**Supplementary material**

**Table S1:** Public Health England reviewed dietary guidelines for cardiovascular health

|  |  |
| --- | --- |
| **Nutritional component** | **Dietary goal** |
| Total fat | <35 % of total energy intake |
| Saturated fat | <11 % of total energy intake |
| Carbohydrates | >50 % of total energy intake |
| Fruit & vegetables  Fish (including oily) | >400 g/day  > 2 portion/week\* |
| Fibre (AOAC)  Added sugar  Sodium | >30 g/day  <5 % of total energy intake  <2400 mg/day |

Abbreviations: AOAC, American Association of Analytical Chemists

\* 2 portions (2 x 140g) one of which should be oily fish

|  |
| --- |
|  |

**Table S2:** Sensitivity analysis stratified by acceptable energy reporters (n=2815) and energy under-reporters (n=2721):

Dietary Reference Value score and Nutrient Profile score association with cardio-metabolic markers in the Airwave Health Monitoring Study

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |  |  | | **Acceptable energy reporters (n= 2815)** | | | | |  |  | | **Energy under reporters (n= 2721)** | | | |  | |  | | **DRV score** | | | **NP score** | | | | **DRV score** | | | | **NP score** | | | |  | | **β** a | **SE** | ***P* value** | | **β** a | **SE** | ***P* value** | **β** a | **SE** | | ***P* value** | **β** a | **SE** | ***P* value** | |  | |  |  |  | |  |  |  |  |  | |  |  |  |  | | HbA1c (%) | | -0.02 | 0.006 | 0.003 | | -0.01 | 0.004 | 0.002 | -0.02 | 0.006 | | 0.008 | -0.01 | 0.004 | 0.002 | | SBP (mmHg) | | 0.46 | 0.18 | 0.10 | | 0.16 | 0.12 | 0.18 | 0.42 | 0.18 | | 0.03 | 0.16 | 0.12 | 0.18 | | DBP (mmHg) | | 0.10 | 0.12 | 0.36 | | -0.03 | 0.08 | 0.70 | 0.08 | 0.12 | | 0.56 | -0.02 | 0.08 | 0.76 | | HDL cholesterol (mmol/L) | | 0.006 | 0.004 | 0.89 | | 0.001 | 0.003 | 0.80 | 0.002 | 0.004 | | 0.57 | <.001 | 0.003 | 0.88 | | Total cholesterol (mmol/L) | | -0.05 | 0.01 | 0.0002 | | -0.03 | 0.009 | 0.001 | -0.06 | 0.02 | | <.0001 | -0.03 | 0.008 | 0.001 | | Waist circumference (cm)\* | | -0.94 | 0.14 | <.0001 | | -0.38 | 0.10 | <.0001 | -0.72 | 0.14 | | <.0001 | -0.40 | 0.09 | <.0001 | | BMI (kg/m2)\*\* | | -0.30 | 0.05 | <.0001 | | -0.10 | 0.04 | 0.004 | -0.20 | 0.06 | | <.0001 | -0.11 | 0.04 | <.0001 |   Abbreviations: DRV, Dietary Reference Values Index; NP, nutrient profile model; HbA1c**,** glycated haemoglobin;  SBP, systolic blood pressure; DBP, diastolic blood pressure; BMI, body mass index; HDL, high density lipoprotein;  β, beta-coefficient; SE, standard error  a Multivariate linear regression models provide regression coefficients (β) in outcome variables for 2-points increase in diet scores  adjusted for age, sex, smoking, alcohol, physical activity, BMI, education level, diagnosis and treatment for specific outcome  \*Adjusted for height not BMI  \*\* Not adjusted for BMI |

