

## Low-Risk Lifestyle and Mortality: Web Appendix

### WEB APPENDIX:

#### METHODS

##### **Coronary Artery Calcium**

CAC was measured using electron beam or multidetector computed tomography (CT). Calcium scores were adjusted using a standard calcium phantom containing four bars of known calcium density. The calcium phantom was used to calibrate the x-ray attenuation level between measurements and was scanned along with participants (1). The presence of CAC was defined as a volume score  $> 0$ , and a minimum focus of calcification (based on  $>4$  contiguous voxels) of  $1.15 \text{ mm}^3$  for the multidetector CT and  $1.38 \text{ mm}^3$  for the electron beam CT.

##### **CHD Events**

Total CHD events in MESA consisted of nonfatal MI, resuscitated cardiac arrest, angina pectoris, coronary revascularization, and death due to CHD. Myocardial infarction criteria from MESA included presence of chest pain and positive cardiac enzymes with or without electrocardiographic changes. Resuscitated cardiac arrest was categorized as either procedure or nonprocedure-related. Angina pectoris criteria included presence of chest pain with any of: 1) physician diagnosis or treatment for angina. 2) coronary artery bypass graft (CABG) surgery or percutaneous coronary intervention (PCI). 3) 70% or greater obstruction of coronary artery. 4) abnormal ST elevation or depression with pain on stress testing. 5) echocardiographic or nuclear stress test positive for ischemia. 6) ST elevations or depressions only present with chest pain. CHD events were independently classified by two physician members of the

MESA mortality and morbidity review committee, and in cases of disagreement the full committee made the final classification.

### **Lifestyle Score**

Dietary health was categorized based on a previously well-validated questionnaire quantifying Mediterranean diet adherence (2). The previously published questionnaire is based on a scale indicating degree of adherence to traditional Mediterranean diet based on nutrient frequency from 14 all-inclusive food groups. This scale has been associated with mortality, is well-validated in over 20,000 adults, and is easily reproducible (2). For beneficial foods (vegetables, legumes, fruits, nuts, cereal/grains, and fish), those with consumption at or below the population median were assigned a value of 0, while those above the median were assigned a value of 1. For detrimental foods, including full-fat dairy (more common whole than low-fat milk consumption), meat, and poultry, those with consumption below the population median were assigned a value of 1, while those at or above the median were assigned a value of 0.

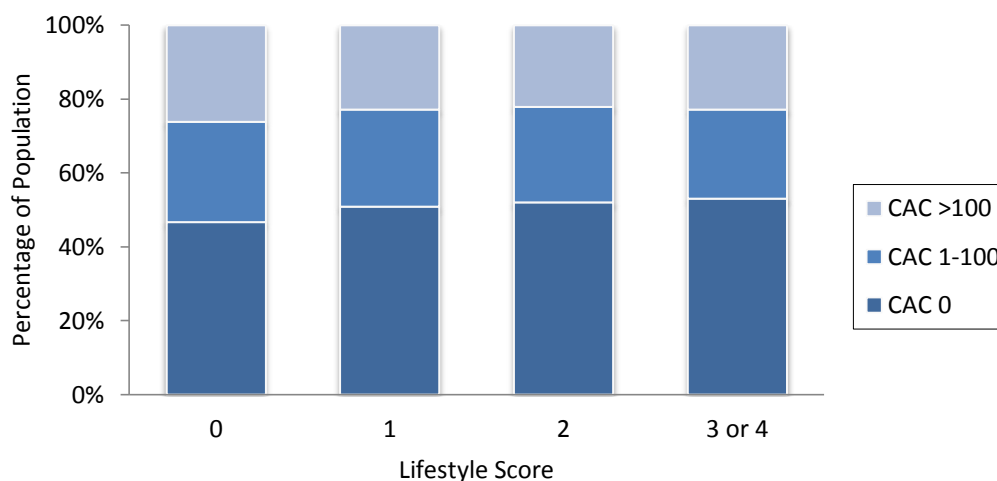
For alcohol intake, a value of 1 was assigned to men consuming between 10 and 50 g (approximately 1-5 drinks) per day and women consuming between 5 and 25 g (approximately 0.5-2.5 drinks) per day. Participants consuming a polyunsaturated-saturated fat ratio greater than the median were given a value of 1, while those at or below the median were given a value of 0. This resulted in a total Mediterranean-diet score ranging from 0 (poor adherence) to 11 (maximum adherence). Participants with a total diet score above the median received one point towards their comprehensive lifestyle score.

