Appendix 1. Odds ratios (OR) and 95% confidence intervals (CI) for being in the groups of vegetarians (self-defined), low red and processed meat (RPM) consumption, or high RPM consumption in the FINRISK 2007 (n=4874) and FinHealth 2017 (n= 4442) Studiesa.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Vegetarians | Low-RPMb group | High-RPMc group |
|  | 2007 (n=45) | 2017 (n=97) | 2007 (n=890) | 2017 (n=754) | 2007 (n=913) | 2017 (n=844) |
|  | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| Gender |  |  |  |  |  |  |
| Man | ref. | ref. | ref. | ref. | ref. | ref. |
| Woman | **5.53 (2.33-13.15)\*\*\*** | **2.00 (1.28-3.12)\*\***Δ | **4.00 (3.33-4.69)\*\*\*** | **3.82 (3.16-4.61)\*\*\*** | **0.19 (0.16-0.22)\*\*\*** | **0.17 (0.14-0.21)\*\*\*** |
| Age group, years |  |  |  |  |  |  |
| 25-34 | ref. | ref. | ref. | ref. | ref. | ref. |
| 35-44 | **0.19 (0.07-0.58)\*\*** | 0.95 (0.54-1.67)Δ | **0.74 (0.55-0.99)\*** | **0.68 (0.50-0.94)\*** | **1.49 (1.11-1.99)\*\*** | 1.07 (0.79-1.44) |
| 45-54 | **0.38 (0.17-0.84)\*** | **0.50 (0.26-0.95)\*** | 0.90 (0.68-1.19) | **0.80 (0.59-1.09)** | **1.39 (1.05-1.84)\*** | **1.41 (1.06-1.88)\*** |
| 55-64 | **0.23 (0.09-0.58)\*\*** | **0.39 (0.21-0.75)\*\*** | **1.39 (1.07-1.81)\*** | 1.17 (0.89-1.54) | 1.28 (0.97-1.69) | 1.27 (0.96-1.67) |
| 65-74 | **0.23 (0.09-0.55)\*\*** | **0.29 (0.14-0.57)\*\*\*** | **1.61 (1.24-2.09)\*\*\*** | **1.48 (1.13-1.94)\*\*** | 0.91 (0.68-1.20) | 0.75 (0.56-1.00) |
| Education level |  |  |  |  |  |  |
| Low | ref. | ref. | ref. | ref. | ref. | ref. |
| Middle | **4.08 (1.34-12.19)\*** | 1.31 (0.73-2.36) | **1.33 (1.09-1.62)\*\*** | 1.18 (0.95-1.46) | 0.87 (0.72-1.05) | 0.96 (0.79-1.17) |
| High | **6.63 (2.27-19.38)\*\*\*** | **2.51 (1.46-4.31)\*\*\*** | **1.44 (1.18-1.77)\*\*\*** | **1.69 (1.36-2.10)\*\*\*** | **0.71 (0.58-0.86)\*\*\*** | **0.63 (0.51-0.78)\*\*\*** |
| Relative Household Income (€/year) |  |  |  |  |  |  |
| 1st quintile | ref. | ref. | ref. | ref. | ref. | ref. |
| 2nd quintile | 0.51 (0.20-1.32) | 0.91 (0.50-1.66) | 0.90 (0.71-1.15) | 0.88 (0.69-1.13) | 0.83 (0.65-1.07) | 1.04 (0.81-1.35) |
| 3rd quintile | 0.79 (0.36-1.73) | 0.70 (0.35-1.43) | 0.88 (0.69-1.12) | **0.74 (0.55-0.99)\*** | 0.83 (0.65-1.06) | 1.20 (0.91-1.57) |
| 4th quintile | **0.28 (0.09-0.83)\*** | 0.90 (0.49-1.66) | 0.86 (0.66-1.12) | 1.00 (0.77-1.30) | 0.91 (0.71-1.17) | 1.03 (0.79-1.34) |
| 5th quintile | **0.38 (0.14-0.99)\*** | 0.59 (0.30-1.16) | 0.78 (0.60-1.01) | 0.79 (0.59-1.05) | **0.71 (0.55-0.92)\*\*** | 0.96 (0.73-1.26) |

a Separate analyses for 2007 and for 2017 were conducted so that vegetarians were compared to non-vegetarians (i.e. meat-eaters), the low-RPM group was compared to other meat-eaters (excluding vegetarians), and the high-RPM group was compared to other meat-eaters (excluding vegetarians). All analyses include the following variables simultaneously in the model: gender (man/woman), age group, education level group, and relative household income group.

