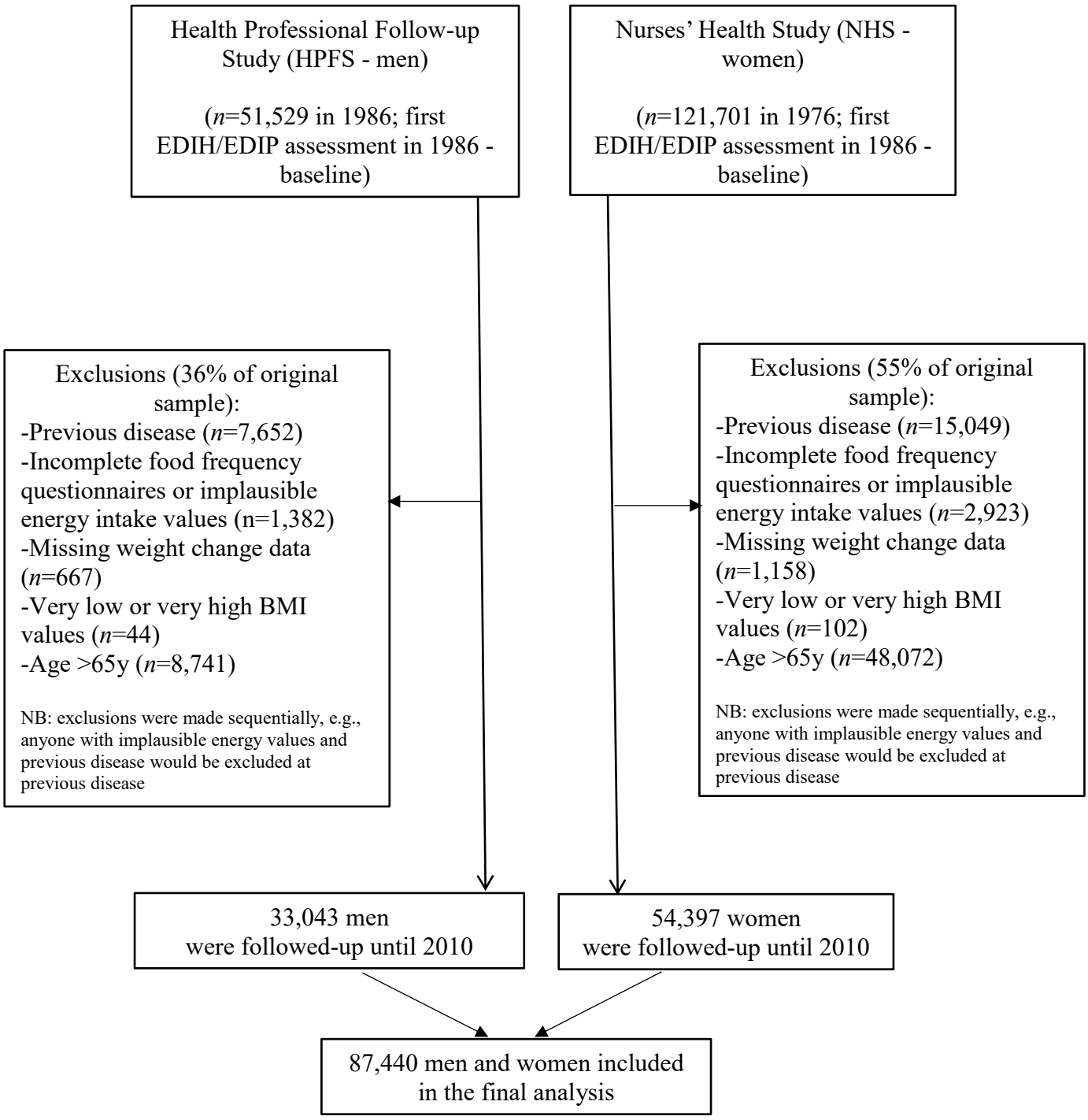

Supplemental Figure 1. Participant flow chart

Supplemental Table 1: Food items constituting the food group components of the empirical dietary index for hyperinsulinemia (EDIH) score and empirical dietary inflammatory pattern (EDIP) score and the food frequency questionnaire serving sizes

