**Supplemental figure 1:** Flow chart for the section of the population study

97,413 people included in the NutriNet-Santé cohort after filling ≥3 dietary records

44,061 people aged less than 40 years old

11,809 people for whom the calculation of the 4 scores was impossible due to missing values in some of the components

41,543 people eligible for the present analysis

**Supplemental table 1** Computation of the WCRF/AICR, AHEI-2010, MEDI-LITE and PNNS-GS scores in the NutriNet-Santé study

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **WCRF/AICR** | **AHEI-2010a** | **MEDI-LITE** | **PNNS** |
|  | **Body mass index** | 18.5-<25 kg/m² | 1 |  |  |  |  |  |  |
| **Body fatness** | 25-<30 kg/m² | 0.5 |  |  |  |  |  |  |
|  | <18.5 or ≥30 kg/m² | 0 |  |  |  |  |  |  |
|  | **Physical activity** | High IPAQ scoreb | 1 |  |  |  |  | ≥60 min/day | 1.5 |
| **Physical activity** | Moderate IPAQ score | 0.5 |  |  |  |  | 30-60 min/day | 1 |
|  | Low IPAQ score | 0 |  |  |  |  | <30 min/day | 0 |
| **Plant foods** | **Fruits** | ≥400g/day | 1 | ≥473.2g/day | 10 | >300g/day | 2 | ≥7.5 servings/day | 2 |
| 0 serving/day | 0 | 150-300g/day | 1 |
| 200-<400g/day | 0.5 |  |  | <150g/day | 0 | 5-7.5 servings/day | 1 |
| **Vegetables** |  |  | >250g/day | 2 |
| <200g/day | 0 | ≥591.5g/day | 10 | 100-250g/day | 1 | 3.5-5 servings/day | 0.5 |
| 0 servings/day | 0 | <100g/day | 0 | <3.5 servings/day | 0 |
| **Dietary fibers**  | ≥25g/day | 1 |  |  |  |  |  |  |
| 12.5-25g/day | 0.5 |  |  |  |  |  |  |
| <12.5g/day | 0 |  |  |  |  |  |  |
|  | **Legumes** |  |  | ≥28.4g nuts and legumes/day | 10 | >140g/week | 2 |  |  |
|  |  |  | 0g nuts and legumes/day | 0 | 70-140g/week | 1 |  |  |
|  |  |  |  |  | <70g/week | 0 |  |  |
|  | **Whole grain food** |  |  | 90 g/day (♂) or 75 (♀) | 10 | >195g/day | 2 | ≥2/3 | 1 |
|  |  |  | 0 g/day | 0 | 130-195g/day | 1 | 1/3-2/3 | 0.5 |
|  |  |  |  |  | <130g/day | 0 | <1/3 | 0 |
|  | **Bread, cereals, potatoes****and legumes** |  |  |  |  |  |  | 3-6 servings/day | 1 |
|  |  |  |  |  |  |  | 1-3 or ≥6 servings/day | 0.5 |
|  |  |  |  |  |  |  | <1 serving/day | 0 |
|  | **Seafood and fish** |  |  |  |  | >250g of fish/week | 2 | ≥2 servings of seafood/week | 1 |
|  |  |  |  |  | 100-250g of fish/week | 1 | <2 servings of seafood/week | 0 |
|  |  |  |  |  | <100g of fish/week | 0 |  |  |
|  | **Meat and meat products** | Red/processed meat <500g/week and processed meat <3 g/day | 1 | 0g red or processed meat/dayd | 10 | <80g/day | 2 |  |  |
| **Animal foods**c | Red/processed meat <500g/week and processed meat 3-<50 g/day | 0.5 | ≥113.4g red or 42.5g processed meat/day | 0 | 80-120g/day | 1 |  |  |
|  | Red/processed meat ≥500g/week or processed meat ≥50 g/day | 0 |  |  | >120g/day | 0 |  |  |
|  | **Meat, poultry, seafood and eggs** |  |  |  |  |  |  | 1-2 servings/day | 1 |
|  |  |  |  |  |  |  | ]0-1[ or >2 servings/day | 0.5 |