a The lowest RPM consumption quintile in the year 2007 (cutoff point 76 g/day) and in 2017 (cutoff point 54 g/day), excluding vegetarians.

b The highest RPM consumption quintile in the year 2007 (cutoff point 210 g/day) and in 2017 (cutoff point 160 g/day).

Statistically significant at level \*p <.05; \*\*p <.01; \*\*\*p<.001.

Δ Statistically significant change between 2007 and 2017 in the importance of the independent variable for the dependent variable.

Appendix 2. Adjusted means and 95% confidence intervals (CI)a for consumption (g/day) of selected foods in the year 2017 in the groups of vegetarians (self-defined), low red and processed meat (RPM) consumption, or high RPM consumption.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Vegetarians (n=98) | Low-RPMb group (n=799) | High-RPMc group (n=888) |
|  | n | Mean (95% CI) | Mean (95% CI) | Mean (95% CI) |
| RPM† | 1785 | 12 (11-14)l,h | 34 (33-36)v,h | 200 (192-208)v,l |
| Poultry† | 1785 | 3 (2-4)l,h | 23 (21-25)v | 27 (25-29)v |
| Fish | 1785 | 15 (13-18)l,h | 41 (38-44)v | 39 (36-41)v |
| Eggs | 1785 | 21 (18-25)h | 22 (21-24)h | 29 (27-31)v,l |
| Liquid dairy products | 1785 | 308 (262-361)l | 406 (380-433)v,h | 305 (287-325)l |
| Cheese | 1785 | 41 (35-49) | 42 (39-44)h | 33 (31-35)l |
| Butter and butter-based fat spreads | 1785 | 6 (5-8)h | 8 (7-8)h | 9 (9-10)v,l |
| Vegetable margarine and oil | 1785 | 15 (13-18) | 16 (15-17)h | 14 (13-15)l |
| FV | 1785 | 585 (516-662)l,h | 443 (421-466)v,h | 307 (293-321)v,l |
| Legumes | 1785 | 39 (33-46)l,h | 10 (10-11)v | 10 (9-10)v |
| Nuts and seeds | 1785 | 10 (8-12)l,h | 6 (5-6)v,h | 2 (2-2)v,l |
| Cereal products | 1785 | 117 (108-128)h | 123 (119-128)h | 103 (100-106)v,l |
| Ryee | 1785 | 29 (23-36) | 31 (29-34)h | 25 (23-27)l |
| Sweets and chocolate | 1785 | 15 (12-18)l,h | 9 (8-10)v | 9 (8-10)v |
| Sugary beverages | 1759 | 28 (21-38) | 22 (19-24)h | 37 (33-42)l |

FV, Fruit and vegetables; RPM, Red and processed meat

a Geometric means and 95% CIs for LG10 transformed and back-transformed food consumption variables, which were analyzed with analyses of covariance (Bonferroni corrections), adjusted for daily energy intake.

b The lowest red and processed meat consumption quintile in the year 2017: cutoff point 54 g/day, excluding vegetarians.

c The highest red and processed meat consumption quintile in the year 2017: cutoff point 160 g/day.

e Rye is the most important determinant of whole grain intake in Finland.

v Statistically significant difference at level p <.05 with vegetarians.

l Statistically significant difference at level p <.05 with the low-RPM group.

h Statistically significant difference at level p <.05 with the high-RPM group.

† Gender interaction: mean daily consumption of RPM among self-defined vegetarians (men: 22 g [95% CI: 19-26] vs. women: 11 g [95% CI: 9-12]), in the low-RPM group (men: 39 g [95% CI: 36-43] vs. women: 33 g [95% CI: 31-35]), and in the high-RPM group (men: 218 g [95% CI: 211-224] vs. women: 182 g [95% CI: 165-200]) as well as mean daily consumption of poultry among self-defined vegetarians (men: 8 g [95% CI: 5-12] vs. women: 3 g [95% CI: 2-3]).