Food group (servings/day)	Dietary index		Food items and serving size
			Food groups positively associated with plasma C-peptide (EDIH) or inflammatory biomarkers (EDIP)
Processed meat	EDIH	EDIP	1 piece or 1 slice (25g) processed meats, 2 slices (25g) bacon, or 1 (50g) hot dog
Red meat	EDIH	EDIP	4–6 oz (113–170g) beef, pork, or lamb, or 1 hamburger patty
Organ meat	-	EDIP	4 oz (113 g) beef, calf, or pork liver; 1 oz (28.3 g) chicken or turkey liver
Low-energy sugary beverages	EDIH	EDIP	1 glass (8 oz or 240mL, 1 bottle (20 oz or 600mL), or 1 can (12 oz or 360mL) low-energy cola; other low-energy carbonated beverages
High-energy sugary beverages	EDIH	EDIP	1 glass (8 oz or 240mL, 1 bottle (20 oz or 600mL), or 1 can (12 oz or 360mL) cola with sugar; other carbonated beverages with sugar; or fruit punch drinks
Margarine	EDIH	-	1 (5g) pat margarine,
Butter	EDIH	-	1 (5g) pat butter
French fries	EDIH	-	4-oz (113g) French fries
Non-dark fish	EDIH	EDIP	3–5 oz (85–142g) canned tuna, shrimp, lobster, scallops, seafood other than dark fish
Eggs	EDIH	-	1 egg
Low-fat dairy	EDIH	-	8-oz (240mL) glass skimmed or low-fat milk, 1/2 cup sherbet or ice milk, 1 cup yogurt
Cream soup	EDIH	-	1 cup chowder or cream soup
Tomatoes	EDIH	EDIP	1 fresh tomato, 1 small glass of tomato juice, or 1/2 cup (115 g) tomato sauce
Poultry	EDIH	-	4–6 oz (113–170g) chicken or turkey with or without skin
Refined grains	-	EDIP	1 slice white bread, 1 English muffin, 1 bagel or roll, 1 muffin or biscuit, 1 cup (250g) white rice, 1 cup (140g) pasta, or 1 serving of pancakes or waffles
Other vegetables	-	EDIP	4-inch (10.2 cm) stick celery, 1/2 cup fresh or cooked or 1 can mushrooms, 1/2 green pepper, 1 ear or 1/2 cup (90 g) frozen or canned corn, 1/2 cup (75 g) mixed vegetables, 1 eggplant, 1/2 cup (90 g) zucchini, 1/2 cup (16 g) alfalfa sprouts, or ¼ cucumber
			Food groups inversely associated with plasma C-peptide (EDIH) or inflammatory biomarker (EDIP)
Green leafy vegetables	EDIH	EDIP	1/2 cup spinach, 1 serving of iceberg or head lettuce, or 1 serving of romaine or leaf lettuce

Dark-yellow vegetables	-	EDIP	1/2 cup carrots, 1/2 cup yellow (winter) squash, or 1/2 cup (100g) yams or sweet potatoes
Beer	-	EDIP	1 bottle, 1 glass, or 1 can of beer
Wine	EDIH	EDIP	4-oz (113g) glass red or white wine
Tea	-	EDIP	1 cup tea (not herbal)
Coffee	EDIH	EDIP	1 cup coffee (regular or decaffeinated)
High-fat diary	EDIH	-	8-oz glass (240mL) whole milk, cream, 1 tablespoon sour cream, 1/2 cup ice cream, 1 oz cream cheese, 1 oz or 1 slice other cheese
Whole fruit	EDIH	-	1 oz or small pack raisins, 1/2 cup grapes, 1 avocado, 1 banana, 1/4 cantaloupe, 1 slice watermelon, 1 orange, 1 fresh apple or pear, ½ cup (112 g) canned grapefruit, 1/2 cup (100 g) strawberries or blueberries, 1 fresh or 1/2 cup (112 g) canned peaches, or 1 fresh or 1/2 cup (95 g) canned apricots or plums (1 oz = 28.3 g; 1/2 cup = 50 g)
Fruit juice	-	EDIP	1 small glass apple juice or cider, orange juice, grapefruit juice, or other fruit juice
Pizza	-	EDIP	2 slices pizza
Snacks	-	EDIP	1 small bag or 1 oz (28.3 g) popcorn, potato chips, corn chips; or 1 cracker