Physical activity data was obtained from the MESA Typical Week Physical Activity Survey (3). Respondents were asked how frequently they participated in physical activity categories including household chores, lawn care, transportation, child/adult care, walking, conditioning activities, dancing and sport activities, leisure activities, and occupational and volunteer activities over the course of a typical week in the prior month. Minutes of activity per week were summed for each activity type,

converted to hours, and then multiplied by metabolic equivalents to give total metabolic equivalent-hours per week for each of light-, moderate-, and vigorous-intensity activities. Participants that averaged >150 minutes/week of moderate-intensity physical activity or >75 minutes/week vigorous-intensity physical activity were considered to have adequate physical activity based on current AHA guidelines, and were awarded one point (4). Body-mass index (BMI) was measured by weight and height measurements at first MESA visit.

## REFERENCES

1. Nelson JC, Kronmal RA, Carr JJ, et al. Measuring Coronary Calcium on CT Images Adjusted for Attenuation Differences. *Radiology*. 2005;235(2):403–414.
2. Trichopoulou A, Costacou T, Bamia C, et al. Adherence to a Mediterranean Diet and Survival in a Greek Population. *NEJM* 2003;348:2599-608.
3. Bertoni AG, Whitt-Glover MC, Chung H, et al. The Association Between Physical Activity and Subclinical Atherosclerosis: The Multi-Ethnic Study of Atherosclerosis. *Am J Epidemiol*. 2009;169(4):444-454.
4. Haskell WL, Lee IM, Pate RR, et al. Physical Activity and Public Health: Updated Recommendation for Adults from the American College of Sports Medicine and the American Heart Association. *Circulation*. 2007;116(9):1081-1093.

**Web Figure 1: Prevalence of CAC at Baseline by Lifestyle Score****( $P < 0.001$ )****Web Table 1: Hazard Ratios of Suffering CHD Event By Lifestyle Score Over 7.6 Years**

Lifestyle Score	Hazard Ratio of CHD Event (95% CI)			
	Model 1	Model 2	Model 3	Model 4
<b>1</b>	1.11 (0.82,1.52)	1.03 (0.76,1.42)	1.08 (0.79,1.49)	1.15 (0.84,1.58)
<b>2</b>	0.82 (0.58,1.14)	0.78 (0.56,1.11)	0.85 (0.60,1.20)	0.91 (0.64,1.28)
<b>3</b>	0.61 (0.38,1.00)	0.60 (0.37,0.99)	0.70 (0.43,1.16)	0.75 (0.46,1.24)
<b>4</b>	0.72 (0.29,1.80)	0.68 (0.27,1.70)	1.02 (0.40,2.57)	1.06 (0.42,2.68)
<b>P Value</b>	0.009	0.011	0.104	0.185

Model 1 is unadjusted.

Model 2 is adjusted for age, race, gender, study site, and income.

Model 3 includes Model 2 plus additional adjustment for hypertension, hypertension medications, fasting plasma glucose, diabetes medications, non-HDL, HDL-C, TG, lipid-lowering medications, and CRP.

Model 4 includes Model 3 plus additional adjustment for baseline CAC.

