

Supplementary Appendix

Figure Legends

Supplementary Figure A: Calibration slopes and confidence intervals of models in training set (National Health and Nutrition Examination Survey, 1999-2010 linked to the 2011 National Death Index, N= 12600). All models included demographic variables age, sex, and race (Black race, Hispanic ethnicity). ACC=American College of Cardiology covariates of total cholesterol (mg/dL), high-density lipoprotein cholesterol (HDL; mg/dL), systolic blood pressure (mmHg), blood pressure treatment status (yes/no), diabetes status (yes/no), and current smoking status (yes/no), HEI=healthy eating index, AHEI=alternative healthy eating index, MDS=Mediterranean diet score, DASH=dietary approaches to stop hypertension diet score, GBM=gradient boosted machine, RF=random forest

Supplementary Figure B: Model discrimination (C-statistic) in training set (National Health and Nutrition Examination Survey, 1999-2010 linked to the 2011 National Death Index, N= 12600). All models included demographic variables age, sex, and race (Black race, Hispanic ethnicity). ACC=American College of Cardiology covariates of total cholesterol (mg/dL), high-density lipoprotein cholesterol (HDL; mg/dL), systolic blood pressure (mmHg), blood pressure treatment status (yes/no), diabetes status (yes/no), and current smoking status (yes/no), HEI=healthy eating index, AHEI=alternative healthy eating index, MDS=Mediterranean diet score, DASH=dietary approaches to stop hypertension diet score, GBM=gradient boosted machine, RF=random forest

Supplementary Figure C: Partial dependence plots for best model (100 trees, interaction depth 5 using demographics, ACC variables, and full nutrition profile) for (a) age and (b) systolic blood pressure. Plots estimated by averaging model predictions for by decile of age or SBP.

Supplementary Table A: List of all predictor variables included in statistical models

Variable name	Definition
Demographic and risk factors (4)	
age	Age in years
sex	Sex (0 if male, 1 if female)
black	Black race (0 if no, 1 if yes)
hispanic	Hispanic ethnicity (0 if no, 1 if yes)
ACC covariates (7)	
total_chol	Total cholesterol (mg/dL)
hdl	HDL cholesterol (mg/dL)
sbp	Systolic blood pressure (mmHg)
dbp	Diastolic blood pressure (mmHg)
bpmeds	Number of blood pressure medications
dm	Type 2 diabetes (0 if no, 1 if yes)
tob	Current smoking (0 if no, 1 if yes)
Composite nutrition variables (4)	
hei	Healthy eating index (0-100)
ahei	Alternative healthy eating index (0-110)
mds	Mediterranean diet score (0-9)
dash	DASH diet score (0-80)
24-hour recall variables (103)	
milk_g	Milk and milk drinks (g)
cream_g	Creams and cream substitutes (g)
milk_dessert_g	Milk desserts, sauces, gravies (g)
cheese_g	Cheeses (g)
meat_ns_g	Meat, not specified as to type (g)
beef_g	Beef (g)
pork_g	Pork (g)
lamb_g	Lamb, veal, game, other carcass meat (g)
poultry_g	Poultry (g)
organ_meat_g	Organ meats, sausages, and lunchmeats, and meat spreads (g)
fish_g	Fish and shellfish (g)
meat_nonmeat_g	Meat, poultry, fish with nonmeat items (g)
protein_frozen_g	Protein and shelf-stable plate meals, soups, and gravies with meat, poultry fish base; gelatin and gelatin-based drinks
eggs_g	Eggs (g)
egg_mixture_g	Egg mixtures (g)
egg_sub_g	Egg substitutes (g)
egg_frozen_g	Frozen plate meals with egg as major ingredient (g)
legumes_g	Legumes (g)
nuts_g	Nuts, nut butters, and nut mixtures (g)
seeds_g	Seeds and seed mixtures (g)
carob_g	Carob products (g)
flour_mix_g	Flour and dry mixes (g)
bread_yeast_g	Yeast breads, rolls (g)
bread_quick_g	Quick breads (g)
pastries_g	Cakes, cookies, pies, pastries, bars (g)

crackers_g	Crackers and salty snacks from grain products (g)
pancakes_g	Pancakes, waffles, French toast, other grain products (g)
pastas_g	Pastas, cooked cereals, rice (g)
cereals_g	Cereals, not cooked or not specified as to cooked (g)
grain_mix_g	Grain mixtures, frozen plate meals, soups (g)
meat_sub_g	Meat substitutes, mainly cereal protein (g)
citrus_g	Citrus fruits, juices (g)
fruit_dried_g	Dried fruits (g)
fruit_other_g	Other fruits (g)
fruit_juice_g	Fruit juices and nectars excluding citrus (g)
fruit_baby_g	Fruit and juices baby food (g)
potatoes_g	White potatoes and Puerto Rican starchy vegetables (g)
veg_darkgreen_g	Dark-green vegetables (g)
veg_deepyellow_g	Deep-yellow vegetables (g)
tomatoes_g	Tomatoes and tomato mixtures (g)
veg_other_g	Other vegetables (g)
veg_baby_g	Vegetables and mixtures mostly vegetables baby food (g)
veg_meat_g	Vegetables with meat, poultry, fish (g)
veg_mixture_g	Mixtures mostly vegetables without meat, poultry, fish (g)
fats_g	Fats (g)
oils_g	Oils (g)
salad_dressing_g	Salad dressings (g)
sweets_g	Sugars and sweets (g)
bev_nonalcohol_g	Nonalcoholic beverages (g)
bev_alcohol_g	Alcoholic beverages (g)
water_g	Water, noncarbonated (g)
bev_nutrition_g	Formulated nutrition beverages, energy drinks, sports drinks, functional beverages (g)
kcal	Energy (kcal)
protein_g	Protein (g)
carb_g	Carbohydrates (g)
fiber_g	Fiber (g)
fat_g	Fat (g)
fat_sat_g	Saturated fats (g)
fat_mono_g	Monounsaturated fats (g)
fat_poly_g	Polyunsaturated fats (g)
cholesterol_mg	Cholesterol (mg)
vite_mg	Vitamin-E as alpha-tocopherol (mg)
vita_mcg	Vitamin A, RAE (mcg)
betacar_mcg	Beta-carotene (mcg)
vitb1_mg	Thiamin (Vitamin B1) (mg)
vitb2_mg	Riboflavin (Vitamin B2) (mg)

niacin_mg	Niacin (mg)
vitb6_mg	Vitamin B6 (mg)
folate_mcg	Total folate (mcg)
vitb12_mcg	Vitamin B12 (mcg)
vitc_mg	Vitamin C (mg)
calcium_mg	Calcium (mg)
phosphorus_mg	Phosphorus (mg)
magnesium_mg	Magnesium (mg)
iron_mg	Iron (mg)
zinc_mg	Zinc (mg)
copper_mg	Copper (mg)
sodium_mg	Sodium (mg)
potassium_mg	Potassium (mg)
selenium_mcg	Selenium (mg)
caffeine_mg	Caffeine (mg)
theobromine_mg	Theobromine (mg)
alcohol_gm	Alcohol (gm)
sfa_40_gm	SFA 4:0 (Butanoic) (g)
sfa_60_gm	SFA 6:0 (Hexanoic) (g)
sfa_80_gm	SFA 8:0 (Octanoic) (g)
sfa_100_gm	SFA 10:0 (Decanoic) (g)
sfa_120_gm	SFA 12:0 (Dodecanoic) (g)
sfa_140_gm	SFA 14:0 (Tetradecanoic) (g)
sfa_160_gm	SFA 16:0 (Hexadecanoic) (g)
sfa_180_gm	SFA 18:0 (Octadecanoic) (g)
mfa_161h_gm	MFA 16:1 (Hexadecanoic) (g)
mfa_161o_gm	MFA 16:1 (Octadecanoic) (g)
mfa_201_gm	MFA 20:1 (Eicosenoic) (g)
mfa_221_gm	MFA 22:1 (Docosenoic) (g)
pfa_182_gm	PFA 18:2 (Octadecadienoic) (g)
pfa_183_gm	PFA 18:3 (Octadecatrienoic) (g)
pfa_184_gm	PFA 18:4 (Octadecatetraenoic) (g)
pfa_204_gm	PFA 20:4 (Eicosatetraenoic) (g)
pfa_205_gm	PFA 20:5 (Eicosapentaenoic) (g)
pfa_225_gm	PFA 22:5 (Docosapentaenoic) (g)
pfa_226_gm	PFA 22:6 (Docosahexaenoic) (g)
water_yesterday_gm	Total plain water drank yesterday (g)

