## Online Supplement Material

**Supplementary Table 1** Components and scoring criteria for the Alternative Healthy Eating Index (AHEI) as previously published by the InterAct consortium(1)

|  |  |  |  |
| --- | --- | --- | --- |
| Component of dietary pattern | Range of points | Criterion for lowest points | Criterion for highest points |
| Vegetables | 0-10 | 0 servings/day\* | ≥ 5 servings/day\* |
| Fruits | 0-10 | 0 servings/day\* | ≥ 4 servings/day\* |
| Nuts | 0-10 | 0 servings/day\* | ≥ 1 serving/day\* |
| Ratio of white to red meat | 0-10 | 0 | ≥ 4 |
| Cereal fibre | 0-10 | 0 g/day | ≥ 15 g/day |
| Ratio of PUFA to SFA | 0-10 | ≤ 0.1 | ≥ 1 |
| Alcohol |  |  |  |
| Men | 0-10 | 0 to > 3.5 drinks/day\* | 1.5 - 2.5 drinks/day\* |
| Women | 0-10 | 0 to >2.5 drinks/day\* | 0.5-1.5 drinks/day\* |

\*Serving sizes are defined as follows: vegetables, fruits, 125 g; nuts, seeds, 30 g; meat, poultry, 30 g; fats, oils, 10 g; alcoholic drink, drink containing 5 g pure ethanol

**Supplementary Table 2** Components of the Mediterranean diet score and their respective scoring points by Galbete et al.(2)

|  |  |  |
| --- | --- | --- |
| Food groups | Food items considered in each group | Scoring criteria |
| Cereals | Whole-grain bread, other bread, grain flakes, grains, muesli, cornflakes, crisps, pasta, rice | Sex-specific tertilesT1 = 0, T2 = 1, T3 = 2 |
| Fruits and nuts | Fresh fruits, nuts | Sex-specific tertilesT1 = 0, T2 = 1, T3 = 2 |
| Vegetables | Raw vegetables, green salad, cruciferous vegetables, cooked vegetables, garlic, mushrooms | Sex-specific tertilesT1 = 0, T2 = 1, T3 = 2 |
| Fish | Fish (preserved and smoked is also considered) | Sex-specific tertilesT1 = 0, T2 = 1, T3 = 2 |
| Legumes | Legumes (green peas, green beans, lentil, peas, bean stew) | Sex-specific tertilesT1 = 0, T2 = 1, T3 = 2 |
| Meat | Poultry, meat, meat products | Sex-specific tertilesT1 = 2, T2 = 1, T3 = 0 |
| Dairy products\* | Low-fat dairy products, high-fat dairy products, low-fat cheese, high-fat cheese | Sex-specific tertilesT1 = 2, T2 = 1, T3 = 0 |
| Alcohol | Beer, wine, spirits, other alcoholic beverages | 5 to 25g/day for women =210-50g/day for men = 2Outside of the range = 0 |
| Olive oil | Olive oil for salad dressing, preparation of vegetables, and preparation of meat | Non-consumers = 0< sex-specific median = 1≥ sex-specific median = 2 |

\*contrarily to previous publication, Butter is no longer included

**Supplementary Table 3** Components and scoring criteria of the MedPyramid as published by Galbete et al.(2)

|  |  |  |  |
| --- | --- | --- | --- |
| Component | Recommended intake | Score of 0 | Score of 1 |
| Vegetables | ≥ 6/d | 0/d | ≥ 6/d |
| Legumes | ≥ 2/wk | 0/wk | ≥ 2/wk |
| Fruits | 3-6/d | 0/d | 3-6/d |
| Nuts | 1-2/d | 0/d | 1-2/d |
| Cereals | 3-6/d | 0/d | 3-6/d |
| Dairy | 2/d | 0/d | 1.5-2.5/d |
| Fish | ≥ 2/wk | 0/wk | ≥ 2/wk |
| Red meat | < 2/wk | ≥ 4/wk | < 2/wk |
| Processed Meat | ≤ 1/wk | ≥ 2/wk | ≤ 1/wk |
| White Meat | 2/wk | 0/wk | 1.5-2.5/wk |
| Egg | 2-4/wk | 0/wk | 2-4/wk |
| Potatoes | ≤ 3/wk | ≥ 6/wk | ≤ 3/wk |
| Sweets | ≤ 2/wk | ≥ 4/wk | ≤ 2/wk |
| Alcohol | 10-50g/d for men5-25g/d for women | >50g/d for men>25g/d for women | 10-50g/d for men5.25g/d for women |
| Olive Oil | Principal source of dietary lipids  | Non-consumers | Consumers |

