**Supplementary Material**

**Supplementary Table 1** List of foods contained in the food groups

|  |  |
| --- | --- |
| Food group | FFQ foods included in food group |
| Rice, pasta, grains | Brown Rice, Buckwheat and Barley Groats/White Pasta, Noodles And Other Grains E.g. Cous Cous, Polenta/White Rice/Wholemeal Pasta |
| Savouries | Pizza, Calzone/Quiche, Savoury Pancakes/Snackbarproducts Eg Frikandel, Kroket, Bamibal, Kaassoufl/ Springrolls |
| White bread/rolls/scones/ croissants | Cream Crackers, Cheese Biscuits, Rusks/ Crispbread E.g. Ryvita/Tortillas, Wraps/ White Bread/ White Rolls |
| Wholemeal and brown bread | Brown And Seeded Rolls/Brown Bread And Seeded Bread/Dark Wholemeal Breads E.g. Rye Or Soda |
| Breakfast cereals and porridge | Breakfast Cereals E.g. Muesli, Cruesli/Breakfast Cereals, Non-Wholegrain E.g. Cornflakes/Breakfast Cereals, Wholegrain E.g. Branflakes, Barley Flakes/Porridge, Readybrek |
| Biscuits, cakes and pastries | Baklava, Kantaifi/Buns, Muffins, Pastries E.g. Croissants, Doughnuts/Flapjacks, Muesli Bars, Oatmeal Cookies/ Fruit Pies, Tarts, Crumbles/Milk Puddings eg Rice, Custard, Trifle/ Plain Cakes Eg Fruit, Sponge, Scones, Gingerbread, Raisinbread/ Rich Cakes E.g. Chocolate, Cheesecake/ Sponge Puddings/ Stroopwafle/ Sweet Biscuits, Plain Eg Nice, Ginger/ Sweet Biscuits,Chocolate Eg Digestive, Cookies/ Waffles, Pancakes, Crepes |
| Wholemilk | Full Fat Whole Milk Average |
| Low fat and skimmed milks | Low-Fat/Semi-Skimmed Milk/ Zero Fat/Skimmed Milk |
| Other milks, milk based beverages & other beverages | Coffee, Milky, Latte, Cappauccino/Hot Chocolate, Ovaltine, Horlicks Made With Milk/Hot Chocolate, Ovaltine, Horlicks, Made With Water/Milkshakes, Fruit Smoothies |
| Creams, ice-creams and desserts | Double or Clotted Cream/Ice-Cream, Choc Ices/Single or Sour Cream |
| Cheese | High Fat Cheeses E.g. Stilton, Cheddar, Brie, Gouda/Low Fat Cheeses - Fresh Mozzarella, Cream Cheese, Katiki/Medium Fat Cheeses E.g. Edam, Goats, Camembert, Feta,Emmental/Very Low Fat Cheese E.g. Cottage Cheese, Quark |
| Yoghurts | Fruit Yoghurt, Fruit Mousse/Full Fat Greek Yoghurt/Low-Fat Natural Yoghurt |
| Egg and egg dishes | Egg - Boiled, Scrambled, Omelette Etc. |
| Butter, fat spreads and hard cooking fats | Block or hard Margarine E.g. Stork,Krona/Butter/Polyunsaturated Marg such as Flora, Sunflower, Soya/Soft Marg Olive Oil Based such as Bertolli, Blue Band |
| Low fat spreads and oils | Low Fat Spreads (<60%)/Olive Oil/Other Vegetable Oils |
| Potatoes | Potatoes - Boiled, Jacket/ Potatoes - Mashed, Instant, Roast |
| Chips and processed potatoes | Chips/ Potato Dishes E.g. Salads, Dauphinoise/ Potato Or Plain Dumplings |
