

## Supplementary Materials

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**Table S1** Missing counts and proportions of covariates.

| <b>Covariates</b>    | <b>No. of missing</b> | <b>Missing proportion (%)</b> |
|----------------------|-----------------------|-------------------------------|
| Age                  | 0                     | 0                             |
| Sex                  | 0                     | 0                             |
| Race/ethnicity       | 0                     | 0                             |
| Marital status       | 59                    | 0.88                          |
| Education attainment | 3                     | 0.04                          |
| Family PIR           | 495                   | 7.36                          |
| Smoking              | 2                     | 0.03                          |
| Alcohol drinking     | 0                     | 0                             |
| Hypertension         | 1                     | 0.01                          |
| Diabetes             | 0                     | 0                             |

Abbreviations: PIR, poverty-income ratio.

**Table S2** Oxidative balance score assignment scheme.

| OBS components                      | Property | Male    |                 |          | Female  |                 |          |
|-------------------------------------|----------|---------|-----------------|----------|---------|-----------------|----------|
|                                     |          | 0       | 1               | 2        | 0       | 1               | 2        |
| Dietary OBS components              |          |         |                 |          |         |                 |          |
| Dietary fiber (g/d)                 | A        | <10.60  | 10.60-<18.60    | ≥18.60   | <9.00   | 9.00-<15.00     | ≥15.00   |
| Carotene (RE/d)                     | A        | <365.00 | 365.00-<1284.33 | ≥1284.33 | <347.00 | 347.00-<1511.00 | ≥1511.00 |
| Riboflavin (mg/d)                   | A        | <1.55   | 1.55-<2.43      | ≥2.43    | <1.18   | 1.18-<1.83      | ≥1.83    |
| Niacin (mg/d)                       | A        | <20.82  | 20.82-<32.01    | ≥32.01   | <14.35  | 14.35-<22.54    | ≥22.54   |
| Vitamin B6 (mg/d)                   | A        | <1.55   | 1.55-<2.46      | ≥2.46    | <1.06   | 1.06-<1.75      | ≥1.75    |
| Total folate (mcg/d)                | A        | <282.00 | 282.00-<458.00  | ≥458.00  | <213.00 | 213.00-<348.00  | ≥348.00  |
| Vitamin B12 (mcg/d)                 | A        | <2.96   | 2.96-<5.68      | ≥5.68    | <1.99   | 1.99-<3.98      | ≥3.98    |
| Vitamin C (mg/d)                    | A        | <26.90  | 26.90-<86.70    | ≥86.70   | <24.10  | 24.10-<72.90    | ≥72.90   |
| Vitamin E (ATE) (mg/d)              | A        | <5.10   | 5.10-<9.10      | ≥9.10    | <4.26   | 4.26-<7.44      | ≥7.44    |
| Calcium (mg/d)                      | A        | <591.00 | 591.00-<1030.32 | ≥1030.32 | <501.00 | 501.00-<826.00  | ≥826.00  |
| Magnesium (mg/d)                    | A        | <233.00 | 233.00-<353.08  | ≥353.08  | <181.00 | 181.00-<268.56  | ≥268.56  |
| Zinc (mg/d)                         | A        | <8.59   | 8.59-<13.82     | ≥13.82   | <6.22   | 6.22-<9.80      | ≥9.80    |
| Copper (mg/d)                       | A        | <0.95   | 0.95-<1.44      | ≥1.44    | <0.75   | 0.75-<1.13      | ≥1.13    |
| Selenium (mcg/d)                    | A        | <91.70  | 91.70-<142.53   | ≥142.53  | <66.80  | 66.80-<103.70   | ≥103.70  |
| Total fat (g/d)                     | P        | ≥100.50 | 62.51-<100.50   | <62.51   | ≥76.88  | 48.20-<76.88    | <48.20   |
| Iron (mg/d)                         | P        | ≥16.95  | 10.97-<16.95    | <10.97   | ≥13.12  | 8.43-<13.12     | <8.43    |
| Lifestyle OBS components            |          |         |                 |          |         |                 |          |
| Physical activity (MET-minute/week) | A        | <480.00 | 480.00-<2880.00 | ≥2880.00 | <40.00  | 40.00-<1260.00  | ≥1260.00 |
| Alcohol (g/d)                       | P        | ≥30     | 0-<30           | 0        | ≥15     | 0-<15           | 0        |
| Body mass index (kg/m2)             | P        | ≥32.90  | 28.09-<32.09    | <28.09   | ≥36.82  | 30.20-<36.82    | <30.20   |
| Cotinine (ng/mL)                    | P        | ≥1.97   | 0.04-<1.97      | <0.04    | ≥0.34   | 0.03-<0.34      | <0.03    |

