**Supplemental Table 1.** Justification of component choice, portion size, scoring and imposed limitations for FDQI-65+PA, NFDQI-65+PA and NFDQI-65*1*.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Component** | **Recommendation** | **Foods and portion size** | **Units** | **Justification** | **Scoring** |
| **Components in FDQI-65+PA, NFDQI-65+PA and NFDQI-65** | | | | | | |
| Vegetables | ≥3 portions/day | To include all vegetables, up to 1 portion of legumes and up to 1 portion of tomato puree  Portion size 80 g vegetables or legumes, 15 g tomato puree | g | Recommendation of 5 portions of fruit and vegetables per day was set for consistency with UK *Eatwell guide* recommendations(5) and considered achievable on a population level, although exceeding this amount may be beneficial.  Number of portions of vegetables and fruit specified. Promotes variety and favours vegetable consumption as fruit is high in fructose. Variety in types of fruits and vegetables consumed is not assessed due to limitations of NDNS data, although could be adapted in future application.  Dried fruit limited as energy dense and high in sugar. Fruit juice limited as low in fibre and source of free sugars(6). Legumes limited to 1 portion as they contribute fewer micronutrients compared to vegetables. Tomato puree limited to 1 portion to promote variety, and portion size reduced by one fifth due to concentration(7).  Standard portion sizes used as per the UK *Eatwell Guide*(5). | Positive appraisal |
| Fruit | ≥2 portions/day | To include fresh fruit and up to 1 portion of dried fruit or fruit juice per day  Portion size 80 g fruit, 150 mL fruit juice, 30 g dried fruit | Positive appraisal |
| Protein | ≥3 portions/day | To include all lean meat and poultry, fish and seafood, eggs, milk, cheese and yoghurt, legumes and nuts, and meat alternatives  Only up to 1 portion of legumes or nuts, 1 portion of dairy per day and 1 portion of red meat per day  Portion size 70 g red meat, 100 g poultry, 140 g cooked fish or shellfish, 2 eggs, 150 g legumes, 30 g nuts, 250 mL milk, 30 g cheese, 125 g yoghurt, 100 g meat alternatives | g | Lean protein selected to promote lower SFA intake. Higher meat fat consumption has been associated with increased risk of CVD(8). Legumes, nuts, eggs, dairy and meat alternatives included to be sensitive to vegetarian diets for score generalisability.  Limited to up to 1 portion each of dairy and legumes to promote animal protein as a source of heme iron(9) and essential amino acids, including leucine, for maximum muscle synthesis. However, meat alternatives included with no limitation to be appropriate to vegans and as insufficient evidence on effect of soya protein on muscle synthesis. A non-consumer of animal products would not score any points for dairy and oily fish, hence a lower total score will be obtained to reflect evidence suggesting benefits of animal protein.  Red meat included as high in folic acid and vitamin B12. Limited to 1 portion per day and portion size 70 g based on current recommendations(10,11). Promotes primary animal protein sources as poultry, fish, seafood and eggs. Processed meat excluded as significantly higher in sodium(12) than fresh meat, contributing to increased blood pressure and vascular dysfunction(13) and due to conclusive evidence regarding increased risk of colorectal cancer(13). Exclusion discourages consumption as it will not contribute to protein score, requiring additional dietary protein to be consumed.  Portion sizes based on standard portions(14), although milk portion size increased to aid in meeting daily protein recommendations.  Protein component is inconsistent with other scores. The Elderly Dietary Index features numerous protein components as complex variables(15), suggesting detrimental effects of high intake. The HEI-2015 promotes seafood and plant proteins(16). The AHEI-2010 negatively appraises red and processed meat(17). Choice of positive appraisal due to role in the aetiology of sarcopenia and diminished protein accretion in older adults. | Positive appraisal |
| Oily fish | ≥1 portion/week | Portion size 140g cooked weight | g | A 140g portion per week provides the equivalent of 450 mg/day EPA and DHA.  Oily fish is unique to these indexes. Only the AHEI-2010 has a comparable component, which is sum of EPA+DHA(17). | Positive appraisal |
| Low fat dairy | ≥3 portions/day | To include all low-fat sources of dairy  Only up to 1 portion of cheese per day  Portion size 250 mL milk, 30 g cheese, 125 g yoghurt, no other dairy included  High fat dairy included if BMI <18.5 kg/m2 | g or mL | Dairy should be low fat as low-fat dairy is inversely associated with systolic blood pressure(18,19). Limitation on portions of cheese as even low-fat cheese contributes significant amount of SFA, although fermented dairy has been associated with reduce risk of CVD in general population(20) so not excluded from the score and may require further investigation.  Separate advice specified for individuals with low BMI and malnourished where higher fat diet is appropriate for meeting energy requirements(21). Included due to 14% of elderly being malnourished(22) and the detrimental effects of this on physical and psychological function(23).  Low fat dairy component dissimilar to other scores. Diet Quality Index appraises calcium intake as a nutrient(24). DHD15-Index includes dairy as a complex variable(25), suggesting detrimental effects for high intake. MDS negatively appraises dairy consumption(26). Role of dairy in preserving bone mineral density important for older adults. | Positive appraisal |
