

**Supplementary Table S1.** Information on laboratory methods used to measure serum and red blood cell folate biomarkers in the US population  $\geq 1$  year, NHANES 2011–2<sup>a</sup>

| <b>Biomarker</b> | <b>Method</b>       | <b>Matrix</b> | <b>QC pool</b> | <b>Concentration<br/>(nmol/L)</b> | <b>Imprecision<br/>(%)</b> | <b># of Runs<br/>(n)</b> | <b>LOD<br/>(nmol/L)</b> |
|------------------|---------------------|---------------|----------------|-----------------------------------|----------------------------|--------------------------|-------------------------|
| 5-MethylTHF      | HPLC-MS/MS          | Serum         | Low            | 18.2                              | 2.5                        | 151                      | 0.31                    |
|                  |                     |               | Medium         | 33.5                              | 2.5                        | 151                      |                         |
|                  |                     |               | High           | 48.3                              | 2.3                        | 151                      |                         |
| UMFA             | HPLC-MS/MS          | Serum         | Low            | 0.68                              | 16.0                       | 147                      | 0.14                    |
|                  |                     |               | Medium         | 5.46                              | 10.4                       | 147                      |                         |
|                  |                     |               | High           | 10.5                              | 11.1                       | 147                      |                         |
| THF              | HPLC-MS/MS          | Serum         | Medium         | 1.40                              | 11.9                       | 144                      | 0.37                    |
|                  |                     |               | High           | 4.39                              | 6.8                        | 144                      |                         |
| 5-FormylTHF      | HPLC-MS/MS          | Serum         | Medium         | 0.67                              | 9.8                        | 143                      | 0.30                    |
|                  |                     |               | High           | 2.41                              | 3.8                        | 143                      |                         |
| 5,10-MethenylTHF | HPLC-MS/MS          | Serum         | Medium         | 1.45                              | 6.6                        | 143                      | 0.34                    |
|                  |                     |               | High           | 4.43                              | 4.1                        | 143                      |                         |
| MeFox            | HPLC-MS/MS          | Serum         | Low            | 1.42                              | 6.2                        | 143                      | 0.34                    |
|                  |                     |               | Medium         | 1.52                              | 6.1                        | 143                      |                         |
|                  |                     |               | High           | 2.90                              | 5.1                        | 143                      |                         |
| Total folate     | Microbiologic assay | RBC           | Low A          | 421                               | 6.2                        | 63                       | 105                     |
|                  |                     |               | Medium A       | 592                               | 5.4                        | 63                       |                         |
|                  |                     |               | High A         | 899                               | 6.5                        | 63                       |                         |
|                  |                     |               | Low B          | 590                               | 7.6                        | 43                       |                         |
|                  |                     |               | Medium B       | 924                               | 8.9                        | 43                       |                         |
|                  |                     |               | High B         | 1470                              | 7.3                        | 43                       |                         |

NHANES, National Health and Nutrition Examination Survey; QC, quality control; LOD, limit of detection; 5-methylTHF, 5-methyltetrahydrofolate; UMFA, unmetabolized folic acid; THF, tetrahydrofolate; 5-formylTHF, 5-formyltetrahydrofolate; 5,10-methenylTHF, 5,10-methenyltetrahydrofolate; MeFox, pyrazino-s-triazine derivative of 4 $\alpha$ -hydroxy-5-methylTHF; RBC, red blood cell.

<sup>a</sup> Imprecision is expressed as CV; LOD for RBC total folate measured by microbiologic assay is based on an assumed hematocrit of 40% and the lowest possible dilution of whole-blood hemolysates (1:40).

**Supplementary Table S2.** Characteristics of US participants  $\geq 1$  year by variable categories, NHANES 2011–2<sup>a</sup>

| <b>Variable</b>  | <b>Sample size<br/>(<i>n</i>)</b> | <b>Estimate (unweighted)<br/>(%)</b> | <b>Estimate (weighted)<br/>(%)</b> |
|--|-----------------------------------|--------------------------------------|------------------------------------|
| Age, years   |                                   |                                      |                                    |
| 1–5  | 1135                              | 12.8                                 | 6.8                                |
| 6–11   | 1272                              | 14.2                                 | 8.1                                |
| 12–19  | 1230                              | 13.7                                 | 11.2                               |
| 20–39  | 1878                              | 21.0                                 | 26.8                               |
| 40–59  | 1754                              | 19.6                                 | 28.0                               |
| $\geq 60$  | 1687                              | 18.8                                 | 19.1                               |
| Sex  |                                   |                                      |                                    |
| Male   | 4463                              | 49.8                                 | 48.8                               |
| Female   | 4493                              | 50.2                                 | 51.2                               |
| Race-ethnicity   |                                   |                                      |                                    |
| Hispanic <sup>b</sup>                                      | 2195                              | 24.5                                 | 16.6                               |
| Mexican-American   | 1226                              | 13.7                                 | 9.6                                |
| Non-Hispanic Asian   | 1191                              | 13.3                                 | 5.1                                |
| Non-Hispanic Black   | 2492                              | 27.8                                 | 12.4                               |
| Non-Hispanic White   | 2729                              | 30.5                                 | 63                                 |
| Fasting time, hours  |                                   |                                      |                                    |
| <3   | 2965                              | 34.8                                 | 33.5                               |
| 3–<8   | 1915                              | 22.5                                 | 20.0                               |
| $\geq 8$   | 3648                              | 42.8                                 | 46.6                               |
| eGFR <sup>c</sup> , mL/(min $\times$ 1.73 m <sup>2</sup> ) |                                   |                                      |                                    |
| 0–<60  | 471                               | 7.9                                  | 7.5                                |
| 60–<90   | 2058                              | 34.4                                 | 41.0                               |
| $\geq 90$  | 3447                              | 57.7                                 | 51.5                               |
| BMI <sup>d</sup>   |                                   |                                      |                                    |
| Underweight  | 1833                              | 21.3                                 | 13.1                               |
| Normal weight  | 2669                              | 31.0                                 | 30.8                               |
| Overweight   | 2019                              | 23.5                                 | 28.1                               |
| Obese  | 2081                              | 24.2                                 | 28.1                               |
| BSA <sup>e</sup> , m <sup>2</sup>                          |                                   |                                      |                                    |
| <1.5   | 2537                              | 29.5                                 | 17.9                               |
| 1.5–1.8  | 2241                              | 26.1                                 | 27                                 |
| 1.8–2  | 1752                              | 20.4                                 | 23.9                               |
| $\geq 2$   | 2072                              | 24.1                                 | 31.2                               |

Supplementary material

|                                    |      |      |      |
|------------------------------------|------|------|------|
| Serum cotinine <sup>f</sup> , µg/L |      |      |      |
| ≤10                                | 6108 | 82.8 | 80.4 |
| >10                                | 1270 | 17.2 | 19.7 |
| Alcohol intake <sup>g</sup>        |      |      |      |
| No drinks                          | 1637 | 33.0 | 25.7 |
| <1 (not 0)                         | 2704 | 54.5 | 58.5 |
| 1–<2                               | 365  | 7.4  | 9.3  |
| ≥2                                 | 256  | 5.2  | 6.6  |
| Supplement use <sup>h</sup>        |      |      |      |
| Yes                                | 1536 | 18.9 | 23.1 |
| No                                 | 6601 | 81.1 | 76.9 |

NHANES, National Health and Nutrition Examination Survey; eGFR, estimated glomerular filtration rate; BSA, body surface area.

<sup>a</sup> Used sample weights for Mobile Examination Center participants ≥1 year to calculate percent estimates.

<sup>b</sup> Hispanic, [Mexican American + other Hispanic]

<sup>c</sup> Used to assess kidney function; available for persons ≥12 years; impaired kidney function was defined as eGFR <60 mL/(min×1.73 m<sup>2</sup>)

<sup>d</sup> BMI definitions: <18.5 kg/m<sup>2</sup> (underweight); 18.5–<25 kg/m<sup>2</sup> (normal weight); 25–<30 kg/m<sup>2</sup> (overweight); and ≥30 kg/m<sup>2</sup> (obese)

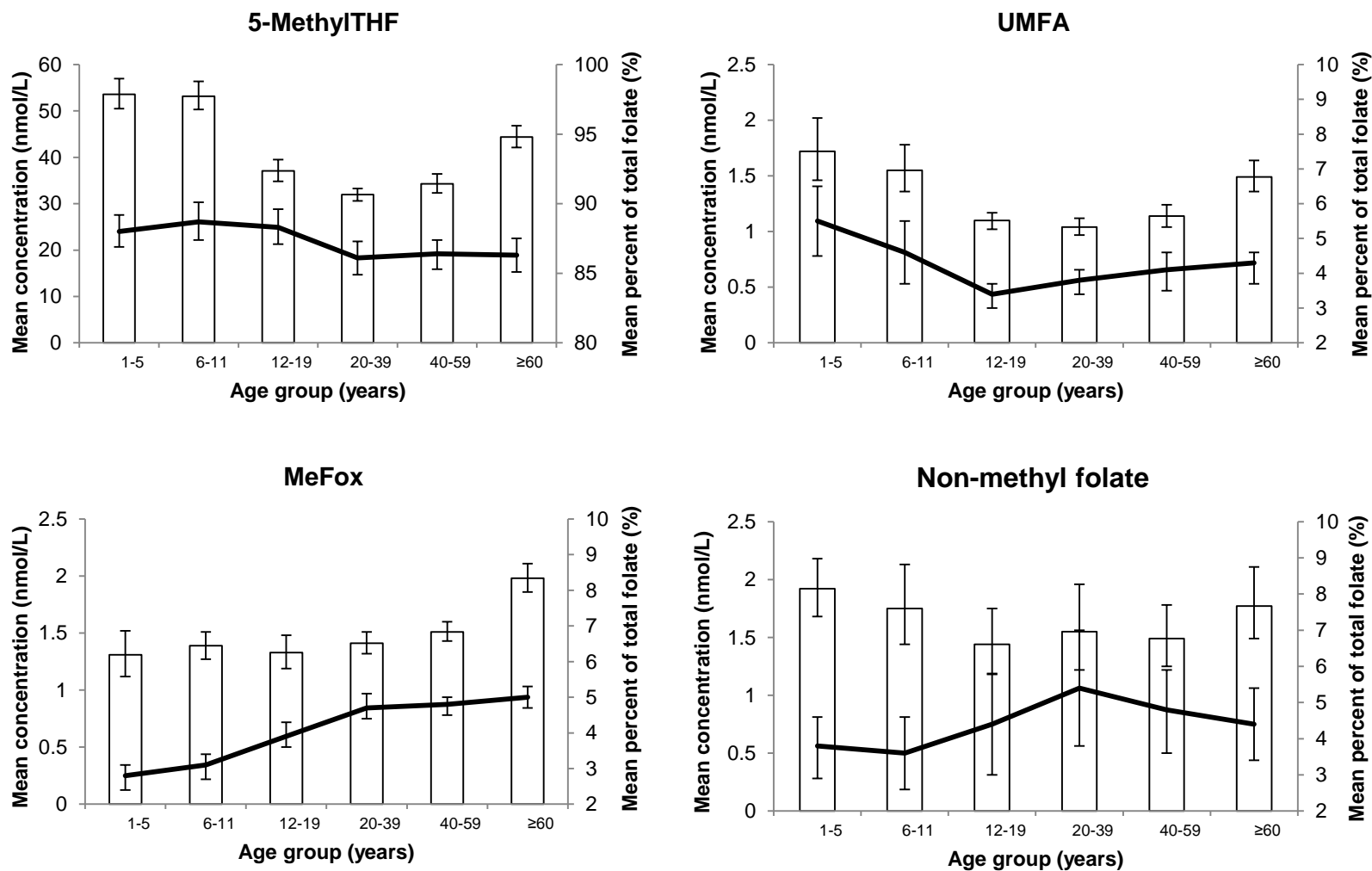
<sup>e</sup> Calculated as square root of [(height in cm × weight in kg)/3600] or square root of [(height in inches × weight in pounds)/3131]

<sup>f</sup> Biomarker of tobacco smoke exposure; concentrations >10 µg/L are considered to represent smokers

<sup>g</sup> Calculated as average daily number of “standard” drinks [(quantity × frequency) / 365.25]; 1 drink ≈ 15 g ethanol

<sup>h</sup> Folic acid-containing dietary supplements used during the last 24 hours prior to visiting the Mobile Examination Center

**Supplementary Fig. S1.** Serum folate forms by age group for the total US population  $\geq 1$  year, NHANES 2011–2.



Bars represent geometric mean concentration; lines represent mean percent of total folate; error bars represent 95% CI. Serum folate forms and serum total folate (sum of folate forms including MeFox) were measured by HPLC-MS/MS. Non-methyl folate represents the sum of the three minor forms tetrahydrofolate, 5-formyltetrahydrofolate and 5,10-methylnetetrahydrofolate. 5-MethylTHF, 5-methyltetrahydrofolate; MeFox, pyrazino-s-triazine derivative of 4 $\alpha$ -hydroxy-5-methylTHF; UMFA, unmetabolized folic acid.

