**Supplemental Figure 1.** Flowchart of sample exclusion criteria for the present study

|  |  |
| --- | --- |
| **EPIC cohort**\* ***N*=492,762** |  |
|  | *Participants excluded based on EPIC-PANACEA selection criteria (n=212,474) (1)* |
| n=280,288 |  |
|  | *Outlying anthropometry (n=17,193) (2)* |
| **Final study population\*\* *N*=263,095** |  |

*\* Excluding participants from Greece due to administrative and data use restrictions (n=28,561)*

*\*\* Missing and/or unknown values in the final study population:*

* Educational level (n=10,251)
* Physical activity (n=3,722)
* Smoking status (n=2512)
* Physical activity at follow-up (n=32,603)
* Smoking status at follow-up (n=15,984)

(1) EPIC-PANACEA exclusion criteria

* No follow-up weight available (n=117,258)
* No baseline weight available (n=89,854)
* Extreme energy reporting, i.e., participants in the lowest and highest 1% of the ratio or reported total energy intake / energy requirement (EI/ER) (n=5,362)

(2) Outlying anthropometry

1. Unreliable anthropometry at baseline:

* Missing value for height (n=325)
* Height < 130 cm (n=24)
* BMI < 16 kg/m2 (n=125)
* Missing value for waist circumference (n=16,078)
* Waist circumference < 40 cm (n=0)
* Waist circumference > 160 cm (n=11)
* Waist circumference < 60 cm if BMI > 25 kg/m2 (n=16)

1. Unreliable anthropometry at follow-up:

* BMI at follow-up < 16 kg/m2 (n=47)
* Weight-change < -5 kg/year (n=259)
* Weight-change > 5 kg/year (n=308)]

**Supplemental Figure 2.** Relative contribution of main food groups to MGO intake by EPIC centres in both sexes (*N*=263,095)

**Supplemental Figure 3.** Relative contribution of main food groups to GO intake by EPIC centres in both sexes (*N*=263,095)

**Supplemental Figure 4.** Relative contribution of main food groups to 3-DG intake by EPIC centres in both sexes (*N*=263,095)

**Supplemental Table 1.** Difference in body weight gain (kg) over 5 years according to baseline dietary dicarbonyls by main food sources – EPIC-PANACEA study (*N*=263,095)

|  |  |  |  |
| --- | --- | --- | --- |
|  | MGO  *Continuous (per 1 SD/d)* | GO  *Continuous (per 1 SD/d)* | 3-DG  *Continuous (per 1 SD/d)* |
| *Dietary dicarbonyls from:* |  |  |  |
| Cereals and cereal products | -0.035 (-0.052, -0.018) | -0.042 (-0.059, -0.025) | -0.060 (-0.077, -0.044) |
| Fruits, nuts, and seeds | -0.006 (-0.024, 0.012) | -0.006 (-0.023, 0.012) | -0.026 (-0.043, -0.008) |
| Vegetables | 0.027 (0.009, 0.045) | 0.020 (0.002, 0.038) | 0.029 (0.012, 0.046) |
| Cakes and biscuits | -0.042 (-0.058, -0.025) | -0.042 (-0.059, -0.025) | -0.042 (-0.058, -0.025) |
| Sugar and confectionary | *NA* | -0.015 (-0.032, 0.001) | -0.007 (-0.024, 0.009) |
| Meat and meat products | 0.129 (0.112, 0.146) | *NA* | *NA* |
| Coffee | 0.025 (0.008, 0.041) | 0.032 (0.015, 0.048) | *NA* |
| Fruit and vegetable juices | *NA* | -0.038 (-0.055, -0.021) | *NA* |
| Beer | *NA* | *NA* | -0.004 (-0.058, -0.025) |

Multilevel linear mixed models with random effect on the intercept and slope according to centre.

Overall mean 5-year weight gain corresponded to 1.8 kg (SD 4.4) and positive beta values indicated more weight gain (kg) over the same period.

Main model (M3): adjusted for age, sex, BMI at baseline, follow-up time in years, total energy intake (kcal/day), educational level, levels of physical activity, smoking status at baseline, plausibility of dietary energy reporting, modified relative Mediterranean diet score, and dietary dicarbonyls intake other than the one studied.

Using total energy, centre-standardized residuals, and log-transformed dietary dicarbonyls.

MGO: methylglyoxal, GO: glyoxal, 3-DG: 3-deoxyglucosone.

