**Supplementary Table 1. Thirty-nine foods or food groups used in the dietary pattern analyses**

| **Foods or food groups \*** | **Food items** |
| --- | --- |
| Processed meats | Processed meats, ham, bacon, frankfurter, hot dog |
| Red meat | Beef, pork, lamb, veal, game, hamburger |
| Organ meat | Liver, tripe, gizzards, and other organ meats |
| Poultry | Chicken, turkey, duck, Cornish game hen |
| Eggs | Eggs |
| Dark meat fish | Tuna steak, anchovy, herring, mackerel, salmon, sardines, bluefish, swordfish |
| Other fish | Canned tuna, shrimp, lobster, scallops, fish and other seafood other than dark meat fish |
| Dark yellow vegetables | Deep yellow or orange vegetables such as carrots, pumpkin, winter squash, and sweet potatoes; mixtures having deep yellow vegetables as a main ingredient, such as peas and carrots and sweet potato casserole |
| Leafy green vegetables | Dark green leafy vegetables such as romaine, collards, turnip greens, and spinach |
| Legumes | Cooked dry beans, peas, and lentils; mixtures having legumes as a main ingredient, such as baked beans or lentil soup; soybean-derived products |
| Tomatoes | Tomatoes; tomato juice; catsup, chili sauce, salsa, and other tomato sauces; and mixtures having tomatoes as a main ingredient |
| Potatoes | Baked, boiled, and mashed potatoes; and mixtures having potatoes as a main ingredient, such as potato salad, stuffed baked potatoes, and potato soup |
| Cruciferous vegetables | Broccoli, cabbage, cauliflower, brussels sprouts, kale, mustard, and chard greens; sauerkraut, kohlrabi, rutabaga |
| Garlic | Garlic |
| Other vegetables | Corn, mushrooms, green pepper, celery, eggplant, summer squash |
| Whole grains | Cooked oatmeal, dark bread, brown rice, brown rice flour, other grains, bran added to food, wild rice, whole wheat flour, whole grain cracked wheat |
| Refined grains | White bread, English muffins, bagels or rolls, muffins or biscuits, white rice, barley malt flour, pancakes or waffles, Wheat flour and cracked wheat (not whole grain), couscous |
| High fat dairy | Whole milk, cream, sour cream, ice cream, cream cheese, other cheese |
| Low fat dairy | Skim or low-fat milk, sherbet or ice milk, yogurt |
| Regular fruit juice drinks and fruit flavored drinks | All fruit juice drinks and fruit flavored drinks except low-calorie and low-sugar types |
| Low-calorie fruit juice drinks and fruit flavored drinks | Low-calorie and low-sugar fruit juice drinks and fruit flavored drinks |
| Regular carbonated soft drinks | All carbonated soft drinks except unsweetened and sugar-free types |
| Low-calorie carbonated soft drinks | Unsweetened and sugar-free carbonated soft drinks, and unsweetened carbonated water |
| Fruits | Citrus fruits, dried fruits, and other fruits; mixtures having fruit as a main ingredient |
| Fruit juice | Citrus fruit juices, apple juice, orange juice, grapefruit juice, other fruit juice |
| Beer | Beer, light (lite) beer |
| Wine | Wine, light wine, and mixtures made with wine, such as wine coolers |
| Liquor | Liquor |
| Tea | Tea |
| Coffee | Coffee |
| Nuts | Nuts, nut butters, and nut mixtures |
| Snacks | Potato chips or corn chips, crackers, popcorn |
| Sweet’s desserts | Candy containing chocolate, candy not containing chocolate cookies, cakes, pies, pastries, sweet roll, coffee cake |
| Pizza | Pizza |
| Butter | Butter |
| Margarine | Margarine |
| Mayonnaise and other creamy salad dressings | Mayonnaise and other creamy salad dressings |
| Oil and vinegar salad dressing | Oil and vinegar salad dressing |
| Condiments | Soy or Worcestershire sauce, jam, jelly, syrups, honey, molasses, sweet toppings |

\* The unit for foods or food groups is grams, except for the whole grains (oz. eq.) and refined grains (oz. eq.).