**Table S3:** Demographic and lifestyle characteristics of the Airwave Health Monitoring Study (n=5,848)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Women a** | **Men a** | **P-value b** | **All a** |
| **n** | 2,352 | 3,496 |  | 5,848 |
| **Sex (women) %** |  |  |  | 40.22 |
| **Age (years)** | 39.81 (9.56) | 42.56 (8.91) | <.0001 | 41.19 (9.28) |
| **Ethnicity (British white) % \*** | 96.21 | 94.61 | 0.01 | 95.26 |
| **Education level %** |  |  | 0.0003 |  |
| Post graduate | 7.06 | 5.84 |  | 6.33 |
| Bachelor degree | 21.39 | 19.17 |  | 20.06 |
| A-level | 32.48 | 32.25 |  | 32.34 |
| Vocational | 7.36 | 7.24 |  | 7.29 |
| GCSE/ O level | 28.19 | 30.79 |  | 29.74 |
| No formal qualification | 3.53 | 4.72 |  | 4.24 |
| **Alcohol g/day** | 10.61 (12.59) | 17.10 (17.42) | <.0001 | 14.51 (15.99) |
| No alcohol % | 25.3 | 17.68 | <.0001 | 20.75 |
| Within guidelines % | 50.47 | 41.42 |  | 45.06 |
| Above guidelines % | 24.23 | 40.90 |  | 34.20 |
| **Diet quality score** |  |  |  |  |
| Dietary Reference Value score | 4.86 (3.00) | 4.39 (3.08) | <.0001 | 4.58 (3.05) |
| Nutrient Profile score | 56.60 (4.54) | 56.32 (4.34) | 0.02 | 56.42 (4.50) |
| **Cigarette smoking %** |  |  | 0.002 |  |
| Never | 67.86 | 70.14 |  | 69.22 |
| Former | 22.24 | 22.91 |  | 22.64 |
| Current | 9.91 | 6.95 |  | 8.14 |
| **Physical active %** |  |  | <.0001 |  |
| Low (<600min/week) % | 12.76 | 8.98 |  | 48.80 |
| Moderate (>600min/week) % | 43.15 | 39.04 |  | 40.70 |
| High (>3000min/week) % | 44.09 | 51.97 |  | 10.50 |
| **Demographic area %\*\*** |  |  | <.0001 |  |
| North west England | 19.52 | 21.28 |  | 20.57 |
| Eastern England | 36.69 | 29.09 |  | 32.15 |
| London | 2.51 | 4.03 |  | 3.42 |
| Wales | 11.44 | 11.24 |  | 11.32 |
| Scotland | 14.75 | 19.16 |  | 17.39 |
| **Body Mass Index (kg/m2)** | 25.91 (4.70) | 27.80 (3.65) | <.0001 | 27.04 (4.20) |
| Normal (18.5-24.99)% | 49.83 | 21.6 | <.0001 | 32.95 |
| Overweight (25-29.99)% | 34.48 | 55.21 |  | 46.87 |
| Obese (>30) % | 15.69 | 23.2 |  | 20.18 |
| **Waist circumference (cm)** | 82.04 (11.35) | 93.97 (9.81) | <.0001 | 89.17 (11.98) |
| **Cardiovascular risk and T2D % \*\*\*** |  |  |  |  |
| Hypertension 16.02 | | 39.25 | <.0001 | 40.33 |  |
| Dyslipidaemia | 11.05 | 37.40 | <.0001 | 35.81 |
| Type 2 Diabetes | 3.63 | 4.00 | 0.60 | 3.58 |
| **Medication usage %** |  |  |  |  |
| Blood pressure lowering | 3.40 | 5.01 | 0.003 | 4.36 |
| Lipid lowering | 1.23 | 3.72 | <.0001 | 2.72 |
| Glucose lowering | 0.60 | 0.74 | 0.50 | 0.68 |
| a Presented as mean (standard deviation) or percentage | | |  |  |  |
| b P-values for Student t-test (continuous variables) or Mantel-Haenzel chi-square test (categorical variables) | | | | | |
| \* Minority ethnic groups not presented included: Asian, African, Chinese and mixed background | | | | | |
| \*\* Minor demographic areas (< 2%) were not presented: South East, South West, Midland West, non-regional | | | | | |

\*\*\* Self-reported diagnosed or on treatment

**Table S4:** Dietary Reference Value score and Nutrient Profile score association with cardio-metabolic markers in

the Airwave Health Monitoring Study presented as per standardised beta-coefficient values

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **DRV score** | | | **NP score** | | |
|  | **β** a | **95% CI** | | **β** a | **95% CI** | |
|  |  |  |  |  |  |  |
| HbA1c (%) | -0.04 | -0.06 | -0.02 | -0.05 | -0.08 | -0.03 |
| SBP (mmHg) | 0.02 | 0.00 | 0.04 | 0.02 | -0.01 | 0.04 |
| DBP (mmHg) | -0.01 | -0.04 | 0.01 | -0.00 | -0.02 | 0.02 |
| HDL cholesterol (mmol/L) | -0.02 | -0.04 | -0.00 | -0.02 | -0.03 | 0.00 |
| Total cholesterol (mmol/L) | -0.10 | -0.12 | -0.07 | -0.07 | -0.10 | -0.05 |
| Waist circumference (cm)\* | -0.07 | -0.09 | -0.05 | 0.01 | -0.01 | 0.03 |
| BMI (kg/m2)\*\* | -0.05 | -0.07 | -0.02 | 0.03 | 0.01 | 0.06 |

|  |
| --- |
| Abbreviations: DRV, Dietary Reference Values Index; NP, nutrient profile model; HbA1c**,** glycated haemoglobin; SBP, systolic blood pressure; DBP, diastolic blood pressure; BMI, body mass index; HDL, high density lipoprotein; β, standardised beta-coefficient; CI, confident interval  a Multivariate linear regression models provide standardised regression coefficients (β) in outcome variables for 1-points increase in diet scores adjusted for age, sex, smoking, alcohol, physical activity, BMI, education level, diagnosis and treatment for specific outcome  \*Adjusted for height not BMI  \*\* Not adjusted for BMI |