*NA: Not Applicable, models were not computed for food groups that were not among the main contributors of the dicarbonyl compound.*

**Supplemental Table 2.** Difference in body weight gain (kg) over 5 years according to baseline dietary dicarbonyl compounds intake – EPIC-PANACEA study (*N*=263,095) – By sex, age, and BMI categories, for each dicarbonyl compounds.

|  |  |  |  |
| --- | --- | --- | --- |
|  | MGO *Continuous (per 1 SD/d)* | GO *Continuous (per 1 SD/d)* | 3-DG *Continuous (per 1 SD/d)* |
| *Sex* |  |  |  |
| Women (*n*=170,710) | 0.102 (0.081, 0.123) | 0.045 (0.021, 0.070) | -0.090 (-0.111, -0.068) |
| Men (*n*=92,385) | 0.078 (0.047, 0.109) | -0.017 (-0.050, 0.016) | -0.061 (-0.092, -0.031) |
| *Age* |  |  |  |
| Quartile 1 of age (*n*=65,782) | 0.088 (0.049, 0.128) | 0.011 (-0.030, 0.053) | -0.099 (-0.137, -0.062) |
| Quartile 2 of age (*n*=65,765) | 0.050 (0.016, 0.084) | -0.009 (-0.048, 0.029) | -0.056 (-0.092, -0.021) |
| Quartile 3 of age (*n*=65,782) | 0.074 (0.041, 0.106) | 0.053 (0.015, 0.091) | -0.056 (-0.092, -0.020) |
| Quartile 4 of age (*n*=65,766) | 0.109 (0.076, 0.143) | 0.029 (-0.009, 0.067) | -0.052 (-0.084, -0.020) |
| *BMI* |  |  |  |
| < 25 kg/m2 (*n*=126,015) | 0.063 (0.044, 0.083) | 0.003 (-0.019, 0.026) | -0.083 (-0.102, -0.063) |
| ≥ 25 and < 30 kg/m2 (*n*=99,438) | 0.097 (0.068, 0.127) | 0.030 (-0.002, 0.063) | -0.074 (-0.105, -0.044) |
| ≥ 30 kg/m2 (*n*=37,642) | 0.039 (-0.029, 0.107) | 0.026 (-0.046, 0.097) | -0.006 (-0.077, 0.065) |
| *Tertile of dietary AGEs* |  |  |  |
| Tertile 1 (*n*=87,698) | 0.079 (0.051, 0.108) | 0.074 (0.042, 0.105) | -0.068 (-0.100, -0.036) |
| Tertile 2 (*n*=87,699) | 0.103 (0.071, 0.135) | -0.019 (-0.054, 0.016) | -0.059 (-0.090, -0.028) |
| Tertile 3 (*n*=87,698) | 0.097 (0.064, 0.153) | -0.002 (-0.039, 0.035) | -0.097 (-0.127, -0.068) |
| *Country* |  |  |  |
| France (*n*=18,722) | 0.041 (0.013, 0.070) | -0.010 (-0.042, 0.023) | -0.044 (-0.082, -0.007) |
| Italy (*n*=32,965) | 0.090 (0.038, 0.141) | -0.007 (-0.039, 0.024) | 0.044 (-0.001, 0.089) |
| Spain (*n*=39,208) | 0.020 (0.134, 0.306) | 0.075 (0.016, 0.134) | -0.165 (-0.228, -0.102) |
| United Kingdom (*n*=48,429) | 0.110 (0.072, 0.147) | 0.044 (-0.003, 0.091) | -0.062 (-0.091, -0.033) |
| The Netherlands (*n*=11,980) | 0.084 (0.024, 0.143) | 0.014 (-0.062, 0.089) | -0.142 (-0.210, -0.075) |
| Germany (*n*=45,972) | 0.112 (0.068, 0.156) | -0.056 (-0.110, -0.002) | -0.070 (-0.123, -0.017) |
| Sweden (*n*=21,570) | 0.095 (0.040, 0.151) | 0.035 (-0.038, 0.109) | -0.047 (-0.098, 0.004) |
| Denmark (*n*=44,249) | 0.030 (-0.005, 0.065) | 0.065 (0.010, 0.119) | -0.045 (-0.104, 0.014) |
| *European region* |  |  |  |
| North (*n*=65,819) | 0.052 (0.022, 0.081) | 0.038 (-0.006, 0.081) | -0.026 (-0.063, 0.012) |
| Central (*n*=118,103) | 0.096 (0.072, 0.120) | -0.005 (-0.034, 0.024) | -0.073 (-0.096, -0.050) |
| South (*n*=79,173) | 0.122 (0.073, 0.171) | 0.034 (0.000, 0.068) | -0.091 (-0.131, -0.051) |

Multilevel linear mixed models with random effect on the intercept and slope according to centre.