Abbreviations: A, antioxidant; ATE, alpha-tocopherol equivalent; MET, metabolic equivalent; OBS, oxidative balance score; P, prooxidant; RE, retinol equivalent.

**Table S3** Baseline characteristics of the selected participants.

| <b>Characteristics<sup>a</sup></b> | <b>Overall (N=6178)</b> |
|------------------------------------|-------------------------|
| Age, years                         | 49.21 (0.28)            |
| Male, n (%)                        | 3822 (62.47)            |
| Race/ethnicity, n (%)              |                         |
| Non-Hispanic white                 | 2912 (72.45)            |
| Non-Hispanic black                 | 1560 (11.33)            |
| Mexican American                   | 743 (5.75)              |
| Others                             | 963 (10.46)             |
| Marital status, n (%)              |                         |
| Married                            | 3313 (57.06)            |
| Single                             | 2421 (35.55)            |
| Living with a partner              | 444 (7.39)              |
| Education attainment, n (%)        |                         |
| Under high school                  | 1376 (14.11)            |
| High school                        | 1522 (25.52)            |
| Above high school                  | 3280 (60.37)            |
| Family PIR, n (%)                  |                         |
| <1.3                               | 1794 (19.32)            |
| 1.3-<3.5                           | 2364 (36.02)            |
| ≥3.5                               | 2020 (44.66)            |
| Current smoking, n (%)             | 1317 (20.47)            |
| Current drinking, n (%)            | 4654 (79.87)            |
| Hypertension, n (%)                | 3764 (55.82)            |
| Diabetes, n (%)                    | 1464 (17.85)            |
| OBS                                | 20.90 (0.15)            |
| OBS components                     |                         |

**Table S3** (continued )

| <b>Characteristics<sup>a</sup></b> | <b>Overall (N=6178)</b> |
|------------------------------------|-------------------------|
| Dietary fiber, g/d                 | 15.52 (0.18)            |
| Carotene, RE/d                     | 2305.05 (71.98)         |
| Riboflavin, mg/d                   | 2.11 (0.02)             |
| Niacin, mg/d                       | 26.88 (0.27)            |
| Vitamin B <sub>6</sub> , mg/d      | 2.10 (0.03)             |
| Total folate, mcg/d                | 392.28 (4.34)           |
| Vitamin B <sub>12</sub> , mcg/d    | 5.11 (0.09)             |
| Vitamin C, mg/d                    | 75.66 (1.38)            |
| Vitamin E (ATE), mg/d              | 8.28 (0.13)             |
| Calcium, mg/d                      | 890.64 (9.84)           |
| Magnesium, mg/d                    | 297.45 (2.92)           |
| Zinc, mg/d                         | 11.76 (0.14)            |
| Copper, mg/d                       | 1.26 (0.01)             |
| Selenium, mcg/d                    | 117.41 (1.11)           |
| Total fat, g/d                     | 84.88 (0.90)            |
| Iron, mg/d                         | 14.58 (0.15)            |
| Physical activity, MET-minute/week | 3255.23 (121.63)        |
| Alcohol, g/d                       | 9.95 (0.35)             |
| Body mass index, kg/m <sup>2</sup> | 32.53 (0.15)            |
| Cotinine, ng/mL                    | 64.89 (2.85)            |

<sup>a</sup> Continuous variables were expressed as weighted means and standard errors and categorical variables were expressed as numbers and weighted percentages. The sums of percentages may not reach 100%, owing to the rounding of decimals.