| Wholegrain carbohydrates | ≥3 portions/day | To include all wholegrain carbohydrate sources such as wholewheat pasta, brown rice, quinoa, wholemeal bread or crackerbreads, and oat or high fibre cereals  Portion size 190 g cooked pasta, rice or grains, 80 g bread or crackerbreads, 30 g breakfast cereals or flour | g | Wholegrain carbohydrates included to represent macronnutrient for overall dietary balance but is more relevant to health outcomes than overall carbohydrate intake which is considered neither beneficial nor detrimental to health(6).  Portion sizes as per standard recommendations(14). | Positive appraisal |
| Fluid | ≥6 portions/day | To include all sources of fluid such as water, tea, coffee and milk  Only up to 1 portion of fruit or vegetable juice and not including alcohol or sugar sweetened beverages  Portion size 250 mL | mL | Fruit juice, alcohol and sugar sweetened beverages limited due to adverse health effects from high sugar consumption(6) and excess alcohol intake. Not including fluid from foods, although additional fluid from foods will help contribute to meeting fluid recommendations. All other sources of fluid included are those promoted in the UK *Eatwell guide*(5)*.* Associations with health may potentially differ but component aimed at recognising fluid intake rather than accounting for health effects of caffeine or dairy.  This component is unique to these indexes, included as our previous review concluded sufficient fluid intake should be emphasised in this age group(27). | Positive appraisal |
| **Components only in FDQI-65+PA and NFDQI-65+PA** | | | | | |
| Physical activity | ≥20 minutes/day moderate activity | Includes walking, cycling, swimming, dancing, gardening, and other active leisure pursuits | minutes | Recommendation as per current UK advice of 150 minutes of moderate intensity physical activity each week(28), with inclusion of age-associated activities to account for likely reduced mobility with age and to appraise engagement by individuals of diverse levels of functional capacity. Aerobic training measured as it is associated with reduced body mass and waist circumference and an increase in functional fitness and endurance(29).  Guideline set per day to prevent a compensatory decline in physical activity after intense training, muscle wastage from prolonged sedentary behaviour and to ensure maximum benefit from acute effects of physical activity including alterations in glucose metabolism and reduced blood pressure(30).  This component is unique to these indexes. | Positive appraisal |
| **Components only in FDQI-65+** | | | | | | |
| Free sugars  (sugary foods) | ≤1 portion/day | To include main dietary sources of free sugars  Portion size 40 g cakes, biscuits or cereal bars, 100 g buns, pastries, pancakes, dairy desserts and sponge puddings, 20 g confectionery or sweet preserves, 330 mL sugar sweetened beverages, 15 g sugar | g | Sugary foods such as cakes and biscuits and confectionery provide free sugars, as do sugar sweetened beverages which can contribute in excess of daily recommended sugar intake and have been associated with poor dental health(6) and increased risk of type 2 diabetes independent of BMI(31).  Portion sizes based on standard portions for biscuits, confectionery and sugar sweetened beverages. Cakes and puddings vary considerably in size and composition. UK *Eatwell guide* recommendation of sugary foods not being consumed daily(5) and aim for <5% of total energy intake being from free sugars(27) means maximum 1 portion/day to promote limited and infrequent consumption. | Negative appraisal |
| Sodium  (salty foods) | ≤1 portion/day | To include processed meat and salty savoury snacks such as crisps  Portion size 25 g crisps or salty snacks, 70 g processed meat | mg | Difficult to capture salt intake in population due to discretionary use in cooking and at the table. Therefore main sources of salt from NDNS Years 1-6 in ≥65y assessed, which included processed meat, bread, smoked fish, ready meals and sauces, and crisps and salty snacks. Not justified to discourage bread consumption nor fish intake. Difficult to estimate salt content of ready meals and sauces. Limited to 1 portion/day due to challenge of setting food-based recommendations.  Salty snacks may contribute to SFA intake and processed meat limitations advised due to the increased risk of colorectal cancer(11).  Portions for snacks based on standard crisp portion size. Processed meat based on standard processed meat portion(10). Maximum 1 portion/day of all salty snack and foods combined to promote limited and infrequent consumption. | Negative appraisal |