**Supplementary Table S3.** Contributions of various folate forms to serum total folate by weighted decile of serum total folate for the US population  $\geq 1$  y, NHANES 2011–2<sup>a</sup>

| Decile category<br>(nmol/L)               | Sample size<br>(n) | 5-MethylTHF         | UMFA               | Non-methyl folate  | MeFox              |
|---|--------------------|---------------------|--------------------|--------------------|--------------------|
| Mean concentration (95% CI) (nmol/L)      |                    |                     |                    |                    |                    |
| 1 <sup>st</sup> (<22.84)                  | 770                | 14.5 (14.0 – 15.1)  | .778 (.729 – .827) | 1.61 (1.13 – 2.10) | 1.18 (1.01 – 1.34) |
| 2 <sup>nd</sup> (22.84–<28.05)            | 714                | 21.4 (21.0 – 21.9)  | .898 (.834 – .963) | 1.71 (1.22 – 2.21) | 1.51 (1.36 – 1.65) |
| 3 <sup>rd</sup> (28.05–<33.0)             | 721                | 26.1 (25.5 – 26.7)  | .975 (.900 – 1.05) | 1.79 (1.26 – 2.32) | 1.66 (1.52 – 1.80) |
| 4 <sup>th</sup> (33.0–<38.46)             | 744                | 31.2 (30.8 – 31.6)  | 1.02 (.939 – 1.11) | 1.69 (1.26 – 2.12) | 1.80 (1.65 – 1.95) |
| 5 <sup>th</sup> (38.46–<43.53)            | 713                | 36.3 (35.9 – 36.7)  | 1.13 (1.02 – 1.24) | 1.73 (1.36 – 2.10) | 1.82 (1.66 – 1.99) |
| 6 <sup>th</sup> (43.53–<49.68)            | 734                | 41.6 (40.9 – 42.3)  | 1.37 (1.21 – 1.53) | 1.93 (1.34 – 2.51) | 1.99 (1.80 – 2.19) |
| 7 <sup>th</sup> (49.68–<56.81)            | 735                | 47.4 (46.8 – 48.0)  | 1.69 (1.34 – 2.03) | 1.96 (1.43 – 2.49) | 2.06 (1.84 – 2.27) |
| 8 <sup>th</sup> (56.81–<66.52)            | 786                | 55.3 (54.8 – 55.8)  | 1.87 (1.63 – 2.12) | 1.95 (1.50 – 2.40) | 2.21 (1.96 – 2.45) |
| 9 <sup>th</sup> (66.52–<82.48)            | 804                | 66.4 (65.6 – 67.2)  | 2.99 (2.58 – 3.39) | 2.13 (1.57 – 2.69) | 2.20 (2.04 – 2.36) |
| 10 <sup>th</sup> ( $\geq 82.48$ )         | 721                | 88.4 (83.8 – 92.9)  | 13.9 (11.1 – 16.7) | 3.08 (2.37 – 3.79) | 3.06 (2.82 – 3.29) |
| Mean percent of total folate (95% CI) (%) |                    |                     |                    |                    |                    |
| 1 <sup>st</sup> (<22.84)                  | 770                | 79.9 (77.9 – 81.9)* | 4.5 (4.2 – 4.7)*   | 9.1 (6.4 – 11.7)*  | 6.6 (5.8 – 7.4)*   |
| 2 <sup>nd</sup> (22.84–<28.05)            | 714                | 83.8 (82.2 – 85.5)  | 3.5 (3.3 – 3.8)*   | 6.7 (4.8 – 8.7)*   | 5.9 (5.3 – 6.5)*   |
| 3 <sup>rd</sup> (28.05–<33.0)             | 721                | 85.5 (83.9 – 87.1)  | 3.2 (2.9 – 3.4)*   | 5.9 (4.1 – 7.6)*   | 5.4 (5.0 – 5.9)*   |
| 4 <sup>th</sup> (33.0–<38.46)             | 744                | 87.4 (86.3 – 88.4)* | 2.9 (2.6 – 3.1)*   | 4.7 (3.6 – 5.9)*   | 5.0 (4.6 – 5.5)*   |
| 5 <sup>th</sup> (38.46–<43.53)            | 713                | 88.6 (87.5 – 89.6)* | 2.8 (2.5 – 3.0)*   | 4.2 (3.3 – 5.1)*   | 4.5 (4.1 – 4.9)*   |
| 6 <sup>th</sup> (43.53–<49.68)            | 734                | 88.7 (87.4 – 90.0)* | 2.9 (2.6 – 3.3)*   | 4.1 (2.9 – 5.4)*   | 4.3 (3.8 – 4.7)*   |
| 7 <sup>th</sup> (49.68–<56.81)            | 735                | 89.2 (88.4 – 90.1)* | 3.2 (2.5 – 3.8)*   | 3.7 (2.7 – 4.7)*   | 3.9 (3.5 – 4.3)*   |
| 8 <sup>th</sup> (56.81–<66.52)            | 786                | 90.2 (89.2 – 91.1)* | 3.1 (2.6 – 3.5)*   | 3.2 (2.5 – 3.9)*   | 3.6 (3.2 – 4.0)*   |
| 9 <sup>th</sup> (66.52–<82.48)            | 804                | 90.1 (89.3 – 91.0)* | 4.0 (3.5 – 4.6)*   | 2.9 (2.1 – 3.6)    | 3.0 (2.8 – 3.2)    |
| 10 <sup>th</sup> ( $\geq 82.45$ )         | 721                | 83.8 (81.9 – 85.7)  | 10.4 (8.9 – 12.0)  | 2.8 (2.2 – 3.4)    | 3.0 (2.7 – 3.2)    |

NHANES, National Health and Nutrition Examination Survey; 5-methylTHF, 5-methyltetrahydrofolate; UMFA, unmetabolized folic acid; MeFox, pyrazino-s-triazine derivative of 4 $\alpha$ -hydroxy-5-methylTHF.

<sup>a</sup> Serum folate forms and serum total folate (sum of all forms including MeFox) were measured by HPLC-MS/MS; non-methyl folate represents the sum of three minor forms: THF, 5-formylTHF, and 5,10-methenylTHF.

\*  $P < 0.05$  for tests comparing the mean percent of total folate in each decile to the 10<sup>th</sup> decile as a reference.

**Supplementary Table S4.** Spearman correlation between various folate biomarkers in the US population  $\geq 1$  year, NHANES 2011–2<sup>a</sup>

|                               | <b>Serum<br/>non-methyl folate</b> | <b>Serum<br/>UMFA</b> | <b>Serum<br/>MeFox</b> | <b>Serum<br/>THF</b> | <b>Serum<br/>total folate</b> | <b>RBC<br/>total folate</b> |
|-------------------------------|------------------------------------|-----------------------|------------------------|----------------------|-------------------------------|-----------------------------|
| Persons $\geq 1$ year         |                                    |                       |                        |                      |                               |                             |
| Serum 5-methylTHF             | 0.22*                              | 0.44*                 | 0.25*                  | 0.22*                | 0.99*                         | 0.59*                       |
| Serum non-methyl folate       |                                    | 0.12                  | 0.05                   | 1.00*                | 0.29*                         | 0.14*                       |
| Serum UMFA                    |                                    |                       | 0.36*                  | 0.11                 | 0.50*                         | 0.30*                       |
| Serum MeFox                   |                                    |                       |                        | 0.05                 | 0.31*                         | 0.30*                       |
| Serum THF                     |                                    |                       |                        |                      | 0.29*                         | 0.14*                       |
| Serum total folate            |                                    |                       |                        |                      |                               | 0.59*                       |
| Children 1–19 years           |                                    |                       |                        |                      |                               |                             |
| Serum 5-methylTHF             | 0.22*                              | 0.32*                 | 0.14*                  | 0.21*                | 0.97*                         | 0.49*                       |
| Serum non-methyl folate       |                                    | 0.13                  | -0.02                  | 1.00*                | 0.30*                         | 0.06                        |
| Serum UMFA                    |                                    |                       | 0.36*                  | 0.12                 | 0.41*                         | 0.22*                       |
| Serum MeFox                   |                                    |                       |                        | -0.01                | 0.21*                         | 0.24*                       |
| Serum THF                     |                                    |                       |                        |                      | 0.29*                         | 0.06                        |
| Serum total folate            |                                    |                       |                        |                      |                               | 0.48*                       |
| Adults 20–59 years            |                                    |                       |                        |                      |                               |                             |
| Serum 5-methylTHF             | 0.22*                              | 0.40*                 | 0.27*                  | 0.17*                | 0.99*                         | 0.58*                       |
| Serum non-methyl folate       |                                    | 0.04                  | 0.00                   | 0.99*                | 0.24*                         | 0.12*                       |
| Serum UMFA                    |                                    |                       | 0.33*                  | 0.04                 | 0.45*                         | 0.26*                       |
| Serum MeFox                   |                                    |                       |                        | 0.01                 | 0.34*                         | 0.26*                       |
| Serum THF                     |                                    |                       |                        |                      | 0.24*                         | 0.12*                       |
| Serum total folate            |                                    |                       |                        |                      |                               | 0.59*                       |
| Older persons $\geq 60$ years |                                    |                       |                        |                      |                               |                             |
| Serum 5-methylTHF             | 0.22*                              | 0.54*                 | 0.28*                  | 0.30*                | 0.99*                         | 0.72*                       |
| Serum non-methyl folate       |                                    | 0.23*                 | 0.20*                  | 0.99*                | 0.37*                         | 0.24*                       |
| Serum UMFA                    |                                    |                       | 0.43*                  | 0.22*                | 0.60*                         | 0.41*                       |
| Serum MeFox                   |                                    |                       |                        | 0.19*                | 0.35*                         | 0.33*                       |
| Serum THF                     |                                    |                       |                        |                      | 0.37*                         | 0.24*                       |
| Serum total folate            |                                    |                       |                        |                      |                               | 0.71*                       |

## Supplementary material

NHANES, National Health and Nutrition Examination Survey; UMFA, unmetabolized folic acid; MeFox, pyrazino-s-triazine derivative of 4 $\alpha$ -hydroxy-5-methylTHF; THF, tetrahydrofolate; RBC, red blood cell; 5-methylTHF, 5-methyltetrahydrofolate.

<sup>a</sup> Serum folate forms and serum total folate (sum of all forms including MeFox) were measured by HPLC-MS/MS; RBC total folate was measured by microbiologic assay; non-methyl folate represents the sum of three minor forms: THF, 5-formylTHF, and 5,10-methenylTHF.

\* Indicates significant correlation,  $P < 0.05$ .

**Supplementary Table S5.** Selected percentile concentrations of serum total folate excluding MeFox by demographic variable categories for the US population  $\geq 1$  year, NHANES 2011–2<sup>a</sup>

| Variable categories   | Sample size<br><i>n</i> | 5 <sup>th</sup>   | 10 <sup>th</sup>  | 25 <sup>th</sup> | 50 <sup>th</sup> | 75 <sup>th</sup> | 90 <sup>th</sup> | 95 <sup>th</sup> |
|-----------------------|-------------------------|-------------------|-------------------|------------------|------------------|------------------|------------------|------------------|
| nmol/L                |                         |                   |                   |                  |                  |                  |                  |                  |
| All                   | 7442                    | 17.5 (16.7–18.4)  | 21.4 (20.5–22.2)  | 28.9 (27.6–30.5) | 41.7 (39.9–44.1) | 59.1 (57.4–61.0) | 80.0 (78.1–82.7) | 94.0 (90.7–98.5) |
| All, fasted           | 3342                    | 16.5 (15.4–17.5)  | 20.1 (19.3–21.1)  | 27.6 (26.3–28.9) | 39.7 (38.1–41.4) | 57.3 (54.4–59.8) | 77.1 (74.1–80.4) | 91.1 (85.5–97.8) |
| All, nonfasted        | 4100                    | 18.7 (17.7–19.3)  | 22.3 (21.6–22.9)  | 30.4 (28.6–32.0) | 44.1 (41.6–46.1) | 60.8 (58.7–63.3) | 83.0 (80.0–86.1) | 96.9 (94.2–99.8) |
| Age, year             |                         |                   |                   |                  |                  |                  |                  |                  |
| 1-5                   | 563                     | 29.2 (26.3–33.5)  | 35.5 (32.0–38.1)  | 46.4 (42.6–51.1) | 59.8 (56.9–63.2) | 77.5 (71.2–83.4) | 93.2 (87.9–105)  | 106 (97.8–158)   |
| 1-5, fasted           | 76                      | 23.1† (17.0–37.5) | 32.5† (17.0–39.3) | 42.8 (32.6–59.9) | 65.6 (57.7–72.9) | 81.0 (73.8–87.3) | 94.2† (87.2–147) | 108† (91.5–353)  |
| 1-5, nonfasted        | 487                     | 29.7 (26.5–33.7)  | 35.6 (32.0–38.6)  | 46.4 (43.2–51.0) | 59.7 (55.3–63.3) | 77.5 (69.1–83.7) | 93.1 (84.8–105)  | 105 (94.5–166)   |
| 6-11                  | 953                     | 32.6 (29.1–34.1)  | 36.9 (34.0–39.3)  | 46.8 (43.6–49.9) | 59.9 (56.5–63.3) | 73.4 (67.6–79.6) | 90.7 (86.0–96.1) | 99.8 (94.1–110)  |
| 6-11, fasted          | 228                     | 31.7 (24.8–36.8)  | 36.7 (29.2–43.9)  | 51.1 (40.9–56.7) | 63.5 (59.0–69.1) | 79.5 (74.0–87.5) | 95.7 (85.1–131)  | 102 (95.7–150)   |
| 6-11, nonfasted       | 725                     | 32.7 (28.6–35.0)  | 36.9 (34.0–39.3)  | 46.1 (43.2–49.1) | 58.8 (54.3–62.8) | 70.6 (66.6–77.6) | 89.1 (82.5–94.2) | 97.6 (93.4–109)  |
| 12-19                 | 1073                    | 18.9 (17.7–20.0)  | 22.7 (21.3–23.7)  | 30.6 (28.2–32.5) | 40.7 (39.1–43.1) | 53.9 (50.2–61.1) | 72.1 (66.6–79.8) | 80.5 (75.4–88.2) |
| 12-19, fasted         | 555                     | 18.9 (16.5–20.4)  | 21.7 (19.7–23.4)  | 29.7 (27.6–31.6) | 39.1 (38.0–41.2) | 51.9 (49.1–55.4) | 67.0 (61.7–78.3) | 78.2 (70.2–92.7) |
| 12-19, nonfasted      | 518                     | 18.0 (15.1–21.8)  | 23.2 (21.3–26.0)  | 31.3 (28.1–35.4) | 43.0 (39.2–47.6) | 58.1 (51.9–64.7) | 75.0 (69.0–82.7) | 82.7 (76.7–89.9) |
| 20-39                 | 1730                    | 16.4 (15.4–17.1)  | 19.8 (18.8–20.8)  | 26.1 (25.0–27.1) | 36.3 (34.4–37.8) | 49.2 (46.8–51.4) | 63.9 (59.7–67.5) | 76.5 (70.5–81.5) |
| 20-39, fasted         | 907                     | 16.0 (14.4–17.0)  | 19.1 (17.5–20.9)  | 25.9 (24.3–27.2) | 35.4 (33.3–37.0) | 48.7 (46.5–50.2) | 63.1 (59.8–66.2) | 74.1 (68.9–80.4) |
| 20-39, nonfasted      | 823                     | 16.8 (13.0–18.9)  | 20.5 (18.4–22.2)  | 26.4 (25.0–27.9) | 37.2 (35.2–38.6) | 50.0 (46.6–52.5) | 65.7 (58.7–73.9) | 77.6 (70.9–89.7) |
| 40-59                 | 1603                    | 16.6 (15.3–17.9)  | 19.7 (18.6–20.7)  | 26.8 (25.1–28.8) | 37.9 (35.2–40.5) | 53.8 (50.1–57.2) | 72.1 (67.5–76.5) | 84.8 (77.7–98.8) |
| 40-59, fasted         | 826                     | 15.9 (13.4–17.4)  | 19.3 (17.0–20.6)  | 26.1 (24.4–28.5) | 38.0 (34.1–41.4) | 55.0 (51.1–59.0) | 68.9 (66.1–76.1) | 78.7 (75.3–86.7) |
| 40-59, nonfasted      | 777                     | 17.8 (16.6–18.5)  | 20.3 (18.7–21.9)  | 27.4 (25.6–29.4) | 37.5 (35.1–41.5) | 51.8 (48.3–56.8) | 74.2 (65.3–89.1) | 92.8 (81.1–111)  |
| $\geq 60$             | 1520                    | 18.8 (15.8–19.8)  | 22.3 (20.9–23.8)  | 31.7 (29.8–35.5) | 50.7 (47.5–53.5) | 75.5 (72.0–80.0) | 99.8 (95.9–105)  | 115 (107–130)    |
| $\geq 60$ , fasted    | 750                     | 17.4 (14.7–19.2)  | 21.4 (19.4–24.3)  | 31.0 (27.3–36.0) | 49.1 (44.5–54.0) | 74.0 (64.4–85.5) | 99.6 (92.7–111)  | 113 (103–138)    |
| $\geq 60$ , nonfasted | 770                     | 19.6 (17.4–20.9)  | 22.4 (21.3–24.6)  | 32.4 (29.4–36.9) | 51.8 (47.4–57.6) | 77.3 (72.5–81.3) | 102 (95.8–107)   | 116 (107–139)    |
| Sex                   |                         |                   |                   |                  |                  |                  |                  |                  |
| Males                 | 3735                    | 17.3 (16.2–18.2)  | 21.5 (20.2–22.3)  | 28.0 (26.7–29.5) | 39.6 (37.8–42.0) | 55.7 (53.1–58.4) | 74.8 (71.7–78.6) | 87.0 (84.6–90.7) |
| Males, fasted         | 1673                    | 15.9 (14.8–16.8)  | 19.9 (18.7–21.4)  | 27.1 (25.7–28.3) | 37.4 (34.6–39.3) | 53.2 (49.9–57.2) | 68.9 (66.5–74.3) | 80.9 (77.4–86.6) |
| Males, nonfasted      | 2062                    | 18.8 (16.8–20.6)  | 22.8 (21.6–23.7)  | 29.2 (27.1–31.3) | 42.5 (39.6–45.3) | 57.9 (54.6–61.7) | 80.6 (74.9–84.2) | 93.8 (86.8–99.0) |
| Females               | 3707                    | 17.9 (17.0–18.7)  | 21.2 (20.1–22.2)  | 30.1 (28.4–32.0) | 44.3 (41.8–46.2) | 62.1 (59.7–65.6) | 84.3 (80.1–90.5) | 99.6 (95.0–104)  |
| Females, fasted       | 1669                    | 17.0 (15.7–18.6)  | 20.3 (19.2–22.3)  | 28.1 (26.4–30.6) | 42.7 (40.2–45.8) | 61.8 (57.2–65.7) | 82.9 (78.0–92.0) | 97.7 (92.1–108)  |
| Females, nonfasted    | 2038                    | 18.6 (17.5–19.2)  | 21.8 (20.7–22.6)  | 31.9 (30.3–33.5) | 45.3 (43.3–47.6) | 62.6 (60.3–66.8) | 85.6 (80.0–91.1) | 102 (96.7–106)   |