Supplementary Table B: Percentage of missing data for variables included in analysis

Variable	Percentage missing
milk_g	10.99
cream_g	10.99
milk_dessert_g	10.99
cheese_g	10.99
meat_ns_g	10.99
beef_g	10.99
pork_g	10.99
lamb_g	10.99
poultry_g	10.99
organ_meat_g	10.99
fish_g	10.99
meat_nonmeat_g	10.99
protein_frozen_g	10.99
eggs_g	10.99
egg_mixture_g	10.99
egg_sub_g	10.99
egg_frozen_g	10.99
legumes_g	10.99
nuts_g	10.99
seeds_g	10.99
carob_g	10.99
flour_mix_g	10.99
bread_yeast_g	10.99
bread_quick_g	10.99
pastries_g	10.99
crackers_g	10.99
pancakes_g	10.99
pastas_g	10.99
cereals_g	10.99
grain_mix_g	10.99
meat_sub_g	10.99
citrus_g	10.99
fruit_dried_g	10.99
fruit_other_g	10.99
fruit_juice_g	10.99
fruit_baby_g	10.99
potatoes_g	10.99
veg_darkgreen_g	10.99
veg_deepyellow_g	10.99
tomatoes_g	10.99
veg_other_g	10.99
veg_baby_g	10.99
veg_meat_g	10.99
veg_mixture_g	10.99

Variable	Percentage missing
fats_g	10.99
oils_g	10.99
salad_dressing_g	10.99
sweets_g	10.99
bev_nonalcohol_g	10.99
bev_alcohol_g	10.99
water_g	10.99
bev_nutrition_g	10.99
permth_int	0.00
bpmeds	0.00
kcal	10.98
protein_g	10.98
carb_g	10.98
fiber_g	10.98
fat_g	10.98
fat_sat_g	10.98
fat_mono_g	10.98
fat_poly_g	10.98
cholesterol_mg	10.98
vite_mg	10.98
vita_mg	10.98
betacarot_mcg	10.98
vitb1_mg	10.98
vitb2_mg	10.98
niacin_mg	10.98
vitb6_mg	10.98
folate_mcg	10.98
vitb12_mcg	10.98
vitc_mg	10.98
calcium_mg	10.98
phosphorus_mg	10.98
magnesium_mg	10.98
iron_mg	10.98
zinc_mg	10.98
copper_mg	10.98
sodium_mg	10.98
potassium_mg	10.98
selenium_mcg	10.98
caffeine_mg	10.98
theobromine_mg	10.98
alcohol_gm	10.98
sfa_40_gm	10.98
sfa_60_gm	10.98
sfa_80_gm	10.98
sfa_100_gm	10.98

Variable	Percentage missing
sfa_120_gm	10.98
sfa_140_gm	10.98
sfa_160_gm	10.98
sfa_180_gm	10.98
mfa_161h_gm	10.98
mfa_161o_gm	10.98
mfa_201_gm	10.98
mfa_221_gm	10.98
pfa_182_gm	10.98
pfa_183_gm	10.98
pfa_184_gm	10.98
pfa_204_gm	10.98
pfa_205_gm	10.98
pfa_225_gm	10.98
pfa_226_gm	10.98
water_yesterday_gm	10.82
age	0.00
sex	0.00
black	29.66
hispanic	0.00
sbp	10.77
tob	0.00
hdl	12.21
total_chol	12.21
pov	8.96
dm	47.92
cvdevent	0.00
hd	0.00
cereb	0.00
educ2	7.35
hei	11.05
ahei	10.99
mds	11.05
dash	29.76

Supplementary Table C: TRIPOD checklist

Title and abstract			Page number
Title	1	Identify the study as developing and/or validating a multivariable prediction model, the target population, and the outcome to be predicted	1
Abstract	2	Provide a summary of objectives, study design, setting, participants, sample size, predictors, outcome, statistical analysis, results, and conclusions	2
Introduction			
Background and objectives	3a	Explain the medical context (including diagnostic or prognostic) and rationale for developing or validating the multivariable prediction model, including references to existing models	4-5
	3b	Specify the objectives, including whether the study describes the development or validation of the model, or both	4-5
Methods			
Source of data	4a	Describe the study design or sources of data (e.g., randomized trial, cohort, or registry data), separately for the development and validation data sets, if applicable	5
	4b	Specify the key study dates, including start of accrual; end of accrual; and, if applicable, end of follow-up	5
Participants	5a	Specify key elements of the study setting (e.g., primary care, secondary care, general population) including number and location of centers	5
	5b	Describe eligibility criteria for participants	6
	5c	Give details of treatments received, if relevant	N/A
Outcome	6a	Clearly define the outcome that is predicted by the prediction model, including how and when assessed	6
	6b	Report any actions to blind assessment of the outcome to be predicted	6
Predictors	7a	Clearly define all predictors used in developing the multivariable prediction model, including how and when they were measured	6, Supp Table A
	7b	Report any actions to blind assessment of predictors for the outcome and other predictors	6
Sample size	8	Explain how the study size was arrived at	7
Missing data	9	Describe how missing data were handled (e.g., complete-case analysis, single imputation, multiple imputation) with details of any imputation method	7
Statistical analysis	10a	Describe how predictors were handled in the analysis (D)	6-7
	10b	Specify type of model, all model-building procedures (including any predictor selection), and method for internal validation (D)	7-8
	10c	For validation, describe how predictions were calculated (V)	9
	10d	Specify all measures used to assess model performance and, if relevant, to compare multiple models	8-9
	10e	Describe any model updating (e.g., recalibration) arising from the validation, if done (V)	9
Risk groups	11	Provide details on how risk groups were created, if done	N/A
Development vs. validation	12	For validation, identify any differences from the development data in setting, eligibility criteria, outcome, and predictors (V)	N/A
Results			
Participants	13a	Describe the flow of participants through the study, including the number of participants with and without the outcome and, if applicable, a summary of the follow-up time. A diagram may be helpful.	10
	13b	Describe the characteristics of the participants (basic demographics, clinical features, available predictors), including number of participants with missing data for predictors and outcome	10, Table 1
	13c	For validation, show a comparison with the development data of the distribution of important variables (demographics, predictors, and outcome) (V)	10, Table 1
Model development	14a	Specify the number of participants and outcome events in each analysis (D)	10-11
	14b	If done, report the unadjusted association between each candidate predictor and outcome (D)	12-13, Supp Table P
Model specification	15a	Present the full prediction model to allow predictions for individuals (i.e., all regression coefficients, and model intercept or baseline survival at a given time point) (D)	12-13, Supp Table P, GitHub repository
	15b	Explain how to use the prediction model (D)	12-13
Model performance	16	Report performance measures (with CIs) for the prediction model	11-13
Model updating	17	If done, report the results from any model updating (i.e., model specification, model performance) (V)	N/A
Discussion			
Limitations	18	Discuss any limitations of the study (such as non-representative sample, few events per predictor, missing data)	15
Interpretation	19a	For validation, discuss the results with reference to performance in the development data, and any other validation data (V)	14-15
	19b	Give an overall interpretation of the results, considering objectives, limitations, results from similar studies, and other relevant evidence	15-16
Implications	20	Discuss the potential clinical use of the model and implications for future research	15-16
Other information			
Supplementary information	21	Provide information about the availability of supplementary resources, such as study protocol, Web calculator, and data sets	10
Funding	22	Give the source of funding and the role of the funders for the present study	16

Supplementary Table D: Internal validation results from models including demographic and ACC variables only. Criteria is equal to $(\text{slope}-1)^2 + (\text{C-statistic}-1)^2$.

