

SUPPLEMENTAL MATERIAL

Data S1. Risk equation calculation

Example of individual 10 year CVD risk calculation with and without interventions

The hypothetical profile is profile 3 in Table 3, a white 45 year-old male with total cholesterol of 200 mg/dL, HDL-C of 40 mg/dL, and a treated systolic blood pressure of 160 mmHg. Regression coefficients are based on those published in Goff et al. (2013).

General equation without intervention for smokers:

$$1 - S_{10} * \exp[12.344 \ln(\text{age}) + 1.797 \ln(\text{SBP}) + 11.853 \ln(\text{TC}) - 7.99 \ln(\text{HDL}) + 7.837y - 2.664 \ln(\text{age}) \ln(\text{TC}) + 1.769 \ln(\text{age}) \ln(\text{HDL}) - 1.795 \ln(\text{age}) - 61.18]$$

where S_{10} is the baseline survival rate at 10 years, or 0.9144 and y is 1 for smoking and 0 for not smoking

Plugging in numbers gives

$$\begin{aligned} 1 - 0.9144 * \exp[12.344 \ln(45) + 1.797 \ln(160) + 11.853 \ln(200) - 7.99 \ln(40) \\ + 7.837(1) - 2.664 \ln(45) \ln(200) + 1.769 \ln(45) \ln(40) - 1.795 \ln(45) \\ - 61.18] \\ = 12.17\% \text{ risk} \end{aligned}$$

This is the baseline 10-year CVD risk.

With group therapy smoking cessation:

$$1 - S_{10} \exp[12.344 \ln(\text{age}) + 1.797 \ln(\text{SBP}) + 11.853 \ln(\text{TC}) - 7.99 \ln(\text{HDL}) + 7.837y - 2.664 \ln(\text{age}) \ln(\text{TC}) + 1.769 \ln(\text{age}) \ln(\text{HDL}) - 1.795 \ln(\text{age}) - 61.18]$$

Plugging in numbers gives

$$\begin{aligned} 1 - S_{10} \exp[12.344 \ln(45) + 1.797 \ln(160) + 11.853 \ln(200) - 7.99 \ln(40) + 7.837(0) \\ - 2.664 \ln(45) \ln 200 + 1.769 \ln(45) \ln(40) - 1.795 \ln(45) - 61.18] \\ = 4.64\% \text{ risk} \end{aligned}$$

This is the baseline risk for a non-smoker with the same clinical profile. Note that the value 7.837 is multiplied by 0 for a non-smoker and disappears in the equation.

The potential gain in risk reduction from becoming a non-smoker is $12.17\% - 4.64\% = 7.53\%$

However, not everyone who attempts to quit smoking will succeed. Based on published literature, with an unaided quit probability of 0.050 and a relative risk of 1.98, the probability of quitting with group therapy is 0.099, or 9.9%.

Thus, based on intention-to-treat calculations, the risk reduction for group therapy with smoking is

$$(0.099 - 0.050) * 7.53\% = 0.37\%$$

The general equation with the other interventions:

$$1 - S_{10} * \exp[12.344 \ln(\text{age}) + 1.797 \ln(\text{SBP} + \text{SBP change}) + 11.853 \ln(\text{TC} + \text{TC change}) - 7.99 \ln(\text{HDL} + \text{HDL change}) + 7.837y - 2.664 \ln(\text{age}) \ln(\text{TC} + \text{TC change}) + 1.769 \ln(\text{age}) \ln(\text{HDL} + \text{HDL change}) - 1.795 \ln(\text{age}) - 61.18]$$

With Mediterranean diet:

$$1 - 0.9144 * \exp[12.344 \ln(45) + 1.797 \ln(160 - 1.70) + 11.853 \ln(200 - 7.35) - 7.99 \ln(40 + 0.94) + 7.837(1) - 2.664 \ln(45) \ln(200 - 7.35) + 1.769 \ln(45) \ln(40 + 0.94) - 1.795 \ln(45) - 61.18] = 10.95\% \text{ risk}$$

With walking as aerobic exercise:

$$1 - 0.9144 * \exp[12.344 \ln(45) + 1.797 \ln(160 - 3.80) + 11.853 \ln(200 - 3.48) - 7.99 \ln(40 + 2.32) + 7.837(1) - 2.664 \ln(45) \ln(200 - 3.48) + 1.769 \ln(45) \ln(40 + 2.32) - 1.795 \ln(45) - 61.18] = 10.62\% \text{ risk}$$

With yoga:

$$1 - 0.9144 * \exp[12.344 \ln(45) + 1.797 \ln(160 - 4.45) + 11.853 \ln(200 - 17) - 7.99 \ln(40 + 2.87) + 7.837(1) - 2.664 \ln(45) \ln(200 - 17) + 1.769 \ln(45) \ln(40 + 2.87) - 1.795 \ln(45) - 61.18] = 9.25\% \text{ risk}$$