Abbreviations: ATE, alpha-tocopherol equivalent; MET, metabolic equivalent; OBS, oxidative balance score; PIR, poverty-income ratio.

**Table S4** Weighted mean and 95% confidence interval of OBS according to population characteristics.

| Characteristics             | No. of subjects | Weighted mean (95% CI) | P-value |
|-----------------------------|-----------------|------------------------|---------|
| <b>Overall</b>              | 6178            | 20.90 (20.61-21.19)    |         |
| <b>Age, years</b>           |                 |                        | 0.23    |
| <50                         | 2545            | 21.04 (20.65-21.44)    |         |
| ≥50                         | 3633            | 20.77 (20.43-21.10)    |         |
| <b>Sex</b>                  |                 |                        | 0.28    |
| Male                        | 3822            | 20.81 (20.50-21.12)    |         |
| Female                      | 2356            | 21.06 (20.62-21.49)    |         |
| <b>Race/ethnicity</b>       |                 |                        | <0.001  |
| Others                      | 3822            | 20.81 (20.50-21.12)    |         |
| Non-Hispanic white          | 2356            | 21.06 (20.62-21.49)    |         |
| <b>Marital status</b>       |                 |                        | <0.001  |
| Others                      | 2600            | 20.28 (19.88-20.67)    |         |
| Married                     | 3578            | 21.37 (21.01-21.73)    |         |
| <b>Education attainment</b> |                 |                        | <0.001  |
| High school and below       | 2898            | 19.58 (19.20-19.97)    |         |
| Above high school           | 3280            | 21.76 (21.42-22.11)    |         |
| <b>Family PIR</b>           |                 |                        | <0.001  |
| <3.5                        | 4158            | 19.85 (19.51-20.18)    |         |
| ≥3.5                        | 2020            | 22.21 (21.82-22.59)    |         |
| <b>Current smoking</b>      |                 |                        | <0.001  |
| No                          | 4861            | 21.44 (21.16-21.72)    |         |
| Yes                         | 1317            | 18.80 (18.20-19.40)    |         |
| <b>Current drinking</b>     |                 |                        | 0.02    |
| No                          | 1524            | 20.33 (19.76-20.90)    |         |
| Yes                         | 4654            | 21.04 (20.73-21.35)    |         |
| <b>Hypertension</b>         |                 |                        | 0.005   |
| No                          | 2414            | 21.25 (20.84-21.67)    |         |
| Yes                         | 3764            | 20.62 (20.31-20.93)    |         |
| <b>Diabetes</b>             |                 |                        | <0.001  |
| No                          | 4714            | 21.11 (20.79-21.42)    |         |
| Yes                         | 1464            | 19.95 (19.42-20.48)    |         |

Abbreviations: CI, confidence interval; OBS, oxidative balance score; PIR, poverty-income ratio.