**Supplementary Table 2. Components in 4 versions of the empirical dietary inflammatory pattern (EDIP) in NHANES**

| **EDIP components** | **Weight** | | | |
| --- | --- | --- | --- | --- |
| **EDIP \*** | **1st alternative version** † | **2nd alternative version** ‡ | **3rd alternative version** § |
| Intercept | 0.0902682605 | 0.0551280345 | 0.0903566134 | 0.0577819195 |
| **Positive associations** |  |  |  |  |
| Regular carbonated drinks | 0.0001343970 | 0.0002151013 | 0.0001342448 | 0.0002125923 |
| Low calorie carbonated drinks | 0.0001384061 | 0.0001749302 | 0.0001384914 | 0.0001741938 |
| High fat dairy | 0.0003023257 | 0.0003255645 | 0.0003023722 | 0.0003237601 |
| Low fat dairy | 0.0001695981 | 0.0002542040 | 0.0001690693 | 0.0002516060 |
| Tea | 0.0000766342 | 0.0001083419 | 0.0000766088 | 0.0001077100 |
| Coffee | 0.0001233368 | 0.0001710618 | - | - |
| Caffeinated coffee | - | - | 0.0001215523 | 0.0001642579 |
| Decaffeinated coffee | - | - | 0.0001359568 | - |
| Margarine | 0.0044374986 | - | 0.0044446328 | 0.0049509809 |
| Eggs | 0.0004660760 | - | 0.0004670851 | - |
| **Inverse associations** |  |  |  |  |
| Poultry | -0.0005540920 | -0.0005257580 | -0.0005544230 | -0.0005211100 |
| Dark meat fish | -0.0010640650 | -0.0015648380 | -0.0010628700 | -0.0015734250 |
| Dark-yellow vegetables | -0.0010732930 | -0.0011824580 | -0.0010733800 | -0.0011911670 |
| Leafy-green vegetables | -0.0009532390 | -0.0012835210 | -0.0009533000 | -0.0012723060 |
| Wine | -0.0006970280 | -0.0006899080 | -0.0006971470 | -0.0006797880 |
| Snacks | -0.0014620360 | -0.0017385500 | -0.0014627160 | -0.0017578110 |
| Fruits | -0.0003087480 | -0.0003921450 | -0.0003088660 | -0.0003901360 |
| Pizza | -0.0003346070 | -0.0003100170 | -0.0003357400 | -0.0003091450 |
| Nuts | -0.0022202990 | -0.0026931930 | -0.0022193320 | -0.0026754380 |
|  |  |  |  |  |
| Sweets desserts | -0.0007715860 | -0.0006377240 | -0.0007713190 | -0.0006378680 |
| Refined grains | -0.0047919700 | -0.0044303590 | -0.0048004440 | -0.0044716120 |
| Whole grains | -0.0079106260 | -0.0124566700 | -0.0079102500 | -0.0126467470 |
| Oil and vinegar salad dressing | -0.0030488597 | -0.0046191980 | -0.0034966540 | -0.0045334630 |
| Condiments | -0.0011844700 | -0.0017077970 | -0.0011861340 | -0.0017658850 |
| Other vegetables | -0.0001967530 | - | -0.0001972830 | - |
| Regular fruit drinks | -0.0001187000 | - | -0.0001187420 | - |
| Beer | -0.0000523110 | - | -0.0000523430 | - |

EDIP, Empirical dietary inflammatory pattern; NHANES, National Health and Nutrition Examination Survey.

\* An EDIP with the use of dietary and inflammatory markers data from the NHANES 1999-2010;

† An EDIP with the use of dietary and inflammatory markers data from the NHANES 2003-2010, in which two 24 h dietary recalls were conducted;

‡ An EDIP with the use of data from the NHANES 1999-2010, and coffee consumption was classified as caffeinated and decaffeinated coffee and were separately entered into the model;

§ An EDIP with the use of data from the NHANES 2003-2010 and data of coffee was classified as caffeinated and decaffeinated coffee.

**Supplementary Table 3. The spearman correlation coefficients between the EDIP score and its 3 alternative versions and hs-CRP and WBC count in NHANES (2015-2018)**

|  |  |  |
| --- | --- | --- |
| **EDIP** | **Spearman correlation coefficients** | |
| **Hs-CRP** | **WBC** |
| EDIP \* | 0.13 | 0.14 |
| 1st alternative version † | 0.13 | 0.14 |
| 2nd alternative version ‡ | 0.13 | 0.14 |
| 3rd alternative version § | 0.13 | 0.14 |

EDIP, Empirical dietary inflammatory pattern; Hs-CRP, High-sensitivity C-reactive protein; NHANES, National Health and Nutrition Examination Survey; WBC, white blood cell.

\* An EDIP with the use of dietary and inflammatory markers data from the NHANES 1999-2010;

† An EDIP with the use of dietary and inflammatory markers data from the NHANES 2003-2010, in which two 24 h dietary recalls were conducted;

‡ An EDIP with the use of data from the NHANES 1999-2010, and coffee consumption was classified as caffeinated and decaffeinated coffee and were separately entered into the model;

§ An EDIP with the use of data from the NHANES 2003-2010 and data of coffee was classified as caffeinated and decaffeinated coffee.