Supplemental Table 2: Multivariable-adjusted results for the associations between changes in dietary insulinemic and inflammatory potential and weight change (kg) over 4-year periods, stratified by selected characteristics among women[1,2]

	Quintiles of 4-year changes in dietary index scores							
	Quintile 1 High improvement	**Quintile 2** Moderate improvement	**Quintile 3** Relatively stable	**Quintile 4** Moderate worsening	**Quintile 5** High worsening	**Per 1 SD increase**	***P*-trend**[3]	***P*-interaction.**[4]
Empirical dietary index for hyperinsulinemia score								
Body mass index								<0.0001
<25 kg/m^2	-0.38 (-0.46, -0.30)	-0.21 (-0.29, -0.14)	reference	0.11 (0.03, 0.19)	0.33 (0.23, 0.41)	0.26 (0.24, 0.29)	<0.0001	
≥25 kg/m^2	-1.01 (-1.15, -0.88)	-0.41 (-0.54, -0.27)	reference	0.15 (0.01, 0.29)	0.53 (0.39, 0.67)	0.57 (0.52, 0.61)	<0.0001	
Physical activity[5]								0.02
≥median MET-/week	-0.59 (-0.69, -0.48)	-0.28 (-0.38, -0.18)	reference	0.19 (0.09, 0.29)	0.43 (0.33, 0.53)	0.38 (0.34, 0.41)	<0.0001	
<median MET-week	-0.78 (-0.89, -0.66)	-0.31 (-0.42, -0.19)	reference	0.09 (-0.03, 0.20)	0.48 (0.36, 0.60)	0.46 (0.42, 0.50)	<0.0001	
Age								<0.0001
<55 years	-0.83 (-0.95, -0.71)	-0.37 (-0.49, -0.25)	reference	0.14 (0.02, 0.26)	0.52 (0.39, 0.64)	0.51 (0.47, 0.56)	<0.0001	
≥55 years	-0.55 (-0.65, -0.44)	-0.23 (-0.33, -0.13)	reference	0.17 (0.07, 0.27)	0.44 (0.35, 0.54)	0.36 (0.33, 0.39)	<0.0001	
Smoking status								0.003
Ever smokers	-0.66 (-0.77, -0.55)	-0.29 (-0.40, -0.18)	reference	0.17 (0.07, 0.28)	0.48 (0.38, 0.59)	0.41 (0.37, 0.44)	<0.0001	
Never smokers	-0.68 (-0.79, -0.57)	-0.30 (-0.41, -0.20)	reference	0.13 (0.02, 0.24)	0.44 (0.33, 0.55)	0.43 (0.39, 0.47)	<0.0001	
Baseline dietary insulinemic potential								<0.0001
<median	-0.47 (-0.60, -0.34)	-0.25 (-0.35, -0.14)	reference	0.18 (0.09, 0.28)	0.53 (0.44, 0.62)	0.37 (0.34, 0.41)	<0.0001	
≥median	-0.82 (-0.93, -0.71)	-0.33 (-0.44, -0.21)	reference	0.10 (-0.03, 0.22)	0.30 (0.14, 0.45)	0.48 (0.44, 0.52)	<0.0001	
Menopausal and hormone therapy (PMH) status								<0.0001
Premenopausal	-0.83 (-0.97, -0.68)	-0.37 (-0.52, -0.23)	reference	0.06 (-0.08, 0.20)	0.54 (0.39, 0.68)	0.50 (0.45, 0.55)	<0.0001	
Postmenopausal, and PMH never	-0.64 (-0.80, -0.47)	-0.25 (-0.41, -0.08)	reference	0.11 (-0.05, 0.27)	0.37 (0.21, 0.53)	0.37 (0.32, 0.43)	<0.0001	
Postmenopausal and PMH ever	-0.50 (-0.60, -0.38)	-0.21 (-0.32, -0.10)	reference	0.23 (0.12, 0.34)	0.51 (0.39, 0.62)	0.37 (0.33, 0.41)	<0.0001	
Empirical dietary inflammatory pattern score								
Body mass index								<0.0001
<25 kg/m^2	-0.19 (-0.27, -0.10)	-0.18 (-0.26, -0.10)	reference	-0.04 (-0.12, 0.04)	0.15 (0.07, 0.23)	0.13 (0.10, 0.15)	<0.0001	
≥25 kg/m^2	-0.41 (-0.54, -0.27)	-0.19 (-0.33, -0.05)	reference	-0.01 (-0.15, 0.13)	0.11 (-0.03, 0.25)	0.18 (0.13, 0.23)	<0.0001	
Physical activity[5]								0.005
≥median MET-/week	-0.27 (-0.38, -0.17)	-0.19 (-0.29, -0.09)	reference	-0.02 (-0.12, 0.08)	0.13 (0.03, 0.23)	0.14 (0.11, 0.18)	<0.0001	