	Intercept	Slope	C-Statistic	Criteria
	95% CI	95% CI	95% CI	
Cox	0.0011 -0.0016 0.0038	0.5144 0.4941 0.5348	0.8607 0.8517 0.8698	0.2552
GBM: 100, 1	-0.0004 -0.0070 0.0061	0.5415 0.4919 0.5910	0.8761 0.8680 0.8842	0.2256
GBM: 100, 5	-0.0022 -0.0044 0.0000	0.5550 0.5399 0.5702	0.8990 0.8912 0.9068	0.2082
GBM: 100, 10	-0.0039 -0.0106 0.0029	0.5678 0.5237 0.6118	0.9163 0.9088 0.9238	0.1938
GBM: 300, 1	0.0005 -0.0070 0.0079	0.5388 0.4847 0.5930	0.8747 0.8664 0.8831	0.2284
GBM: 300, 5	-0.0014 -0.0050 0.0023	0.5436 0.5186 0.5687	0.8963 0.8884 0.9042	0.2191
GBM: 300, 10	-0.0038 -0.0068 -0.0007	0.5719 0.5514 0.5924	0.9140 0.9065 0.9215	0.1907
GBM: 500, 1	-0.0004 -0.0070 0.0062	0.5401 0.4908 0.5894	0.8767 0.8685 0.8849	0.2267
GBM: 500, 5	-0.0014 -0.0042 0.0015	0.5493 0.5295 0.5691	0.8985 0.8907 0.9063	0.2134
GBM: 500, 10	-0.0020 -0.0052 0.0012	0.5488 0.5279 0.5696	0.9113 0.9037 0.9189	0.2114
RF: 100, 1	-0.0462 -0.0824 -0.0101	1.3190 0.8935 1.7445	0.9210 0.9140 0.9279	0.1080
RF: 100, 5	-0.0185 -0.0489 0.0118	0.7434 0.5668 0.9199	0.9728 0.9705 0.9751	0.0666
RF: 100, 10	-0.0191 -0.0526 0.0144	0.7191 0.5421 0.8961	0.9720 0.9696 0.9744	0.0797
RF: 300, 1	-0.0442 -0.0750 -0.0135	1.2884 0.9315 1.6454	0.9210 0.9140 0.9279	0.0894

RF: 300, 5	-0.0156	0.7380	0.9731	0.0694
	-0.0409	0.5808	0.9708	
	0.0096	0.8951	0.9755	
RF: 300, 10	-0.0194	0.7222	0.9724	0.0779
	-0.0535	0.5423	0.9701	
	0.0147	0.9021	0.9747	
RF: 500, 1	-0.0475	1.3431	0.9272	0.1230
	-0.0805	0.9557	0.9206	
	-0.0145	1.7304	0.9337	
RF: 500, 5	-0.0198	0.7633	0.9763	0.0566
	-0.0524	0.5706	0.9741	
	0.0128	0.9560	0.9784	
RF: 500, 10	-0.0219	0.7462	0.9758	0.0650
	-0.0610	0.5376	0.9736	
	0.0172	0.9549	0.9780	

Supplementary Table E: *Internal* validation results from models including demographic, ACC variables, and HEI. Criteria is equal to $(\text{slope}-1)^2 + (\text{C-statistic}-1)^2$.

	Intercept	Slope	C-Statistic	Criteria
	95% CI	95% CI	95% CI	
Cox	0.0009	0.5165	0.8608	0.2531
	-0.0018	0.4962	0.8517	
	0.0036	0.5368	0.8699	
GBM: 100, 1	-0.0006	0.5595	0.8762	0.2094
	-0.0065	0.5159	0.8679	
	0.0054	0.6031	0.8845	
GBM: 100, 5	-0.0018	0.5513	0.8992	0.2115
	-0.0041	0.5348	0.8914	
	0.0006	0.5678	0.9070	
GBM: 100, 10	-0.0043	0.5829	0.9107	0.1819
	-0.0113	0.5354	0.9027	
	0.0028	0.6305	0.9187	
GBM: 300, 1	-0.0015	0.5601	0.8752	0.2091
	-0.0068	0.5200	0.8668	
	0.0037	0.6003	0.8837	
GBM: 300, 5	-0.0032	0.5638	0.9027	0.1997
	-0.0071	0.5366	0.8950	
	0.0008	0.5910	0.9105	
GBM: 300, 10	-0.0049	0.5859	0.9191	0.1780
	-0.0106	0.5482	0.9118	
	0.0008	0.6236	0.9264	

GBM: 500, 1	-0.0007	0.5485	0.8754	0.2194
	-0.0076	0.4959	0.8671	
	0.0062	0.6011	0.8836	
GBM: 500, 5	-0.0030	0.5680	0.9009	0.1964
	-0.0063	0.5456	0.8931	
	0.0002	0.5904	0.9088	
GBM: 500, 10	-0.0035	0.5777	0.9144	0.1857
	-0.0086	0.5437	0.9068	
	0.0016	0.6117	0.9219	
RF: 100, 1	-0.0463	1.3193	0.9302	0.1068
	-0.0772	0.9646	0.9239	
	-0.0154	1.6740	0.9365	
RF: 100, 5	-0.0193	0.7561	0.9759	0.0601
	-0.0512	0.5684	0.9737	
	0.0125	0.9439	0.9782	
RF: 100, 10	-0.0207	0.7366	0.9757	0.0700
	-0.0575	0.5408	0.9735	
	0.0160	0.9325	0.9779	
RF: 300, 1	-0.0448	1.2936	0.9345	0.0905
	-0.0793	0.9023	0.9285	
	-0.0102	1.6848	0.9405	
RF: 300, 5	-0.0199	0.7645	0.9764	0.0560
	-0.0523	0.5724	0.9742	
	0.0125	0.9566	0.9785	
RF: 300, 10	-0.0213	0.7440	0.9762	0.0661
	-0.0591	0.5423	0.9740	
	0.0164	0.9457	0.9783	
RF: 500, 1	-0.0454	1.3038	0.9336	0.0967
	-0.0815	0.8937	0.9275	
	-0.0094	1.7139	0.9397	
RF: 500, 5	-0.0174	0.7627	0.9768	0.0568
	-0.0459	0.5824	0.9746	
	0.0112	0.9429	0.9789	
RF: 500, 10	-0.0182	0.7384	0.9766	0.0690
	-0.0500	0.5556	0.9744	
	0.0137	0.9212	0.9787	

Supplementary Table F: *Internal* validation results from models including demographic, ACC variables, and AHEI. Criteria is equal to $(\text{slope}-1)^2 + (\text{C-statistic}-1)^2$.

	Intercept 95% CI	Slope 95% CI	C-Statistic 95% CI	Criteria
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Cox	0.0011	0.5142	0.8610	0.2553
	-0.0009	0.4993	0.8520	
	0.0031	0.5292	0.8701	
GBM: 100, 1	-0.0012	0.5533	0.8761	0.2149
	-0.0075	0.5057	0.8678	
	0.0050	0.6008	0.8844	
GBM: 100, 5	-0.0020	0.5502	0.8991	0.2125
	-0.0060	0.5231	0.8912	
	0.0019	0.5773	0.9071	
GBM: 100, 10	-0.0049	0.5887	0.9147	0.1764
	-0.0116	0.5440	0.9070	
	0.0017	0.6334	0.9225	
GBM: 300, 1	-0.0004	0.5399	0.8760	0.2271
	-0.0059	0.4989	0.8677	0.2271
	0.0051	0.5808	0.8842	0.2271
GBM: 300, 5	-0.0024	0.5586	0.8977	0.2053
	-0.0050	0.5407	0.8897	
	0.0001	0.5764	0.9057	
GBM: 300, 10	-0.0020	0.5685	0.9159	0.1933
	-0.0066	0.5385	0.9081	
	0.0026	0.5985	0.9237	
GBM: 500, 1	-0.0005	0.5416	0.8762	0.2255
	-0.0072	0.4909	0.8679	
	0.0063	0.5922	0.8844	
GBM: 500, 5	-0.0021	0.5564	0.8993	0.2069
	-0.0055	0.5328	0.8916	
	0.0013	0.5800	0.9071	
GBM: 500, 10	-0.0037	0.5697	0.9165	0.1921
	-0.0110	0.5227	0.9089	
	0.0035	0.6167	0.9242	
RF: 100, 1	-0.0481	1.3493	0.9317	0.1267
	-0.0844	0.9270	0.9255	
	-0.0118	1.7717	0.9379	
RF: 100, 5	-0.0202	0.7717	0.9770	0.0526
	-0.0539	0.5712	0.9749	
	0.0135	0.9722	0.9791	
RF: 100, 10	-0.0214	0.7427	0.9760	0.0668
	-0.0596	0.5396	0.9739	
	0.0168	0.9458	0.9782	
RF: 300, 1	-0.0438	1.2788	0.9327	0.0823
	-0.0756	0.9201	0.9267	
	-0.0120	1.6374	0.9387	
RF: 300, 5	-0.0171	0.7559	0.9766	0.0601
	-0.0450	0.5808	0.9745	
	0.0109	0.9311	0.9788	

RF: 300, 10	-0.0220	0.7478	0.9766	0.0642
	-0.0613	0.5385	0.9745	
	0.0173	0.9571	0.9787	
RF: 500, 1	-0.0498	1.3774	0.9330	0.1469
	-0.0862	0.9518	0.9269	
	-0.0135	1.8029	0.9391	
RF: 500, 5	-0.0176	0.7642	0.9772	0.0561
	-0.0467	0.5813	0.9750	
	0.0115	0.9471	0.9793	
RF: 500, 10	-0.0183	0.7369	0.9768	0.0698
	-0.0505	0.5538	0.9747	
	0.0138	0.9200	0.9789	

Supplementary Table G: Internal validation results from models including demographic, ACC variables, and MDS. Criteria is equal to $(\text{slope}-1)^2 + (\text{C-statistic}-1)^2$.