Supplementary material

| Race-ethnicity <sup>b</sup> |      |                  |                  |                  |                  |                  |                  |                  |
|-----------------------------|------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Hispanic                    | 1794 | 18.6 (16.7–20.5) | 22.3 (21.0–23.1) | 29.3 (27.4–31.3) | 40.2 (37.7–42.8) | 55.0 (52.8–57.7) | 71.8 (69.5–74.4) | 82.9 (78.8–89.0) |
| Hispanic, fasted            | 778  | 17.5 (15.5–20.1) | 21.8 (19.5–23.0) | 28.0 (26.2–29.8) | 37.7 (35.0–40.2) | 52.2 (49.2–54.8) | 69.7 (67.0–74.5) | 80.2 (77.8–84.3) |
| Hispanic, nonfasted         | 1016 | 19.6 (16.3–21.3) | 22.7 (20.7–24.4) | 31.2 (28.5–32.8) | 42.7 (39.8–45.8) | 57.5 (55.2–60.6) | 72.8 (69.8–77.4) | 86.2 (78.8–94.5) |
| MA                          | 987  | 20.8 (20.3–21.8) | 23.4 (22.3–24.9) | 30.4 (28.3–32.3) | 41.2 (38.1–44.8) | 55.8 (52.8–59.1) | 71.1 (68.4–74.7) | 80.9 (76.2–88.6) |
| MA, fasted                  | 431  | 20.5 (16.5–21.7) | 23.1 (21.7–24.3) | 29.2 (27.0–31.6) | 38.6 (36.0–42.7) | 53.9 (50.4–58.7) | 72.2 (67.1–78.9) | 80.0 (74.2–92.5) |
| MA, nonfasted               | 556  | 21.5 (20.2–22.7) | 23.9 (22.4–26.6) | 31.6 (28.3–35.0) | 42.8 (39.5–46.7) | 56.9 (52.3–62.3) | 70.2 (67.6–75.1) | 82.5 (74.6–90.1) |
| NHW                         | 2397 | 18.2 (17.0–19.1) | 22.1 (20.9–22.9) | 30.3 (28.6–31.6) | 44.4 (41.5–46.4) | 61.7 (59.8–64.2) | 84.2 (81.4–88.4) | 98.6 (94.3–103)  |
| NHW, fasted                 | 1124 | 16.5 (14.8–18.5) | 20.1 (19.3–21.8) | 28.9 (27.3–30.5) | 42.3 (39.7–45.2) | 60.1 (57.4–62.7) | 80.6 (76.2–87.7) | 96.3 (90.1–104)  |
| NHW, nonfasted              | 1273 | 19.2 (18.5–20.3) | 23.2 (22.1–24.6) | 31.6 (29.7–33.9) | 45.7 (44.0–47.5) | 63.6 (60.5–67.8) | 87.0 (83.8–90.8) | 99.9 (97.3–103)  |
| NHB                         | 2025 | 15.1 (13.8–16.2) | 17.6 (16.4–18.9) | 23.6 (22.2–25.1) | 33.8 (31.6–36.0) | 48.2 (45.5–52.2) | 66.1 (62.6–71.3) | 80.0 (76.4–82.3) |
| NHB, fasted                 | 899  | 14.8 (13.4–16.2) | 17.4 (15.7–18.9) | 22.9 (21.5–24.4) | 31.0 (28.7–33.2) | 44.4 (41.0–49.0) | 63.1 (57.9–69.7) | 74.8 (71.5–79.7) |
| NHB, nonfasted              | 1126 | 15.3 (13.3–16.7) | 17.7 (16.9–18.8) | 24.2 (22.4–26.4) | 37.2 (33.7–40.4) | 51.5 (47.2–56.2) | 70.2 (65.1–74.8) | 82.9 (79.9–89.2) |
| NHA                         | 944  | 16.8 (14.9–19.1) | 20.8 (19.2–22.6) | 28.4 (26.5–30.1) | 41.0 (39.2–43.2) | 59.4 (57.0–62.0) | 78.2 (74.0–82.4) | 89.6 (82.7–96.4) |
| NHA, fasted                 | 439  | 15.9 (13.1–18.5) | 19.8 (17.6–21.1) | 26.0 (23.9–28.4) | 37.8 (35.5–40.7) | 56.9 (52.3–63.3) | 77.2 (69.5–83.6) | 86.0 (79.8–96.4) |
| NHA, unfasted               | 505  | 18.6 (16.1–20.7) | 22.9 (20.0–24.5) | 30.3 (27.9–32.8) | 43.5 (41.8–47.0) | 61.6 (58.4–64.8) | 79.5 (75.2–86.0) | 91.8 (86.6–104)  |

MeFox, pyrazino-s-triazine derivative of 4 $\alpha$ -hydroxy-5-methylTHF; NHANES, National Health and Nutrition Examination Survey; MA, Mexican American; NHW, non-Hispanic White; NHB, non-Hispanic Black; NHA, non-Hispanic Asian.

<sup>a</sup> Values are percentiles (95% CI) and were measured by HPLC-MS/MS; “fasted” refers to no food intake for past  $\geq 8$  hours; “nonfasted” refers to food intake during the last 8 hours.

<sup>b</sup> Hispanic subgroup represents the sum of Mexican American and other Hispanic ethnicity (not shown).

† Estimate is subject to greater uncertainty due to small sample size ( $n < 224$ ).

## Supplementary material

**Supplementary Table S6.** Selected percentile concentrations of serum total folate including MeFox by demographic variable categories for the US population  $\geq 1$  year, NHANES 2011–2<sup>a</sup>

| Variable categories   | Sample size<br><i>n</i> | 5 <sup>th</sup>   | 10 <sup>th</sup>  | 25 <sup>th</sup> | 50 <sup>th</sup> | 75 <sup>th</sup> | 90 <sup>th</sup> | 95 <sup>th</sup> |
|-----------------------|-------------------------|-------------------|-------------------|------------------|------------------|------------------|------------------|------------------|
| nmol/L                |                         |                   |                   |                  |                  |                  |                  |                  |
| All                   | 7442                    | 18.9 (17.8–19.6)  | 22.8 (22.0–23.6)  | 30.6 (29.0–32.0) | 43.5 (41.8–46.1) | 61.2 (59.3–62.7) | 82.5 (80.3–85.7) | 96.6 (93.7–101)  |
| All, fasted           | 3342                    | 17.3 (16.3–18.4)  | 21.3 (20.4–22.2)  | 28.8 (27.2–30.5) | 41.1 (39.3–43.0) | 58.8 (55.9–61.7) | 78.9 (75.9–81.8) | 93.9 (87.5–99.9) |
| All, nonfasted        | 4100                    | 20.2 (19.3–21.1)  | 24.2 (23.4–25.3)  | 32.5 (30.8–34.3) | 46.3 (43.9–48.4) | 62.7 (60.9–65.9) | 86.2 (83.7–88.4) | 99.7 (96.4–103)  |
| Age, year             |                         |                   |                   |                  |                  |                  |                  |                  |
| 1-5                   | 563                     | 29.9 (26.8–34.6)  | 36.8 (32.8–40.0)  | 48.1 (43.7–52.3) | 61.3 (58.5–65.2) | 78.5 (72.8–85.6) | 96.8 (89.2–106)  | 107 (101–161)    |
| 1-5, fasted           | 76                      | 23.3† (17.2–37.1) | 33.0† (17.2–40.3) | 43.8 (33.1–60.9) | 66.9 (57.9–74.9) | 81.5 (75.1–88.4) | 95.0† (88.1–148) | 109† (96.8–223)  |
| 1-5, nonfasted        | 487                     | 30.3 (27.4–35.1)  | 36.8 (32.7–40.1)  | 48.1 (44.2–52.1) | 60.9 (57.5–65.2) | 78.0 (71.2–86.1) | 96.3 (87.5–107)  | 107 (99.6–167)   |
| 6-11                  | 953                     | 34.0 (30.3–35.6)  | 39.0 (35.2–40.9)  | 48.6 (45.4–51.4) | 61.8 (58.1–65.0) | 75.2 (70.2–80.8) | 91.7 (87.2–97.2) | 102 (94.8–117)   |
| 6-11, fasted          | 228                     | 32.2 (25.0–37.5)  | 37.4 (29.7–44.2)  | 51.6 (41.9–57.2) | 64.1 (59.8–69.7) | 80.1 (74.6–88.1) | 96.4 (86.0–132)  | 104 (93.7–152)   |
| 6-11, nonfasted       | 725                     | 34.5 (30.0–36.9)  | 39.4 (36.4–40.8)  | 47.9 (44.7–50.6) | 61.2 (56.3–64.8) | 73.0 (69.1–79.6) | 90.6 (86.0–96.0) | 101 (94.8–111)   |
| 12-19                 | 1073                    | 20.4 (18.3–21.8)  | 24.0 (22.4–25.4)  | 31.9 (30.1–33.7) | 42.2 (40.8–45.0) | 55.6 (51.6–62.6) | 73.9 (68.2–81.2) | 82.2 (78.6–89.7) |
| 12-19, fasted         | 555                     | 20.2 (16.8–21.6)  | 22.6 (21.1–24.5)  | 30.9 (28.6–32.7) | 40.5 (38.4–42.3) | 53.0 (50.1–57.2) | 68.8 (63.2–77.0) | 79.2 (70.9–93.9) |
| 12-19, nonfasted      | 518                     | 20.9 (12.0–25.5)  | 25.7 (22.2–27.7)  | 33.1 (30.3–37.1) | 45.3 (41.4–49.5) | 60.2 (54.1–67.7) | 77.1 (71.0–86.6) | 86.0 (80.0–92.3) |
| 20-39                 | 1730                    | 17.5 (16.8–18.2)  | 21.4 (20.1–22.1)  | 27.6 (26.6–28.5) | 37.9 (36.2–39.6) | 50.9 (48.5–53.4) | 65.7 (62.1–70.1) | 78.8 (73.3–84.5) |
| 20-39, fasted         | 907                     | 17.0 (14.9–18.0)  | 20.6 (18.3–21.9)  | 27.0 (25.2–28.3) | 36.3 (34.4–39.0) | 49.9 (48.2–51.1) | 64.4 (61.9–67.5) | 75.5 (70.1–81.6) |
| 20-39, nonfasted      | 823                     | 18.3 (16.6–19.5)  | 21.9 (19.7–23.7)  | 28.4 (26.6–29.5) | 39.5 (37.7–40.9) | 52.2 (48.8–54.8) | 68.2 (60.9–76.5) | 82.6 (73.7–92.1) |
| 40-59                 | 1603                    | 17.6 (16.5–19.1)  | 21.1 (19.9–22.8)  | 28.5 (26.5–30.8) | 39.5 (37.4–42.6) | 55.8 (52.0–59.6) | 74.1 (69.2–80.2) | 87.8 (80.3–100)  |
| 40-59, fasted         | 826                     | 16.3 (14.0–17.9)  | 20.2 (17.6–22.7)  | 27.5 (25.8–30.0) | 39.3 (35.6–43.0) | 56.6 (52.3–60.6) | 71.5 (67.7–77.3) | 80.5 (76.4–96.6) |
| 40-59, nonfasted      | 777                     | 19.2 (17.4–19.9)  | 22.5 (20.0–23.8)  | 29.6 (26.7–32.1) | 39.7 (37.5–43.9) | 55.2 (50.9–59.4) | 78.3 (68.1–92.7) | 94.8 (83.8–114)  |
| $\geq 60$             | 1520                    | 20.3 (18.1–21.2)  | 24.4 (22.9–25.2)  | 34.3 (31.8–37.2) | 53.1 (49.8–56.5) | 79.0 (74.2–83.3) | 102 (99.3–106)   | 120 (110–136)    |
| $\geq 60$ , fasted    | 750                     | 18.3 (15.1–20.5)  | 23.1 (20.5–25.2)  | 32.8 (28.6–37.2) | 51.0 (46.9–55.9) | 76.1 (66.6–87.9) | 101 (94.9–112)   | 117 (105–143)    |
| $\geq 60$ , nonfasted | 770                     | 21.7 (20.3–22.9)  | 24.9 (23.3–27.5)  | 35.6 (33.1–38.6) | 55.7 (50.3–59.0) | 80.8 (76.0–86.0) | 104 (99.4–112)   | 120 (113–143)    |
| Sex                   |                         |                   |                   |                  |                  |                  |                  |                  |
| Males                 | 3735                    | 18.3 (17.2–19.3)  | 22.8 (21.7–23.8)  | 29.9 (28.2–31.3) | 41.5 (39.4–43.7) | 57.7 (55.2–60.5) | 77.3 (73.8–80.9) | 90.6 (87.5–94.0) |
| Males, fasted         | 1673                    | 16.8 (15.9–17.8)  | 21.1 (19.3–22.3)  | 28.2 (26.7–29.9) | 39.0 (35.9–41.0) | 54.7 (51.6–58.6) | 70.7 (67.7–77.2) | 81.9 (78.8–88.9) |
| Males, nonfasted      | 2062                    | 20.4 (18.4–22.1)  | 24.8 (23.3–25.9)  | 31.4 (29.2–33.5) | 44.5 (41.4–47.9) | 60.2 (57.0–63.4) | 83.7 (78.2–87.8) | 95.3 (90.4–103)  |
| Females               | 3707                    | 19.4 (18.0–20.0)  | 22.9 (21.8–23.7)  | 31.9 (29.9–33.9) | 46.4 (43.9–48.1) | 64.2 (62.0–67.5) | 87.1 (82.7–93.5) | 101 (98.2–106)   |
| Females, fasted       | 1669                    | 17.8 (16.6–19.9)  | 21.7 (20.3–23.5)  | 29.7 (27.3–31.9) | 44.3 (41.2–47.4) | 62.8 (58.7–67.4) | 85.5 (79.6–94.1) | 99.9 (94.3–108)  |
| Females, nonfasted    | 2038                    | 20.2 (19.4–20.9)  | 23.6 (22.9–24.5)  | 34.3 (32.0–35.9) | 47.8 (45.5–50.2) | 65.7 (62.7–69.5) | 88.4 (83.8–94.8) | 102 (99.1–107)   |