**Supplementary Table 4. Sensitivity analyses of hazard ratios (95% CIs) for all-cause and cause-specific mortality in quintiles of EDIP score in NHANES (1999-2014)**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **HR (95% CI)** || | | | | | |
|  | **Quintile 1** | **Quintile 2** | **Quintile 3** | **Quintile 4** | **Quintile 5** | **Per 1-SD** |
| **Sensitivity analysis I** \* |  |  |  |  |  |  |
| All-cause mortality |  |  |  |  |  |  |
| No. of deaths/person-years | 364/52 971 | 425/53 018 | 559/54 082 | 594/57 146 | 687/63 039 |  |
| Model | 1 (Reference) | 1.11 (0.96-1.28) | 1.26 (1.09-1.44) | 1.09 (0.95-1.25) | 1.15 (1.00-1.31) | 1.05 (1.01-1.10) |
| Cancer mortality |  |  |  |  |  |  |
| No. of deaths/person-years | 80/52 971 | 103/53 018 | 117/54 082 | 114/57 146 | 158/63 039 |  |
| Multivariable adjusted model | 1 (Reference) | 1.25 (0.93-1.68) | 1.25 (0.93-1.68) | 1.05 (0.78-1.42) | 1.31 (0.99-1.75) | 1.06 (0.97-1.16) |
| CVD mortality |  |  |  |  |  |  |
| No. of deaths/person-years | 64/52 971 | 84/53 018 | 98/54 082 | 120/57 146 | 125/63 039 |  |
| Multivariable adjusted model | 1 (Reference) | 1.26 (0.90-1.75) | 1.23 (0.89-1.71) | 1.21 (0.88-1.66) | 1.14 (0.83-1.56) | 1.07 (0.97-1.18) |
| **Sensitivity analysis II** † |  |  |  |  |  |  |
| All-cause mortality |  |  |  |  |  |  |
| No. of deaths/person-years | 503/60 961 | 619/60 266 | 753/61 320 | 840/63 521 | 881/67 923 |  |
| Multivariable adjusted model | 1 (Reference) | 1.10 (0.98-1.24) | 1.20 (1.07-1.35) | 1.12 (1.00-1.26) | 1.14 (1.02-1.29) | 1.04 (1.00-1.08) |
| Cancer mortality |  |  |  |  |  |  |
| No. of deaths/person-years | 112/60 961 | 146/60 266 | 142/61 320 | 147/63 521 | 203/67 923 |  |
| Multivariable adjusted model | 1 (Reference) | 1.26 (0.98-1.62) | 1.12 (0.87-1.45) | 1.01 (0.78-1.31) | 1.28 (1.00-1.64) | 1.05 (0.97-1.13) |
| CVD mortality |  |  |  |  |  |  |
| No. of deaths/person-years | 98/60 961 | 136/60 266 | 154/61 320 | 168/63 521 | 180/67 923 |  |
| Multivariable adjusted model | 1 (Reference) | 1.19 (0.92-1.55) | 1.20 (0.92-1.56) | 1.07 (0.83-1.40) | 1.12 (0.86-1.45) | 1.04 (0.96-1.13) |
| **Sensitivity analysis III** ‡ |  |  |  |  |  |  |
| All-cause mortality |  |  |  |  |  |  |
| No. of deaths/person-years | 305/34 882 | 411/35 534 | 547/36 211 | 633/36 957 | 640/38 812 |  |
| Multivariable adjusted model | 1 (Reference) | 1.08 (0.93-1.26) | 1.22 (1.06-1.42) | 1.25 (1.08-1.45) | 1.16 (1.00-1.34) | 1.06 (1.01-1.11) |
| Cancer mortality |  |  |  |  |  |  |
| No. of deaths/person-years | 72/34 882 | 97/35 534 | 107/36 211 | 131/36 957 | 152/38 812 |  |
| Multivariable adjusted model | 1 (Reference) | 1.21 (0.89-1.66) | 1.21 (0.89-1.65) | 1.34 (0.99-1.81) | 1.45 (1.07-1.96) | 1.14 (1.03-1.25) |
| CVD mortality |  |  |  |  |  |  |
| No. of deaths/person-years | 52/34 882 | 89/35 534 | 105/36 211 | 124/36 957 | 139/38 812 |  |
| Multivariable adjusted model | 1 (Reference) | 1.25 (0.89-1.79) | 1.26 (0.90-1.79) | 1.26 (0.90-1.79) | 1.23 (0.88-1.75) | 1.08 (0.97-1.20) |
| **Sensitivity analysis IV** § |  |  |  |  |  |  |
| All-cause mortality |  |  |  |  |  |  |
| No. of deaths/person-years | 722/61 848 | 918/61 270 | 1081/63 497 | 1102/66 138 | 1081/73 153 |  |
| Multivariable adjusted model | 1 (Reference) | 1.11 (1.01-1.23) | 1.15 (1.04-1.26) | 1.14 (1.03-1.25) | 1.13 (1.03-1.25) | 1.04 (1.01-1.08) |
| Cancer mortality |  |  |  |  |  |  |
| No. of deaths/person-years | 172/61 848 | 193/61 270 | 216/63 497 | 223/66 138 | 264/73 153 |  |
| Multivariable adjusted model | 1 (Reference) | 1.04 (0.85-1.29) | 1.07 (0.87-1.31) | 1.07 (0.87-1.31) | 1.20 (0.99-1.47) | 1.07 (1.00-1.14) |
| CVD mortality |  |  |  |  |  |  |
| No. of deaths/person-years | 146/61 848 | 188/61 270 | 237/63 497 | 229/66 138 | 229/73 153 |  |
| Multivariable adjusted model | 1 (Reference) | 1.09 (0.88-1.36) | 1.18 (0.96-1.47) | 1.10 (0.89-1.37) | 1.14 (0.92-1.41) | 1.05 (0.98-1.12) |