	Intercept	Slope	C-Statistic	Criteria
	95% CI	95% CI	95% CI	
Cox	0.0009	0.5172	0.8609	0.2524
	-0.0015	0.4991	0.8518	
	0.0033	0.5352	0.8700	
GBM: 100, 1	-0.0017	0.5647	0.8763	0.2048
	-0.0064	0.5281	0.8680	
	0.0031	0.6012	0.8847	
GBM: 100, 5	-0.0010	0.5495	0.8973	0.2135
	-0.0041	0.5284	0.8891	
	0.0020	0.5705	0.9055	
GBM: 100, 10	-0.0043	0.5771	0.9166	0.1858
	-0.0079	0.5530	0.9091	
	-0.0007	0.6011	0.9241	
GBM: 300, 1	-0.0006	0.5417	0.8760	0.2254
	-0.0075	0.4895	0.8677	
	0.0063	0.5939	0.8843	
GBM: 300, 5	-0.0020	0.5547	0.8997	0.2084
	-0.0046	0.5367	0.8920	
	0.0005	0.5727	0.9073	
GBM: 300, 10	-0.0037	0.5752	0.9151	0.1877
	-0.0091	0.5395	0.9075	
	0.0017	0.6109	0.9227	
GBM: 500, 1	-0.0011	0.5551	0.8769	0.2131
	-0.0074	0.5072	0.8687	
	0.0051	0.6029	0.8851	
GBM: 500, 5	-0.0019	0.5575	0.8984	0.2061
	-0.0056	0.5317	0.8905	

	0.0018	0.5832	0.9063	
GBM: 500, 10	-0.0047	0.5814	0.9167	0.1822
	-0.0115	0.5366	0.9092	
	0.0021	0.6263	0.9242	
RF: 100, 1	-0.0405	1.2255	0.9238	0.0567
	-0.0689	0.9059	0.9175	
	-0.0121	1.5451	0.9302	
RF: 100, 5	-0.0228	0.7646	0.9724	0.0562
	-0.0598	0.5597	0.9701	
	0.0142	0.9695	0.9748	
RF: 100, 10	-0.0207	0.7390	0.9731	0.0688
	-0.0569	0.5445	0.9707	
	0.0155	0.9336	0.9754	
RF: 300, 1	-0.0460	1.318	0.9262	0.1066
	-0.0788	0.935	0.9197	
	-0.0132	1.701	0.9326	
RF: 300, 5	-0.0169	0.7560	0.9733	0.0602
	-0.0442	0.5829	0.9709	
	0.0105	0.9291	0.9756	
RF: 300, 10	-0.0209	0.7435	0.9734	0.0665
	-0.0568	0.5489	0.9711	
	0.0151	0.9380	0.9757	
RF: 500, 1	-0.0457	1.3123	0.9274	0.1028
	-0.0790	0.9259	0.9211	
	-0.0125	1.6988	0.9338	
RF: 500, 5	-0.0168	0.7556	0.9734	0.0604
	-0.0440	0.5833	0.9711	
	0.0104	0.9280	0.9757	
RF: 500, 10	-0.0178	0.7375	0.9737	0.0696
	-0.0484	0.5601	0.9714	
	0.0128	0.9149	0.9760	

Supplementary Table H: *Internal* validation results from models including demographic, ACC variables, and DASH. Criteria is equal to $(\text{slope}-1)^2 + (\text{C-statistic}-1)^2$.

	Intercept	Slope	C-Statistic	Criteria
	95% CI	95% CI	95% CI	
Cox	0.0009	0.5165	0.8615	0.2530
	-0.0027	0.4896	0.8525	
	0.0045	0.5434	0.8706	
GBM: 100, 1	-0.0006	0.5456	0.8769	0.2216
	-0.0073	0.4949	0.8687	
	0.0061	0.5964	0.8851	

GBM: 100, 5	-0.0032	0.5684	0.9018	0.1959
	-0.0074	0.5391	0.8940	
	0.0010	0.5977	0.9097	
GBM: 100, 10	-0.0048	0.5825	0.9183	0.1810
	-0.0099	0.5494	0.9108	
	0.0002	0.6157	0.9258	
GBM: 300, 1	-0.0006	0.5553	0.8766	0.2130
	-0.0075	0.5052	0.8683	
	0.0063	0.6054	0.8848	
GBM: 300, 5	-0.0022	0.5545	0.8990	0.2087
	-0.0064	0.5255	0.8910	
	0.0020	0.5836	0.9069	
GBM: 300, 10	-0.0041	0.5727	0.9172	0.1894
	-0.0105	0.5307	0.9098	
	0.0023	0.6146	0.9245	
GBM: 500, 1	-0.0004	0.5423	0.8772	0.2246
	-0.0076	0.4880	0.8690	
	0.0068	0.5965	0.8853	
GBM: 500, 5	-0.0033	0.5719	0.9016	0.1930
	-0.0078	0.5403	0.8938	
	0.0013	0.6035	0.9094	
GBM: 500, 10	-0.0029	0.5674	0.9064	0.1959
	-0.0083	0.5306	0.8986	
	0.0025	0.6043	0.9141	
RF: 100, 1	-0.0475	1.3431	0.9272	0.1230
	-0.0805	0.9557	0.9206	
	-0.0145	1.7304	0.9337	
RF: 100, 5	-0.0198	0.7633	0.9763	0.0566
	-0.0524	0.5706	0.9741	
	0.0128	0.9560	0.9784	
RF: 100, 10	-0.0219	0.7462	0.9758	0.0650
	-0.0610	0.5376	0.9736	
	0.0172	0.9549	0.9780	
RF: 300, 1	-0.0469	1.3320	0.9311	0.1150
	-0.0817	0.9285	0.9249	
	-0.0121	1.7354	0.9372	
RF: 300, 5	-0.0171	0.7578	0.9767	0.0592
	-0.0451	0.5818	0.9746	
	0.0108	0.9339	0.9789	
RF: 300, 10	-0.0225	0.7558	0.9767	0.0602
	-0.0630	0.5384	0.9746	
	0.0179	0.9731	0.9788	
RF: 500, 1	-0.0439	1.2784	0.9309	0.0823
	-0.0757	0.9184	0.9247	
	-0.0121	1.6383	0.9370	

RF: 500, 5	-0.0176	0.7640	0.9766	0.0562
	-0.0467	0.5804	0.9745	
	0.0115	0.9476	0.9788	
RF: 500, 10	-0.0184	0.7408	0.9766	0.0677
	-0.0506	0.5556	0.9745	
	0.0138	0.9260	0.9787	

Supplementary Table I: Internal validation results from models including demographic, ACC variables, and nutrition variables. Criteria is equal to $(\text{slope}-1)^2 + (\text{C-statistic}-1)^2$.

	Intercept 95% CI	Slope 95% CI	C-Statistic 95% CI	Criteria
Cox	0.0007 -0.0016 0.0031	0.5156 0.4991 0.5321	0.8750 0.8661 0.8838	0.2503
GBM: 100, 1	-0.0027 -0.0075 0.0021	0.5748 0.5386 0.6111	0.8811 0.8729 0.8894	0.1949
GBM: 100, 5	-0.0063 -0.0121 -0.0004	0.6183 0.5778 0.6589	0.9169 0.9092 0.9246	0.1526
GBM: 100, 10	-0.0088 -0.0203 0.0026	0.6767 0.5990 0.7545	0.9377 0.9309 0.9445	0.1084
GBM: 300, 1	-0.0024 -0.0071 0.0024	0.5723 0.5354 0.6091	0.8793 0.8707 0.8878	0.1975
GBM: 300, 5	-0.0066 -0.0140 0.0007	0.6294 0.5778 0.6811	0.9135 0.9059 0.9211	0.1448
GBM: 300, 10	-0.0061 -0.0152 0.0029	0.6427 0.5795 0.7060	0.9228 0.9152 0.9303	0.1336
GBM: 500, 1	-0.0020 -0.0077 0.0036	0.5616 0.5188 0.6044	0.8785 0.8700 0.8870	0.2070
GBM: 500, 5	-0.0073 -0.0161 0.0016	0.6395 0.5770 0.7020	0.9160 0.9082 0.9239	0.1370
GBM: 500, 10	-0.0083 -0.0183 0.0016	0.6644 0.5961 0.7327	0.9314 0.9242 0.9386	0.1173