| Fat and fatty acids  (cooking oil and spreads) | 100% MUFA and PUFA | Percentage of spreads and oils predominantly comprised of MUFA and PUFA  Fat composition of MUFA/PUFA oils and spreads (MUFA+PUFA):SFA≥2  Percentage calculated as proportion of MUFA/PUFA oils and spreads out of total oils and spreads | % | Fat spreads high contributor to total fat and SFA intake in UK. Also provide vitamin A and E, whereas oils such as rapeseed, olive and sunflower oil provide MUFA and PUFA.  Measurement as percentage of MUFA or PUFA fats or oils compared to SFA to promote dietary replacement. | Positive appraisal |
| Alcohol  (alcoholic drinks) | ≤14 units/week | To include all alcoholic drinks  75 mL wine, 220 mL beer, lager, cider or alcoholic soft drinks, 25 mL spirits, liqueurs or fortified wine, not including low or no alcohol versions  1 portion equals 1 unit | units | Score measured based on standard alcohol portion sizes for 1 unit of alcohol(32).  Alcohol scoring method differs from other scores. DHD15-Index and MDS positively appraise moderate intake(25,26). Decision based on conclusions from our previous review(27), where it was not considered appropriate to promote alcohol consumption in older adults. | Negative appraisal |
| **Components only in NFDQI-65+PA and NFDQI-65** | | | | | | |
| Free sugars | ≤5% energy intake | To be measured as percentage of energy intake from free sugars from nutrient calculations | % energy intake | Measured as nutritional intake to capture all sources of sugar in the diet, but utilising the definition adopted by SACN in 2015(6).  Recommendation directly reflects nutritional guidelines set in our previous review(27). | Negative appraisal |
| Sodium | ≤2400 mg/day | To be measured as quantity of sodium from nutrient calculations | mg | Recommendation aligns with our proposed nutritional recommendations(27). Measured as sodium from nutritional intake to capture all sources of sodium.  No lower limit set to reflect nutrient recommendations. Underreporting means sodium intake likely to be lower than actual intake. Not justified to promote increase in sodium based on inaccurate information and would require biochemical analysis for diagnosis of low blood electrolytes. | Negative appraisal |
| Fat and fatty acids (MUFA+PUFA:SFA) | (MUFA+PUFA)/SFA ≥2 | To be measured as quantity of fat intake from nutrient calculations | - | Measured as % energy intake from nutritional intake to capture all sources of dietary fat, although differential association between MUFA and CHD risk for animal and plant sources has been reported, with plant, but not animal sources, showing reduction in risk(33). Whether animal sources should be included remains uncertain.  Ratio based on beneficial effects of both MUFA and PUFA compared to SFA. Recommendations from our previous review were for 6% total energy from PUFA and population average of 12% from MUFA but 10% from SFA(27), so approximate daily intake of sum of MUFA and PUFA being twice that of SFA. | Positive appraisal |
| Fat and fatty acids (SFA) | ≤10% total energy intake | To be measured as percentage of total energy intake from SFA | % energy intake | Measured as % total energy intake from nutritional intake to capture all sources of dietary fats.  No association found between SFA intake and (MUFA+PUFA)/SFA so both components included, comprising a score with equal weighting to other components. The SFA intake component is an absolute measure to reflect total fat in the diet else it could be possible to score highly for (MUFA+PUFA):SFA yet have a high fat and SFA diet.  No inclusion of trans fatty acid component due to trans fatty acid intake in UK being below recommendations for older adults(34,35). Recommendation based on our previous review(27). | Positive appraisal |
| Alcohol | ≤14 units/week | To be measured as quantity of alcohol intake from nutrient calculations  1 alcohol unit is 8g pure alcohol | alcohol units | Score measured based on alcohol from nutritional intake to capture all alcohol consumed.  Alcohol scoring method differs from other scores. DHD15-Index and MDS positively appraise moderate intake(25,26). Decision based on conclusions from our previous review(27), where it was not considered appropriate to promote alcohol consumption in older adults. | Negative appraisal |
| 1 AHEI-2010, Alternative Healthy Eating Index-2010; BMI, body mass index; CHD, coronary heart disease; CVD, cardiovascular disease; DHA, docosahexaenoic acid; DHD15-Index, Dutch Healthy Diet Index-2015; EPA, eicosapentaenoic acid; FDQI-65+PA, Food-based Diet Quality Index for older adults with physical activity; HEI-2010, Healthy Eating Index-2010; MDS, Mediterranean Diet Score; MUFA, monounsaturated fatty acids; NDNS, National Diet and Nutrition Survey; NFDQI-65, Nutrient and Food-based Diet Quality Index for older adults; NFDQI-65+PA, Nutrient and Food-based Diet Quality Index for older adults with physical activity; PUFA, polyunsaturated fatty acids; SFA, saturated fatty acids. | | | | | | |
|  | | | | | | |