| Vegtables and vegatable dishes | Asparagus, Okra/Avocado/Baked Beans/Beans Sprouts, Radish/Beetroot/Broccoli, Spring Greens, Kale/Brussel Sprouts/Butternut Squash,Pumpkin/Cabbage/Carrots/Cauliflower/Coleslaw, Sauerkraut/Corn (On The Cob, Sweetcorn)/ Dried Lentils, Beans, Peas, Chickpeas/Fresh/ Frozen Peas/Garlic/Green Beans, Broad Beans, Runner Beans/Green Salad, Lettuce, Cucumber, Celery, Watercress/Leeks/Marrow, Courgettes, Aubergine/Mushrooms/Olives/Onions/Parsnips, Turnips, Swedes/Sauerkraut Stew/Spinach/Stuffed Cabbage/Sweet Peppers/Tofu, Soya Meat, TVP, Vegeburger/Tomatoes |
| Fruit juices and smoothies | Fruit Squash, Cordial, Nectar/Pure Fruit Juice E.g. Orange/Tomato And Vegetable Juices/ |
| Fruit | Apples/Bananas/Berries E.g. Strawberries, Raspberries, Cherries/Dried Fruit Eg Raisins, Prunes/Grapefruit/Grapes/Kiwi/Melon, Mango/Oranges, Satsumas, Mandarins/Peaches/Plums/Apricots/Pears/Tinned, Stewed Fruit |
| Savoury snacks | Crisps Or Other Packet Snacks Eg Wotsits/Nuts And Seeds E.g. Almonds, Peanuts, Pumpkin Seeds |
| Fish, fish dishes and products | Fish Dishes E.g. Pie, Pudding, Casserole/Fish Fingers, Fish Cakes/Fish Roe, Caviar, Taramasalata/Fried Fish In Batter/Non-Smoked Oily Fish, Fresh (Mackerel, Tuna, Sardines, Salmon)/ Non-Smoked Oily Fish, Canned (Mackerel, Tuna, Sardines, Salmon)/ Shellfish, Crab, Prawn/Smoked Fish E.g. Salmon, Mackerel/Sushi/White Fish E.g. Cod, Haddock, Sole |
| Red meat | Beef, Venison (Roast, Steak, Mince)/ Lamb, Goat (Roast, Chops, Souvlaki)/ Offal E.g. Liver, Kidney/Pork (Roast, Chops)/ |
| Poultry | Chicken Or Poultry, Grilled, Roast/ Processed Chicken Or Poultry E.g. Nuggets, Goujons, Fried |
| Meat products | Bacon/ Burgers E.g. Beef, Meatballs/ Cured Meats E.g. Corned Beef, Salami, Chorizo/ Pate E.g. Meat Or Liver/ Sausages E.g. Pork, Jadwurst/ Savory Pies, Meat Pies, Pasties, Sausage Rolls/ Sliced Cold Meats E.g. Ham, Turkey |
| Red meat dishes | Lasagne, Moussaka, Ravioli And Tortelini, Filled Dumplings/ Stew And Casserole (Meat And Veg) |
| Alcoholic beverages | Beer, Larger, Cider/ Port, Sherry, Vermouth, Liqueurs/ Spirits, E.g. Gin, Brandy, Whiskey, Vodka/ Sweet Alcoholic Drinks, Eg Alcopops, Cocktails/ Wine |
| Sugars syrups, preserves and sweetners | Jam,Marmalade,Honey/Sugar, Added To Tea, Coffee, Cereal |
| Confectionary | Chocolate Snack Bars Eg Mars,Crunchie/ Chocolates, Single Or Squares/ Nut Or Chocolate Spreads E.g. Peanut Butter, Nutella/ Sorbets And Jellies/ Sweets, Toffees, Mints, Liquorice |
| Soups, sauces and condiments | Creamy Sauces E.g.carbonara,Cheese/ Creamy Soups E.g. Chowder, Cream Of Mushroom/ Dark Sauces E.g. Gravy, Stir-Fry Sauces/ French Dressing, Vinaigrette/ Low Fat Salad Cream, Mayonnaise/ Marmite,Bovril/ Non-Creamy Soups E.g. Minestrone, Vegetable/ Other Salad Dressing/ Pickles, Chutney, Satesaus (Sate)/ Salad Cream, Mayonnaise/ Tomato Ketchup/ Tomato Sauces E.g. In Bolognese, On Meatballs Or Pasta |
| Low energy beverages | Coffee, Americano, Black/ Low Calorie or Diet Fizzy Soft Drinks/ Tea (Black, Green, Fruit, Herbal) |
| High energy beverages | Fizzy Soft Drinks E.g. Coca Cola / Lemonade |