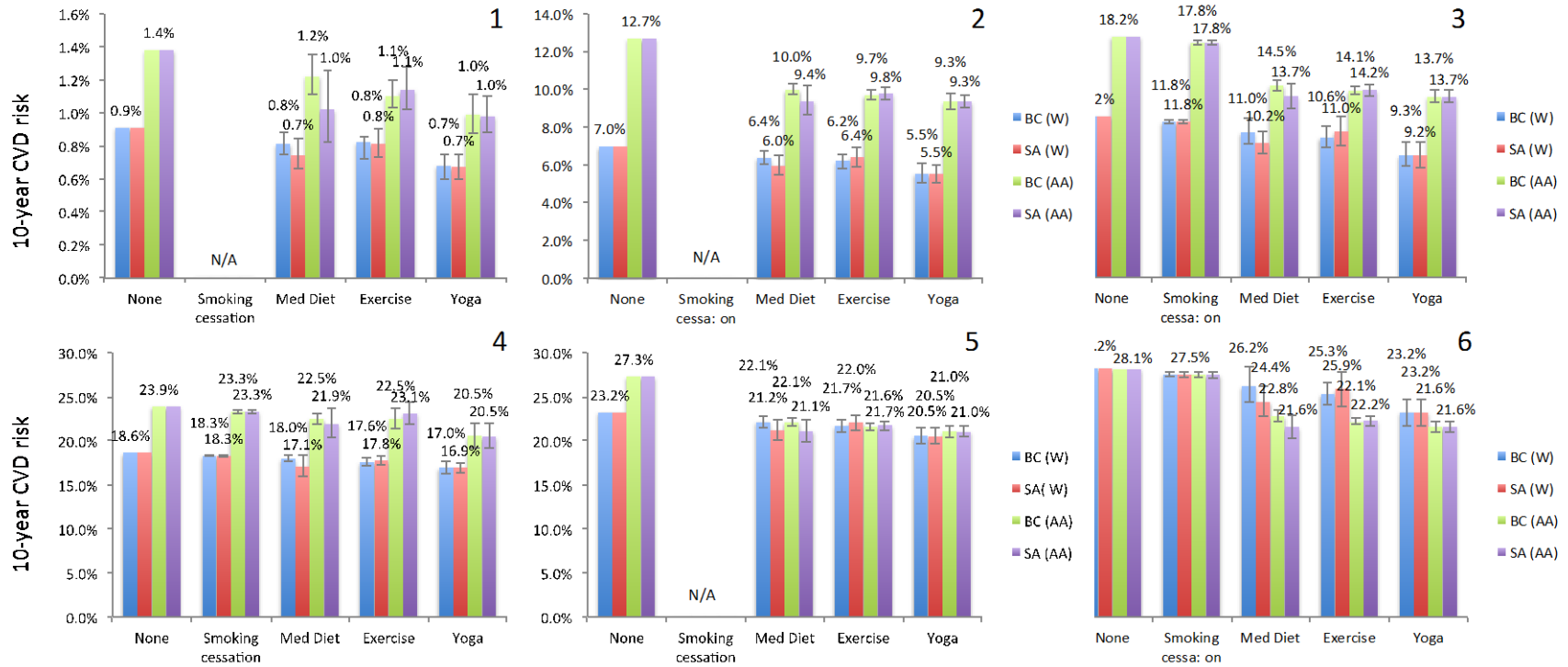
Table S1. Alternative estimates for effectiveness of lifestyle interventions on reducing CVD risk through changes in risk factors

Impact of Lifestyle Changes on Risk Factor due to Interventions				
Risk factor	Physician advice for smoking cessation	Mediterranean diet	Aerobic exercise	Yoga
Smoking (% quitting)	8.30* (7.10, 9.70) (28)	--	--	--
Systolic blood pressure (mmHg)	--	-1.70 (-3.35, -0.05) (29)	-3.84 (-4.97, -2.72) (34)	-5.85 (-8.81, -2.89) (25)
Total cholesterol (mg/dl)	--	-6.19‡ (-10.05, -2.32) (32)	1.16 (-9.28, 11.99) (33)	-13.09 (-19.60, -6.59) (25)
HDL cholesterol (mg/dl)	--	0.94 (-1.93, 3.82) (29)	2.32 (1.16, 3.87) (33)	2.94 (0.57, 5.31) (25)

* Probability of quitting smoking with physical advice compared to quitting without intervention. Assume same unassisted rate as base case (5%) (28). The relative proportion of quitting (relative risk) is 1.66 for physician advice versus control (95% CI: 1.42-1.94) (31).