|  |  |  |  |  |  |  | 0 serving/day | 0 |
|  | **Milk and dairy products** |  |  |  |  | <180g/day | 2 | 2.5-3.5/day+55 yo : 2.5-4.5 | 1 |
|  |  |  |  |  | 180-270g/day | 1 | 1-2.5/day | 0.5 |
|  |  |  |  |  | >270g/day | 0 | <1 or >3.5+55 yo : >4.5 | 0 |
|  | **Olive oil** |  |  |  |  | Regular use | 2 |  |  |
|  |  |  |  |  | Frequent use | 1 |  |  |
|  |  |  |  |  | Occasional use | 0 |  |  |
|  | **Added fat** |  |  |  |  |  |  | Lipids from added fat ≤16% energy intake/day | 1 |
|  |  |  |  |  |  |  | Lipids from added fat >16% energy intake/day | 0 |
|  | **Vegetable added fat** |  |  |  |  |  |  | No use of added fats or ratio vegetable oil/total added fats >0.5 | 1 |
|  |  |  |  |  |  |  | No use of added fats or ratio vegetable oil/total added fats ≤0.5 | 0 |
|  | **Energy density** | ≤125 kcal/100g/day | 1 |  |  |  |  | ***Penalty****: ratio energy intake/calculated energy needs* |
|  | 125-175 kcal/100g/day | 0.5 |  |  |  |  | ≤1.05 | 0 |
|  | ≥175 kcal/100g/day | 0 |  |  |  |  | >1.05 | -% overconsumption |
| **Food that promote weight gain**c | **Sugary drinks** | 0g/day | 1 | 0g sugar/daye | 10 |  |  | ≥1L water and ≤250mL soda /day | 1 |
|  | ≤250g/day | 0.5 | ≥28.4g sugar/daye | 0 |  |  | <1L water and ≤250mL soda /day | 0.75 |
|  | >250g/day | 0 |  |  |  |  | ≥1L water and >250mL soda /day  | 0.5 |
|  |  |  |  |  |  |  | <1L water and >250mL soda /day | 0 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Sweetened foods** |  |  |  |  |  |  | Added sugar from sweetened foods ≥17.5% energy intake/day | 1 |
|  |  |  |  |  |  |  | Added sugar from sweetened foods 12.5-17.5% energy intake/day | 0 |
|  |  |  |  |  |  |  | Added sugar from sweetened foods <12.5% energy intake/day | -0.5 |
|  | **Alcohol/ethanol** | ≤20g/day (♂) or ≤10g (♀) | 1 | 0.5-2 drinks/day (♂) or 0.5-1.5 (♀) | 10 | 12-24g/day | 2 | Abstainers and irregular consumers (<1/week) | 1 |
| **Alcohol** | >20-30 (♂) or >10-20 (♀) | 0.5 | ≥3.5 drinks/day (♂) or ≥2.5 (♀) | 0 | <12g/day | 1 | ≤30g/day (♂) or ≤20g (♀) | 0.8 |
|  | >30g/day (♂) or >20 (♀) | 0 |  |  | >24g/day | 0 | >30g/day (♂) or >20g (♀) | 0 |
|  | **Salt/sodium** | <6g salt/day | 1 | Lowest decile(mg sodium/day) | 10 |  |  | ≤6g salt/day | 1.5 |
|  | 6-9g salt/day | 0.5 | Highest decile(mg sodium/day) | 0 |  |  | 6-8g salt/day | 1 |
| **Sodium** | ≥9g salt/day | 0 |  |  |  |  | 8-10g salt/day | 0.5 |
|  |  |  |  |  |  |  | 10-12g salt/day | 0 |
|  |  |  |  |  |  |  | >12g salt/day | -0.50 |
| **Dietary supplements**f | **Dietary supplements** | No | 1 |  |  |  |  |  |  |
| Yes | 0 |  |  |  |  |  |  |
| **Dietary polyunsaturated fatty acids intake** | **Long-chain (n-3) fats: EPA+DHA** |  |  | 250 mg/day | 10 |  |  |  |  |
|  |  |  | 0 mg/day | 0 |  |  |  |  |
|  | **Polyunsaturated fatty acids** |  |  | ≥10 % of energy | 10 |  |  |  |  |
|  |  |  | ≤2% of energy | 0 |  |  |  |  |