Supplementary material

| Race-ethnicity <sup>b</sup> |      |                  |                  |                  |                  |                  |                  |                  |
|-----------------------------|------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Hispanic                    | 1794 | 19.3 (17.5–21.6) | 23.6 (22.3–24.5) | 30.5 (28.9–32.6) | 41.6 (39.6–44.4) | 56.9 (54.7–59.5) | 73.8 (71.4–76.3) | 84.1 (80.7–90.5) |
| MA                          | 987  | 22.1 (21.1–23.1) | 24.9 (23.7–25.8) | 31.9 (29.6–33.7) | 42.8 (39.9–46.0) | 57.8 (54.5–61.1) | 73.3 (70.1–77.5) | 82.0 (78.7–88.8) |
| MA, fasted                  | 431  | 21.1 (17.5–22.6) | 24.0 (22.9–25.3) | 30.5 (28.0–32.6) | 39.9 (37.0–43.2) | 55.0 (51.5–60.1) | 73.5 (68.5–79.7) | 81.0 (76.4–93.4) |
| MA, nonfasted               | 556  | 22.9 (20.0–24.3) | 25.6 (23.8–28.3) | 33.3 (29.3–37.4) | 44.6 (41.1–49.0) | 60.1 (55.5–64.5) | 72.8 (69.7–77.6) | 84.0 (77.5–93.3) |
| NHW                         | 2397 | 19.6 (18.2–20.3) | 23.8 (23.1–24.5) | 31.9 (30.7–33.4) | 46.4 (43.8–48.2) | 63.5 (61.9–66.6) | 87.4 (84.5–90.7) | 101 (98.1–105)   |
| NHW, fasted                 | 1124 | 17.6 (15.8–19.9) | 21.8 (20.3–23.6) | 30.5 (28.6–31.6) | 43.5 (41.2–46.8) | 62.2 (59.2–64.3) | 81.9 (77.8–90.8) | 98.9 (92.0–106)  |
| NHW, nonfasted              | 1273 | 21.4 (20.4–22.5) | 25.8 (24.4–26.3) | 34.0 (32.0–36.1) | 48.2 (46.2–50.2) | 66.5 (62.6–70.1) | 90.5 (87.2–94.6) | 103 (101–107)    |
| NHB                         | 2025 | 16.5 (14.5–17.2) | 18.8 (17.8–19.8) | 24.8 (23.3–26.5) | 35.1 (32.9–37.6) | 50.1 (47.4–54.3) | 68.6 (64.7–72.3) | 82.1 (79.0–85.1) |
| NHB, fasted                 | 899  | 16.0 (14.3–16.8) | 18.1 (16.9–19.6) | 23.9 (22.3–25.6) | 32.2 (29.5–34.5) | 46.4 (42.3–50.2) | 64.2 (59.2–70.8) | 75.7 (72.4–81.2) |
| NHB, nonfasted              | 1126 | 16.6 (14.5–17.8) | 19.3 (18.2–20.6) | 25.7 (24.0–28.2) | 39.0 (35.4–42.2) | 53.3 (49.2–58.0) | 72.0 (67.8–77.3) | 85.9 (82.2–90.8) |
| NHA                         | 944  | 18.3 (17.1–20.0) | 22.4 (20.7–23.8) | 30.5 (28.6–32.4) | 43.3 (41.7–45.1) | 61.9 (59.6–65.0) | 80.9 (77.0–86.1) | 91.6 (86.7–97.9) |
| NHA, fasted                 | 439  | 17.2 (13.4–19.6) | 20.6 (18.0–22.1) | 26.9 (25.1–29.6) | 38.9 (36.5–42.0) | 58.9 (53.6–64.0) | 78.6 (71.2–85.9) | 87.5 (81.2–98.0) |
| NHA, unfasted               | 505  | 19.9 (17.6–23.4) | 25.1 (22.2–27.5) | 33.2 (31.2–35.7) | 46.2 (44.1–49.5) | 65.1 (61.9–67.0) | 81.9 (79.4–87.5) | 95.3 (90.9–105)  |

MeFox, pyrazino-s-triazine derivative of 4 $\alpha$ -hydroxy-5-methylTHF; NHANES, National Health and Nutrition Examination Survey; MA, Mexican American; NHW, non-Hispanic White; NHB, non-Hispanic Black; NHA, non-Hispanic Asian.

<sup>a</sup> Values are percentiles (95% CI) and were measured by HPLC-MS/MS; “fasted” refers to no food intake for past  $\geq 8$  hours; “nonfasted” refers to food intake during the last 8 hours.

<sup>b</sup> Hispanic subgroup represents the sum of Mexican American and other Hispanic ethnicity (not shown).

† Estimate is subject to greater uncertainty due to small sample size ( $n < 224$ ).

## Supplementary material

**Supplementary Table S7.** Selected percentile concentration of red blood cell total folate by demographic variable categories for the US population  $\geq 1$  year, NHANES 2011–2<sup>a</sup>

| Variable categories   | Sample size<br><i>n</i> | 5 <sup>th</sup> | 10 <sup>th</sup> | 25 <sup>th</sup> | 50 <sup>th</sup> | 75 <sup>th</sup> | 90 <sup>th</sup>  | 95 <sup>th</sup>  |
|-----------------------|-------------------------|-----------------|------------------|------------------|------------------|------------------|-------------------|-------------------|
| nmol/L                |                         |                 |                  |                  |                  |                  |                   |                   |
| All                   | 7867                    | 543 (527–563)   | 637 (607–664)    | 811 (774–845)    | 1050 (1010–1090) | 1340 (1290–1400) | 1720 (1660–1820)  | 2020 (1920–2140)  |
| All, fasted           | 3479                    | 553 (529–573)   | 636 (610–664)    | 807 (760–843)    | 1050 (1010–1090) | 1360 (1310–1410) | 1770 (1660–1900)  | 2060 (1960–2200)  |
| All, nonfasted        | 4388                    | 542 (519–563)   | 637 (596–670)    | 814 (782–849)    | 1050 (1010–1090) | 1330 (1260–1400) | 1710 (1620–1800)  | 1940 (1840–2120)  |
| Age, year             |                         |                 |                  |                  |                  |                  |                   |                   |
| 1-5                   | 708                     | 634 (589–663)   | 725 (634–776)    | 867 (800–908)    | 1030 (982–1090)  | 1230 (1200–1280) | 1480 (1370–1630)  | 1660 (1510–1860)  |
| 1-5, fasted           | 88                      | 440† (217–609)  | 608† (217–723)   | 758 (721–779)    | 970 (865–1040)   | 1140 (1070–1240) | 1310† (1230–1430) | 1360† (1310–1930) |
| 1-5, nonfasted        | 620                     | 650 (581–703)   | 735 (650–793)    | 882 (813–942)    | 1030 (996–1100)  | 1240 (1200–1290) | 1500 (1370–1670)  | 1680 (1550–1810)  |
| 6-11                  | 1044                    | 678 (592–712)   | 742 (710–770)    | 892 (854–918)    | 1070 (1030–1090) | 1260 (1210–1320) | 1490 (1440–1560)  | 1630 (1570–1700)  |
| 6-11, fasted          | 251                     | 612 (511–716)   | 728 (655–771)    | 852 (799–911)    | 1020 (950–1120)  | 1230 (1140–1350) | 1420 (1360–1510)  | 1520 (1470–1610)  |
| 6-11, nonfasted       | 793                     | 691 (619–713)   | 745 (713–769)    | 906 (866–938)    | 1070 (1040–1100) | 1270 (1220–1330) | 1520 (1440–1630)  | 1670 (1580–1820)  |
| 12-19                 | 1127                    | 500 (473–546)   | 595 (551–636)    | 752 (718–793)    | 939 (887–995)    | 1170 (1120–1230) | 1380 (1350–1470)  | 1580 (1470–1720)  |
| 12-19, fasted         | 585                     | 491 (461–555)   | 587 (531–640)    | 746 (710–785)    | 922 (882–971)    | 1150 (1110–1210) | 1360 (1320–1470)  | 1550 (1450–1680)  |
| 12-19, nonfasted      | 542                     | 507 (451–565)   | 604 (542–657)    | 770 (698–828)    | 966 (913–1030)   | 1200 (1110–1270) | 1400 (1350–1540)  | 1600 (1490–1720)  |
| 20-39                 | 1762                    | 521 (480–551)   | 597 (564–638)    | 761 (733–790)    | 976 (937–1010)   | 1210 (1170–1270) | 1520 (1430–1630)  | 1720 (1610–1850)  |
| 20-39, fasted         | 931                     | 537 (479–572)   | 615 (570–652)    | 758 (720–796)    | 968 (921–1020)   | 1210 (1170–1270) | 1510 (1430–1630)  | 1710 (1620–1890)  |
| 20-39, nonfasted      | 831                     | 494 (467–534)   | 584 (544–627)    | 768 (733–796)    | 979 (938–1030)   | 1210 (1160–1310) | 1530 (1400–1720)  | 1710 (1570–1880)  |
| 40-59                 | 1655                    | 540 (522–562)   | 626 (585–663)    | 811 (751–852)    | 1070 (1010–1140) | 1370 (1300–1440) | 1760 (1650–1910)  | 2050 (1920–2260)  |
| 40-59, fasted         | 847                     | 540 (519–573)   | 627 (586–669)    | 833 (760–874)    | 1090 (1010–1170) | 1400 (1330–1460) | 1840 (1660–1980)  | 2080 (1920–2340)  |
| 40-59, nonfasted      | 808                     | 540 (523–562)   | 614 (563–663)    | 799 (727–850)    | 1050 (965–1140)  | 1340 (1240–1460) | 1700 (1590–1920)  | 1990 (1810–2340)  |
| $\geq 60$             | 1571                    | 597 (547–628)   | 702 (670–734)    | 931 (888–978)    | 1270 (1210–1320) | 1710 (1600–1860) | 2180 (2000–2550)  | 2650 (2410–3050)  |
| $\geq 60$ , fasted    | 777                     | 626 (599–642)   | 721 (664–756)    | 938 (867–998)    | 1270 (1210–1380) | 1690 (1520–1920) | 2170 (1950–2710)  | 2720 (2250–3600)  |
| $\geq 60$ , nonfasted | 794                     | 545 (513–597)   | 677 (612–739)    | 910 (852–984)    | 1260 (1170–1320) | 1720 (1630–1810) | 2180 (1990–2560)  | 2620 (2480–2850)  |
| Sex                   |                         |                 |                  |                  |                  |                  |                   |                   |
| Males                 | 3944                    | 542 (522–567)   | 632 (595–665)    | 801 (752–841)    | 1030 (995–1070)  | 1310 (1250–1380) | 1660 (1560–1790)  | 1880 (1820–1960)  |
| Males, fasted         | 1739                    | 537 (510–566)   | 624 (602–656)    | 790 (746–829)    | 1030 (995–1070)  | 1320 (1260–1380) | 1650 (1540–1860)  | 1930 (1860–2070)  |
| Males, nonfasted      | 2205                    | 546 (509–584)   | 638 (583–676)    | 810 (760–857)    | 1030 (988–1080)  | 1300 (1220–1400) | 1660 (1550–1780)  | 1840 (1740–1970)  |
| Females               | 3923                    | 547 (524–564)   | 644 (618–673)    | 823 (791–850)    | 1070 (1030–1110) | 1370 (1320–1440) | 1800 (1720–1910)  | 2140 (2000–2320)  |
| Females, fasted       | 1740                    | 560 (539–581)   | 650 (625–677)    | 826 (777–868)    | 1080 (1030–1120) | 1410 (1340–1480) | 1870 (1740–2020)  | 2190 (2060–2300)  |
| Females, nonfasted    | 2183                    | 535 (507–556)   | 634 (597–676)    | 820 (795–844)    | 1060 (1030–1110) | 1350 (1290–1420) | 1750 (1670–1870)  | 2080 (1910–2380)  |