**Supplementary Table 4** Overview of the 39 food groups and their respective food items

|  |  |  |
| --- | --- | --- |
|  |  Food group | Food items |
| 1 | Potatoes | Potatoes, Potato products |
| 2 | Leafy vegetables | All sorts of leafy vegetables (raw or cooked) |
| 3 | Fruiting vegetables | All sorts of fruiting vegetables (raw or cooked) |
| 4 | Root vegetables | All sorts of root vegetables (raw or cooked) |
| 5 | Cabbages | All cabbages (raw or cooked) |
| 6 | Other vegetables | Mushrooms, onions, garlic, mixed salad, mixed vegetables |
| 7 | Legumes | All legumes |
| 8 | Fruits  | Fruits (raw or cooked) |
| 9 | Nuts | Nuts, seeds |
| 10 | Other fruits | Mixed fruits, olives |
| 11 | Milk and dairy products | Milk and all dairy except for cheese |
| 12 | Cheese | All sorts of cheese |
| 13 | Pasta, rice | Pasta, Rice, Groats |
| 14 | Bread | Bread, Crispbread, Rusk, rice waffle |
| 15 | Other cereals | Flour, Flakes, Semolina, breakfast cereals, savoury biscuits, doughs |
| 16 | Red meat | Beef, Veal, Pork, Lamb, Game |
| 17 | Poultry  | All sorts of poultry |
| 18 | Processed meat | Sausages, Meatballs, Ham, all sorts pf processed meat |
| 19 | Offals | Offals |
| 20 | Fish | Fish, fish products, shellfish, mussels |
| 21 | Eggs | Eggs |
| 22 | Vegetable oils  | All sorts of vegetable oils  |
| 23 | Margarines | Margarine |
| 24 | Butter | Butter |
| 25 | Other fats | Frying fat, lard, fat non-specified |
| 26 | Sugar | Sugar, Honey, Marmalade, chocolate, sweets with/without chocolate, syrup, ice cream |
| 27 | Cakes, cookies | Cake, pastry, cookies, waffles |
| 28 | Fruit and vegetables juices | Fruit and vegetable juices |
| 29 | Soft drinks | Lemonade, Coca cola, Tonic |
| 30 | Coffee | Coffee, Cappuccino, Espresso (with or without caffeine) |
| 31 | Tea | All sorts of tea |
| 32 | Other non-alcoholic drinks | Water, coffee substitute, alcohol-free beer, alcohol-free wine/sparkling wine |
| 33 | Wine | Red, white or rosé wine |
| 34 | Beer | All sorts of beer |
| 35 | Spirits | All sorts of spirits |
| 36 | Other alcoholic beverages | Dessert wine, Liqueur, cocktails, anis drinks |
| 37 | Sauces | All sorts of sauces (incl. dressings, dessert sauces) |
| 38 | Soups | Bouillons, cream soups |
| 39 | Miscellaneous  | Soy products, diet products, brawlings, snacks, condiments |