<median MET-/week	-0.32 (-0.44, -0.20)	-0.18 (-0.30, -0.07)	reference	-0.03 (-0.15, 0.09)	0.15 (0.03, 0.27)	0.16 (0.12, 0.20)	<0.0001	
Age								0.047
<55 years	-0.36 (-0.48, -0.24)	-0.32 (-0.45, -0.20)	reference	-0.08 (-0.20, 0.04)	0.08 (-0.04, 0.21)	0.19 (0.14, 0.23)	<0.0001	
≥55 years	-0.23 (-0.33, -0.13)	-0.05 (-0.15, 0.05)	reference	0.06 (-0.04, 0.16)	0.22 (0.12, 0.31)	0.14 (0.11, 0.17)	<0.0001	
Smoking status								0.03
Ever smokers	-0.30 (-0.41, -0.19)	-0.11 (-0.22, -0.01)	reference	-0.04 (-0.14, 0.07)	0.12 (0.01, 0.23)	0.14 (0.10, 0.17)	<0.0001	
Never smokers	-0.26 (-0.37, -0.15)	-0.23 (-0.34, -0.12)	reference	-0.01 (-0.12, 0.10)	0.17 (0.06, 0.29)	0.17 (0.13, 0.21)	<0.0001	
Baseline dietary inflammatory potential								<0.0001
<median	-0.48 (-0.59, -0.37)	-0.23 (-0.33, -0.13)	reference	0.15 (0.05, 0.25)	0.46 (0.36, 0.55)	0.33 (0.30, 0.36)	<0.0001	
≥median	-0.72 (-0.83, -0.61)	-0.32 (-0.43, -0.20)	reference	0.11 (-0.01, 0.23)	0.32 (0.19, 0.45)	0.41 (0.37, 0.45)	<0.0001	
Menopausal and hormone therapy (PMH) status								<0.0001
Premenopausal	-0.42 (-0.57, -0.28)	-0.39 (-0.53, -0.24)	reference	-0.21 (-0.35, -0.06)	0.04 (-0.11, 0.19)	0.17 (0.12, 0.23)	<0.0001	
Postmenopausal, and PMH never	-0.17 (-0.33, 0.00)	-0.04 (-0.20, 0.12)	reference	0.01 (-0.15, 0.18)	0.22 (0.06, 0.39)	0.11 (0.06, 0.17)	<0.0001	
Postmenopausal and PMH ever	-0.24 (-0.36, -0.13)	-0.08 (-0.19, 0.04)	reference	0.08 (-0.03, 0.20)	0.20 (0.08, 0.31)	0.16 (0.12, 0.20)	<0.0001	

[1]Values are weight change (95% confidence intervals) in kilograms. To convert kilograms to pounds, divide by 0.4536.