WCRF/AICR: World Cancer Research Fund/American Institute for Cancer Research; AHEI: Alternate Healthy Eating Index; MEDI-LITE: Mediterranean diet based on literature; PNNS-GS: The Nutrition and Health Program – Guideline Score (Programme National Nutrition Santé-Guideline Score)
EPA: eicosapentaenoic acid; DHA: docosahexaenoic acid

a Unlike the WCRF/AICR, MEDI-LITE and PNNS-GS scores which use categorical scoring, the AHEI-2010 score is based on a continuous scoring. Indeed, each AHEI-2010 component contributed 0 (recommendation not met) to 10 points (recommendation fully met) to the total score. Between these two extremes, intermediate inputs were assessed proportionally between 0 and 10. For example, for the “whole grain food” component, the recommendation was not met if the participant did not eat whole grain food at all (0 g/day) and the recommendation was fully met if a man eats 90 g/day and a woman 75 g/day. If a man ate 45 g/day, he obtained 5 points for this recommendation: $\frac{45\*10}{90}$ = 5.

b The highest category corresponds to participants who practiced vigorous-intensity activity on at least 3 days during the week and accumulating at least 1500 MET-minutes/week, or 7 days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 3000 MET-minutes/week. The category of moderate physical activity corresponds to any one of the following 3 criteria: 3 or more days of vigorous activity of at least 20 minutes per day or 5 or more days of moderate-intensity activity or walking of at least 30 minutes per day, or 5 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 600 MET-minutes/week. The lowest category concerns participants with the lowest level of physical activity, who did not meet criteria of the categories “high” or “moderate”.

c As includedin the WCRF/AICR scoring system

d Calculation of the number of servings. One serving = 113.4g for red meat and 42.5g for processed meat. Then we assigned points between 0 and 10 according to proportionality

e Number of soft drinks servings

f "Dietary supplements" were considered as any supplement or vitamin (vitamins, minerals, multivitamins, omega 3 fatty acids etc.).

**Supplemental table 2** Net Reclassification Improvement (NRI) for cancer risk associated with each nutritional score, NutriNet-Santé Cohort, France, 2009-2017 (n= 41,543)a

|  |  |  |  |
| --- | --- | --- | --- |
| **Cancer site** | **Nutritional score** | **NRI [95% CI]** | **P-value** |
| Overall cancer | WCRF/AICRa | 0.10 [0.05-0.16] | <0.0001 |
|  | AHEI-2010b | 0.004 [-0.05-0.06] | 0.9 |
|  | MEDI-LITEc | 0.02 [-0.04-0.07] | 0.5 |
|  | PNNS-GSd | 0.04 [-0.01-0.10] | 0.09 |
| Breast cancere | WCRF/AICR | 0.09 [0.00-0.18] | 0.04 |
|  | AHEI-2010 | -0.009 [-0.10-0.08] | 0.8 |
|  | MEDI-LITE | 0.07 [-0.02-0.16] | 0.1 |
|  | PNNS-GS | 0.11 [0.02-0.20] | 0.01 |
| Prostate cancer | WCRF/AICR | 0.08 [-0.06-0.21] | 0.3 |
|  | AHEI-2010 | 0.07 [-0.05-0.21] | 0.2 |
|  | MEDI-LITE | 0.004 [-0.13-0.14] | 0.9 |
|  | PNNS-GS | 0.03 [-0.10-0.17] | 0.60 |
| Colorectal cancers | WCRF/AICR | 0.12 [-0.06-0.30] | 0.2 |
|  | AHEI-2010 | 0.08 [-0.10-0.26] | 0.4 |
|  | MEDI-LITE | 0.12 [-0.06-0.30] | 0.2 |
|  | PNNS-GS | 0.09 [-0.09-0.27] | 0.3 |

WCRF/AICR: World Cancer Research Fund/American Institute for Cancer Research; AHEI: Alternate Healthy Eating Index; MEDI-LITE: Mediterranean diet based on literature; PNNS-GS: The Nutrition and Health Program – Guideline Score (Programme National Nutrition Santé-Guideline Score)

a Analyses for the association between the WCRF/AICR score (1-point increment) and cancer risk were performed by using logistic regression model, adjusted for age (time-scale), sex, educational level (<high-school degree, ≥high-school degree to <2y after high-school degree, ≥2y after high-school degree), smoking status (non-smokers, former smokers, smokers), number of 24h-dietary records (continuous), height (cm, continuous) and family history of cancer (yes/no).

b Analyses for the association between the AHEI-2010 score (10-points increment) and cancer risk were performed by using logistic regression model, adjusted for age (time-scale), sex, educational level (<high-school degree, ≥high-school degree to <2y after high-school degree, ≥2y after high-school degree), smoking status (non-smokers, former smokers, smokers), number of 24h-dietary records (continuous), height (cm, continuous), family history of cancer (yes/no), body mass index (kg/m², continuous), physical activity (high, moderate, low, computed following IPAQ recommendations), and energy intake (without alcohol, g/d, continuous).

c Analyses for the association between the MEDI-LITE score (1-point increment) and cancer risk were performed by using logistic regression model, adjusted for age (time-scale), sex, educational level (<high-school degree, ≥high-school degree to <2y after high-school degree, ≥2y after high-school degree), smoking status (non-smokers, former smokers, smokers), number of 24h-dietary records (continuous), height (cm, continuous), family history of cancer (yes/no), body mass index (kg/m², continuous), physical activity (high, moderate, low, computed following IPAQ recommendations), and energy intake (without alcohol, g/d, continuous).