RF: 100, 1	-0.1754	3.3994	0.9874	5.7573
	-0.2884	1.7584	0.9853	
	-0.0624	5.0405	0.9895	
RF: 100, 5	-0.0427	1.2353	0.9967	0.0554
	-0.0884	0.8154	0.9960	
	0.0029	1.6552	0.9973	
RF: 100, 10	-0.0328	1.0458	0.9942	0.0021
	-0.0743	0.7056	0.9932	
	0.0087	1.3860	0.9952	
RF: 300, 1	-0.1742	3.3849	0.9919	5.6878
	-0.2843	1.7938	0.9903	
	-0.0642	4.9760	0.9934	
RF: 300, 5	-0.0432	1.2387	0.9969	0.0570
	-0.0884	0.8230	0.9963	
	0.0021	1.6544	0.9975	
RF: 300, 10	-0.0333	1.0426	0.9943	0.0018
	-0.0739	0.7138	0.9934	
	0.0072	1.3713	0.9953	
RF: 500, 1	-0.1813	3.4987	0.9921	6.2436
	-0.2962	1.8260	0.9907	
	-0.0664	5.1713	0.9935	
RF: 500, 5	-0.0436	1.2453	0.9970	0.0602
	-0.0885	0.8311	0.9964	
	0.0013	1.6596	0.9976	
RF: 500, 10	-0.0337	1.0453	0.9944	0.0021
	-0.0743	0.7155	0.9934	
	0.0069	1.3751	0.9953	

Table J: External validation results from models including demographic and ACC variables only. Criteria is equal to $(\text{slope}-1)^2 + (\text{C-statistic}-1)^2$. Best performing GBM and RF are italicized.

	Intercept	Slope	C-Statistic	Criteria
	95% CI	95% CI	95% CI	
Cox	-0.0004	0.5278	0.8780	0.2379
	-0.0038	0.5037	0.8667	
	0.0029	0.5520	0.8893	
GBM: 100, 1	-0.0004	0.5276	0.8846	0.2365
	-0.0096	0.4621	0.8737	
	0.0088	0.5931	0.8956	
GBM: 100, 5	0.0004	0.5294	0.8948	0.2325
	-0.0064	0.4828	0.8840	
	0.0072	0.5761	0.9056	

GBM: 100, 10	0.0020	0.5358	0.9020	0.2251
	-0.0050	0.4875	0.8914	
	0.0090	0.5841	0.9126	
GBM: 300, 1	0.0004	0.5250	0.8838	0.2391
	-0.0101	0.4532	0.8728	
	0.0108	0.5968	0.8948	
GBM: 300, 5	0.0017	0.5254	0.8919	0.2369
	-0.0063	0.4696	0.8810	
	0.0097	0.5813	0.9027	
GBM: 300, 10	0.0004	0.5342	0.9022	0.2265
	-0.0058	0.4932	0.8917	
	0.0065	0.5751	0.9128	
GBM: 500, 1	0.0005	0.5173	0.8843	0.2464
	-0.0102	0.4408	0.8733	
	0.0113	0.5939	0.8952	
GBM: 500, 5	0.0011	0.5306	0.8944	0.2315
	-0.0052	0.4869	0.8837	
	0.0074	0.5743	0.9052	
GBM: 500, 10	0.0030	0.5608	0.9010	0.2027
	-0.0042	0.5091	0.8905	
	0.0102	0.6124	0.9115	
RF: 100, 1	-0.0427	1.2546	0.9097	0.0730
	-0.0744	0.8887	0.8982	
	-0.0109	1.6204	0.9213	
RF: 100, 5	-0.0077	0.6025	0.9273	0.1633
	-0.0224	0.5196	0.9167	
	0.0070	0.6853	0.9379	
RF: 100, 10	-0.0051	0.5591	0.9260	0.1999
	-0.0176	0.4954	0.9157	
	0.0075	0.6228	0.9363	
RF: 300, 1	-0.0380	1.1824	0.9083	0.0417
	-0.0609	0.9215	0.8969	
	-0.0150	1.4433	0.9197	
RF: 300, 5	-0.0058	0.5959	0.9281	0.1685
	-0.0171	0.5279	0.9180	
	0.0055	0.6639	0.9383	
RF: 300, 10	-0.0046	0.5559	0.9269	0.2026
	-0.0163	0.4970	0.9167	
	0.0070	0.6149	0.9371	
RF: 500, 1	-0.0410	1.2346	0.9079	0.0635
	-0.0659	0.9484	0.8963	
	-0.0162	1.5207	0.9195	
RF: 500, 5	-0.0066	0.5966	0.9281	0.1679
	-0.0186	0.5278	0.9182	
	0.0053	0.6654	0.9381	

RF: 500, 10	-0.0060	0.5671	0.9274	0.1927
	-0.0201	0.4952	0.9173	
	0.0080	0.6390	0.9375	

Supplementary Table K: *External validation results from models including demographic, ACC variables, and HEI. Criteria is equal to (slope-1)² + (C-statistic-1)². Best performing GBM and RF are italicized.*

	Intercept	Slope	C-Statistic	Criteria
	95% CI	95% CI	95% CI	
Cox	-0.0003	0.5265	0.8781	0.2391
	-0.0040	0.5003	0.8667	
	0.0033	0.5527	0.8894	
GBM: 100, 1	0.0005	0.5395	0.8846	0.2254
	-0.0110	0.4587	0.8734	
	0.0120	0.6204	0.8958	
GBM: 100, 5	0.0012	0.5513	0.8943	0.2125
	-0.0071	0.4910	0.8834	
	0.0096	0.6116	0.9051	
GBM: 100, 10	0.0020	0.5908	0.8968	0.1781
	-0.0048	0.5397	0.8857	
	0.0088	0.6419	0.9080	
GBM: 300, 1	-0.0006	0.5416	0.8843	0.2235
	-0.0110	0.4644	0.8731	
	0.0098	0.6187	0.8955	
GBM: 300, 5	0.0007	0.5469	0.8963	0.2161
	-0.0062	0.4975	0.8855	
	0.0077	0.5963	0.9070	
GBM: 300, 10	0.0012	0.5769	0.9035	0.1883
	-0.0063	0.5229	0.8929	
	0.0087	0.6309	0.9142	
GBM: 500, 1	-0.0003	0.5362	0.8843	0.2285
	-0.0097	0.4677	0.8733	
	0.0091	0.6047	0.8954	
GBM: 500, 5	0.0012	0.5594	0.8969	0.2048
	-0.0068	0.5011	0.8858	
	0.0092	0.6177	0.9081	
GBM: 500, 10	0.0009	0.5699	0.9047	0.1941
	-0.0037	0.5371	0.8942	
	0.0056	0.6026	0.9152	
RF: 100, 1	-0.0395	1.2045	0.9127	0.0494
	-0.0619	0.9521	0.9015	
	-0.0171	1.4570	0.9239	

RF: 100, 5	-0.0076	0.6063	0.9309	0.1598
	-0.0212	0.5282	0.9213	
	0.0060	0.6844	0.9406	
RF: 100, 10	-0.0078	0.5851	0.9304	0.1770
	-0.0257	0.4934	0.9204	
	0.0101	0.6768	0.9403	
RF: 300, 1	-0.0378	1.1752	0.9154	0.0379
	-0.0633	0.8938	0.9043	
	-0.0124	1.4566	0.9264	
RF: 300, 5	-0.0084	0.6177	0.9314	0.1509
	-0.0241	0.5266	0.9216	
	0.0074	0.7088	0.9411	
RF: 300, 10	-0.0078	0.5867	0.9309	0.1756
	-0.0233	0.5065	0.9212	
	0.0078	0.6669	0.9406	
RF: 500, 1	-0.0377	1.1735	0.9148	0.0374
	-0.0625	0.8969	0.9038	
	-0.0129	1.4501	0.9258	
RF: 500, 5	-0.0077	0.6221	0.9318	0.1475
	-0.0222	0.5329	0.9222	
	0.0068	0.7112	0.9415	
RF: 500, 10	-0.0066	0.5851	0.9308	0.1769
	-0.0209	0.5060	0.9212	
	0.0078	0.6641	0.9403	

Supplementary Table L: External validation results from models including demographic, ACC variables, and AHEI. Criteria is equal to $(\text{slope}-1)^2 + (\text{C-statistic}-1)^2$. Best performing GBM and RF are italicized.

