95% confidence intervals and Irwin's restricted mean survival and standard error						

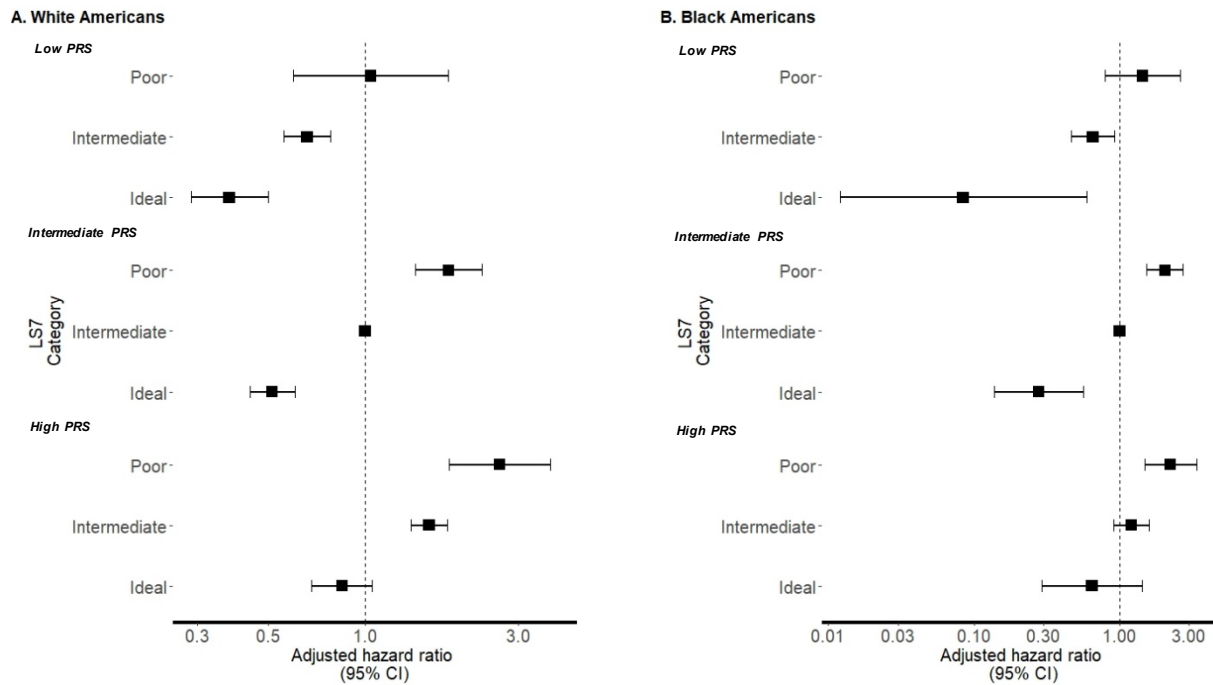
**Supplemental Table 6. Lifetime risk of CHD according to polygenic risk and Life's Simple 7\***

	<b>No Family History</b>	<b>Family History of CHD</b>	<b>Family History of premature CHD</b>
<b>Overall</b>	26.1% (23.7%-28.6%)	29.4% (27.3%-31.6%)	32.0% (27.9%-36.4%)
<b>PRS</b>			
Low	19.0% (16.2%-22.1%)	21.3% (16.2%-27.7%)	15.6% (8.5%-27.7%)
Intermediate	25.6% (22.6%-29.0%)	28.6% (26.1%-31.3%)	29.9% (25.4%-35.1%)
High	34.3% (30.2%-38.8%)	39.2% (34.5%-44.2%)	44.6% (36.2%-53.9%)
<b>LS7</b>			
Ideal	15.7% (13.1%-18.9%)	17.6% (14.8%-20.8%)	17.9% (13.2%-24.2%)
Intermediate	28.4% (25.6%-31.5%)	32.3% (29.8%-35.1%)	36.9% (31.6%-42.8%)
Poor	42.3% (36.1%-49.1%)	43.7% (36.6%-51.5%)	38.9% (26.9%-54.0%)
CHD: coronary heart disease, LS7: life's simple 7, PRS: polygenic risk score *Data are cumulative incidence functions and 95% confidence intervals			

**Supplemental Table 7: Lifetime risk of CHD according to polygenic risk and family history of CHD\***

	<b>No Family History</b>	<b>Family History of CHD</b>	<b>Family History of premature CHD</b>
<b>White Americans</b>			
<b>PRS</b>			
Low	18.4% (15.5%-21.8%)	21.7% (16.4%-28.4%)	16.3% (8.7%-29.4%)
Intermediate	26.7% (22.6%-31.3%)	28.7% (26.0%-31.7%)	30.2% (25.3%-35.7%)
High	36.8% (31.7%-42.4%)	41.5% (36.4%-47.0%)	43.9% (35.3%-53.6%)
<b>Black Americans</b>			
<b>PRS</b>			
Low	20.7% (14.4%-29.2%)	16.0% (9.0%-27.6%)	6.7% (1.0%-38.9%)
Intermediate	22.9% (19.6%-26.7%)	27.5% (21.9%-34.1%)	27.4% (16.7%-42.9%)
High	28.6% (22.3%-36.1%)	26.5% (18.4%-37.2%)	58.1% (32.5%-85.5%)
CHD: coronary heart disease, PRS: polygenic risk score *Data are cumulative incidence functions and 95% confidence intervals			