[2]Multivariable models were adjusted for: age (years, continuous), questionnaire cycle (4-year intervals), baseline total energy intake (kcal/d), changes in total energy intake (kcal/d), baseline dietary insulinemic or inflammatory potential at the beginning of each 4-year period, baseline BMI (kg/m^2, continuous), baseline physical activity (MET/week, continuous), changes in physical activity (MET/week, continuous), baseline hours of sleep per day (≤6, 7, 8, and >8 hours), hours of sitting and watching TV per week (baseline only in NHS [0-1, 2-5, 6-20, 21-40, >40 hours]; and also 4-year change in HPFS [continuous]), 4-year change in alcohol consumption, 4-year change in smoking status (stayed never smoker, stayed former smoker, stayed current smoker, change from former to current smoker, change from never to current smoker, and change from current to former smoker), and among women only: baseline parity (0, 1-2, 3, 4+ children), menopausal status and postmenopausal hormone use (premenopausal, and postmenopausal never, current, past users). When stratifying by BMI, physical activity, age and baseline dietary insulinemic or inflammatory potential, we adjusted for the continuous variable within strata of the potential effect modifier, e.g., adjusting for continuous BMI among normal weight women.

[3]*P*-value for trend was the *P*-value of the 1 SD dietary score as a continuous variable in multivariable linear models.

[4]*P*-value for interaction was the Wald *P*-value of the interaction term.

[5]Median physical activity was 10.7 MET-hours/week

Supplemental Table 3: Multivariable-adjusted results for the associations between changes in dietary insulinemic and inflammatory potential and weight change (kg) over 4-year periods, stratified by selected characteristics among men[1,2]

	Quintiles of 4-year changes in dietary index scores							
	Quintile 1 High improvement	**Quintile 2** Moderate improvement	**Quintile 3** Relatively stable	**Quintile 4** Moderate worsening	**Quintile 5** High worsening	**Per 1 SD increase**	***P*-trend**[3]	***P*-interaction.**[4]
Empirical dietary index for hyperinsulinemia score								
Body mass index								<0.0001
<25 kg/m^2	-0.33 (-0.46, -0.20)	-0.16 (-0.29, -0.04)	reference	0.20 (-0.08, 0.33)	0.45 (0.32, 0.58)	0.27 (0.22, 0.31)	<0.0001	
≥25 kg/m^2	-0.82 (-0.99, -0.65)	-0.32 (-0.49, -0.15)	reference	0.08 (-0.09, 0.25)	0.46 (0.29, 0.63)	0.44 (0.39, 0.49)	<0.0001	
Physical activity[5]								0.55
≥median MET-h/week	-0.53 (-0.67, -0.39)	-0.20 (-0.34, -0.07)	reference	0.27 (0.14, 0.41)	0.55 (0.42, 0.69)	0.37 (0.32, 0.41)	<0.0001	
<median MET-h/week	-0.66 (-0.82, -0.49)	-0.26 (-0.42, -0.09)	reference	-0.05 (-0.11, 0.22)	0.42 (0.25, 0.58)	0.38 (0.33, 0.43)	<0.0001	
Age								<0.0001
<55 years	-0.72 (-0.87, -0.57)	-0.30 (-0.44, -0.15)	reference	0.21 (0.06, 0.36)	0.56 (0.41, 0.71)	0.44 (0.39, 0.49)	<0.0001	
≥55 years	-0.46 (-0.62, -0.30)	-0.21 (-0.37, -0.05)	reference	0.11 (-0.04, 0.27)	0.41 (0.26, 0.57)	0.30 (0.25, 0.35)	<0.0001	
Smoking status								0.11
Ever smokers	-0.49 (-0.67, -0.32)	-0.23 (-0.40, -0.05)	reference	0.17 (-0.003, 0.24)	0.51 (0.34, 0.68)	0.36 (0.31, 0.41)	<0.0001	
Never smokers	-0.67 (-0.81, -0.53)	-0.24 (-0.38, 0.11)	reference	0.14 (0.008, 0.28)	0.52 (0.38, 0.66)	0.40 (0.35, 0.44)	<0.0001	
Baseline dietary insulinemic potential								<0.0001
<median	-0.46 (-0.65, -0.27)	-0.25 (-0.40, -0.10)	reference	0.24 (0.10, 0.38)	0.56 (0.43, 0.70)	0.36 (0.32, 0.41)	<0.0001	
≥median	-0.70 (-0.85, -0.55)	-0.21 (-0.37, -0.04)	reference	0.08 (0.10, 0.35)	0.40 (0.19, 0.62)	0.41 (0.36, 0.46)	<0.0001	
Empirical dietary inflammatory pattern score								
Body mass index								<0.0001
<25 kg/m^2	-0.01 (-0.15, 0.12)	-0.05 (-0.18, 0.08)	reference	0.12 (-0.01, 0.25)	0.22 (0.09, 0.35)	0.09 (0.04, 0.14)	0.0004	
≥25 kg/m^2	-0.27 (-0.44, -0.10)	-0.11 (-0.28, 0.06)	reference	0.03 (-0.14, 0.20)	0.19 (0.02, 0.37)	0.16 (0.09, 0.22)	<0.0001	
Physical activity[5]								0.09
≥median MET-h/week	-0.20 (-0.35, -0.06)	-0.19 (-0.33, -0.05)	reference	0.06 (-0.08, 0.20)	0.17 (0.03, 0.31)	0.13 (0.08, 0.18)	<0.0001	
<median MET-h/week	-0.17 (-0.34, -0.01)	0.09 (-0.07, 0.26)	reference	0.08 (-0.09, 0.25)	0.26 (0.09, 0.43)	0.15 (0.09, 0.21)	<0.0001	
Age								0.33
<55 years	-0.20 (-0.35, -0.04)	-0.06 (-0.21, 0.09)	reference	0.09 (-0.06, 0.24)	0.31 (0.16, 0.47)	0.16 (0.11, 0.22)	<0.0001	
≥55 years	-0.10 (-0.26, 0.06)	-0.07 (-0.22, 0.09)	reference	0.06 (-0.10, 0.22)	0.17 (0.01, 0.33)	0.12 (0.06, 0.18)	<0.0001	
Smoking status								0.36
Ever smokers	0.04 (-0.14, 0.22)	-0.01 (-0.19, 0.17)	reference	0.14 (-0.03, 0.32)	0.38 (0.21, 0.55)	0.12 (0.05, 0.18)	0.0004	