	Intercept	Slope	C-Statistic	Criteria
	95% CI	95% CI	95% CI	
Cox	-0.0009	0.5347	0.8784	0.2313
	-0.0041	0.5115	0.8671	
	0.0023	0.5579	0.8897	
GBM: 100, 1	-0.0009	0.5326	0.8839	0.2319
	-0.0106	0.4627	0.8728	
	0.0088	0.6025	0.8951	
GBM: 100, 5	0.0005	0.5312	0.8964	0.2305
	-0.0052	0.4924	0.8857	
	0.0061	0.5700	0.9071	
GBM: 100, 10	0.0009	0.5697	0.9025	0.1947
	-0.0044	0.5315	0.8917	
	0.0063	0.6079	0.9133	
GBM: 300, 1	0.0001	0.5197	0.8852	0.2439
	-0.0088	0.4561	0.8741	

	0.0089	0.5833	0.8963	
GBM: 300, 5	0.0002	0.5223	0.8957	0.2391
	-0.0092	0.4583	0.8852	
	0.0097	0.5864	0.9062	
GBM: 300, 10	0.0030	0.5638	0.9061	0.1991
	-0.0034	0.5179	0.8954	
	0.0095	0.6096	0.9168	
GBM: 500, 1	-0.0004	0.5284	0.8848	0.2357
	-0.0097	0.4612	0.8737	
	0.0090	0.5955	0.8960	
GBM: 500, 5	0.0018	0.5348	0.8942	0.2276
	-0.0063	0.4780	0.8836	
	0.0098	0.5916	0.9047	
GBM: 500, 10	0.0011	0.5511	0.9054	0.2105
	-0.0038	0.5176	0.8948	
	0.0060	0.5846	0.9161	
RF: 100, 1	-0.0416	1.2373	0.9141	0.0637
	-0.0695	0.9188	0.9028	
	-0.0137	1.5558	0.9255	
RF: 100, 5	-0.0081	0.6211	0.9296	0.1485
	-0.0243	0.5268	0.9196	
	0.0080	0.7154	0.9395	
RF: 100, 10	-0.0064	0.5761	0.9288	0.1848
	-0.0200	0.5061	0.9191	
	0.0071	0.6460	0.9386	
RF: 300, 1	-0.0372	1.1657	0.9147	0.0347
	-0.0610	0.9034	0.9036	
	-0.0134	1.4281	0.9258	
RF: 300, 5	-0.0066	0.6066	0.9309	0.1595
	-0.0184	0.5344	0.9212	
	0.0053	0.6788	0.9406	
RF: 300, 10	-0.0067	0.5774	0.9299	0.1835
	-0.0206	0.5058	0.9201	
	0.0073	0.6491	0.9396	
RF: 500, 1	-0.0429	1.2622	0.9137	0.0762
	-0.0699	0.9513	0.9024	
	-0.0159	1.5731	0.9249	
RF: 500, 5	-0.0074	0.6195	0.9307	0.1496
	-0.0215	0.5326	0.9208	
	0.0068	0.7063	0.9407	
RF: 500, 10	-0.0055	0.5733	0.9295	0.1870
	-0.0175	0.5070	0.9196	
	0.0066	0.6396	0.9394	

Supplementary Table M: *External validation results from models including demographic, ACC variables, and MDS. Criteria is equal to (slope-1)² + (C-statistic-1)². Best performing GBM and RF are italicized.*

	Intercept	Slope	C-Statistic	Criteria
	95% CI	95% CI	95% CI	
Cox	-0.0003	0.5268	0.8783	0.2387
	-0.0037	0.5020	0.8670	
	0.0032	0.5516	0.8896	
GBM: 100, 1	-0.0009	0.5401	0.8860	0.2245
	-0.0099	0.4738	0.8749	
	0.0081	0.6064	0.8972	
GBM: 100, 5	0.0012	0.5358	0.8960	0.2263
	-0.0047	0.4945	0.8846	
	0.0072	0.5770	0.9075	
GBM: 100, 10	<i>0.0015</i>	<i>0.5480</i>	<i>0.9043</i>	<i>0.2135</i>
	<i>-0.0064</i>	<i>0.4927</i>	<i>0.8939</i>	
	<i>0.0094</i>	<i>0.6034</i>	<i>0.9147</i>	
GBM: 300, 1	-0.0005	0.5253	0.8853	0.2385
	-0.0100	0.4578	0.8743	
	0.0090	0.5927	0.8963	
GBM: 300, 5	0.0009	0.5382	0.8930	0.2247
	-0.0066	0.4851	0.8823	
	0.0084	0.5914	0.9037	
GBM: 300, 10	0.0024	0.5390	0.9036	0.2218
	-0.0053	0.4860	0.8931	
	0.0100	0.5919	0.9141	
GBM: 500, 1	-0.0003	0.5304	0.8856	0.2336
	-0.0110	0.4526	0.8745	
	0.0103	0.6083	0.8966	
GBM: 500, 5	0.0011	0.5551	0.8974	0.2085
	-0.0067	0.4986	0.8867	
	0.0090	0.6116	0.9082	
GBM: 500, 10	0.0014	0.5220	0.9035	0.2378
	-0.0056	0.4750	0.8931	
	0.0085	0.5690	0.9139	
RF: 100, 1	<i>-0.0345</i>	<i>1.1250</i>	<i>0.9055</i>	<i>0.0246</i>
	<i>-0.0557</i>	<i>0.8905</i>	<i>0.8941</i>	
	<i>-0.0133</i>	<i>1.3595</i>	<i>0.9168</i>	
RF: 100, 5	-0.0084	0.6085	0.9275	0.1585
	-0.0232	0.5282	0.9178	
	0.0064	0.6887	0.9371	
RF: 100, 10	-0.0054	0.5666	0.9249	0.1935
	-0.0171	0.5063	0.9148	
	0.0062	0.6269	0.9351	

RF: 300, 1	-0.0404	1.2231	0.9094	0.0580
	-0.0659	0.9316	0.8981	
	-0.0150	1.5146	0.9207	
RF: 300, 5	-0.0066	0.6099	0.9269	0.1575
	-0.0190	0.5332	0.9168	
	0.0058	0.6866	0.9371	
RF: 300, 10	-0.0064	0.5802	0.9254	0.1818
	-0.0217	0.5000	0.9154	
	0.0090	0.6605	0.9354	
RF: 500, 1	-0.0388	1.1954	0.9094	0.0464
	-0.0632	0.9179	0.8983	
	-0.0145	1.4728	0.9206	
RF: 500, 5	-0.0060	0.6030	0.9275	0.1629
	-0.0169	0.5352	0.9177	
	0.0050	0.6708	0.9373	
RF: 500, 10	-0.0052	0.5782	0.9267	0.1833
	-0.0171	0.5118	0.9169	
	0.0066	0.6446	0.9364	

Supplementary Table N: External validation results from models including demographic, ACC variables, and DASH. Criteria is equal to $(\text{slope}-1)^2 + (\text{C-statistic}-1)^2$. Best performing GBM and RF are italicized.

	Intercept	Slope	C-Statistic	Criteria
	95% CI	95% CI	95% CI	
Cox	-0.0001	0.5248	0.8775	0.2408
	-0.0050	0.4892	0.8662	
	0.0048	0.5604	0.8888	
GBM: 100, 1	-0.0004	0.5277	0.8847	0.2364
	-0.0099	0.4598	0.8735	
	0.0091	0.5956	0.8959	
GBM: 100, 5	0.0008	0.5548	0.8959	0.2090
	-0.0056	0.5080	0.8851	
	0.0073	0.6015	0.9067	
GBM: 100, 10	<i>0.0002</i>	<i>0.6169</i>	<i>0.9073</i>	<i>0.1554</i>
	<i>-0.0062</i>	<i>0.5691</i>	<i>0.8970</i>	
	<i>0.0066</i>	<i>0.6647</i>	<i>0.9175</i>	
GBM: 300, 1	-0.0003	0.5352	0.8849	0.2293
	-0.0109	0.4618	0.8737	
	0.0103	0.6085	0.8961	
GBM: 300, 5	0.0010	0.5268	0.8925	0.2355
	-0.0059	0.4785	0.8812	
	0.0080	0.5750	0.9037	
GBM: 300, 10	0.0022	0.5366	0.9015	0.2244
	-0.0048	0.4889	0.8911	
	0.0092	0.5843	0.9120	