Supplementary material

| Race-ethnicity <sup>b</sup> |      |               |               |               |                  |                  |                  |                  |
|-----------------------------|------|---------------|---------------|---------------|------------------|------------------|------------------|------------------|
| Hispanic                    | 1919 | 538 (502–567) | 623 (594–654) | 773 (753–793) | 965 (941–992)    | 1200 (1150–1240) | 1460 (1410–1530) | 1670 (1600–1760) |
| Hispanic, fasted            | 819  | 536 (486–563) | 608 (569–656) | 758 (733–782) | 943 (907–986)    | 1210 (1140–1250) | 1460 (1410–1540) | 1690 (1600–1830) |
| Hispanic, nonfasted         | 1100 | 551 (496–583) | 640 (577–686) | 787 (755–824) | 982 (955–1010)   | 1190 (1150–1250) | 1460 (1410–1520) | 1640 (1580–1730) |
| MA                          | 1071 | 576 (550–610) | 667 (639–695) | 785 (759–814) | 963 (921–1000)   | 1200 (1150–1260) | 1440 (1390–1530) | 1610 (1530–1810) |
| MA, fasted                  | 462  | 563 (502–621) | 672 (618–711) | 780 (757–807) | 935 (899–999)    | 1210 (1120–1260) | 1440 (1360–1600) | 1700 (1530–2020) |
| MA, nonfasted               | 609  | 581 (558–608) | 659 (611–696) | 792 (747–842) | 977 (935–1020)   | 1190 (1150–1270) | 1450 (1380–1530) | 1580 (1500–1750) |
| NHW                         | 2471 | 587 (562–611) | 683 (653–707) | 866 (832–915) | 1120 (1080–1170) | 1430 (1370–1520) | 1850 (1750–1940) | 2180 (2020–2350) |
| NHW, fasted                 | 1150 | 610 (578–629) | 691 (667–711) | 870 (833–918) | 1150 (1110–1180) | 1460 (1390–1540) | 1900 (1830–2020) | 2210 (2070–2350) |
| NHW, nonfasted              | 1321 | 565 (533–607) | 670 (628–712) | 857 (815–920) | 1100 (1050–1160) | 1410 (1340–1530) | 1790 (1710–1940) | 2110 (1930–2460) |
| NHB                         | 2185 | 452 (422–475) | 517 (491–545) | 661 (639–681) | 855 (824–891)    | 1110 (1060–1160) | 1440 (1340–1530) | 1680 (1590–1750) |
| NHB, fasted                 | 948  | 434 (408–479) | 508 (481–534) | 646 (620–667) | 829 (800–859)    | 1060 (1030–1130) | 1430 (1300–1540) | 1690 (1540–1870) |
| NHB, nonfasted              | 1237 | 460 (440–476) | 528 (490–552) | 676 (652–698) | 887 (840–927)    | 1140 (1080–1200) | 1450 (1340–1550) | 1670 (1570–1800) |
| NHA                         | 999  | 503 (459–537) | 589 (544–629) | 751 (714–785) | 945 (913–999)    | 1210 (1160–1280) | 1510 (1410–1670) | 1750 (1660–1880) |
| NHA, fasted                 | 457  | 492 (439–517) | 558 (504–608) | 714 (678–753) | 921 (868–997)    | 1170 (1100–1280) | 1430 (1360–1660) | 1680 (1550–1860) |
| NHA, unfasted               | 542  | 534 (460–572) | 633 (550–676) | 778 (740–816) | 962 (924–1030)   | 1250 (1180–1310) | 1580 (1470–1750) | 1780 (1690–1910) |

NHANES, National Health and Nutrition Examination Survey; MA, Mexican American; NHW, non-Hispanic White; NHB, non-Hispanic Black; NHA, non-Hispanic Asian.

<sup>a</sup> Values are percentiles (95% CI) and were measured by microbiologic assay; “fasted” refers to no food intake for past  $\geq 8$  hours; “nonfasted” refers to food intake during the last 8 hours.

<sup>b</sup> Hispanic subgroup represents the sum of Mexican American and other Hispanic ethnicity (not shown).

† Estimate is subject to greater uncertainty due to small sample size ( $n < 224$ ).

**Supplementary Table S8.** Selected percentile concentrations of serum 5-methyltetrahydrofolate by demographic variable categories for the US population  $\geq 1$  year, NHANES 2011–2<sup>a</sup>

| Variable categories   | Sample size<br><i>n</i> | 5 <sup>th</sup>   | 10 <sup>th</sup>  | 25 <sup>th</sup> | 50 <sup>th</sup> | 75 <sup>th</sup> | 90 <sup>th</sup> | 95 <sup>th</sup> |
|-----------------------|-------------------------|-------------------|-------------------|------------------|------------------|------------------|------------------|------------------|
| nmol/L                |                         |                   |                   |                  |                  |                  |                  |                  |
| All                   | 7454                    | 14.7 (13.8–15.9)  | 18.5 (17.7–19.4)  | 26.1 (24.7–27.7) | 38.5 (36.7–40.5) | 54.7 (52.8–57.1) | 72.7 (70.8–75.2) | 84.7 (80.9–89.6) |
| All, fasted           | 3345                    | 14.1 (13.5–14.6)  | 17.7 (16.7–18.3)  | 24.9 (23.4–26.2) | 36.9 (35.1–38.9) | 54.0 (51.4–56.9) | 72.3 (68.4–77.3) | 86.8 (79.0–94.1) |
| All, nonfasted        | 4109                    | 15.7 (14.2–16.9)  | 19.6 (18.7–20.6)  | 27.7 (25.5–29.3) | 40.1 (37.5–42.4) | 55.6 (53.5–58.4) | 73.6 (71.4–75.3) | 82.8 (80.8–86.9) |
| Age, year             |                         |                   |                   |                  |                  |                  |                  |                  |
| 1-5                   | 568                     | 26.9 (23.0–30.2)  | 32.5 (28.1–34.9)  | 41.5 (37.7–46.8) | 54.2 (50.6–56.9) | 70.3 (66.2–75.2) | 83.8 (81.1–87.0) | 94.8 (86.7–109)  |
| 1-5, fasted           | 76                      | 21.7† (12.3–31.7) | 29.8† (12.3–37.8) | 40.5 (29.8–56.0) | 60.7 (51.7–69.2) | 77.4 (68.5–81.8) | 84.8† (81.2–105) | 94.6† (84.3–108) |
| 1-5, nonfasted        | 492                     | 27.0 (23.4–30.8)  | 32.5 (28.1–34.9)  | 41.5 (37.7–46.1) | 53.2 (49.8–56.6) | 69.6 (65.1–75.2) | 83.6 (79.9–87.8) | 94.1 (86.0–116)  |
| 6-11                  | 955                     | 30.3 (24.8–31.8)  | 33.4 (30.9–35.4)  | 42.7 (39.0–46.2) | 55.6 (51.2–59.4) | 66.5 (63.1–70.8) | 80.5 (76.0–87.0) | 89.2 (84.5–96.8) |
| 6-11, fasted          | 229                     | 29.1 (21.3–32.4)  | 33.1 (26.3–40.9)  | 47.6 (38.7–52.4) | 60.2 (56.8–64.8) | 75.5 (66.9–88.3) | 90.7 (79.1–134)  | 98.8 (90.7–144)  |
| 6-11, nonfasted       | 726                     | 30.4 (24.7–31.8)  | 33.4 (31.0–35.1)  | 42.0 (38.6–45.3) | 54.5 (49.3–58.0) | 64.2 (61.9–67.8) | 76.8 (72.8–83.4) | 85.4 (80.2–91.9) |
| 12-19                 | 1073                    | 16.3 (14.4–18.3)  | 20.0 (18.6–21.5)  | 28.0 (25.2–30.4) | 38.1 (36.6–39.8) | 50.1 (46.9–57.1) | 66.5 (61.5–72.0) | 74.3 (70.8–83.0) |
| 12-19, fasted         | 555                     | 16.5 (14.5–17.9)  | 18.9 (17.3–20.4)  | 27.0 (24.2–29.3) | 36.8 (34.1–38.7) | 48.9 (46.1–52.5) | 64.5 (57.6–75.6) | 75.4 (66.6–89.3) |
| 12-19, nonfasted      | 518                     | 16.2 (12.9–19.6)  | 21.1 (18.7–23.2)  | 28.7 (25.0–32.2) | 39.7 (36.1–44.2) | 53.2 (47.0–59.6) | 68.2 (61.5–74.1) | 74.1 (70.8–82.4) |
| 20-39                 | 1730                    | 13.6 (12.1–14.3)  | 17.1 (15.9–18.2)  | 23.1 (22.2–24.1) | 33.5 (31.5–35.0) | 45.2 (43.4–47.4) | 58.9 (55.5–62.3) | 67.6 (63.8–73.6) |
| 20-39, fasted         | 907                     | 13.7 (11.4–14.4)  | 16.7 (15.5–17.7)  | 23.0 (21.0–24.2) | 32.1 (30.8–34.4) | 45.0 (43.2–47.1) | 59.1 (55.5–61.4) | 67.7 (63.7–74.4) |
| 20-39, nonfasted      | 823                     | 13.5 (11.7–15.3)  | 18.0 (15.5–19.2)  | 23.3 (22.1–25.0) | 34.4 (32.1–35.9) | 45.3 (42.7–48.8) | 58.8 (54.3–63.5) | 67.5 (62.6–75.2) |
| 40-59                 | 1604                    | 14.3 (12.9–15.3)  | 17.2 (15.5–18.6)  | 24.3 (22.5–26.0) | 35.0 (32.6–37.1) | 50.3 (46.2–53.3) | 64.9 (62.1–69.1) | 76.0 (72.1–81.2) |
| 40-59, fasted         | 827                     | 13.6 (11.2–14.9)  | 16.5 (14.4–18.3)  | 23.2 (21.8–25.8) | 35.3 (31.9–38.8) | 52.2 (48.3–55.1) | 65.6 (62.8–69.9) | 73.6 (68.6–83.4) |
| 40-59, nonfasted      | 777                     | 15.0 (14.0–15.7)  | 17.6 (15.6–19.6)  | 24.9 (23.4–26.8) | 34.9 (32.5–37.1) | 47.6 (44.5–51.4) | 63.5 (57.2–75.5) | 78.9 (70.4–92.2) |
| $\geq 60$             | 1524                    | 15.3 (13.3–16.9)  | 19.6 (18.3–20.7)  | 28.8 (26.4–31.8) | 46.7 (44.2–49.3) | 70.1 (65.9–73.8) | 91.6 (87.3–97.1) | 102 (97.1–116)   |
| $\geq 60$ , fasted    | 751                     | 14.1 (12.5–16.7)  | 18.4 (17.5–20.8)  | 28.1 (25.0–33.0) | 45.2 (41.4–51.1) | 71.0 (61.5–81.2) | 95.2 (88.1–103)  | 104 (97.6–140)   |
| $\geq 60$ , nonfasted | 773                     | 16.7 (13.2–18.2)  | 20.0 (18.4–22.1)  | 29.4 (26.4–33.8) | 48.0 (44.2–52.2) | 68.8 (66.6–72.3) | 87.8 (83.0–92.0) | 99.6 (94.0–102)  |
| Sex                   |                         |                   |                   |                  |                  |                  |                  |                  |
| Males                 | 3739                    | 14.5 (13.6–16.0)  | 18.8 (17.7–19.9)  | 25.2 (23.8–26.9) | 36.4 (34.5–38.6) | 51.7 (49.3–54.3) | 67.2 (65.1–70.8) | 79.2 (76.8–81.4) |
| Males, fasted         | 1674                    | 13.7 (11.9–14.4)  | 17.5 (16.1–18.5)  | 24.2 (22.4–26.1) | 34.4 (32.0–36.4) | 50.4 (46.4–54.0) | 65.1 (62.5–69.4) | 76.3 (71.5–83.7) |
| Males, nonfasted      | 2065                    | 16.3 (14.3–17.8)  | 20.3 (18.8–21.2)  | 26.0 (24.5–28.1) | 38.6 (36.0–41.5) | 53.2 (50.1–55.8) | 70.4 (66.1–75.5) | 81.2 (76.8–86.9) |
| Females               | 3715                    | 15.0 (13.9–16.0)  | 18.3 (17.5–19.5)  | 27.3 (25.7–29.1) | 40.6 (38.5–43.2) | 57.9 (55.5–60.6) | 76.7 (73.9–80.1) | 90.2 (85.5–95.2) |
| Females, fasted       | 1671                    | 14.4 (12.9–16.0)  | 17.7 (16.7–18.7)  | 25.6 (23.9–27.3) | 39.3 (37.7–42.5) | 58.5 (54.1–61.8) | 78.4 (72.7–87.4) | 91.8 (87.1–102)  |
| Females, nonfasted    | 2044                    | 15.4 (13.9–16.8)  | 19.2 (18.1–20.2)  | 29.1 (27.2–31.4) | 41.8 (38.9–44.2) | 57.9 (56.3–60.4) | 75.2 (73.1–78.2) | 85.8 (80.9–92.3) |