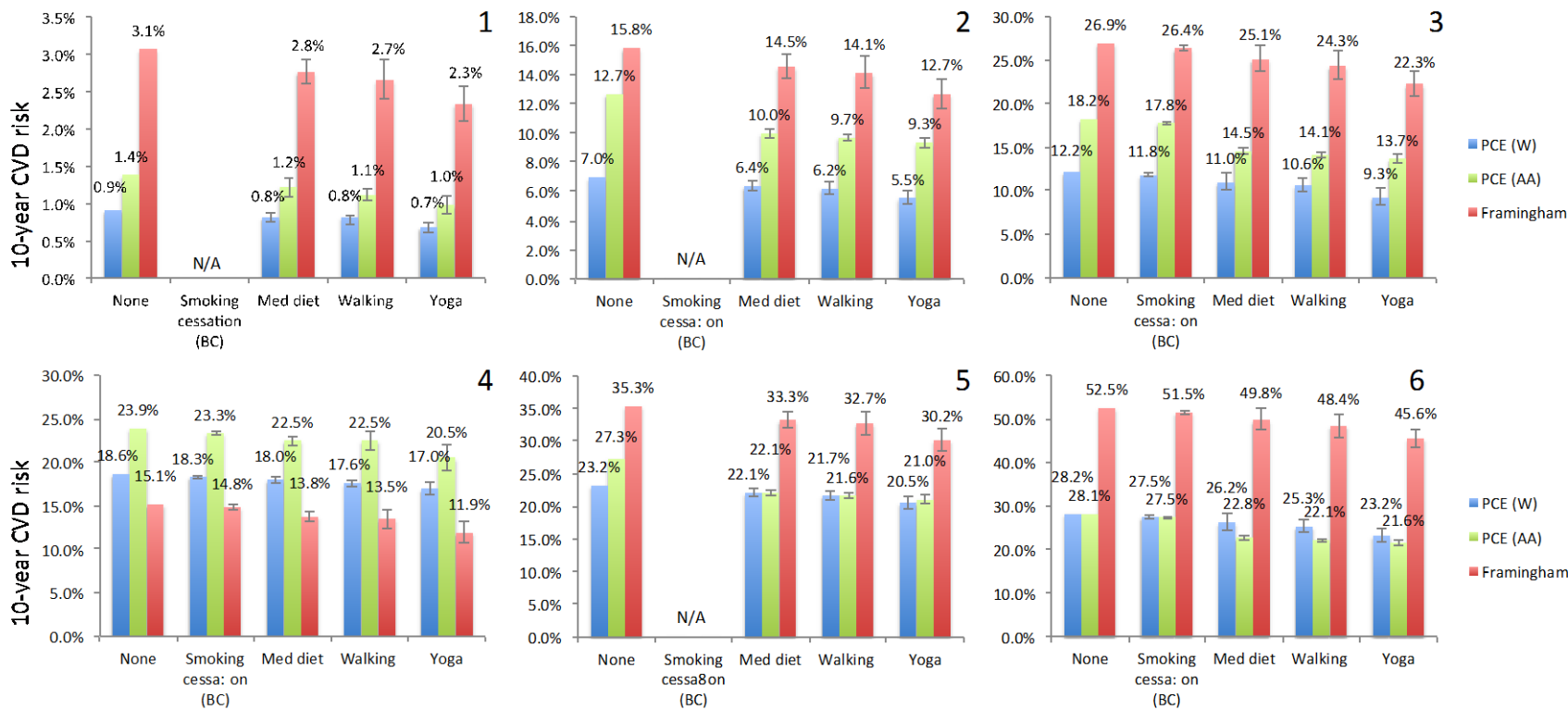
‡ Only this parameter was changed due to data availability.

Figure S1. Sensitivity analysis with alternate meta-analyses, shown by hypothetical profile (y-axes represent 10-year CVD risk, x-axes represent interventions). Note that the optimal intervention with the lowest 10-year risk with the alternate estimates (red and purple bars) remains the same as that in the base-case (blue and green bars) for each profile and race.



Abbreviations: CVD: cardiovascular disease, Med diet: Mediterranean diet, BC: base case, SA: sensitivity analysis, W: white, AA: African-American, N/A: not applicable

Figure S2. Sensitivity analysis with Framingham risk equations, shown by hypothetical profile (y-axes represent 10-year CVD risk, x-axes represent interventions). Note that the optimal intervention with the lowest 10-year risk with the Framingham equations (red bars) remains the same as that in the base-case (blue and green bars) for each profile.



Abbreviations: CVD: cardiovascular disease, Med diet: Mediterranean diet, PCE: Pooled Cohort Equations, W: white, AA: African-American, N/A: not applicable