GBM: 500, 1	-0.0003	0.5276	0.8853	0.2363
	-0.0101	0.4577	0.8742	
	0.0094	0.5974	0.8964	
GBM: 500, 5	0.0006	0.5344	0.8963	0.2275
	-0.0074	0.4796	0.8851	
	0.0085	0.5892	0.9074	
GBM: 500, 10	0.0003	0.5544	0.8973	0.2091
	-0.0034	0.5286	0.8860	
	0.0039	0.5803	0.9086	
RF: 100, 1	-0.0410	1.2346	0.9079	0.0635
	-0.0659	0.9484	0.8963	
	-0.0162	1.5207	0.9195	
RF: 100, 5	-0.0066	0.5966	0.9281	0.1679
	-0.0186	0.5278	0.9182	
	0.0053	0.6654	0.9381	
RF: 100, 10	-0.0060	0.5671	0.9274	0.1927
	-0.0201	0.4952	0.9173	
	0.0080	0.6390	0.9375	
RF: 300, 1	-0.0393	1.2049	0.9104	0.0500
	-0.0636	0.9279	0.8988	
	-0.0149	1.4819	0.9219	
RF: 300, 5	-0.0062	0.6025	0.9289	0.1631
	-0.0178	0.5313	0.9189	
	0.0054	0.6738	0.9389	
RF: 300, 10	-0.0070	0.5789	0.9279	0.1825
	-0.0214	0.5044	0.9179	
	0.0074	0.6533	0.9379	
RF: 500, 1	-0.0369	1.1604	0.9114	0.0336
	-0.0597	0.9083	0.9000	
	-0.0142	1.4124	0.9227	
RF: 500, 5	-0.0053	0.5905	0.9300	0.1726
	-0.0142	0.5364	0.9205	
	0.0035	0.6446	0.9396	
RF: 500, 10	-0.0057	0.5756	0.9284	0.1852
	-0.0181	0.5073	0.9185	
	0.0067	0.6440	0.9383	

Supplementary Table O: External validation results from models including demographic, ACC variables, and nutrition variables. Criteria is equal to $(\text{slope}-1)^2 + (\text{C-statistic}-1)^2$. Best performing GBM and RF are italicized.

	Intercept	Slope	C-Statistic	Criteria
	95% CI	95% CI	95% CI	

Cox	0.0010	0.4611	0.8830	0.3041
	-0.0034	0.4264	0.8698	
	0.0054	0.4959	0.8962	
GBM: 100, 1	-0.0030	0.5674	0.8896	0.1993
	-0.0092	0.5227	0.8784	
	0.0031	0.6120	0.9007	
GBM: 100, 5	-0.0016	0.5621	0.9072	0.2004
	-0.0073	0.5227	0.8966	
	0.0041	0.6015	0.9178	
GBM: 100, 10	0.0027	0.6518	0.9090	0.1295
	-0.0049	0.5906	0.8981	
	0.0103	0.7131	0.9200	
GBM: 300, 1	-0.0026	0.5681	0.8886	0.1989
	-0.0103	0.5108	0.8772	
	0.0051	0.6254	0.9000	
GBM: 300, 5	-0.0009	0.6548	0.9022	0.1287
	-0.0062	0.6121	0.8902	
	0.0044	0.6975	0.9143	
GBM: 300, 10	0.0021	0.8318	0.9058	0.0372
	-0.0039	0.7710	0.8947	
	0.0081	0.8927	0.9170	
GBM: 500, 1	-0.0026	0.5545	0.8894	0.2107
	-0.0101	0.5000	0.8781	
	0.0050	0.6090	0.9008	
GBM: 500, 5	-0.0029	0.5980	0.9030	0.1710
	-0.0060	0.5759	0.8912	
	0.0002	0.6202	0.9148	
GBM: 500, 10	0.0003	0.7133	0.9098	0.0903
	-0.0057	0.6624	0.8990	
	0.0063	0.7642	0.9206	
RF: 100, 1	-0.1254	2.5742	0.8937	2.4894
	-0.1941	1.5825	0.8781	
	-0.0567	3.5659	0.9093	
RF: 100, 5	-0.0299	1.0137	0.9320	0.0048
	-0.0567	0.7609	0.9208	
	-0.0031	1.2666	0.9433	
RF: 100, 10	-0.0201	0.8447	0.9336	0.0285
	-0.0412	0.6690	0.9226	
	0.0010	1.0204	0.9445	
RF: 300, 1	-0.1293	2.6387	0.9059	2.6942
	-0.1973	1.6579	0.8914	
	-0.0613	3.6195	0.9203	
RF: 300, 5	-0.0314	1.0368	0.9371	0.0053
	-0.0583	0.7826	0.9262	
	-0.0046	1.2909	0.9481	

RF: 300, 10	-0.0204	0.8343	0.9367	0.0315
	-0.0395	0.6773	0.9263	
	-0.0012	0.9913	0.9470	
RF: 500, 1	-0.1401	2.8162	0.9129	3.3062
	-0.2170	1.6982	0.8993	
	-0.0632	3.9342	0.9266	
RF: 500, 5	-0.0304	1.0242	0.9348	0.0048
	-0.0552	0.7896	0.9238	
	-0.0057	1.2588	0.9459	
RF: 500, 10	-0.0215	0.8494	0.9379	0.0265
	-0.0419	0.6824	0.9277	
	-0.0012	1.0165	0.9481	

Supplementary Table P: Hazard ratios (95% CIs) from Cox models developed on training data. See Supplementary Table A for variable definitions.

	Model 1 (ACC)	Model 2 (+HEI)	Model 3 (+AHEI)	Model 4 (+MDS)	Model 5 (+DASH)	Model 6 (+All)
age	1.10 (1.09, 1.10)	1.10 (1.09, 1.11)	1.10 (1.09, 1.11)	1.10 (1.09, 1.10)	1.10 (1.09, 1.11)	1.10 (1.09, 1.10)
sex	0.65 (0.57, 0.73)	0.65 (0.58, 0.74)	0.65 (0.58, 0.73)	0.65 (0.57, 0.73)	0.65 (0.58, 0.74)	0.61 (0.54, 0.70)
black	1.14 (0.99, 1.32)	1.14 (0.99, 1.32)	1.15 (0.99, 1.33)	1.14 (0.99, 1.32)	1.11 (0.97, 1.29)	1.10 (0.99, 1.29)
hispanic	0.69 (0.58, 0.81)	0.69 (0.58, 0.82)	0.69 (0.58, 0.82)	0.69 (0.58, 0.82)	0.70 (0.59, 0.83)	0.64 (0.58, 0.77)
total_cholesterol	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)
hdl	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)	1.00 (1.00, 1.00)	1.00 (1.00, 1.01)	1.00 (1.00, 1.00)
sbp	1.00 (1.00, 1.01)	1.00 (1.00, 1.01)	1.00 (1.00, 1.01)	1.00 (1.00, 1.01)	1.01 (1.00, 1.01)	1.00 (1.00, 1.01)
bpmeds	1.19 (1.08, 1.30)	1.19 (1.09, 1.30)	1.19 (1.09, 1.30)	1.19 (1.09, 1.31)	1.18 (1.07, 1.29)	1.21 (1.09, 1.33)
dm	1.46 (1.29, 1.65)	1.46 (1.29, 1.65)	1.45 (1.29, 1.64)	1.46 (1.29, 1.65)	1.45 (1.28, 1.63)	1.40 (1.29, 1.59)
tob	1.91 (1.61, 2.27)	1.89 (1.59, 2.25)	1.88 (1.59, 2.23)	1.91 (1.61, 2.26)	1.84 (1.55, 2.18)	1.84 (1.59, 2.19)
hei		1.00 (0.99, 1.01)				
ahei			1.00 (0.99, 1.00)			
mdds				1.05 (1.00, 1.10)		
dash					0.99 (0.98, 0.99)	
milk_g						1 (1, 1)
cream_g						1 (0.99, 1)
milk_desse						1 (1, 1)
rt_g						
cheese_g						1 (1, 1)
meat_ns_g						1 (0.99, 1.01)
beef_g						1 (1, 1)
pork_g						1 (1, 1)
lamb_g						1 (1, 1)
poultry_g						1 (1, 1)
organ_meat_g						1 (1, 1)
t_g						
fish_g						1 (0.99, 1)
meat_nonm						1 (1, 1)
eat_g						
protein_fro						1 (1, 1)
zen_g						
eggs_g						1 (1, 1)
egg_mixture_g						1 (1, 1)
e_g						
egg_sub_g						0.99 (0.99, 1)
legumes_g						1 (1, 1)
nuts_g						1 (1, 1)
seeds_g						1 (0.99, 1.01)
flour_mixture_g						0.22 (0, ∞)
bread_yeast_g						1 (1, 1)
t_g						
bread_quick_g						1 (1, 1)
k_g						
pastries_g						1 (1, 1)
crackers_g						1 (1, 1)