***Supplementary Table 5*** *Dietary patterns and the respective factor loadings of all 39 food groups compared to energy-adjusted\* food groups*

|  |  |  |  |
| --- | --- | --- | --- |
| Food groups | FFQb | FFQ1 | mHDR |
| **DP score 1** | **DP score 1\_e\*** | **DP score 2** | **DP score 2\_e\*** | **DP score 1** | **DP score 1\_e\*** | **DP score 2** | **DP score 2\_e\*** | **DP score 1** | **DP score 1\_e\*** |
| Explained variance | **10.42%** | **9.74%** | **8.96%** | **8.02%** | **10.15%** | **9.75%** | **8.69%** | **9.00%** | **10.21%** | **8.51%** |
| Potatoes  | - | - | 59 | 44 | 45 | 57 | 46 | 27 | 50 | - |
| Leafy vegetables  | 64 | 65 | - | - | 49 | -30 | -45 | 57 | - | -37 |
| Fruiting vegetables  | 59 | 62 | - | - | - | -36 | -37 | 24 | - | - |
| Root vegetables  | 65 | 59 | - | -24 | 52 | -28 | -43 | 57 | - | - |
| Cabbages  | 37 | 28 | - | - | 53 | - | - | 51 | - | - |
| Other vegetables  | 54 | 50 | 36 | 21 | 71 | 27 | - | 62 | 48 | 27 |
| Legumes  | - | - | 37 | 35 | 47 | 30 | - | 39 | - | - |
| Fruits  | 49 | 40 | - | -35 | - | -43 | -45 | 27 | - | -39 |
| Nuts  | - | - | - | - | - | -27 | - | - | - | -37 |
| Other fruits  | 31 | - | 37 | -34 | - | -27 | - | - | - | - |
| Milk and dairy products  | 36 | - | - | -39 | - | -45 | -40 | - | -47 | -64 |
| Cheeses  | - | -21 | - | - | - | - | - | -25 | - | - |
| Pasta, rice  | 37 | 38 | - | - | 39 | - | - | 48 | - | - |
| Bread  | - | -20 | 34 | 25 | - | - | - | -42 | 42 | - |
| other cereals  | 45 | 36 | - | -33 | - | -46 | -52 | 29 | - | -48 |
| Red meat  | - | - | 70 | 64 | 58 | 64 | 49 | 38 | 59 | 40 |
| Poultry  | - | 35 | - | 27 | 30 | - | - | 26 | - | - |
| Processed meat  | - | - | 42 | 34 | - | 23 | 31 | -21 | 64 | 54 |
| Offals  | - | - | 56 | 45 | - | 26 | - | - | - | - |
| Fish  | - | - | - | - | 41 | - | - | 43 | 39 | 28 |
| Eggs  | - | - | - | - | - | - | - | - | - | 22 |
| Vegetable oils  | 66 | 66 | - | - | 49 | 61 | 49 | 27 | - | -26 |
| Margarines  | - | - | - | - | - | - | - | - | 46 | 31 |
| Butter  | - | -20 | 40 | - | - | - | - | -34 | - | - |
| Other fats  | - | - | - | - | - | 33 | 32 | - | 51 | 30 |
| Sugar  | - | - | - | -25 | - | 21 | 32 | -21 | - | -30 |
| Cakes, cookies  | - | -37 | - | -46 | - | -26 | - | - | - | - |
| Fruit and vegetable juices | 32 | 21 | - | -35 | - | -24 | - | - | - | -27 |
| Soft drinks  | - | - | 31 | - | - | - | - | - | - | - |
| Coffee  | - | - | - | - | - | 23 | 34 | -27 | 34 | 35 |
| Tea  | - | 25 | - | 24 | - | - | - | - | - | - |
| Other non-alcoholic drinks | - | 32 | -29 | - | - | -29 | -32 | - | - | - |
| Wine  | - | 25 | -26 | - | - | - | - | - | - | - |
| Beer  | - | -21 | 40 | 56 | - | 55 | 50 | - | 66 | 68 |
| Spirits  | - | - | 33 | 52 | - | 42 | 42 | - | 51 | 52 |
| Other alcoholic beverages  | - | - | - | - | - | - | - | - | - | - |
| Sauces  | - | - | 66 | 43 | 36 | 60 | 54 | - | 31 | - |
| Soups  | 37 | 31 | 39 | 24 | 65 | 21 | - | 58 | 30 | - |
| Miscellaneous  | 52 | 56 | - | - | - | - | - | 27 | - | - |