**Web Table 2: Hazard Ratios of Death By Lifestyle Score Over 7.6 Years**

Lifestyle Score	Hazard Ratio of Death (95% CI)			
	Model 1	Model 2	Model 3	Model 4
<b>1</b>	0.79 (0.61,1.03)	0.77 (0.59,1.01)	0.76 (0.58,1.00)	0.78 (0.59,1.02)
<b>2</b>	0.61 (0.46,0.81)	0.54 (0.40,0.73)	0.54 (0.39,0.73)	0.54 (0.40,0.74)
<b>3</b>	0.49 (0.32,0.75)	0.49 (0.32,0.76)	0.49 (0.32,0.76)	0.50 (0.33,0.78)
<b>4</b>	0.19 (0.05,0.75)	0.20 (0.05,0.80)	0.22 (0.05,0.90)	0.22 (0.05,0.91)
<b>P Value</b>	<0.001	<0.001	<0.001	<0.001

Model 1 is unadjusted.

Model 2 is adjusted for age, race, gender, study site, and income.

Model 3 includes Model 2 plus additional adjustment for hypertension, hypertension medications, fasting plasma glucose, diabetes medications, non-HDL, HDL-C, TG, lipid-lowering medications, and CRP.

Model 4 includes Model 3 plus additional adjustment for baseline CAC.

Web Table 3: Hazard Ratios of CHD By Lifestyle Variable Over 7.6 Years

Lifestyle Variable	N	Cases	Hazard Ratio of CHD (95% CI)			
			Model 1	Model 2	Model 3	Model 4
<b>Healthy Diet</b>	2,821	139	1.01 (0.80,1.27)	0.89 (0.70,1.12)	0.89 (0.71,1.13)	0.90 (0.71,1.14)
<b>Normal BMI</b>	1,842	85	0.94 (0.73,1.22)	0.89 (0.68,1.15)	1.15 (0.88,1.53)	1.18 (0.89,1.55)
<b>Never Smoker</b>	3,416	139	*0.64 (0.51,0.80)	*0.76 (0.60,0.97)	*0.74 (0.58,0.94)	0.78 (0.62,1.00)
<b>Exercise</b>	1,202	56	0.88 (0.65,1.19)	0.90 (0.66,1.23)	0.93 (0.68,1.28)	0.91 (0.67,1.25)

Model 1 is unadjusted.

Model 2 is adjusted for age, race, gender, study site, and income.

Model 3 includes Model 2 plus additional adjustment for hypertension, hypertension medications, fasting plasma glucose, diabetes medications, non-HDL, HDL-C, TG, lipid-lowering medications, and CRP.

Model 4 includes Model 3 plus additional adjustment for baseline CAC.

Results are separate for each lifestyle variable, and are not adjusted for other lifestyle variables in the models.

Web Table 4: Hazard Ratios of Death By Lifestyle Variable Over 7.6 Years

Lifestyle Variable	N	Cases	Hazard Ratio of Death (95% CI)			
			Model 1	Model 2	Model 3	Model 4
<b>Healthy Diet</b>	2,821	171	1.06 (0.86,1.31)	0.93 (0.75,1.16)	0.93 (0.75,1.16)	0.93 (0.75,1.16)
<b>Normal BMI</b>	1,842	105	0.93 (0.73,1.17)	0.86 (0.66,1.10)	0.90 (0.69,1.16)	0.91 (0.70,1.17)
<b>Never Smoker</b>	3,416	158	*0.57 (0.46,0.71)	*0.57 (0.46,0.72)	*0.57 (0.45,0.71)	*0.58 (0.46,0.72)
<b>Exercise</b>	1,202	43	*0.52 (0.38,0.73)	*0.65 (0.47,0.91)	*0.66 (0.47,0.92)	*0.65 (0.47,0.91)

Model 1 is unadjusted.

Model 2 is adjusted for age, race, gender, study site, and income.

Model 3 includes Model 2 plus additional adjustment for hypertension, hypertension medications, fasting plasma glucose, diabetes medications, non-HDL, HDL-C, TG, lipid-lowering medications, and CRP.

Model 4 includes Model 3 plus additional adjustment for baseline CAC.

Results are separate for each lifestyle variable, and are not adjusted for other lifestyle variables in the models.