Supplementary material

| Race-ethnicity <sup>b</sup> |      |                  |                  |                  |                  |                  |                  |                  |
|-----------------------------|------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Hispanic                    | 1798 | 15.7 (14.1–16.8) | 19.3 (18.2–20.3) | 26.6 (24.3–28.4) | 37.0 (34.5–39.3) | 50.8 (48.6–52.9) | 65.9 (64.2–68.2) | 75.9 (71.8–78.9) |
| Hispanic, fasted            | 779  | 15.3 (12.1–16.7) | 19.1 (16.6–20.2) | 25.0 (23.1–27.3) | 34.6 (32.4–37.2) | 48.6 (45.4–52.3) | 65.6 (63.0–69.8) | 76.4 (70.6–81.4) |
| Hispanic, nonfasted         | 1019 | 16.0 (13.8–17.8) | 19.5 (17.8–21.6) | 27.9 (25.0–30.4) | 38.9 (36.2–41.6) | 52.4 (50.0–54.7) | 66.2 (64.1–68.5) | 74.8 (71.3–80.2) |
| MA                          | 989  | 17.9 (15.7–19.1) | 20.8 (18.8–22.3) | 27.8 (24.9–30.1) | 38.1 (34.2–41.7) | 52.0 (48.6–55.4) | 65.7 (63.7–70.4) | 76.0 (70.3–82.3) |
| MA, fasted                  | 432  | 17.1 (14.3–19.0) | 20.1 (19.0–21.0) | 26.7 (24.2–28.7) | 35.8 (32.7–39.1) | 50.6 (46.2–56.2) | 67.4 (63.7–73.8) | 76.5 (70.4–84.0) |
| MA, nonfasted               | 557  | 18.4 (13.7–20.5) | 21.3 (18.7–23.5) | 28.3 (23.5–33.2) | 39.7 (35.5–43.5) | 52.8 (48.5–57.4) | 64.8 (62.1–68.2) | 74.4 (67.7–82.9) |
| NHW                         | 2401 | 15.6 (14.0–16.8) | 19.5 (18.4–20.5) | 27.7 (26.0–29.0) | 40.9 (38.4–43.3) | 57.6 (55.5–59.8) | 76.3 (74.1–79.3) | 90.2 (85.0–94.4) |
| NHW, fasted                 | 1126 | 14.3 (13.6–15.1) | 17.9 (17.3–19.3) | 26.2 (24.9–27.7) | 39.3 (37.2–42.3) | 56.9 (54.1–59.8) | 76.5 (70.8–84.6) | 91.1 (84.6–98.2) |
| NHW, nonfasted              | 1275 | 16.8 (15.5–18.3) | 20.8 (19.7–22.3) | 28.8 (27.1–31.4) | 42.2 (39.4–44.3) | 58.5 (55.7–61.4) | 76.1 (74.9–78.5) | 87.1 (83.3–92.3) |
| NHB                         | 2025 | 12.4 (11.3–13.0) | 14.8 (13.9–15.5) | 20.4 (19.3–21.5) | 30.2 (27.6–32.2) | 43.9 (41.1–47.5) | 59.2 (56.8–63.1) | 71.1 (68.2–74.6) |
| NHB, fasted                 | 899  | 11.8 (10.7–13.1) | 14.7 (13.3–15.6) | 19.8 (18.3–21.0) | 27.2 (25.8–29.9) | 40.9 (36.8–45.4) | 57.4 (53.9–63.9) | 69.9 (64.6–74.1) |
| NHB, nonfasted              | 1126 | 12.6 (11.4–13.5) | 14.9 (13.9–16.0) | 20.9 (19.9–22.7) | 32.6 (29.9–36.2) | 45.4 (42.4–49.9) | 60.9 (57.1–66.3) | 73.0 (68.4–78.2) |
| NHA                         | 947  | 14.6 (11.6–17.0) | 18.2 (17.0–19.5) | 25.4 (23.8–28.0) | 38.1 (36.7–40.3) | 55.6 (53.4–58.9) | 73.9 (69.0–77.1) | 81.1 (77.0–87.5) |
| NHA, fasted                 | 439  | 13.7 (10.6–16.5) | 17.3 (15.4–18.5) | 23.2 (21.2–26.2) | 34.6 (32.1–38.7) | 54.3 (49.7–59.1) | 72.6 (66.6–79.4) | 82.3 (76.0–90.4) |
| NHA, unfasted               | 508  | 16.2 (12.1–17.7) | 20.2 (17.7–21.5) | 28.0 (25.3–30.6) | 40.9 (38.7–43.8) | 57.0 (53.7–60.3) | 74.4 (69.9–77.0) | 78.8 (76.9–85.5) |

NHANES, National Health and Nutrition Examination Survey; MA, Mexican American; NHW, non-Hispanic White; NHB, non-Hispanic Black; NHA, non-Hispanic Asian.

<sup>a</sup> Values are percentiles (95% CI) and were measured by microbiologic assay; “fasted” refers to no food intake for past  $\geq 8$  hours; “nonfasted” refers to food intake during the last 8 hours.

<sup>b</sup> Hispanic subgroup represents the sum of Mexican American and other Hispanic ethnicity (not shown).

† Estimate is subject to greater uncertainty due to small sample size ( $n < 224$ ).

**Supplementary Table S9.** Selected percentile concentrations of serum unmetabolized folic acid by demographic variable categories for the US population  $\geq 1$  year, NHANES 2011–2<sup>a</sup>

| Variable categories   | Sample size<br><i>n</i> | 5 <sup>th</sup>   | 10 <sup>th</sup>  | 25 <sup>th</sup> | 50 <sup>th</sup> | 75 <sup>th</sup> | 90 <sup>th</sup> | 95 <sup>th</sup> |
|-----------------------|-------------------------|-------------------|-------------------|------------------|------------------|------------------|------------------|------------------|
| nmol/L                |                         |                   |                   |                  |                  |                  |                  |                  |
| All                   | 7462                    | .487 (.440–.524)  | .573 (.529–.616)  | .750 (.708–.787) | .991 (.955–1.03) | 1.43 (1.36–1.52) | 2.93 (2.72–3.31) | 7.62 (7.00–9.50) |
| All, fasted           | 3346                    | .458 (.402–.500)  | .545 (.496–.581)  | .690 (.644–.738) | .911 (.866–.954) | 1.21 (1.15–1.27) | 1.72 (1.61–1.87) | 2.47 (2.27–2.79) |
| All, nonfasted        | 4116                    | .517 (.469–.561)  | .620 (.560–.678)  | .813 (.782–.845) | 1.11 (1.05–1.16) | 1.81 (1.68–1.99) | 6.10 (5.26–7.03) | 13.7 (11.6–18.3) |
| Age, year             |                         |                   |                   |                  |                  |                  |                  |                  |
| 1-5                   | 573                     | .530 (.478–.570)  | .642 (.534–.704)  | .805 (.751–.880) | 1.16 (1.06–1.39) | 2.42 (1.89–3.29) | 10.9 (5.62–15.5) | 18.2 (12.1–41.4) |
| 1-5, fasted           | 77                      | .456† (.371–.488) | .500† (.379–.542) | .695 (.493–.789) | .859 (.727–1.04) | 1.12 (.947–1.85) | 2.32† (1.20–282) | 4.57† (2.23–282) |
| 1-5, nonfasted        | 496                     | .545 (.392–.650)  | .671 (.556–.736)  | .831 (.780–.911) | 1.25 (1.10–1.57) | 2.61 (2.20–4.06) | 11.1 (6.88–17.1) | 18.4 (12.1–44.5) |
| 6-11                  | 957                     | .566 (.482–.633)  | .673 (.589–.731)  | .839 (.784–.914) | 1.16 (1.10–1.27) | 1.83 (1.62–2.16) | 6.73 (3.92–12.1) | 17.4 (10.3–30.2) |
| 6-11, fasted          | 229                     | .539 (.370–.597)  | .619 (.543–.671)  | .738 (.672–.803) | .875 (.817–.941) | 1.07 (.972–1.24) | 1.51 (1.24–1.88) | 1.69 (1.53–8.40) |
| 6-11, nonfasted       | 728                     | .588 (.455–.664)  | .699 (.589–.774)  | .923 (.815–1.03) | 1.30 (1.23–1.41) | 2.24 (1.77–3.55) | 8.67 (4.93–18.3) | 21.6 (13.0–35.1) |
| 12-19                 | 1074                    | .521 (.444–.559)  | .584 (.529–.633)  | .738 (.678–.789) | .980 (.938–1.04) | 1.33 (1.25–1.46) | 2.09 (1.87–2.47) | 3.39 (2.48–7.17) |
| 12-19, fasted         | 555                     | .498 (.357–.538)  | .557 (.499–.600)  | .695 (.626–.749) | .921 (.839–.989) | 1.21 (1.10–1.30) | 1.53 (1.43–1.73) | 1.86 (1.73–2.18) |
| 12-19, nonfasted      | 519                     | .562 (.478–.601)  | .623 (.566–.677)  | .806 (.727–.873) | 1.05 (.979–1.16) | 1.63 (1.34–2.04) | 3.35 (2.41–4.95) | 7.18 (4.53–17.9) |
| 20-39                 | 1730                    | .438 (.364–.491)  | .526 (.449–.585)  | .695 (.636–.754) | .922 (.861–.974) | 1.27 (1.18–1.34) | 2.12 (1.79–2.62) | 4.33 (3.52–5.88) |
| 20-39, fasted         | 907                     | .383 (.335–.443)  | .496 (.386–.549)  | .657 (.580–.710) | .851 (.790–.923) | 1.10 (1.01–1.25) | 1.54 (1.42–1.96) | 2.18 (1.79–3.69) |
| 20-39, nonfasted      | 823                     | .476 (.418–.548)  | .579 (.495–.632)  | .764 (.698–.815) | .990 (.930–1.06) | 1.43 (1.34–1.51) | 3.22 (2.42–5.33) | 7.33 (5.78–11.3) |
| 40-59                 | 1604                    | .481 (.428–.517)  | .556 (.500–.612)  | .710 (.666–.759) | .945 (.909–.978) | 1.32 (1.25–1.44) | 2.63 (2.16–3.34) | 6.74 (4.40–11.7) |
| 40-59, fasted         | 827                     | .470 (.409–.503)  | .542 (.476–.580)  | .660 (.611–.724) | .878 (.836–.932) | 1.19 (1.09–1.25) | 1.73 (1.52–2.24) | 2.59 (1.95–5.05) |
| 40-59, nonfasted      | 777                     | .500 (.428–.554)  | .608 (.534–.671)  | .778 (.737–.815) | 1.03 (.958–1.10) | 1.63 (1.37–1.96) | 4.99 (3.26–7.42) | 12.2 (7.07–28.5) |
| $\geq 60$             | 1524                    | .553 (.481–.625)  | .674 (.604–.738)  | .875 (.822–.914) | 1.16 (1.11–1.22) | 1.75 (1.57–2.12) | 5.36 (3.46–7.24) | 12.7 (10.2–17.0) |
| $\geq 60$ , fasted    | 751                     | .559 (.487–.611)  | .648 (.595–.691)  | .829 (.749–.888) | 1.05 (.989–1.11) | 1.40 (1.30–1.50) | 2.08 (1.76–2.61) | 2.81 (2.52–5.34) |
| $\geq 60$ , nonfasted | 773                     | .531 (.400–.692)  | .737 (.629–.788)  | .928 (.871–1.00) | 1.35 (1.23–1.57) | 2.79 (2.12–3.68) | 10.9 (7.03–16.9) | 21.6 (13.7–45.8) |
| Sex                   |                         |                   |                   |                  |                  |                  |                  |                  |
| Males                 | 3745                    | .473 (.407–.511)  | .553 (.510–.591)  | .717 (.673–.765) | .959 (.913–1.01) | 1.39 (1.32–1.48) | 2.91 (2.59–3.81) | 7.55 (6.51–10.5) |
| Males, fasted         | 1676                    | .435 (.355–.492)  | .527 (.464–.562)  | .665 (.614–.707) | .866 (.809–.928) | 1.14 (1.07–1.23) | 1.63 (1.46–1.87) | 2.41 (1.89–3.93) |
| Males, nonfasted      | 2069                    | .501 (.426–.558)  | .596 (.529–.660)  | .793 (.747–.833) | 1.08 (1.02–1.15) | 1.84 (1.67–2.05) | 6.41 (4.92–8.05) | 12.6 (10.4–15.0) |
| Females               | 3717                    | .508 (.462–.545)  | .607 (.550–.650)  | .782 (.737–.826) | 1.02 (.979–1.07) | 1.46 (1.38–1.61) | 2.95 (2.60–3.42) | 7.90 (5.50–12.4) |
| Females, fasted       | 1670                    | .476 (.423–.522)  | .562 (.480–.626)  | .722 (.676–.777) | .954 (.907–.995) | 1.28 (1.21–1.33) | 1.76 (1.65–2.07) | 2.58 (2.28–3.12) |
| Females, nonfasted    | 2047                    | .537 (.484–.590)  | .661 (.597–.701)  | .835 (.796–.882) | 1.13 (1.06–1.20) | 1.79 (1.65–2.03) | 5.46 (4.25–7.60) | 17.1 (10.9–26.6) |