Overall mean 5-year weight gain corresponded to 1.8 kg (SD 4.4) and positive beta values indicated more weight gain (kg) over the same period.

Main model (M3) was adjusted for age, sex, BMI at baseline, follow-up time in years, total energy intake (kcal/day), educational level, levels of physical activity, smoking status at baseline, plausibility of dietary energy reporting, modified relative Mediterranean diet score, and dietary dicarbonyls intake other than the one studied.

Using total energy, centre-standardized residuals, and log-transformed dietary dicarbonyls.

MGO: methylglyoxal, GO: glyoxal, 3-DG: 3-deoxyglucosone.

P-values for interaction by sex were 0.375, 0.001, and 0.211, for MGO, GO and 3-DG, respectively.

P-values for interaction by age quartiles were 0.138, 0.003, and 0.015, for MGO, GO and 3-DG, respectively.

P-values for interaction by BMI were 0.112, 0.001, and 0.002, for MGO, GO and 3-DG, respectively.

P-values for interaction by AGEs tertile were 0.372, 0.003, and 0.059, for MGO, GO and 3-DG, respectively.

P-values for interaction by country were 0.003, <0.001, and <0.001, for MGO, GO and 3-DG, respectively.

P-values for interaction by European regions were 0.003, <0.001, and <0.001, for MGO, GO and 3-DG, respectively.

Cut-offs for quartiles of age were 44.8, 52.4, and 58.6.

Range of dietary AGEs tertiles: 0.60-20.7, 20.7-29.1, and 29.1-260 mg/d, for tertile 1, 2, and 3, respectively.

For analyses by European regions, “North” includes Denmark and Sweden, “Central” includes Germany, France (north), the Netherlands, and UK, “South” includes France (south), Italy, and Spain.

**Supplemental Table 3.** Difference in body weight gain (kg) over 5 years according to baseline dietary dicarbonyl compounds intake – EPIC-PANACEA study (*N*=263,095) – Sensitivity analyses