**Table S5:** Association between single nutritional components incorporated in Dietary Reference Value Index

and cardio-metabolic risk markers in the Airwave Health Monitoring Study (n=5848)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **CHO** |  | **Fibre†** |  | **F&V** |  | **Total fish**†† |  |
|
|  | β a | SE | β a | SE | β a | SE | β a | SE |
|  |  |  |  |  |  |  |  |  |
| HbA1c (%) | 0.000 | 0.000 | \*-0.006 | 0.002 | \*-0.010 | 0.004 | -0.000 | 0.000 |
| SBP (mmHg) | 0.009 | 0.006 | 0.008 | 0.044 | \* 0.250 | 0.100 | -0.002 | 0.006 |
| DBP (mmHg) | 0.002 | 0.004 | \*-0.071 | 0.030 | -0.001 | 0.068 | \*-0.012 | 0.004 |
| HDL cholesterol (mmol/L) | \*-0.001 | 0.000 | 0.000 | 0.001 | -0.002 | 0.003 | \*0.001 | 0.000 |
| Total cholesterol (mmol/L) | \*-0.003 | 0.000 | \*-0.026 | 0.003 | \*-0.040 | 0.007 | \*-0.001 | 0.001 |
| Waist circumference (cm) δ | \*-0.030 | 0.005 | \*-0.239 | 0.034 | \*-0.600 | 0.077 | \*-0.015 | 0.005 |
| BMI (kg/m2) | \*-0.012 | 0.002 | \*-0.062 | 0.014 | \*-0.002 | 0.031 | -0.001 | 0.002 |

Abbreviations: β, beta-coefficient; SE, standard error; Sat fat, saturated fat; CHO, carbohydrates; F&V, fruit and vegetables;

HbA1c, glycated haemoglobin SBP, systolic blood pressure; DBP, diastolic blood pressure; BMI, body mass index; HDL,

high density lipoprotein

a Multiple regression models provide regression coefficients (β) in outcome variables for each 1g increase of nutrient, 100g increase

F&V and 1000mg increase sodium. All models are adjusted for age, sex, BMI, alcohol, energy intake, smoking, physical activity,

education level, diagnosis and treatment for specific outcomes

\* p-value <0.05

δ Adjusted for height instead of BMI

† Non-starch polysaccharides fibre

†† Includes oily fish

**Table S5 continued:** Association between single nutritional components incorporated in Dietary Reference Value Index

and cardio-metabolic risk markers in the Airwave Health Monitoring Study (n=5848)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Total fat** |  | **Sat fat** |  | **Sodium** |  | **Sugar†††** |  |
|
|  | β | SE | β a | SE | β a | SE | β a | SE |
|  |  |  |  |  |  |  |  |  |
| HbA1c (%) | \*0.002 | 0.001 | \*0.003 | 0.001 | -0.001 | 0.012 | 0.000 | 0.000 |
| SBP (mmHg) | -0.021 | 0.015 | -0.024 | 0.029 | -0.400 | 0.310 | 0.011 | 0.007 |
| DBP (mmHg) | \*0.023 | 0.010 | 0.036 | 0.019 | -0.026 | 0.211 | -0.002 | 0.005 |
| HDL cholesterol (mmol/L) | \*-0.001 | 0.000 | \*0.003 | 0.001 | 0.011 | 0.008 | \*-0.001 | 0.000 |
| Total cholesterol (mmol/L) | \*0.009 | 0.001 | \*0.019 | 0.002 | -0.029 | 0.022 | 0.000 | 0.001 |
| Waist circumference (cm) δ | \*0.055 | 0.012 | \*0.072 | 0.022 | \*1.604 | 0.237 | \*-0.046 | 0.006 |
| BMI (kg/m2) | \*0.012 | 0.005 | 0.008 | 0.009 | \*0.680 | 0.096 | \*-0.012 | 0.002 |

Abbreviations: β, beta-coefficient; SE, standard error; Sat fat, saturated fat; CHO, carbohydrates; F&V, fruit and vegetables;

HbA1c, glycated haemoglobin SBP, systolic blood pressure; DBP, diastolic blood pressure; BMI, body mass index; HDL, high density lipoprotein

a Multiple regression models provide regression coefficients (β) in outcome variables for each 1g increase of nutrient, 100g increase F&V and 1000mg increase sodium. All models are adjusted for age, sex, BMI, alcohol, energy intake, smoking, physical activity, education level, diagnosis and treatment for specific outcomes

\* p-value <0.05

δ Adjusted for height instead of BMI

††† Non-milk extrinsic sugar