Supplementary material

| Race-ethnicity <sup>b</sup> |      |                  |                  |                  |                  |                  |                  |                  |
|-----------------------------|------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Hispanic                    | 1803 | .418 (.349–.476) | .503 (.422–.568) | .673 (.591–.740) | .904 (.836–.970) | 1.23 (1.15–1.33) | 1.93 (1.76–2.19) | 3.84 (2.72–6.59) |
| Hispanic, fasted            | 780  | .382 (.336–.422) | .462 (.384–.516) | .620 (.521–.696) | .825 (.759–.911) | 1.08 (1.01–1.18) | 1.43 (1.33–1.57) | 1.78 (1.56–2.08) |
| Hispanic, nonfasted         | 1023 | .475 (.375–.528) | .559 (.496–.592) | .724 (.664–.784) | .975 (.915–1.05) | 1.43 (1.34–1.54) | 2.85 (2.22–4.26) | 8.56 (4.30–13.5) |
| MA                          | 993  | .400 (.332–.475) | .499 (.390–.580) | .678 (.581–.769) | .915 (.838–.979) | 1.21 (1.12–1.34) | 1.77 (1.55–2.11) | 2.79 (2.11–5.87) |
| MA, fasted                  | 433  | .366 (.273–.417) | .447 (.321–.538) | .626 (.487–.751) | .835 (.763–.925) | 1.09 (.982–1.24) | 1.37 (1.29–1.61) | 1.70 (1.50–2.12) |
| MA, nonfasted               | 560  | .469 (.299–.552) | .564 (.473–.599) | .742 (.630–.825) | .978 (.921–1.07) | 1.37 (1.24–1.53) | 2.34 (1.93–3.25) | 6.45 (3.12–12.0) |
| NHW                         | 2402 | .531 (.458–.565) | .616 (.560–.661) | .787 (.742–.831) | 1.03 (.985–1.07) | 1.50 (1.43–1.64) | 3.47 (3.22–4.42) | 10.0 (7.60–12.0) |
| NHW, fasted                 | 1126 | .517 (.435–.550) | .569 (.519–.631) | .717 (.668–.769) | .936 (.885–.983) | 1.24 (1.19–1.31) | 1.78 (1.67–2.10) | 2.78 (2.44–3.37) |
| NHW, nonfasted              | 1276 | .558 (.472–.640) | .685 (.625–.736) | .860 (.823–.897) | 1.18 (1.13–1.24) | 2.04 (1.87–2.32) | 7.26 (6.29–9.07) | 16.4 (12.9–21.9) |
| NHB                         | 2027 | .495 (.460–.520) | .581 (.530–.622) | .757 (.720–.789) | 1.02 (.968–1.06) | 1.48 (1.39–1.62) | 2.59 (2.35–2.92) | 5.36 (4.25–6.69) |
| NHB, fasted                 | 899  | .455 (.410–.501) | .548 (.497–.604) | .723 (.665–.778) | .968 (.922–1.02) | 1.30 (1.21–1.48) | 1.82 (1.65–2.09) | 2.49 (2.03–3.34) |
| NHB, nonfasted              | 1128 | .525 (.502–.541) | .609 (.567–.641) | .778 (.746–.827) | 1.08 (1.01–1.17) | 1.69 (1.58–1.86) | 3.61 (3.05–4.95) | 8.58 (6.72–13.8) |
| NHA                         | 947  | .376 (.294–.407) | .437 (.399–.483) | .586 (.543–.635) | .799 (.744–.862) | 1.12 (1.06–1.26) | 2.25 (1.80–2.96) | 5.13 (3.28–9.13) |
| NHA, fasted                 | 439  | .347 (.262–.390) | .416 (.359–.467) | .555 (.494–.622) | .720 (.670–.789) | .972 (.890–1.08) | 1.25 (1.16–1.42) | 1.78 (1.38–2.24) |
| NHA, unfasted               | 508  | .400 (.325–.424) | .479 (.417–.508) | .625 (.557–.688) | .907 (.806–1.01) | 1.43 (1.22–1.88) | 3.80 (2.74–8.18) | 11.1 (7.03–17.8) |

NHANES, National Health and Nutrition Examination Survey; MA, Mexican American; NHW, non-Hispanic White; NHB, non-Hispanic Black; NHA, non-Hispanic Asian.

<sup>a</sup> Values are percentiles (95% CI) and were measured by microbiologic assay; “fasted” refers to no food intake for past  $\geq 8$  hours; “nonfasted” refers to food intake during the last 8 hours.

<sup>b</sup> Hispanic subgroup represents the sum of Mexican American and other Hispanic ethnicity (not shown).

† Estimate is subject to greater uncertainty due to small sample size ( $n < 224$ ).

**Supplementary Table S10.** Selected percentile concentrations of serum non-methyl folate by demographic variable categories for the US population  $\geq 1$  year, NHANES 2011–2<sup>a</sup>

| Variable categories   | Sample size<br><i>n</i> | 5 <sup>th</sup> | 10 <sup>th</sup>  | 25 <sup>th</sup> | 50 <sup>th</sup> | 75 <sup>th</sup> | 90 <sup>th</sup>  | 95 <sup>th</sup>  |
|-----------------------|-------------------------|-----------------|-------------------|------------------|------------------|------------------|-------------------|-------------------|
| nmol/L                |                         |                 |                   |                  |                  |                  |                   |                   |
| All                   | 7458                    | <LOD            | <LOD              | 1.08 (<LOD–1.18) | 1.42 (1.30–1.58) | 2.05 (1.60–4.08) | 4.24 (3.01–6.07)  | 5.16 (4.43–6.85)  |
| All, fasted           | 3348                    | <LOD            | <LOD              | 1.07 (<LOD–1.18) | 1.42 (1.28–1.58) | 1.97 (1.58–4.19) | 4.23 (2.93–6.03)  | 4.99 (4.37–6.87)  |
| All, nonfasted        | 4110                    | <LOD            | <LOD              | 1.08 (<LOD–1.18) | 1.42 (1.31–1.57) | 2.09 (1.62–3.97) | 4.25 (3.02–6.19)  | 5.29 (4.48–7.14)  |
| Age, year             |                         |                 |                   |                  |                  |                  |                   |                   |
| 1-5                   | 570                     | <LOD            | 1.06 (<LOD–1.14)  | 1.32 (1.25–1.40) | 1.67 (1.52–1.82) | 2.59 (1.95–4.00) | 4.39 (3.57–6.35)  | 5.58 (4.93–6.78)  |
| 1-5, fasted           | 77                      | <LOD†           | 1.08† (<LOD–1.26) | 1.41 (1.04–1.50) | 1.66 (1.42–1.82) | 2.30 (1.78–5.31) | 4.96† (3.68–12.6) | 7.00† (4.81–12.6) |
| 1-5, nonfasted        | 493                     | <LOD            | 1.06 (<LOD–1.15)  | 1.32 (1.22–1.40) | 1.67 (1.53–1.85) | 2.61 (1.97–3.79) | 4.36 (3.40–6.33)  | 5.46 (4.73–6.79)  |
| 6-11                  | 959                     | <LOD            | <LOD              | 1.17 (1.03–1.30) | 1.54 (1.37–1.83) | 2.59 (1.75–4.44) | 4.42 (3.54–5.70)  | 5.29 (4.71–6.49)  |
| 6-11, fasted          | 231                     | <LOD            | <LOD              | 1.15 (<LOD–1.29) | 1.48 (1.36–1.70) | 2.18 (1.58–5.25) | 3.98 (2.59–8.28)  | 5.42 (3.89–8.28)  |
| 6-11, nonfasted       | 728                     | <LOD            | <LOD              | 1.18 (1.01–1.32) | 1.55 (1.37–1.85) | 2.73 (1.84–4.28) | 4.49 (3.77–5.58)  | 5.29 (4.86–6.20)  |
| 12-19                 | 1074                    | <LOD            | <LOD              | <LOD             | 1.31 (1.18–1.46) | 1.76 (1.42–3.91) | 3.70 (2.44–5.87)  | 4.38 (3.85–6.20)  |
| 12-19, fasted         | 555                     | <LOD            | <LOD              | <LOD             | 1.30 (1.20–1.48) | 1.77 (1.36–4.29) | 3.85 (2.74–5.52)  | 4.46 (3.89–5.86)  |
| 12-19, nonfasted      | 519                     | <LOD            | <LOD              | <LOD             | 1.31 (1.16–1.45) | 1.75 (1.45–3.41) | 3.50 (2.33–5.99)  | 4.28 (3.57–6.98)  |
| 20-39                 | 1730                    | <LOD            | <LOD              | 1.03 (<LOD–1.13) | 1.35 (1.21–1.56) | 2.03 (1.44–4.56) | 4.29 (3.19–5.94)  | 4.95 (4.34–7.06)  |
| 20-39, fasted         | 907                     | <LOD            | <LOD              | 1.03 (<LOD–1.16) | 1.38 (1.21–1.55) | 1.94 (1.46–4.47) | 4.24 (3.12–5.97)  | 4.85 (4.32–7.56)  |
| 20-39, nonfasted      | 823                     | <LOD            | <LOD              | 1.02 (<LOD–1.12) | 1.34 (1.19–1.58) | 2.16 (1.43–4.72) | 4.31 (3.14–6.21)  | 5.12 (4.33–7.52)  |
| 40-59                 | 1605                    | <LOD            | <LOD              | 1.01 (<LOD–1.15) | 1.36 (1.25–1.48) | 1.81 (1.55–3.13) | 3.98 (2.17–6.31)  | 5.05 (4.13–7.83)  |
| 40-59, fasted         | 828                     | <LOD            | <LOD              | 1.06 (<LOD–1.17) | 1.39 (1.24–1.56) | 1.90 (1.55–3.98) | 4.30 (2.38–6.38)  | 4.94 (4.41–7.17)  |
| 40-59, nonfasted      | 777                     | <LOD            | <LOD              | <LOD             | 1.35 (1.22–1.45) | 1.73 (1.55–2.41) | 3.68 (2.14–5.70)  | 5.22 (3.82–11.5)  |
| $\geq 60$             | 1520                    | <LOD            | <LOD              | 1.24 (1.10–1.33) | 1.61 (1.47–1.79) | 2.33 (1.83–4.27) | 4.69 (3.06–7.35)  | 5.95 (4.92–8.27)  |
| $\geq 60$ , fasted    | 750                     | <LOD            | <LOD              | 1.22 (1.01–1.34) | 1.59 (1.46–1.73) | 2.15 (1.77–4.15) | 4.38 (2.61–7.03)  | 5.27 (4.42–8.38)  |
| $\geq 60$ , nonfasted | 770                     | <LOD            | <LOD              | 1.25 (1.12–1.35) | 1.65 (1.46–1.87) | 2.51 (1.88–4.76) | 5.08 (3.23–8.22)  | 6.46 (5.13–9.66)  |
| Sex                   |                         |                 |                   |                  |                  |                  |                   |                   |
| Males                 | 3746                    | <LOD            | <LOD              | 1.06 (<LOD–1.16) | 1.43 (1.30–1.57) | 2.05 (1.59–3.97) | 4.00 (2.93–5.99)  | 4.95 (4.20–6.60)  |
| Males, fasted         | 1678                    | <LOD            | <LOD              | 1.06 (<LOD–1.16) | 1.42 (1.28–1.57) | 1.89 (1.57–4.11) | 4.12 (2.84–6.05)  | 4.85 (4.22–6.57)  |
| Males, nonfasted      | 2068                    | <LOD            | <LOD              | 1.06 (<LOD–1.17) | 1.43 (1.30–1.58) | 2.14 (1.61–3.90) | 3.97 (2.99–6.09)  | 5.11 (4.14–7.45)  |
| Females               | 3712                    | <LOD            | <LOD              | 1.09 (<LOD–1.19) | 1.42 (1.29–1.58) | 2.03 (1.61–4.23) | 4.43 (3.02–6.17)  | 5.43 (4.61–6.85)  |
| Females, fasted       | 1670                    | <LOD            | <LOD              | 1.08 (<LOD–1.21) | 1.42 (1.28–1.59) | 2.05 (1.58–4.36) | 4.38 (2.87–6.31)  | 5.16 (4.42–8.24)  |
| Females, nonfasted    | 2042                    | <LOD            | <LOD              | 1.09 (<LOD–1.19) | 1.42 (1.30–1.58) | 2.03 (1.63–4.16) | 4.56 (3.04–6.23)  | 5.55 (4.81–6.80)  |

Supplementary material

| Race-ethnicity <sup>b</sup> |      |      |      |                  |                  |                  |                  |                  |
|-----------------------------|------|------|------|------------------|------------------|------------------|------------------|------------------|
| Hispanic                    | 1803 | .710 | .710 | 1.04 (.710–1.26) | 1.46 (1.15–2.17) | 3.35 (1.57–5.33) | 4.82 (4.07–6.42) | 5.54 (4.91–7.35) |
| Hispanic, fasted            | 782  | .710 | .710 | 1.03 (.710–1.24) | 1.42 (1.14–1.95) | 3.20 (1.50–5.18) | 4.70 (3.98–6.22) | 5.28 (4.74–6.63) |
| Hispanic, nonfasted         | 1021 | .710 | .710 | 1.05 (.710–1.29) | 1.49 (1.15–2.51) | 3.52 (1.64–5.42) | 5.03 (4.08–6.79) | 5.61 (5.04–10.7) |
| MA                          | 995  | <LOD | <LOD | 1.12 (<LOD–1.32) | 1.49 (1.19–2.44) | 3.29 (1.54–5.54) | 4.71 (3.98–6.15) | 5.36 (4.82–6.49) |
| MA, fasted                  | 435  | <LOD | <LOD | 1.11 (<LOD–1.29) | 1.46 (1.18–2.34) | 3.45 (1.49–5.80) | 4.69 (4.07–6.51) | 5.22 (4.71–6.64) |
| MA, nonfasted               | 560  | <LOD | <LOD | 1.13 (<LOD–1.34) | 1.52 (1.20–2.58) | 3.16 (1.60–5.57) | 4.86 (3.96–5.78) | 5.37 (4.91–6.80) |
| NHW                         | 2398 | <LOD | <LOD | 1.08 (<LOD–1.18) | 1.40 (1.30–1.53) | 1.85 (1.59–3.01) | 3.62 (2.14–6.84) | 4.83 (3.77–7.99) |
| NHW, fasted                 | 1124 | <LOD | <LOD | 1.08 (<LOD–1.19) | 1.41 (1.28–1.54) | 1.81 (1.58–3.12) | 3.70 (2.10–6.80) | 4.71 (3.82–7.41) |
| NHW, nonfasted              | 1274 | <LOD | <LOD | 1.09 (<LOD–1.18) | 1.39 (1.31–1.52) | 1.88 (1.60–2.87) | 3.50 (2.19–6.96) | 5.06 (3.56–11.3) |
| NHB                         | 2027 | <LOD | <LOD | 1.08 (<LOD–1.30) | 1.62 (1.26–2.48) | 3.42 (1.78–5.54) | 4.95 (3.95–7.16) | 5.61 (5.04–7.36) |
| NHB, fasted                 | 899  | <LOD | <LOD | 1.04 (<LOD–1.27) | 1.54 (1.24–2.15) | 3.04 (1.69–5.51) | 4.67 (3.68–8.28) | 5.53 (4.71–8.35) |
| NHB, nonfasted              | 1128 | <LOD | <LOD | 1.12 (<LOD–1.35) | 1.71 (1.26–2.87) | 3.64 (1.94–5.47) | 5.04 (4.20–7.01) | 5.89 (5.19–7.60) |
| NHA                         | 948  | <LOD | <LOD | 1.09 (<LOD–1.21) | 1.42 (1.27–1.61) | 2.05 (1.53–4.51) | 4.29 (2.51–12.0) | 5.23 (4.03–12.0) |
| NHA, fasted                 | 441  | <LOD | <LOD | 1.11 (<LOD–1.25) | 1.44 (1.26–1.77) | 2.27 (1.50–5.73) | 4.47 (2.49–12.0) | 5.38 (4.06–12.0) |
| NHA, unfasted               | 507  | <LOD | <LOD | 1.07 (<LOD–1.19) | 1.40 (1.27–1.52) | 1.86 (1.53–3.58) | 3.82 (2.53–7.13) | 4.96 (3.83–9.45) |

NHANES, National Health and Nutrition Examination Survey; MA, Mexican American; NHW, non-Hispanic White; NHB, non-Hispanic Black; NHA, non-Hispanic Asian.