|  |  |  |  |
| --- | --- | --- | --- |
|  | MGO | GO | 3-DG |
| *Main model (M3)* |  |  |  |
| Continuous (per 1 SD/d) | 0.089 (0.072, 0.107) | 0.018 (-0.002, 0.037) | -0.076 (-0.094, -0.058) |
| Quintiles of dietary dicarbonyls |  |  |  |
| Q1 (*n*=52,613) | Reference | Reference | Reference |
| Q2 (*n*=52,621) | 0.024 (-0.028, 0.076) | 0.017 (-0.036, 0.070) | -0.060 (-0.112, -0.007) |
| Q3 (*n*=52,623) | 0.039 (-0.014, 0.092) | -0.003 (-0.057, 0.052) | -0.105 (-0.158, -0.052) |
| Q4 (*n*=52,621) | 0.096 (0.042, 0.149) | 0.002 (-0.053, 0.058) | -0.131 (-0.184, -0.077) |
| Q5 (*n*=52,617) | 0.260 (0.205, 0.314) | 0.047 (-0.012, 0.106) | -0.189 (-0.245, -0.134) |
| P-trend (linear) | <0.001 | 0.253 | <0.001 |
| *Supplementary model 1* |  |  |  |
| Continuous (per 1 SD/d) | 0.118 (0.101, 0.135) | -0.006 (-0.025, 0.014) | -0.084 (-0.102, -0.067) |
| Quintiles of dietary dicarbonyls |  |  |  |
| Q1 (*n*=52,613) | Reference | Reference | Reference |
| Q2 (*n*=52,621) | 0.036 (-0.017, 0.088) | -0.014 (-0.066, 0.039) | -0.076 (-0.128, -0.024) |
| Q3 (*n*=52,623) | 0.063 (0.010, 0.116) | -0.043 (-0.097, 0.011) | -0.125 (-0.178, -0.072) |
| Q4 (*n*=52,621) | 0.134 (0.081, 0.187) | -0.048 (-0.103, 0.008) | -0.149 (-0.203, -0.095) |
| Q5 (*n*=52,617) | 0.337 (0.283, 0.391 | -0.011 (-0.070, 0.048) | -0.210 (-0.265, -0.155) |
| P-trend (linear) | <0.001 | 0.417 | <0.001 |
| *Supplementary model 2* |  |  |  |
| Continuous (per 1 SD/d) | 0.083 (0.066, 0.101) | 0.024 (0.004, 0.043) | -0.075 (-0.093, -0.058) |
| Quintiles of dietary dicarbonyls |  |  |  |
| Q1 (*n*=52,613) | Reference | Reference | Reference |
| Q2 (*n*=52,621) | 0.025 (-0.027, 0.078) | 0.026 (-0.026, 0.079) | -0.055 (-0.108, -0.003) |
| Q3 (*n*=52,623) | 0.038 (-0.015, 0.091) | 0.011 (-0.043, 0.065) | -0.098 (-0.151, -0.045) |
| Q4 (*n*=52,621) | 0.093 (0.039, 0.146) | 0.018 (-0.038, 0.074) | -0.125 (-0.179, -0.071) |
| Q5 (*n*=52,617) | 0.243 (0.189, 0.298) | 0.062 (0.003, 0.121) | -0.189 (-0.244, -0.134) |
| P-trend (linear) | <0.001 | 0.096 | <0.001 |
| *Supplementary model 3* |  |  |  |
| Continuous (per 1 SD/d) | 0.089 (0.071, 0.106) | 0.017 (-0.003, 0.036) | -0.075 (-0.093, -0.058) |
| Quintiles of dietary dicarbonyls |  |  |  |
| Q1 (*n*=52,613) | Reference | Reference | Reference |
| Q2 (*n*=52,621) | 0.024 (-0.028, 0.076) | 0.017 (-0.036, 0.069) | -0.058 (-0.111, -0.006) |
| Q3 (*n*=52,623) | 0.039 (-0.014, 0.092) | -0.003 (-0.057, 0.051) | -0.103 (-0.156, -0.050) |
| Q4 (*n*=52,621) | 0.096 (0.042, 0.149) | 0.002 (-0.054, 0.057) | -0.128 (-0.182, -0.074) |
| Q5 (*n*=52,617) | 0.259 (0.204, 0.313 | 0.045 (-0.014, 0.104) | -0.187 (-0.242, -0.132) |
| P-trend (linear) | <0.001 | 0.282 | <0.001 |
| *Supplementary model 4* |  |  |  |
| Continuous (per 1 SD/d) | 0.089 (0.071, 0.106) | 0.014 (-0.005, 0.034) | -0.076 (-0.093, -0.058) |
| Quintiles of dietary dicarbonyls |  |  |  |
| Q1 (*n*=52,613) | Reference | Reference | Reference |
| Q2 (*n*=52,621) | 0.023 (-0.030, 0.075) | 0.011 (-0.042, 0.064) | -0.060 (-0.112, -0.007) |