FFQ, food frequency questionnaire

**Supplementary Table 2** Cut-offs used for the development of the individualised dietary advice in Food4Me study

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Health parameter/Nutrient | | Cut-off points | | | | Reference |
| BMI (kg/m2) | | *Normal*  18.5 - 24.99 | *Overweight*  ≥ 25 | *Obese*  ≥ 30 | | World Health Organisation, 2000 |
| W. C. (m) | | *Normal*  < 102 / < 88 | *Increased risk*  ≥ 102 / ≥ 88 |  | | Alberti *et al*., 2009 |
| Cholesterol | | *Recommended*  < 5 | *Intermediate*  ≥ 5 - ≤ 8 | *Too high*  > 8 | |  |
| Omega-3 index (%)1 | | *Low*  < 4 | *Intermediate*  4 - 8 | *Recommended*  ≥ 8 | | Harris, 2008 |
| Total carotenoids(µM)2 | | *Low*  < 1.3 | *Intermediate*  ≥ 1.3 - < 1.5 | *Recommended*  > 1.5 | | Based on data from Brevik *et al.* 2004 |
| Salt (g) | | *Recommended* | *High* | *Too high* | | Institute of Medicine, 2005 |
| 18 – 50 yrs | | ≤ 3.75 | > 3.75 & ≤ 5.75 | > 5.75 | |
| 51 – 70 yrs | | ≤ 3.25 | > 3.25 & ≤ 5.75 | > 5.75 | |
| > 70 yrs | | <3 | ≥ 3 & < 5.75 | > 5.75 | |
|  | | *Too low* | *Low* | *Recommended* | *Too high* |  |
| Folate (µg) | | < 240 | ≥ 240 & < 320 | ≥ 320 & ≤ 1000 | > 1000 | Institute of Medicine, 1998 |
| Calcium (mg)  M 18 – 70 yrs  M > 70 yrs  F 18 – 50 yrs  F > 50 yrs | | < 600  < 800  < 600  < 800 | ≥ 600 & < 800  ≥ 800 & < 1000  ≥ 600 & < 800  ≥ 800 & < 1000 | ≥ 800 & ≤ 2500  ≥ 1000 & ≤ 2500  ≥ 800 & ≤ 2500  ≥ 1000 & ≤ 2500 | > 2500  > 2500  > 2500  > 2500 | Institute of Medicine, 1997 |
| Iron (mg)  M >18 yrs  F 18-50 yrs  >50 yrs |  | |  |  |  | Institute of Medicine, 2001 |
| < 4 | | ≥ 4 & < 6 | ≥ 6 & ≤ 45 | > 45 |
| < 3.15 | | ≥ 3.15 & < 5 | ≥ 8.1 & ≤ 45 | > 45 |
| < 3.5 | | ≥ 3.5 & < 5 | ≥ 5 & ≤ 45 | > 45 |

M, males; F, females

1n-3 index = 1.4473+0.8303\*(EPA+DPA+DHA). 2Total carotenoids = alpha-carotene + beta-carotene + lutein + zeaxanthin + beta-cryptoxanthin + lycopene. These cut-offs were used for the development of the individualised dietary advice given within the Food4Me personalised reports for participants within Levels 1, 2 and 3.

**Supplementary Table 3**. Overview of the characteristics of the total population used in this study.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | | Gender | | | | | |
| male | | | female | | |
| Mean | SD |  | Mean | SD |  |
| Age (years) | | 42 | 13 |  | 39 | 13 |  |
| BMI (kg/m2) | | 26.16 | 3.97 |  | 24.96 | 5.25 |  |
| W.C (m) | | 0.93 | 0.12 |  | 0.81 | 0.13 |  |
| Total Cholesterol (mM) | | 4.76 | 0.94 |  | 4.50 | 0.93 |  |
| Total Carotenoids (µM) | | 1.42 | 0.64 |  | 1.61 | 0.70 |  |
| Country (n) | |  |  |  |  |  |  |
|  | Germany |  | 90 |  |  | 105 |  |
| Greece |  | 77 |  |  | 109 |  |
| Ireland |  | 81 |  |  | 122 |  |
| Netherlands |  | 101 |  |  | 100 |  |
| Poland |  | 53 |  |  | 133 |  |
| Spain |  | 97 |  |  | 94 |  |
| United Kingdom |  | 69 |  |  | 123 |  |

N, number per country. Values are presented as means ± standard deviations.