d Analyses for the association between the PNNS-GS score (1-point increment) and cancer risk were performed by using logistic regression model, adjusted for age (time-scale), sex, educational level (<high-school degree, ≥high-school degree to <2y after high-school degree, ≥2y after high-school degree), smoking status (non-smokers, former smokers, smokers), number of 24h-dietary records (continuous), height (cm, continuous) and family history of cancer (yes/no) and body mass index (kg/m², continuous).

e Models for breast cancer were further adjusted for the number of biological children (continuous), menopausal status at baseline (premenopausal, postmenopausal), hormonal treatment for menopause at baseline (yes/no) and oral contraception use at baseline (yes/no)

**Supplemental table 3** Hazard ratios (HR) and 95% confidence intervals (95% CIs) for cancer risk associated with a one-point increment in the WCRF/AICR score after removing each component of the score at a time, NutriNet-Santé Cohort, France, 2009-2017 (n= 41,543)a.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Overall cancer** | **Breast cancer** | **Prostate cancer** | **Colorectal cancers** |
|  | **HR [95% CI]** | **P-value** | **HR [95% CI]** | **P-value** | **HR [95% CI]** | **P-value** | **HR [95% CI]** | **P-value** |
| WCRF/AICR score | 0.88 [0.84-0.92] | <0.0001 | 0.86 [0.79-0.94] | 0.002 | 0.88 [0.78-1.00] | 0.05 | 0.86 [0.72-1.03] | 0.09 |
| WCRF/AICR score without Body fatness | 0.89 [0.84-0.94] | <0.0001 | 0.85 [0.77-0.94] | 0.001 | 0.90 [0.78-1.04] | 0.2 | 0.80 [0.66-0.97] | 0.02 |
| WCRF/AICR score without Physical activity | 0.88 [0.84-0.93] | <0.0001 | 0.84 [0.76-0.93] | 0.0008 | 0.90 [0.78-1.04] | 0.2 | 0.95 [0.78-1.14] | 0.6 |
| WCRF/AICR score without (Body fatness+Physical activity) | 0.90 [0.84-0.96] | 0.001 | 0.83 [0.74-0.93] | 0.001 | 0.93 [0.79-1.10] | 0.4 | 0.85 [0.69-1.04] | 0.1 |
| WCRF/AICR score without Food that promote weight gain | 0.88 [0.83-0.92] | <0.0001 | 0.86 [0.79-0.94] | 0.001 | 0.88 [0.78-1.01] | 0.06 | 0.89 [0.75-1.07] | 0.2 |
| WCRF/AICR score without Plant foods | 0.88 [0.83-0.93] | <0.0001 | 0.88 [0.80-0.97] | 0.01 | 0.89 [0.77-1.02] | 0.1 | 0.93 [0.78-1.11] | 0.4 |
| WCRF/AICR score without Animal foods | 0.88 [0.83-0.93] | <0.0001 | 0.85 [0.76-0.93] | 0.001 | 0.90 [0.78-1.04] | 0.2 | 0.91 [0.75-1.11] | 0.4 |
| WCRF/AICR score without Alcohol | 0.89 [0.84-0.94] | <0.0001 | 0.91 [0.82-1.00] | 0.04 | 0.90 [0.79-1.04] | 0.2 | 0.84 [0.70-1.02] | 0.08 |
| WCRF/AICR score without Sodium | 0.88 [0.83-0.93] | <0.0001 | 0.86 [0.78-0.94] | 0.001 | 0.88 [0.77-1.01] | 0.06 | 0.87 [0.73-1.05] | 0.2 |
| WCRF/AICR score without Dietary supplements | 0.86 [0.81-0.91] | <0.0001 | 0.85 [0.77-0.93] | 0.0009 | 0.83 [0.72-0.95] | 0.007 | 0.91 [0.76-1.10] | 0.4 |

WCRF/AICR, World Cancer Research Fund/American Institute for Cancer Research.

a Analyses were performed by using hazard proportional Cox regression model, adjusted for age (time-scale), sex, educational level (<high-school degree, ≥high-school degree to <2y after high-school degree, ≥2y after high-school degree), smoking status (non-smokers, former smokers, smokers), number of 24h-dietary records (continuous), height (cm, continuous) and family history of cancer (yes/no). Models for women were further adjusted for the number of biological children (continuous), menopausal status at baseline (premenopausal, postmenopausal), hormonal treatment for menopause at baseline (yes/no) and oral contraception use at baseline (yes/no).