| Q3 (*n*=52,623) | 0.037 (-0.016, 0.091) | -0.011 (-0.066, 0.043) | -0.105 (-0.159, -0.052) |
| Q4 (*n*=52,621) | 0.094 (0.040, 0.148) | -0.007 (-0.064, 0.049) | -0.131 (-0.184, -0.077) |
| Q5 (*n*=52,617) | 0.257 (0.201, 0.312) | 0.038 (-0.022, 0.097) | -0.189 (-0.244, -0.134) |
| P-trend (linear) | <0.001 | 0.404 | <0.001 |
| *Supplementary model 5* |  |  |  |
| Continuous (per 1 SD/d) | 0.047 (0.014, 0.081) | 0.006 (-0.014, 0.025) | -0.058 (-0.077, -0.039) |
| Quintiles of dietary dicarbonyls |  |  |  |
| Q1 (n=49,704) | Reference | Reference | Reference |
| Q2 (n=49,711) | -0.001 (-0.055, 0.053) | 0.000 (-0.053, 0.053) | -0.041 (-0.094, -0.012) |
| Q3 (n=49,713) | -0.008 (-0.066, 0.050) | -0.027 (-0.081, 0.027) | -0.076 (-0.130, -0.022) |
| Q4 (n=49,711) | 0.027 (-0.037, 0.092) | -0.029 (-0.085, 0.028) | -0.093 (-0.148, -0.038) |
| Q5 (n=49,707) | 0.148 (0.069, 0.228) | 0.012 (-0.048, 0.071) | -0.134 (-0.192, -0.077) |
| P-trend (linear) | 0.003 | 0.941 | <0.001 |
| *Supplementary model 6* |  |  |  |
| Continuous (per 1 SD/d) | 0.088 (0.070, 0.106) | 0.014 (-0.006, 0.034) | -0.073 (-0.092, -0.055) |
| Quintiles of dietary dicarbonyls |  |  |  |
| Q1 (*n*=49,704) | Reference | Reference | Reference |
| Q2 (*n*=49,711) | 0.033 (-0.021, 0.087) | 0.019 (-0.036, 0.073) | -0.069 (-0.123, -0.015) |
| Q3 (*n*=49,713) | 0.049 (-0.006, 0.104) | -0.004 (-0.060, 0.052) | -0.110 (-0.165, -0.055) |
| Q4 (*n*=49,711) | 0.101 (0.046, 0.157) | -0.003 (-0.061, 0.054) | -0.128 (-0.184, -0.072) |
| Q5 (*n*=49,707) | 0.266 (0.210, 0.322) | 0.040 (-0.021, 0.100) | -0.180 (-0.237, -0.123) |
| P-trend (linear) | <0.001 | 0.427 | <0.001 |
| *Supplementary model 7 \** |  |  |  |
| Continuous (per 1 SD/d) | 0.079 (0.062, 0.096) | 0.031 (0.010, 0.052) | -0.057 (-0.075, -0.038) |
| Quintiles of dietary dicarbonyls |  |  |  |
| Q1 (*n*=36,029) | Reference | Reference | Reference |
| Q2 (*n*=36,039) | -0.007 (-0.060, 0.047) | 0.024 (-0.030, 0.078) | -0.072 (-0.126, -0.019) |
| Q3 (*n*=39,042) | 0.034 (-0.020, 0.088) | 0.049 (-0.006, 0.104) | -0.094 (-0.148, -0.039) |
| Q4 (*n*=36,039) | 0.080 (0.026, 0.134) | 0.059 (0.001, 0.116) | -0.085 (-0.140, -0.029) |
| Q5 (*n*=36,034) | 0.228 (0.173, 0.284) | 0.070 (0.010, 0.131) | -0.156 (-0.212, -0.099) |
| P-trend (linear) | <0.001 | 0.013 | <0.001 |
| *Supplementary model 8* |  |  |  |
| Continuous (per 1 SD/d) | 0.085 (0.066, 0.104) | 0.011 (-0.011, 0.032) | -0.071 (-0.090, -0.052) |
| Quintiles of dietary dicarbonyls |  |  |  |
| Q1 (*n*=43,573) | Reference | Reference | Reference |
| Q2 (*n*=43,579) | 0.020 (-0.037, 0.078) | 0.008(-0.050, 0.066) | -0.041 (-0.098, 0.017) |
| Q3 (*n*=43,581) | 0.032 (-0.026, 0.090) | -0.005 (-0.065, 0.054) | -0.109 (-0.168, -0.050) |
| Q4 (*n*=43,579) | 0.086 (0.028, 0.145) | -0.015 (-0.077, 0.046) | -0.119 (-0.179, -0.060) |
| Q5 (*n*=43,576) | 0.244 (0.184, 0.304) | 0.027 (-0.038, 0.092) | -0.179 (-0.240, -0.118) |
| P-trend (linear) | <0.001 | 0.700 | <0.001 |