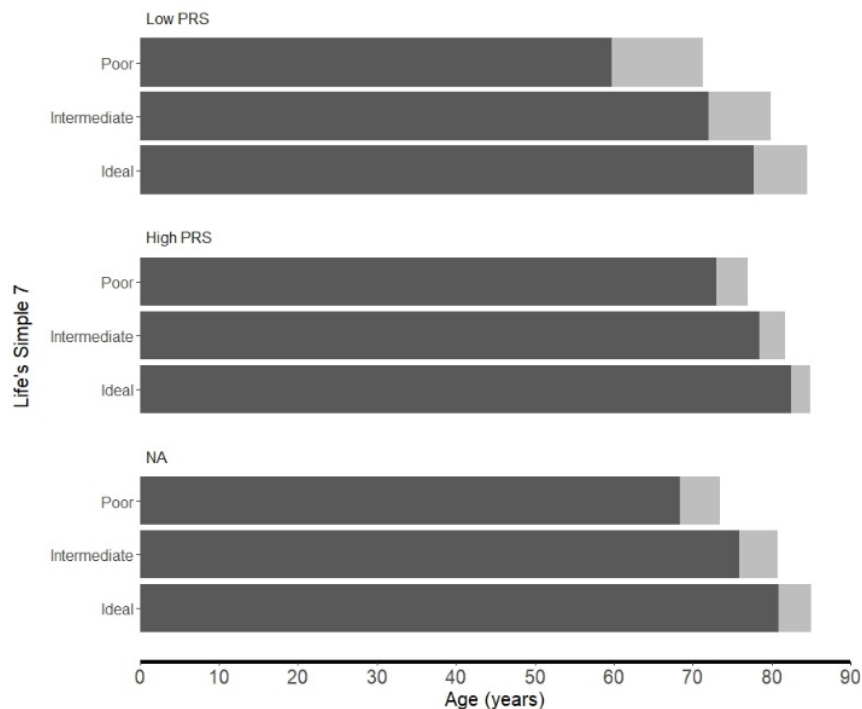




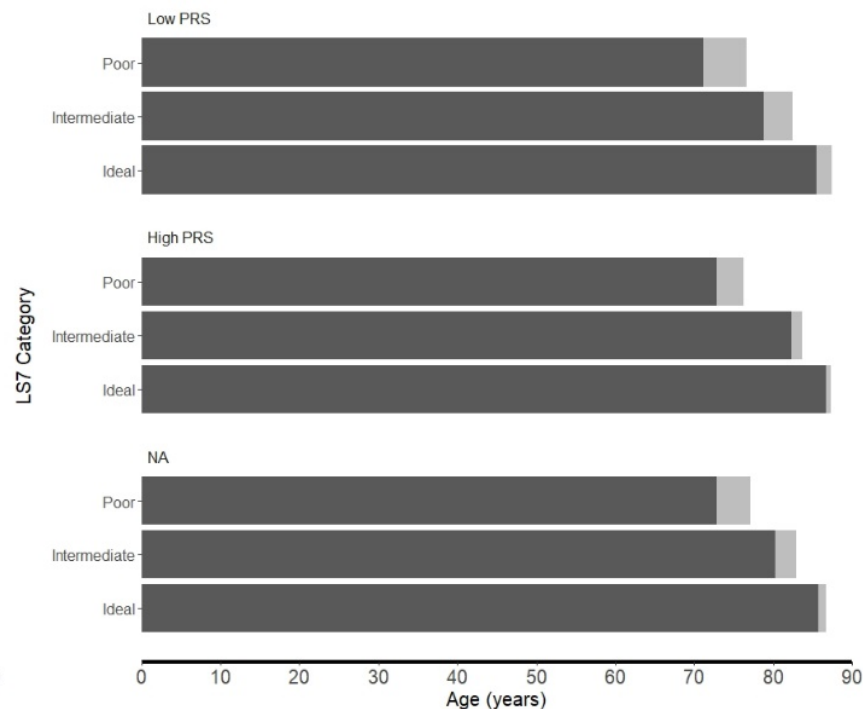
**Supplemental Figure 1. Relative risk of CHD according to polygenic risk and Life's Simple 7 according to race**

Figure is a forest plot represents the hazard ratio (HR) and 95% confidence interval for the joint effect of polygenic risk (PRS) and Life's Simple 7 (LS7) categories. Panel A reports estimates for White Americans and Panel B reports estimates for Black Americans. HRs were calculated accounting for the competing risk of death and adjusted for family history, sex and study center. Normal PRS and intermediate LS7 was used as the reference group.

**A. Male Participants**



**B. Female Participants**



**Supplemental Figure 2. Years free of CHD and Overall Survival according to polygenic risk and lifestyle stratified by sex**

Figure is a bar plot, where each bar represent Irwin's restricted survival mean time for incident coronary heart disease (CHD), or years free of CHD, and overall survival for participants according to polygenic risk score (PRS) and life's simple 7 (LS7) score category. Panel A reports the data for all male participants and Panel B reports the data for all female participants. Years free of CHD is in dark gray and overall survival is light gray.