CI, confidence interval; CVD, cardiovascular diseases; EDIP, empirical dietary inflammatory pattern; HR, hazard ratio; NHANES, National Health and Nutrition Examination Survey; SD, standard deviation.

\* We repeated analysis after exclusion of individuals with a history of major cardiovascular diseases or cancer at baseline;

† We repeated analysis after exclusion of individuals with the [follow-up](javascript:;) [time](javascript:;) less than 3 years;

‡ We repeated analysis after exclusion of individuals with a single 24-hour dietary recall;

§ We repeated analysis after adjusting EDIP scores for total energy intake using the residual method. The residual method used to adjust EDIP scores for total energy intake see ref. 35 in text.

|| Cox model was stratified for age (18-45, 46-65, and ≥66 years) and year of survey (assigned values from 1 to 8) with further adjustment for gender (male, female), total energy intake (kcal/day, tertile), race/ethnicity (Mexican American, other Hispanic, non-Hispanic white, non-Hispanic black, or other race), education (≤ 12th grade, high school graduate/GED or equivalent, or more than high school), [marital status](https://wwwn.cdc.gov/Nchs/Nhanes/2015-2016/DEMO_I.htm#DMDMARTL) (married, widowed/divorced/separated, or never married), ratio of family income to poverty (<1.30, 1.30-3.49, or ≥3.50), physical activity (<8.3, 8.3-16.7, or >16.7 METS-h/week), smoking (never smokers, former smokers, or current smokers), body mass index (BMI, calculated as weight in kilograms divided by height in meters squared) (<18.5, 18.5-24.9, 25.0-29.9, and ≥30.0) and diabetes (no, yes).

NHANES (1999-2010) (n=62 160)

**Excluded:**

* <18 years (n = 26 781)
* Having missing data on diet (n = 7051)
* Having missing data on C-reactive protein or white blood cell count (n = 14 799)
* C-reactive protein concentrations >10 mg/L (n = 3902)
* Implausible energy intake (n = 10 169)

Training set

(n=25 500)

**Reduced rank regression (RRR):**

* Dependent variables: C-reactive protein and white blood cell count
* Independent variables: 39 food groups

**Stepwise linear regression:**

* Dependent variables: RRR dietary pattern
* Independent variables: 39 foods groups

NHANES (2015-2018) (n=19 225)

**Excluded:**

* <18 years (n = 7377)
* Having missing data on diet (n = 3414)
* Having missing data on both high-sensitivity C-reactive protein and white blood cell count (n = 3532)
* Implausible energy intake (n = 4126)

Validation set

(n=9466)

**Spearman correlation analysis** Correlations between EDIP score and validators (hs-CRP and WBC count)

**Supplementary Figure 1. The flow chart of development and validation of empirical dietary inflammatory pattern (EDIP).** EDIP, Empirical dietary inflammatory pattern; Hs-CRP, High-sensitivity C-reactive protein; NHANES, National Health and Nutrition Examination Survey; RRR, Reduced rank regression; WBC, White blood cell