Multilevel linear mixed models with random effect on the intercept and slope according to centre.

Overall mean 5-year weight gain corresponded to 1.8 kg (SD 4.4) and positive beta values indicated more weight gain (kg) over the same period.

Main model (M3): adjusted for age, sex, BMI at baseline, follow-up time in years, total energy intake (kcal/day), educational level, levels of physical activity, smoking status at baseline, plausibility of dietary energy reporting, modified relative Mediterranean diet score, and dietary dicarbonyls intake other than the one studied.

Quintiles were calculated using total energy, centre-standardized residuals, and log-transformed dietary dicarbonyls.

Supplementary model 1 was adjusted for smoking status at follow-up instead of baseline.

Supplementary model 2 adjusting for the number of cigarettes smoked (in pack years).

Supplementary model 3 adjusting for chronic conditions (myocardial infarction, angina, stroke, or diabetes) at recruitment using an indicator for missing values.

Supplementary model 4 adjusting for dietary AGEs intake.

Supplementary model 5 adjusting for coffee intake.

Supplementary model 6 excluding subjects with missing values in any of the covariates (n=248,546).

Supplementary model 7 excluding participants with less than 5 years of follow-up (n=180,183).

Supplementary model 8 excluding participants who started or quit smoking during follow-up (*n*=217,888).

MGO: methylglyoxal, GO: glyoxal, 3-DG: 3-deoxyglucosone.

\* P-values for interaction by follow-up time (< 5 and ≥ 5 years) were 0.505, 0.001, and 0.824, for MGO, GO and 3-DG, respectively.

**Supplemental Table 4.** Risk of becoming overweight or obese according to baseline BMI – Odds ratios (OR) and 95% confidence intervals obtained using multivariable-adjusted logistic regression models – EPIC-PANACEA study (*N*=263,095) – Sensitivity analyses

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Baseline weight status | Follow-up weight status | MGO (per 1 SD/d)  OR (95% CI) | *P*-value | GO (per 1 SD/d)  OR (95% CI) | *P*-value | 3-DG (per 1 SD/d)  OR (95% CI) | *P*-value |
| Normal weight participants  (n=126,015) | Risk of becoming overweight at follow-up  (*n* cases=29,880) |  |  |  |  |  |  |
|  | *Main model (M3)* | 1.02 (1.01, 1.03) | 0.006 | 0.99 (0.98, 1.01) | 0.386 | 0.98 (0.97, 0.99) | 0.005 |
|  | *Supplementary model 1* | 1.03 (1.01, 1.04) | <0.001 | 0.99 (0.97, 1.00) | 0.050 | 0.98 (0.97, 0.99) | 0.002 |
|  | *Supplementary model 2* | 1.01 (1.00, 1.03) | 0.018 | 1.00 (0.98, 1.01) | 0.567 | 0.98 (0.97, 1.00) | 0.006 |
|  | *Supplementary model 3* | 1.02 (1.00, 1.03) | 0.008 | 0.99 (0.98, 1.01) | 0.344 | 0.98 (0.97, 1.00) | 0.007 |
|  | *Supplementary model 4* | 1.02 (1.00, 1.03) | 0.011 | 0.99 (0.98, 1.01) | 0.298 | 0.98 (0.97, 0.99) | 0.005 |
|  | *Supplementary model 5* | 1.00 (0.97, 1.02) | 0.772 | 0.99 (0.98, 1.01) | 0.211 | 0.99 (0.98, 1.00) | 0.090 |
|  | *Supplementary model 6*  *(n=118,043; n cases=27,879)* | 1.02 (1.01, 1.03) | 0.004 | 1.00 (0.99, 1.01) | 0.605 | 0.98 (0.97, 1.00) | 0.009 |
|  | *Supplementary model 7 (n=95,816; n cases=22,652)* | 1.02 (1.01, 1.03) | 0.005 | 0.99 (0.98, 1.01) | 0.503 | 0.98 (0.97, 1.00) | 0.016 |
|  | *Supplementary model 8*  *(103,858; n cases=23,501)* | 1.02 (1.00, 1.03) | 0.014 | 0.99 (0.97, 1.00) | 0.114 | 0.98 (0.97, 1.00) | 0.011 |
|  | Risk of becoming obese at follow-up  (*n* cases=553) |  |  |  |  |  |  |
|  | *Main model (M3)* | 1.14 (1.05, 1.25) | 0.002 | 1.06 (0.96, 1.17) | 0.268 | 0.93 (0.85, 1.02) | 0.135 |