**Table S5** Association between OBS and mortality in gout and hyperuricemia subjects after excluding outliers of OBS.

| Outcome                  | Quartiles of OBS |                  |                  |                  | P-trend | Continuous       |
|--------------------------|------------------|------------------|------------------|------------------|---------|------------------|
|                          | Q1 (lowest)      | Q2               | Q3               | Q4 (highest)     |         |                  |
| Range                    | <16              | 16-20            | 21-26            | >26              |         |                  |
| All-cause mortality      |                  |                  |                  |                  |         |                  |
| Deaths/person-years      | 364/14955        | 238/11134        | 234/14247        | 118/11187        |         | 954/51523        |
| Crude model              | 1.00 (reference) | 0.99 (0.81-1.21) | 0.69 (0.54-0.86) | 0.42 (0.32-0.56) | <0.001  | 0.96 (0.95-0.97) |
| Model 1 <sup>a</sup>     | 1.00 (reference) | 0.92 (0.74-1.13) | 0.67 (0.54-0.84) | 0.42 (0.32-0.55) | <0.001  | 0.96 (0.95-0.97) |
| Model 2 <sup>b</sup>     | 1.00 (reference) | 1.10 (0.89-1.35) | 0.89 (0.72-1.10) | 0.58 (0.45-0.76) | <0.001  | 0.98 (0.97-0.99) |
| cardiovascular mortality |                  |                  |                  |                  |         |                  |
| Deaths/person-years      | 126/14955        | 91/11134         | 71/14247         | 34/11187         |         | 322/51523        |
| Crude model              | 1.00 (reference) | 1.16 (0.82-1.65) | 0.71 (0.47-1.05) | 0.36 (0.22-0.59) | <0.001  | 0.96 (0.94-0.98) |
| Model 1 <sup>a</sup>     | 1.00 (reference) | 1.07 (0.75-1.52) | 0.69 (0.47-1.01) | 0.36 (0.23-0.58) | <0.001  | 0.96 (0.94-0.98) |
| Model 2 <sup>b</sup>     | 1.00 (reference) | 1.28 (0.91-1.81) | 0.92 (0.63-1.36) | 0.50 (0.31-0.80) | 0.004   | 0.98 (0.96-1.00) |

<sup>a</sup> Model 1 was adjusted for age (<50, ≥50 years), sex (male, female), and race/ethnicity (non-Hispanic white, others).

<sup>b</sup> Model 2 was further adjusted for marital status (married, others), family poverty-income ratio (<3.5, ≥3.5), education attainment (above high school, high school and below), current smoking (yes, no), current drinking (yes, no), hypertension (yes, no), and diabetes (yes, no).

Abbreviations: OBS, oxidative balance score.

**Table S6** Association between OBS and mortality in gout and hyperuricemia subjects after excluding CVD patients at baseline.

| Outcome                  | Quartiles of OBS |                  |                  |                  | P-trend | Continuous       |
|--------------------------|------------------|------------------|------------------|------------------|---------|------------------|
|                          | Q1 (lowest)      | Q2               | Q3               | Q4 (highest)     |         |                  |
| Range                    | <15              | 15-20            | 21-26            | >26              |         |                  |
| All-cause mortality      |                  |                  |                  |                  |         |                  |
| Deaths/person-years      | 226/11859        | 179/11721        | 153/12447        | 82/9828          |         | 640/45854        |
| Crude model              | 1.00 (reference) | 0.93 (0.73-1.19) | 0.66 (0.50-0.86) | 0.43 (0.30-0.61) | <0.001  | 0.96 (0.95-0.97) |
| Model 1 <sup>a</sup>     | 1.00 (reference) | 0.85 (0.66-1.10) | 0.63 (0.48-0.84) | 0.41 (0.29-0.58) | <0.001  | 0.96 (0.94-0.97) |
| Model 2 <sup>b</sup>     | 1.00 (reference) | 1.04 (0.80-1.36) | 0.84 (0.63-1.12) | 0.58 (0.41-0.82) | 0.002   | 0.98 (0.96-0.99) |
| cardiovascular mortality |                  |                  |                  |                  |         |                  |
| Deaths/person-years      | 69/11859         | 58/11721         | 47/12447         | 20/9828          |         | 194/45854        |
| Crude model              | 1.00 (reference) | 0.96 (0.63-1.46) | 0.71 (0.46-1.12) | 0.38 (0.22-0.66) | <0.001  | 0.96 (0.94-0.99) |
| Model 1 <sup>a</sup>     | 1.00 (reference) | 0.88 (0.56-1.36) | 0.68 (0.44-1.06) | 0.37 (0.22-0.62) | <0.001  | 0.96 (0.94-0.98) |
| Model 2 <sup>b</sup>     | 1.00 (reference) | 1.09 (0.70-1.69) | 0.92 (0.58-1.45) | 0.53 (0.31-0.91) | 0.04    | 0.98 (0.95-1.00) |