	Model 1 (ACC)	Model 2 (+HEI)	Model 3 (+AHEI)	Model 4 (+MDS)	Model 5 (+DASH)	Model 6 (+All)
pancakes_g						1 (1, 1)
pastas_g						1 (1, 1)
cereals_g						1 (1, 1)
grain_mix_g						1 (1, 1)
meat_sub_g						0.78 (0, ∞)
citrus_g						1 (1, 1)
fruit_dried_g						1 (1, 1.01)
fruit_other_g						1 (1, 1)
fruit_juice_g						1 (1, 1)
fruit_baby_g						0.84 (0, ∞)
potatoes_g						1 (1, 1)
veg_darkgreen_g						1 (1, 1)
veg_deepyellow_g						1 (1, 1.01)
tomatoes_g						1 (1, 1)
veg_other_g						1 (1, 1)
veg_meat_g						1 (1, 1)
veg_mixture_g						1 (1, 1)
fats_g						1 (1, 1.01)
oils_g						1 (0.98, 1.01)
salad_dressing_g						1 (1, 1.01)
sweets_g						1 (1, 1)
bev_nonalcoholic_g						1 (1, 1)
bev_alcohol_g						1 (1, 1)
water_g						1 (1, 1)
kcal						1 (1, 1)
protein_g						1.01 (1, 1.02)
carb_g						1 (1, 1.01)
fiber_g						0.96 (0.95, 0.97)
fat_g						0.99 (0.97, 1.01)
fat_sat_g						1.19 (1.07, 1.32)
fat_mono_g						0.96 (0.93, 1)
fat_poly_g						0.97 (0.94, 0.99)
cholesterol_mg						1 (1, 1)
vite_mg						0.99 (0.98, 1.01)
vita_mg						1 (1, 1)
betacarotene_mcg						1 (1, 1)
vitb1_mg						0.92 (0.78, 1.10)
vitb2_mg						1.02 (0.87, 1.19)
niacin_mg						0.98 (0.96, 0.99)
vitb6_mg						1.11 (0.98, 1.25)
folate_mcg						1 (1, 1)
vitb12_mcg						1 (0.99, 1.02)
vitc_mg						1 (1, 1)
calcium_mg						1 (1, 1)
phosphorus_mg						1 (1, 1)
magnesium_mg						1 (1, 1)
iron_mg						1.01 (1, 1.03)
zinc_mg						1.01 (1, 1.01)
copper_mg						0.93 (0.84, 1.03)
sodium_mg						1 (1, 1)
potassium_mg						1 (1, 1)
selenium_mcg						1 (0.99, 1)
caffeine_mg						1 (1, 1)

	Model 1 (ACC)	Model 2 (+HEI)	Model 3 (+AHEI)	Model 4 (+MDS)	Model 5 (+DASH)	Model 6 (+All)
theobromin_e_mg						1 (1, 1)
alcohol_gm						1.01 (1, 1.01)
sfa_40_gm						1.31 (0.69, 2.47)
sfa_60_gm						0.67 (0.24, 1.81)
sfa_80_gm						1.17 (0.53, 2.60)
sfa_100_gm						0.67 (0.22, 2.05)
sfa_120_gm						0.88 (0.77, 1.01)
sfa_140_gm						0.76 (0.57, 1.01)
sfa_160_gm						0.85 (0.76, 0.94)
sfa_180_gm						0.86 (0.75, 0.98)
mfa_161h_gm						0.85 (0.66, 1.09)
mfa_161o_gm						1.06 (1.02, 1.10)
mfa_201_gm						1.32 (1.03, 1.69)
mfa_221_gm						0.34 (0.13, 0.90)
pfa_182_gm						1.07 (1.04, 1.11)
pfa_183_gm						0.80 (0.68, 0.95)
pfa_184_gm						5.67 (0.15, 211.03)
pfa_204_gm						1.02 (0.29, 3.64)
pfa_205_gm						0.99 (0.21, 4.69)
pfa_225_gm						0.63 (0.01, 55.24)
pfa_226_gm						1.45 (0.40, 5.24)
water_yesterday_gm						1 (1, 1)

Supplementary Table Q: Relative influences of variables in best performing GBM models in training set from each modeling approach. See Supplementary Table A for variable definitions.

	Model 1 (ACC)	Model 2 (+HEI)	Model 3 (+AHEI)	Model 4 (+MDS)	Model 5 (+DASH)	Model 6 (+All)
age	19.89	30.33	5.59	2.93	29.70	19.25
sex	2.26	1.81	0.28	0.50	1.43	0.17
black	2.13	0.61	0.02	0.02	0.70	0.01
hispanic	0.98	0.68	0.05	0.02	0.71	0.01
total_chol	23.61	15.16	17.43	16.56	13.43	2.14
hdl	18.18	11.00	2.62	36.47	12.00	2.80
sbp	24.06	20.79	23.02	41.44	19.09	2.56
bpmeds	3.47	3.11	3.11	0.12	3.94	0.49
dm	2.08	1.53	0.12	0.05	1.64	0.27
tob	3.32	0.68	45.83	0.26	0.81	0.02
hei		14.30				
ahei			1.92			
mds				1.63		
dash					16.54	
iron_mg						10.86
legumes_g						8.42
sweets_g						6.55
pastries_g						5.75
pork_g						4.33
vita_mg						3.86
sfa_80_gm						2.99
cholesterol_mg						1.95
water_yesterday_gm						1.22
erday_gm						
copper_mg						1.00

	Model 1 (ACC)	Model 2 (+HEI)	Model 3 (+AHEI)	Model 4 (+MDS)	Model 5 (+DASH)	Model 6 (+All)
fats_g						0.97
beef_g						0.92
vite_mg						0.76
bread_quic						0.70
k_g						
calcium_m						0.67
g						
mfa_201_g						0.66
m						
vitb12_mcg						0.65
sfa_140_g						0.65
m						
betacaro_m						0.61
cg						
mfa_161o_g						0.56
gm						
carb_g						0.54
kcal						0.51
mfa_161h_g						0.50
gm						
caffeine_m						0.47
g						
veg_other_g						0.46
g						
selenium_mcg						0.45
zinc_mg						0.44
vitb1_mg						0.43
pfa_183_g						0.41
m						
sfa_180_g						0.39
m						
sfa_120_g						0.39
m						
magnesium_mg						0.38
alcohol_gm						0.38
nuts_g						0.38
vitc_mg						0.37
fiber_g						0.37
phosphoru_s_mg						0.37
fat_poly_g						0.35
potassium_mg						0.35
salad_dres						0.34
sing_g						
vitb6_mg						0.34
fat_g						0.33
bev_nonalc						0.33
ohol_g						
fruit_other_g						0.32
g						
sodium_mg						0.32
pancakes_g						0.31
g						
protein_g						0.30
pfa_205_g						0.30
m						
poultry_g						0.29
sfa_160_g						0.29
m						
pfa_182_g						0.28
m						
milk_g						0.28
folate_mcg						0.28
fat_mono_g						0.28
g						
cheese_g						0.26
milk_desse						0.26
rt_g						
pfa_204_g						0.26
m						
niacin_mg						0.24
theobromin_e_mg						0.21
pastas_g						0.20

	Model 1 (ACC)	Model 2 (+HEI)	Model 3 (+AHEI)	Model 4 (+MDS)	Model 5 (+DASH)	Model 6 (+All)
pfa_226_g						0.20
m						
veg_darkgr						0.19
een_g						
bev_alcohol_g						0.19
tomatoes_g						0.18
fat_sat_g						0.16
crackers_g						0.16
vitb2_mg						0.16
sfa_100_g						0.15
m						
sfa_60_gm						0.14
pfa_225_g						0.14
m						
mfa_221_g						0.14
m						
egg_mixture_g						0.14
fruit_juice_g						0.14
citrus_g						0.12
veg_deepy						0.12
ellow_g						
cream_g						0.12
organ_meat_g						0.11
potatoes_g						0.11
cereals_g						0.10
meat_nonm						0.09
eat_g						
seeds_g						0.08
water_g						0.06
fish_g						0.06
grain_mixture_g						0.05
lamb_g						0.05
pfa_184_g						0.04
m						
meat_ns_g						0.03
eggs_g						0.03
protein_frozen_g						0.02
oils_g						0.02
fruit_dried_g						0.02
egg_sub_g						0.01
flour_mixture_g						0.00
meat_sub_g						0.00
fruit_baby_g						0.00
veg_meat_g						0.00
veg_mixture_g						0.00