|  | *Supplementary model 1* | 1.18 (1.08, 1.29) | <0.001 | 1.03 (0.93, 1.14) | 0.554 | 0.93 (0.84, 1.02) | 0.104 |
|  | *Supplementary model 2* | 1.13 (1.03, 1.23) | 0.007 | 1.07 (0.97, 1.18) | 0.178 | 0.93 (0.85, 1.02) | 0.131 |
|  | *Supplementary model 3* | 1.14 (1.05, 1.25) | 0.003 | 1.05 (0.95, 1.17) | 0.299 | 0.94 (0.86, 1.03) | 0.186 |
|  | *Supplementary model 4* | 1.17 (1.07, 1.29) | 0.001 | 1.07 (0.97, 1.18) | 0.187 | 0.93 (0.85, 1.02) | 0.124 |
|  | *Supplementary model 5* | 1.09 (0.92, 1.28) | 0.314 | 1.05 (0.95, 1.16) | 0.381 | 0.95 (0.86, 1.05) | 0.294 |
|  | *Supplementary model 6*  *(n=118,043; n cases=491)* | 1.11 (1.01, 1.22) | 0.037 | 1.00 (0.98, 1.02) | 0.802 | 0.94 (0.85, 1.04) | 0.265 |
|  | *Supplementary model 7*  *(n=95,816; n cases=518)* | 1.15 (1.05, 1.26) | 0.003 | 1.05 (0.94, 1.16) | 0.383 | 0.94 (0.85, 1.03) | 0.188 |
|  | *Supplementary model 9*  *(103,858; n cases=341)* | 1.14 (1.03, 1.27) | 0.016 | 1.15 (1.01, 1.31) | 0.031 | 0.94 (0.84, 1.05) | 0.263 |
| Overweight participants  (*n*=99,438) | Risk of becoming obese at follow-up  (*n* cases=15,127) |  |  |  |  |  |  |
|  | *Main model (M3)* | 1.02 (1.01, 1.04) | 0.008 | 1.00 (0.98, 1.02) | 0.951 | 0.98 (0.97, 1.00) | 0.085 |
|  | *Supplementary model 1* | 1.03 (1.02, 1.05) | <0.001 | 0.99 (0.97, 1.01) | 0.339 | 0.98 (0.96, 1.00) | 0.042 |
|  | *Supplementary model 2* | 1.02 (1.00, 1.04) | 0.032 | 1.00 (0.99, 1.02) | 0.688 | 0.99 (0.97, 1.00) | 0.105 |
|  | *Supplementary model 3* | 1.02 (1.02, 1.04) | 0.009 | 1.00 (0.98, 1.02) | 0.906 | 0.99 (0.97, 1.00) | 0.106 |
|  | *Supplementary model 4* | 1.02 (1.00, 1.04) | 0.020 | 1.00 (0.98, 1.02) | 0.773 | 0.98 (0.97, 1.00) | 0.091 |
|  | *Supplementary model 5* | 1.03 (0.99, 1.06) | 0.127 | 1.00 (0.98, 1.02) | 0.746 | 0.99 (0.97, 1.01) | 0.174 |
|  | *Supplementary model 6*  *(n=94,481; n cases=14,251)* | 1.03 (1.01, 1.04) | 0.006 | 1.00 (0.98, 1.02) | 0.802 | 0.99 (0.97, 1.00) | 0.118 |
|  | *Supplementary model 7*  *(n=64,176; n cases=10,476)* | 1.02 (1.00, 1.04) | 0.116 | 1.00 (0.98, 1.03) | 0.885 | 0.99 (0.97 ,1.01) | 0.417 |
|  | *Supplementary model 8*  *(n=82,504; n cases=11,711)* | 1.02 (1.00, 1.04) | 0.047 | 0.99 (0.97, 1.02) | 0.569 | 0.99 (0.97, 1.01) | 0.145 |

Multivariable-adjusted logistic regression models.

Main model (M3): adjusted for age, sex, BMI at baseline, follow-up time in years, total energy intake (kcal/day), educational level, levels of physical activity, smoking status at baseline, plausibility of dietary energy reporting, modified relative Mediterranean diet score, and dietary dicarbonyls intake other than the one studied.

Using total energy, centre-standardized residuals, and log-transformed dietary dicarbonyls.

Supplementary model 1 was adjusted for smoking status at follow-up instead of baseline.

Supplementary model 2 adjusting for the number of cigarettes smoked (in pack years).

Supplementary model 3 adjusting for chronic conditions (myocardial infarction, angina, stroke, or diabetes) at recruitment using an indicator for missing values.

Supplementary model 4 adjusting for dietary AGEs intake.

Supplementary model 5 adjusting for coffee intake.

Supplementary model 6 excluding subjects with missing values in any of the covariates (*n*=248,546).

Supplementary model 7 excluding participants with less than 5 years of follow-up (*n*=180,183).

Supplementary model 9 excluding participants who started or quit smoking during follow-up (*n*=217,888).

MGO: methylglyoxal, GO: glyoxal, 3-DG: 3-deoxyglucosone.