FFQb = FFQ at baseline; FFQ1 = FFQ after 1 year; mHDR = mean of 12 24-hour dietary recalls

\*PCA was applied on the 39 food groups, which were adjusted for total energy intake by the residual method

***Supplementary Table 6*** *Comparisons of intake between baseline FFQb, FFQ1 and the mHDR (n=134)*

|  |  |  |  |
| --- | --- | --- | --- |
|  | Median food intake (g/d) | Median difference | MAD† |
| Food groups | **FFQb** | **FFQ1** | **mHDR** | **FFQb vs FFQ1** | **mHDR vs FFQ1** | **FFQb vs FFQ1** | **mHDR vs FFQ1** |
| Potatoes  | 106.3 | 100.5 | 95.6  | 9.87\* | 1.21 | 58.66 | 46.04 |
| Leafy vegetables  | 6.93 | 7.48 | 7.20  | -0.79 | -1.46 | 7.02 | 1.72 |
| Fruiting vegetables  | 53.22 | 57.22 | 55.39 | -0.24 | 2.94 | 11.79 | 7.11 |
| Root vegetables  | 11.54 | 13.09 | 11.29  | -1.50 | -1.83 | 7.29 | 2.39 |
| Cabbages  | 15.43 | 17.10 | 21.71  | 0.60 | 4.07\* | 2.89 | 22.34 |
| Other vegetables  | 24.58 | 21.73 | 30.85  | 1.69\* | 8.26\* | 16.63 | 11.65 |
| Legumes  | 1.87 | 2.80 | 0.00  | 0.00 | -0.84 | 7.11 | 25.04 |
| Fruits  | 141.4 | 155.9 | 235.4  | -5.46 | 51.79\* | 238.1 | 29.97 |
| Nuts  | 0.95 | 0.73 | 0.00  | 0.03\* | -0.38\* | 0.03 | 0.37 |
| Other fruits  | 2.67 | 2.30 | 0.03  | 0.27\* | -1.09 | 4.00 | 2.23 |
| Milk and dairy products  | 183.1 | 162.1 | 146.6  | 5.28 | -7.31 | 35.30 | 103.4 |
| Cheeses  | 31.61 | 31.75 | 26.58  | -0.17 | -3.80 | 26.12 | 7.41 |
| Pasta, rice  | 15.70 | 15.33 | 14.21  | 0.38 | -0.29 | 8.80 | 32.50 |
| Bread  | 187.9 | 184.8 | 130.7  | 3.97 | -40.9\* | 94.50 | 99.11 |
| other cereals  | 5.47 | 4.45 | 3.76  | 0.49\* | -0.86 | 1.20 | 0.99 |
| Red meat  | 26.81 | 28.03 | 32.10  | -1.52 | 4.13\* | 13.80 | 14.06 |
| Poultry  | 10.65 | 9.76 | 13.23  | -0.30 | 0.92\* | 6.92 | 11.60 |
| Processed meat  | 58.03 | 53.19 | 58.94  | 4.80 | 2.05 | 22.14 | 33.91 |
| Offals  | 1.22 | 1.14 | 0.00  | 0.00 | 0.00 | 0 | 0 |
| Fish  | 22.19 | 21.64 | 19.17  | 0.82\* | -0.46 | 1.59 | 10.67 |
| Eggs  | 14.10 | 13.12 | 13.75  | 0.36\* | 0.48 | 0.43 | 1.68 |
| Vegetable oils  | 3.31 | 0.86 | 1.84  | 2.27\* | 1.03\* | 2.36 | 1.86 |
| Margarines  | 12.23 | 11.79 | 12.77  | 0.65 | 0.15 | 62.48 | 15.32 |
| Butter  | 5.32 | 1.83 | 5.38  | 0.93\* | -1.75\* | 0.91 | 0.98 |
| Other fats  | 0.29 | 0.11 | 1.34  | 0.12\* | 1.23\* | 0.12 | 0.01 |
| Sugar  | 29.04 | 23.50 | 27.72  | 4.99\* | 2.07\* | 173.2 | 32.00 |
| Cakes, cookies  | 55.55 | 48.91 | 55.76  | 7.73\* | 4.15 | 82.26 | 62.24 |
| Fruit and vegetable juices | 122.3 | 109.2 | 101.7 | 6.27 | -9.51\* | 14.53 | 55.90 |
| Soft drinks  | 0.00 | 0.00 | 0.00  | 0.00 | 0.00 | 0 | 0 |
| Coffee  | 450.0 | 435.2 | 512.9  | 0.00 | 93.55\* | 0 | 25.23 |
| Tea  | 25.68 | 24.66 | 17.71  | 0.00 | 0.00 | 0 | 0 |
| Other non-alcoholic drinks | 431.4 | 480.1 | 481.4  | 4.16 | 12.36 | 4.50 | 127.1 |
| Wine  | 37.26 | 25.48 | 19.76  | 1.44\* | -4.95\* | 18.70 | 12.31 |
| Beer  | 71.23 | 45.21 | 79.06  | 0.00\* | 0.00\* | 0 | 94.75 |
| Spirits  | 0.62 | 0.31 | 0.00  | 0.00 | 0.00 | 3.70 | 4.62 |
| Other alcoholic beverages  | 0.43 | 0.46 | 0.00  | 0.00\* | 0.00\* | 0.25 | 0.31 |
| Sauces  | 11.22 | 11.63 | 19.02  | -0.19 | 7.02\* | 9.03 | 41.77 |
| Soups  | 33.72 | 33.14 | 52.25 | 1.18 | 15.95\* | 21.07 | 10.58 |
| Miscellaneous  | 0.75 | 0.53 | 1.67  | 0.08\* | 0.95\* | 0.17 | 0.78 |