Appendix 3. Adjusted means and 95% confidence intervals (CI)a for consumption (g/day) of selected foods in the year 2017 in the groups of vegetarians (cutoff point < 50 g/day of RPM, poultry, or fish), low red and processed meat (RPM) consumption, or high RPM consumption.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Vegetarians (n=60) | Low-RPMb group (n=828) | High-RPMc group (n=888) |
|  | n | Mean (95% CI) | Mean (95% CI) | Mean (95% CI) |
| RPM | 1776 | 8 (7-10)l,h | 33 (32-34)v,h | 202 (194-210)v,l |
| Poultry | 1776 | 1 (1-2)l,h | 22 (20-24)v,h | 27 (25-30)v,l |
| Fish | 1776 | 7 (5-8)l,h | 41 (38-44)v | 39 (37-42)v |
| Eggs | 1776 | 15 (12-19)l,h | 23 (21-24)v,h | 29 (27-31)v,l |
| Liquid dairy products | 1776 | 282 (230-345)l | 403 (378-429)v,h | 306 (288-326)l |
| Cheese | 1776 | 39 (31-49) | 42 (39-45)h | 33 (31-35)l |
| Butter and butter-based fat spreads | 1776 | 6 (5-8)h | 7 (7-8)h | 9 (9-10)v,l |
| Vegetable margarine and oil | 1776 | 15 (12-18) | 16 (15-17)h | 14 (13-15)l |
| FV | 1776 | 574 (490-673)l,h | 450 (428-473)v,h | 307 (292-322)v,l |
| Legumes | 1776 | 41 (33-51)l,h | 11 (10-11)v | 10 (9-10)v |
| Nuts and seeds | 1776 | 11 (8-15)l,h | 6 (5-6)v,h | 2 (2-2)v,l |
| Cereal products | 1776 | 120 (108-133)h | 122 (119-126)h | 103 (100-106)v,l |
| Ryee | 1776 | 28 (21-38) | 31 (29-34)h | 25 (23-27)l |
| Sweets and chocolate | 1776 | 17 (14-22)l,h | 9 (9-10)v | 9 (8-10)v |
| Sugary beverages | 1751 | 30 (20-43) | 21 (19-24)h | 37 (33-42)l |

FV, Fruit and vegetables; RPM, Red and processed meat

a Geometric means and 95% CIs for LG10 transformed and back-transformed food consumption variables, which were analyzed with analyses of covariance (Bonferroni corrections), adjusted for daily energy intake.

b The lowest red and processed meat consumption quintile in the year 2017: cutoff point 54 g/day, excluding vegetarians.

c The highest red and processed meat consumption quintile in the year 2017: cutoff point 160 g/day.

e Rye is the most important determinant of whole grain intake in Finland.

v Statistically significant difference at level p <.05 with vegetarians.

l Statistically significant difference at level p <.05 with the low-RPM group.

h Statistically significant difference at level p <.05 with the high-RPM group.