<sup>a</sup> Values are percentiles (95% CI) and were measured by microbiologic assay; “fasted” refers to no food intake for past  $\geq 8$  hours; “nonfasted” refers to food intake during the last 8 hours.

<sup>b</sup> Hispanic subgroup represents the sum of Mexican American and other Hispanic ethnicity (not shown).

† Estimate is subject to greater uncertainty due to small sample size ( $n < 224$ ).

## Supplementary material

**Supplementary Table S11.** Selected percentile concentrations of serum MeFox by demographic variable categories for the US population  $\geq 1$  year, NHANES 2011–2<sup>a</sup>

| Variable categories   | Sample size<br><i>n</i> | 5 <sup>th</sup>  | 10 <sup>th</sup> | 25 <sup>th</sup> | 50 <sup>th</sup> | 75 <sup>th</sup> | 90 <sup>th</sup>  | 95 <sup>th</sup>  |
|-----------------------|-------------------------|------------------|------------------|------------------|------------------|------------------|-------------------|-------------------|
| nmol/L                |                         |                  |                  |                  |                  |                  |                   |                   |
| All                   | 7469                    | .530 (.495–.558) | .642 (.608–.672) | .937 (.885–.985) | 1.49 (1.40–1.59) | 2.44 (2.28–2.59) | 3.76 (3.55–3.99)  | 4.81 (4.52–5.12)  |
| All, fasted           | 3350                    | .466 (.432–.500) | .568 (.527–.601) | .750 (.709–.795) | 1.13 (1.04–1.19) | 1.71 (1.60–1.86) | 2.58 (2.38–2.92)  | 3.61 (3.19–4.24)  |
| All, nonfasted        | 4119                    | .644 (.602–.694) | .839 (.804–.869) | 1.26 (1.18–1.34) | 1.95 (1.83–2.10) | 2.94 (2.80–3.14) | 4.37 (4.14–4.56)  | 5.54 (5.16–5.98)  |
| Age, year             |                         |                  |                  |                  |                  |                  |                   |                   |
| 1-5                   | 575                     | .410 (<LOD–.494) | .513 (.433–.573) | .708 (.635–.774) | 1.31 (1.09–1.52) | 2.26 (1.83–3.01) | 3.81 (3.10–5.13)  | 4.51 (3.88–6.15)  |
| 1-5, fasted           | 77                      | <LOD†            | <LOD†            | .442 (<LOD–.591) | .622 (.467–.766) | .805 (.703–1.80) | 1.25† (.844–5.70) | 2.07† (1.01–5.70) |
| 1-5, nonfasted        | 498                     | .473 (<LOD–.530) | .561 (.515–.594) | .781 (.697–.913) | 1.44 (1.27–1.67) | 2.48 (1.86–3.40) | 3.85 (3.40–5.14)  | 4.56 (3.92–7.25)  |
| 6-11                  | 960                     | .434 (.383–.457) | .511 (.468–.554) | .784 (.685–.887) | 1.52 (1.33–1.64) | 2.39 (2.19–2.70) | 3.60 (3.05–4.07)  | 4.17 (3.89–4.75)  |
| 6-11, fasted          | 231                     | <LOD             | .375 (<LOD–.410) | .457 (.442–.485) | .597 (.546–.630) | .745 (.697–.847) | .930 (.867–1.75)  | 1.47 (.942–4.30)  |
| 6-11, nonfasted       | 729                     | .584 (.503–.656) | .755 (.645–.854) | 1.17 (1.08–1.26) | 1.83 (1.65–1.96) | 2.68 (2.38–3.04) | 3.83 (3.28–4.36)  | 4.37 (3.94–5.60)  |
| 12-19                 | 1074                    | .493 (.443–.532) | .591 (.516–.663) | .824 (.730–.927) | 1.27 (1.09–1.46) | 2.17 (1.83–2.50) | 3.17 (2.93–3.62)  | 3.94 (3.57–4.32)  |
| 12-19, fasted         | 555                     | .440 (<LOD–.479) | .517 (.470–.559) | .681 (.626–.711) | .916 (.828–1.01) | 1.35 (1.15–1.54) | 1.88 (1.61–2.48)  | 2.48 (2.01–3.31)  |
| 12-19, nonfasted      | 519                     | .666 (.505–.877) | .925 (.661–1.01) | 1.23 (1.06–1.39) | 1.94 (1.59–2.26) | 2.92 (2.60–3.26) | 3.93 (3.55–4.20)  | 4.44 (4.16–5.23)  |
| 20-39                 | 1730                    | .530 (.482–.558) | .632 (.588–.669) | .871 (.812–.932) | 1.39 (1.28–1.50) | 2.21 (1.98–2.48) | 3.22 (3.07–3.53)  | 4.33 (3.94–4.74)  |
| 20-39, fasted         | 907                     | .460 (.389–.522) | .562 (.502–.617) | .721 (.690–.774) | 1.07 (1.01–1.15) | 1.62 (1.48–1.77) | 2.39 (2.14–2.78)  | 3.12 (2.80–3.67)  |
| 20-39, nonfasted      | 823                     | .636 (.560–.706) | .760 (.719–.851) | 1.20 (1.08–1.33) | 1.82 (1.65–2.02) | 2.74 (2.55–2.90) | 3.95 (3.58–4.32)  | 4.87 (4.39–5.94)  |
| 40-59                 | 1606                    | .547 (.518–.588) | .657 (.615–.699) | .945 (.873–1.00) | 1.46 (1.35–1.56) | 2.34 (2.14–2.54) | 3.77 (3.44–4.14)  | 4.51 (4.26–5.18)  |
| 40-59, fasted         | 829                     | .514 (.442–.546) | .597 (.539–.639) | .772 (.723–.826) | 1.15 (1.03–1.21) | 1.71 (1.52–1.93) | 2.58 (2.32–3.19)  | 3.61 (2.85–4.48)  |
| 40-59, nonfasted      | 777                     | .727 (.588–.794) | .879 (.825–.975) | 1.26 (1.18–1.37) | 1.95 (1.82–2.10) | 2.97 (2.67–3.42) | 4.42 (4.02–5.12)  | 5.69 (4.86–6.86)  |
| $\geq 60$             | 1524                    | .701 (.599–.777) | .858 (.771–.943) | 1.24 (1.14–1.36) | 1.90 (1.78–2.04) | 2.94 (2.83–3.16) | 4.98 (4.54–5.31)  | 6.63 (5.77–7.41)  |
| $\geq 60$ , fasted    | 751                     | .591 (.470–.670) | .732 (.606–.829) | 1.04 (.920–1.17) | 1.50 (1.38–1.61) | 2.17 (1.96–2.36) | 3.70 (3.25–4.43)  | 5.26 (4.40–6.83)  |
| $\geq 60$ , nonfasted | 773                     | .892 (.787–.999) | 1.13 (1.04–1.22) | 1.69 (1.45–1.86) | 2.50 (2.32–2.67) | 3.70 (3.36–4.01) | 5.54 (5.13–6.72)  | 7.60 (6.90–9.17)  |
| Sex                   |                         |                  |                  |                  |                  |                  |                   |                   |
| Males                 | 3750                    | .529 (.487–.565) | .647 (.594–.679) | .913 (.851–.975) | 1.47 (1.37–1.56) | 2.40 (2.23–2.57) | 3.68 (3.34–3.98)  | 4.50 (4.16–5.13)  |
| Males, fasted         | 1679                    | .461 (.398–.510) | .558 (.520–.591) | .729 (.691–.780) | 1.07 (.985–1.18) | 1.61 (1.48–1.76) | 2.51 (2.30–2.91)  | 3.42 (2.95–4.08)  |
| Males, nonfasted      | 2071                    | .677 (.620–.736) | .848 (.788–.907) | 1.29 (1.18–1.41) | 1.95 (1.79–2.16) | 2.92 (2.69–3.24) | 4.15 (3.95–4.45)  | 5.33 (4.71–6.58)  |
| Females               | 3719                    | .532 (.486–.562) | .639 (.614–.675) | .955 (.914–1.01) | 1.52 (1.41–1.64) | 2.46 (2.29–2.64) | 3.87 (3.64–4.27)  | 5.02 (4.63–5.63)  |
| Females, fasted       | 1671                    | .473 (.444–.504) | .588 (.526–.617) | .767 (.717–.822) | 1.17 (1.10–1.22) | 1.82 (1.67–1.96) | 2.64 (2.39–3.18)  | 3.70 (3.43–4.36)  |
| Females, nonfasted    | 2048                    | .611 (.564–.668) | .831 (.781–.871) | 1.22 (1.15–1.30) | 1.96 (1.85–2.10) | 2.97 (2.83–3.15) | 4.51 (4.36–4.79)  | 5.69 (5.28–6.37)  |

Supplementary material

| Race-ethnicity <sup>b</sup> |      |                  |                  |                  |                  |                  |                  |                  |
|-----------------------------|------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| Hispanic                    | 1806 | .453 (.415–.474) | .547 (.521–.569) | .752 (.719–.803) | 1.22 (1.15–1.31) | 2.05 (1.94–2.19) | 3.17 (2.96–3.34) | 4.00 (3.75–4.47) |
| Hispanic, fasted            | 782  | .381 (<LOD–.428) | .465 (.433–.500) | .636 (.602–.667) | .842 (.806–.895) | 1.27 (1.18–1.40) | 2.01 (1.90–2.33) | 2.82 (2.53–3.22) |
| Hispanic, nonfasted         | 1024 | .557 (.500–.629) | .718 (.643–.799) | 1.13 (1.06–1.20) | 1.70 (1.59–1.77) | 2.62 (2.43–2.78) | 3.80 (3.50–4.14) | 4.57 (4.38–4.90) |
| MA                          | 996  | .435 (.372–.483) | .534 (.492–.566) | .719 (.672–.782) | 1.19 (1.09–1.25) | 1.94 (1.76–2.16) | 3.11 (2.83–3.45) | 3.99 (3.51–4.72) |
| MA, fasted                  | 435  | <LOD (<LOD–.414) | .449 (.393–.499) | .627 (.582–.660) | .817 (.789–.848) | 1.24 (1.10–1.38) | 1.98 (1.78–2.30) | 2.86 (2.33–3.42) |
| MA, nonfasted               | 561  | .534 (.460–.613) | .650 (.569–.728) | 1.08 (.997–1.18) | 1.61 (1.46–1.78) | 2.42 (2.22–2.81) | 3.76 (3.28–4.37) | 4.59 (4.23–5.25) |
| NHW                         | 2402 | .597 (.563–.625) | .711 (.677–.753) | 1.03 (.991–1.09) | 1.62 (1.51–1.75) | 2.56 (2.41–2.76) | 3.99 (3.77–4.23) | 5.12 (4.71–5.68) |
| NHW, fasted                 | 1126 | .539 (.487–.582) | .631 (.591–.670) | .841 (.800–.900) | 1.25 (1.17–1.32) | 1.82 (1.69–1.97) | 2.76 (2.49–3.19) | 3.99 (3.41–4.64) |
| NHW, nonfasted              | 1276 | .752 (.687–.783) | .935 (.876–1.01) | 1.38 (1.28–1.48) | 2.12 (1.99–2.31) | 3.14 (2.94–3.34) | 4.52 (4.37–4.87) | 5.98 (5.55–6.65) |
| NHB                         | 2027 | .437 (.410–.476) | .528 (.507–.553) | .731 (.706–.767) | 1.18 (1.13–1.22) | 1.87 (1.77–1.98) | 2.88 (2.70–3.09) | 3.91 (3.64–4.25) |
| NHB, fasted                 | 899  | .400 (.361–.425) | .476 (.429–.513) | .625 (.596–.661) | .902 (.839–.957) | 1.42 (1.28–1.60) | 2.25 (2.04–2.62) | 3.21 (2.53–4.15) |
| NHB, nonfasted              | 1128 | .520 (.453–.567) | .622 (.596–.657) | .946 (.901–1.00) | 1.46 (1.41–1.50) | 2.15 (2.05–2.29) | 3.21 (2.99–3.62) | 4.33 (4.04–4.81) |
| NHA                         | 951  | .507 (.461–.543) | .612 (.545–.664) | .910 (.814–1.01) | 1.54 (1.36–1.78) | 2.70 (2.45–3.04) | 4.24 (3.81–4.75) | 5.54 (5.11–6.13) |
| NHA, fasted                 | 441  | .440 (<LOD–.497) | .520 (.472–.558) | .677 (.623–.744) | .996 (.911–1.08) | 1.44 (1.30–1.71) | 2.18 (1.95–2.48) | 2.77 (2.42–3.86) |
| NHA, unfasted               | 510  | .712 (.647–.787) | .970 (.864–1.08) | 1.56 (1.38–1.72) | 2.43 (2.22–2.62) | 3.67 (3.51–3.79) | 5.20 (4.98–5.69) | 6.86 (6.05–8.14) |

NHANES, National Health and Nutrition Examination Survey; MA, Mexican American; NHW, non-Hispanic White; NHB, non-Hispanic Black; NHA, non-Hispanic Asian.

<sup>a</sup> Values are percentiles (95% CI) and were measured by microbiologic assay; “fasted” refers to no food intake for past  $\geq 8$  hours; “nonfasted” refers to food intake during the last 8 hours.

<sup>b</sup> Hispanic subgroup represents the sum of Mexican American and other Hispanic ethnicity (not shown).

† Estimate is subject to greater uncertainty due to small sample size ( $n < 224$ ).