FFQb = FFQ at baseline; FFQ1 = FFQ after 1 year; mHDR = mean of 12 24-hour dietary recalls;

\*Wilcoxon signed rank test to test, if median difference is significantly different from 0; †MAD = mean absolute deviation from median of individual differences;

**Supplementary Table 7** Spearman rank correlation coefficients for 39 food groups between the two FFQs and mHDR

|  |  |  |  |
| --- | --- | --- | --- |
| Food group | FFQb vs FFQ1r | FFQ1 vs mHDR r | FFQ1 vs mHDR rdeatt† |
| Potatoes  | 0.67\* | 0.65\* | 0.68 |
| Leafy vegetables  | 0.44\* | 0.30\* | 0.31 |
| Fruiting vegetables  | 0.47\* | 0.27 | 0.28 |
| Root vegetables  | 0.40\* | 0.35\* | 0.36 |
| Cabbages  | 0.37\* | 0.20 | 0.21 |
| Other vegetables  | 0.51\* | 0.31\* | 0.32 |
| Legumes  | 0.63\* | 0.36\* | 0.38 |
| Fruits  | 0.55\* | 0.58\* | 0.61 |
| Nuts  | 0.65\* | 0.37\* | 0.38 |
| Other fruits  | 0.72\* | -0.04 | -0.04 |
| Milk and dairy products  | 0.73\* | 0.69\* | 0.74 |
| Cheeses  | 0.24 | 0.48\* | 0.51 |
| Pasta, rice  | 0.57\* | 0.34\* | 0.38 |
| Bread  | 0.63\* | 0.52\* | 0.54 |
| Other cereals  | 0.66\* | 0.58\* | 0.65 |
| Red meat  | 0.61\* | 0.40\* | 0.42 |
| Poultry  | 0.54\* | 0.40\* | 0.42 |
| Processed meat  | 0.59\* | 0.60\* | 0.62 |
| Offals  | 0.67\* | 0.37\* | 0.39 |
| Fish  | 0.63\* | 0.39\* | 0.41 |
| Eggs  | 0.62\* | 0.31\* | 0.32 |
| Vegetable oils  | 0.22 | -0.01 | -0.01 |
| Margarine  | 0.72\* | 0.79\* | 0.81 |
| Butter  | 0.70\* | 0.74\* | 0.75 |
| Other fats  | 0.30\* | 0.16 | 0.18 |
| Sugar  | 0.65\* | 0.52\* | 0.55 |
| Cakes, cookies  | 0.65\* | 0.57\* | 0.60 |
| Fruit and veg. juices | 0.58\* | 0.67\* | 0.70 |
| Soft drinks  | 0.74\* | 0.50\* | 0.53 |
| Coffee  | 0.73\* | 0.83\* | 0.98 |
| Tea  | 0.81\* | 0.70\* | 0.77 |
| Other non-alc. drinks | 0.73\* | 0.82\* | 0.87 |
| Wine  | 0.76\* | 0.66\* | 0.70 |
| Beer  | 0.93\* | 0.90\* | 0.99 |
| Spirits  | 0.77\* | 0.62\* | 0.65 |
| Other alcoholic beverages  | 0.66\* | 0.26 | 0.27 |
| Sauces  | 0.62\* | 0.40\* | 0.41 |
| Soups  | 0.56\* | 0.42\* | 0.44 |
| Miscellaneous  | 0.48\* | 0.51\* | 0.53 |