<sup>a</sup> Model 1 was adjusted for age (<50, ≥50 years), sex (male, female), and race/ethnicity (non-Hispanic white, others).

<sup>b</sup> Model 2 was further adjusted for marital status (married, others), family poverty-income ratio (<3.5, ≥3.5), education attainment (above high school, high school and below), current smoking (yes, no), current drinking (yes, no), hypertension (yes, no), and diabetes (yes, no).

Abbreviations: CVD, cardiovascular disease; OBS, oxidative balance score.

**Table S7** Association between OBS and mortality in gout and hyperuricemia subjects after excluding deaths occurring in the first one year of follow-up.

| Outcome                  | Quartiles of OBS |                  |                  |                  | P-trend | Continuous       |
|--------------------------|------------------|------------------|------------------|------------------|---------|------------------|
|                          | Q1 (lowest)      | Q2               | Q3               | Q4 (highest)     |         |                  |
| Range                    | <16              | 16-20            | 21-26            | >26              |         |                  |
| All-cause mortality      |                  |                  |                  |                  |         |                  |
| Deaths/person-years      | 305/13349        | 268/13245        | 220/14252        | 112/11611        |         | 905/52458        |
| Crude model              | 1.00 (reference) | 0.96 (0.77-1.18) | 0.67 (0.53-0.86) | 0.40 (0.30-0.53) | <0.001  | 0.96 (0.95-0.97) |
| Model 1 <sup>a</sup>     | 1.00 (reference) | 0.89 (0.71-1.12) | 0.65 (0.52-0.83) | 0.39 (0.30-0.51) | <0.001  | 0.96 (0.95-0.97) |
| Model 2 <sup>b</sup>     | 1.00 (reference) | 1.04 (0.82-1.32) | 0.86 (0.68-1.09) | 0.53 (0.40-0.70) | <0.001  | 0.98 (0.96-0.99) |
| cardiovascular mortality |                  |                  |                  |                  |         |                  |
| Deaths/person-years      | 108/13349        | 98/13245         | 67/14252         | 32/11611         |         | 305/52458        |
| Crude model              | 1.00 (reference) | 1.01 (0.72-1.42) | 0.63 (0.43-0.94) | 0.33 (0.20-0.53) | <0.001  | 0.95 (0.94-0.97) |
| Model 1 <sup>a</sup>     | 1.00 (reference) | 0.94 (0.66-1.34) | 0.61 (0.42-0.91) | 0.32 (0.20-0.52) | <0.001  | 0.95 (0.94-0.97) |
| Model 2 <sup>b</sup>     | 1.00 (reference) | 1.09 (0.75-1.59) | 0.81 (0.54-1.22) | 0.44 (0.27-0.72) | 0.001   | 0.97 (0.95-0.99) |

<sup>a</sup> Model 1 was adjusted for age (<50, ≥50 years), sex (male, female), and race/ethnicity (non-Hispanic white, others).

<sup>b</sup> Model 2 was further adjusted for marital status (married, others), family poverty-income ratio (<3.5, ≥3.5), education attainment (above high school, high school and below), current smoking (yes, no), current drinking (yes, no), hypertension (yes, no), and diabetes (yes, no).

Abbreviations: OBS, oxidative balance score.