**Supplementary Table 4.** An example report for a partipicant from cluster 1.

Your Targeted Nutrition Advice

Your BMI is within the obese category for your height and waist circumference is higher than recommended. We strongly urge you to try to lose weight; even a 10% reduction in body weight can have huge benefits to your health. According to your blood results, you have high cholesterol and saturated fat intake. Your carotenoids are high which is great as these are important for overall general good health. However, your omega 3 index is low which indicates you are not eating enough oily fish. Please follow the tips below to reduce your saturated fat intake and to increase your omega 3 index;

How to reduce your BMI, waist circumference, cholesterol levels and saturated fat intake

* Become more physically active; to maintain weight loss, 60-90 minutes of moderately intense aerobic activities, such as brisk walking, swimming or cycling, on most days of the week, is recommended
* Reduce your intake of high fat products such as cakes, biscuits, pastries, processed meats, ready meals, eat less butter, cream and limit cheese
* Choose low fat cooking methods – grilling, boiling, baking and choose healthier fats such as olive & rapeseed oil in cooking or dressings
* Trim visible fat from meat & remove skin from chicken
* Include oats (porridge), barley (add to soups, stews) and beans & lentils (soups, salads) regularly in your diet
* Eat 5 portions of fruit & veg/day

How to increase your intake of omega 3

* Eat two portions of fish per week – one should be oily such as salmon, trout mackerel
* A portion equates to the thickness and size of the palm of the hand or 140g in fish
* Tinned varieties are also good sources with the exception of tuna where fresh is better
* If you don’t like eating oily fish, take an omega 3 supplement which contains 400-500mg/d of pure omega 3

According to your dietary intake, your intake of salt is high while your intake of calcium is low. However, your intake of folate is high which is great! We advise you to try to lower your salt intake for your cardiovascular health. We also recommend you try to increase your intake of calcium for strong teeth & bones. Please follow the tips below to help you to do this;

How to reduce your intake of salt

* Reduce your intake of foods which are high in salt – salty meats & processed meat products, smoked meat & fish, ready meals, takeaways, salted snacks such as crisps, salted nuts, salted biscuits, canned foods containing salt, stock cubes
* Don’t add salt at the table & during cooking – use alternatives such as pepper, herbs, spices instead to flavour food

How to increase your intake of calcium

* Eat 3 portions of low-fat dairy products per day – have milk in your breakfast cereal, yoghurt as a snack, glass of milk with your dinner
* Tinned fish such as salmon & sardines are also excellent sources of calcium – have these in a sandwich
* Have a stir-fry with tofu, broccoli & chopped nuts for dinner

**Supplementary Figure 1a Cluster 2 Anthropometric and metabolic decision tree and example of targeted dietary advice message**



Tailored dietary advice was developed per cluster based on the metabolic characteristics of the cluster with the addition of anthropometric branches of body mass index (BMI) and waist circumference (W.C.)

**Examples of targeted advice messages from Cluster 2 anthropometric and metabolic decision tree**

**Targeted dietary advice message 2.8MA**

* Reduce bodyweight
* Increase physical activity levels
* Lower your cholesterol levels
* Increase your omega 3 index

**Targeted dietary advice message 2.5MA**

* Lower your cholesterol levels
* Increase your omega 3 index

**Targeted dietary advice message 2.3MA**

* Reduce bodyweight
* Increase physical activity levels
* Increase your omega 3 index

## **Supplementary Figure 1b Cluster 2 dietary decision tree and example of targeted dietary advice message**



Tailored dietary advice was developed per cluster based on the intakes of salt, calcium, folate and fibre.

**Examples of targeted advice messages from Cluster 2 dietary decision tree**

**Targeted dietary advice message 2.12D**

* Reduce salt intake

**Targeted dietary advice message 2.8D**

* Reduce salt intake
* Increase folate intake

**Targeted dietary advice message 2.4D**

* Reduce salt intake
* Increase calcium intake
* Increase intake of dietary fibre