FFQb = FFQ at baseline; FFQ1 = FFQ after 1 year; mHDR = mean of 12 24-hour dietary recall

\*P<0.001; †corrected for the intra-individual variation in the 12 24HDRs;

**Supplementary Table 8** Sensitivity analysis: Reliability and validity of a confirmatory tMDS score

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Dietary index** | **FFQb** | **FFQ1** | **mHDR** | **FFQb vs** **FFQ1** | **mHDR vs** **FFQ1** | **FFQb vs FFQ1** | **mHDR vs** **FFQ1**  |
|  | **Mean** | **Std** | **Mean** | **Std** | **Mean** | **Std** | **Mean difference** | **Std** | **Mean difference** | **Std** | **r** | **r** | **rdeatt** |
| **tMDS\*** **(Max 18P)** |   |   |   |
| **All** | 9.09 | 2.55 | 9.30 | 2.70 | 8.43  | 2.50 | -0.21  | 2.54 | -0.87  | 2.79 | 0.53 | 0.43 | 0.46 |
| **Men** | 9.21 | 2.40 | 9.24  | 2.30 | 8.17 | 2.53 | -0.03  | 2.41 | -1.07  | 2.91 | 0.47 | 0.28 | 0.30 |
| **women** | 8.93 | 2.74 | 9.37 | 3.15 | 8.76 | 2.44 | -0.44  | 2.70 | -0.61  | 2.64 | 0.59 | 0.58 | 0.63 |

FFQb = FFQ at baseline; FFQ1 = FFQ after 1 year; mHDR = mean of 12 24-hour dietary recalls

\*For all tMDS scores, the sex-specific tertiles of the respective components from FFQb were applied to FFQ1 data.



**Supplemental Figure 1** Bland-Altman Plot of the FFQ1-derived DP score 1 vs mHDR-derived DP score 1

FFQ1 = FFQ applied after 1 year; mHDR = mean of 12 24-hour dietary recalls



**Supplemental Figure 2** Bland-Altman Plot of the FFQ1-derived DP score 2 vs mHDR-derived DP score 1

FFQ1 = FFQ applied after 1 year; mHDR = mean of 12 24-hour dietary recalls

## References

1. InterAct C. Adherence to predefined dietary patterns and incident type 2 diabetes in European populations: EPIC-InterAct Study. Diabetologia. 2014;57(2):321-33.

2. Galbete C, Kroger J, Jannasch F, et al. Nordic diet, Mediterranean diet, and the risk of chronic diseases: the EPIC-Potsdam study. BMC Med. 2018;16(1):99.