Never smokers	-0.34 (-0.48, -0.20)	-0.13 (-0.27, 0.01)	reference	0.05 (-0.10, 0.19)	0.13 (-0.01, 0.28)	0.18 (0.12, 0.23)	<0.0001	
Baseline dietary inflammatory potential								<0.0001
<median	-0.38 (-0.53, -0.22)	-0.18 (-0.33, -0.03)	reference	0.23 (0.08, 0.37)	0.58 (0.44, 0.72)	0.33 (0.28, 0.37)	<0.0001	
≥median	-0.64 (-0.80, -0.49)	-0.22 (-0.38, -0.06)	reference	0.05 (-0.12, 0.21)	0.23 (0.03, 0.40)	0.31 (0.26, 0.36)	<0.0001	

[1]Values are weight change (95% confidence intervals) in kilograms. To convert kilograms to pounds, divide by 0.4536.

[2]Multivariable models were adjusted for: age (years, continuous), questionnaire cycle (4-year intervals), baseline total energy intake (kcal/d), changes in total energy intake (kcal/d), baseline dietary insulinemic or inflammatory potential at the beginning of each 4-year period, baseline BMI (kg/m^2, continuous), baseline physical activity (MET/week, continuous), changes in physical activity (MET/week, continuous), baseline hours of sleep per day (≤6, 7, 8, and >8 hours), hours of sitting and watching TV per week (baseline only in NHS [0-1, 2-5, 6-20, 21-40, >40 hours]; and also 4-year change in HPFS [continuous]), 4-year change in alcohol consumption, 4-year change in smoking status (stayed never smoker, stayed former smoker, stayed current smoker, change from former to current smoker, change from never to current smoker, and change from current to former smoker). When stratifying by BMI, physical activity, age and baseline dietary insulinemic or inflammatory potential, we adjusted for the continuous variable within strata of the potential effect modifier, e.g., adjusting for continuous BMI among normal weight men.

[3]*P*-value for trend was the *P*-value of the 1 SD dietary score as a continuous variable in multivariable linear models.

[4]*P*-value for interaction was the Wald *P*-value of the interaction term.

[5]Median physical activity was 20.8 MET-hours/week