**Table S8** Association between OBS and mortality in gout and hyperuricemia subjects after imputing missing covariates with multiple imputation.

| Outcome                  | Quartiles of OBS |                  |                  |                  | P-trend | Continuous       |
|--------------------------|------------------|------------------|------------------|------------------|---------|------------------|
|                          | Q1 (lowest)      | Q2               | Q3               | Q4 (highest)     |         |                  |
| Range                    | <16              | 16-20            | 21-26            | >26              |         |                  |
| All-cause mortality      |                  |                  |                  |                  |         |                  |
| Deaths/person-years      | 364/14561        | 312/14405        | 259/15646        | 135/12828        |         | 1070/57440       |
| Crude model              | 1.00 (reference) | 0.98 (0.81-1.19) | 0.68 (0.56-0.83) | 0.40 (0.30-0.53) | <0.001  | 0.96 (0.95-0.97) |
| Model 1 <sup>a</sup>     | 1.00 (reference) | 0.91 (0.74-1.11) | 0.66 (0.54-0.81) | 0.39 (0.29-0.51) | <0.001  | 0.96 (0.95-0.97) |
| Model 2 <sup>b</sup>     | 1.00 (reference) | 1.06 (0.84-1.35) | 0.85 (0.68-1.06) | 0.53 (0.41-0.70) | <0.001  | 0.98 (0.96-0.99) |
| cardiovascular mortality |                  |                  |                  |                  |         |                  |
| Deaths/person-years      | 128/14561        | 109/14405        | 78/15646         | 37/12828         |         | 352/57440        |
| Crude model              | 1.00 (reference) | 0.91 (0.65-1.26) | 0.62 (0.43-0.87) | 0.28 (0.18-0.46) | <0.001  | 0.95 (0.93-0.97) |
| Model 1 <sup>a</sup>     | 1.00 (reference) | 0.84 (0.60-1.17) | 0.59 (0.42-0.83) | 0.28 (0.17-0.44) | <0.001  | 0.95 (0.93-0.97) |
| Model 2 <sup>b</sup>     | 1.00 (reference) | 1.01 (0.69-1.48) | 0.81 (0.55-1.18) | 0.41 (0.25-0.66) | <0.001  | 0.97 (0.95-0.99) |

<sup>a</sup> Model 1 was adjusted for age (<50, ≥50 years), sex (male, female), and race/ethnicity (non-Hispanic white, others).

<sup>b</sup> Model 2 was further adjusted for marital status (married, others), family poverty-income ratio (<3.5, ≥3.5), education attainment (above high school, high school and below), current smoking (yes, no), current drinking (yes, no), hypertension (yes, no), and diabetes (yes, no).

Abbreviations: OBS, oxidative balance score.

**Table S9** E-values and lower limit of 95% CIs for the association between OBS and mortality in gout and hyperuricemia subjects.

| <b>Outcome</b>                  | <b>HR (95% CI)</b> | <b>E-value</b> |
|---------------------------------|--------------------|----------------|
| <b>All-cause mortality</b>      |                    |                |
| <b>Quartiles of OBS</b>         |                    |                |
| Q1                              | 1.00 (ref.)        | —              |
| Q2                              | 1.00 (0.79-1.28)   | 1.00           |
| Q3                              | 0.84 (0.67-1.06)   | 1.67           |
| Q4                              | 0.53 (0.40-0.69)   | 3.18           |
| <b>Continuous</b>               | 0.98 (0.96-0.99)   | 1.16           |
| <b>cardiovascular mortality</b> |                    |                |
| <b>Quartiles of OBS</b>         |                    |                |
| Q1                              | 1.00 (ref.)        | —              |
| Q2                              | 1.03 (0.72-1.49)   | 1.21           |
| Q3                              | 0.80 (0.54-1.19)   | 1.81           |
| Q4                              | 0.41 (0.25-0.67)   | 4.31           |
| <b>Continuous</b>               | 0.97 (0.95-0.99)   | 1.21           |

Abbreviations: CI, confidence interval; HR, hazard ratio; OBS, oxidative balance score.