Appendix 4. Percentages of food choice motives, BMI, and lifestyle factors and adjusted mean and 95% confidence intervals (CI)a for alcohol consumption (g/day) in the year 2017 in the groups of vegetarians (self-defined), low red and processed meat (RPM) consumption, or high RPM consumption.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Vegetarians (n=98) | Low-RPMb group (n=799) | High-RPMc group(n=888) |
|  | n | % | % | % |
| Food choice motives: Important that food… |  |  |  |  |
| is high in meat | 1751 | 1.0l,h | 13.8v,h | 62.1v,l |
| is high in FV | 1754 | 99.0l,h | 90.6v,h | 78.4v,l |
| is low in fat | 1753 | 60.2 | 69.0h | 50.3l |
| is high in fiber | 1752 | 84.5h | 84.2h | 64.5v,l |
| is low in salt | 1758 | 64.3l | 76.0v,h | 59.5l |
| is low in carbohydrates | 1749 | 30.6 | 28.4h | 23.2l |
| contains no additives | 1753 | 80.6h | 75.8h | 59.0v,l |
| comforts when sad or stressed | 1757 | 27.6l,h | 15.5v | 15.6v |
| Possibility to eat in workplace/school canteen | 1762 | 43.2 | 31.4 | 35.3 |
| Eats lunch in workplace/school canteen | 1774 | 23.7l | 13.8v,h | 18.5l |
| BMI <25 | 1759 | 50.0h | 44.4h | 25.6v,l |
| Leisure-time PA: inactive  | 1770 | 21.6 | 22.4 | 25.1 |
| Commuting PA: inactive | 1095 | 30.3h | 37.3h | 63.6v,l |
| Work-related PA: inactive | 1750 | 60.0 | 68.3h | 55.7l |
| Smoking regularly | 1764 | 14.3 | 12.9h | 20.5l |
|  |  |  |  |  |
|  | n | Mean (95% CI) | Mean (95% CI) | Mean (95% CI) |
| Alcohol consumptiond † | 1785 | 3 (2-3)h | 3 (2-3)h | 5 (5-6)v,l |

BMI, Body mass index; PA, Physical activity; RPM, Red and processed meat

a Geometric mean and 95% CIs for LG10 transformed and back-transformed alcohol consumption variable, which was analyzed with analyses of covariance (Bonferroni corrections), adjusted for daily energy intake. All other variables were analyzed unadjusted (Chi-square test).

b The lowest red and processed meat consumption quintile in the year 2017: cutoff point 54 g/day, excluding vegetarians.

c The highest red and processed meat consumption quintile in the year 2017: cutoff point 160 g/day.

d Measured as ethanol g/day.

v Statistically significant difference at level p <.05 with vegetarians.

l Statistically significant difference at level p <.05 with the low-RPM group.

h Statistically significant difference at level p <.05 with the high-RPM group.

† Gender interaction: men in the high-RPM group consumed more alcohol than those in the low-RPM group, no differences between groups among women.

Appendix 5. Percentages of food choice motives, BMI, and lifestyle factors and adjusted mean and 95% confidence intervals (CI)a for alcohol consumption (g/day) in the year 2017 in the groups of vegetarians (cutoff point < 50 g/day of RPM, poultry, or fish), low red and processed meat (RPM) consumption, or high RPM consumption.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Vegetarians (n=60) | Low-RPMb group (n=828) | High-RPMc group(n=888) |
|  | n | % | % | % |
| Food choice motives: Important that food… |  |  |  |  |
| is high in meat | 1742 | 0.0l,h | 13.3v,h | 62.1v,l |
| is high in FV | 1745 | 100.0l,h | 90.9v,h | 78.4v,l |
| is low in fat | 1744 | 58.3 | 68.6h | 50.3l |
| is high in fiber | 1752 | 84.5h | 84.2h | 64.5v,l |
| is low in salt | 1749 | 63.3 | 75.6h | 59.5l |
| is low in carbohydrates | 1740 | 21.7 | 29.0h | 23.2l |
| contains no additives | 1744 | 80.0h | 76.2h | 59.0v,l |
| comforts when sad or stressed | 1748 | 33.3l,h | 15.7v | 15.6v |
| Possibility to eat in workplace/school canteen | 1753 | 41.4 | 32.1 | 35.3 |
| Eats lunch in workplace/school canteen | 1765 | 25.4l | 14.0v,h | 18.5l |
| BMI <25 | 1750 | 53.4h | 44.4h | 25.6v,l |
| Leisure-time PA: inactive  | 1761 | 25.4 | 22.2 | 25.1 |
| Commuting PA: inactive | 1094 | 23.7h | 37.1h | 63.6v,l |
| Work-related PA: inactive | 1741 | 64.9 | 67.5h | 55.7l |
| Smoking regularly | 1755 | 15.0 | 12.9h | 20.5l |
|  |  |  |  |  |
|  | n | Mean (95% CI) | Mean (95% CI) | Mean (95% CI) |
| Alcohol consumptiond † | 1776 | 2 (2-3)h | 3 (2-3)h | 5 (5-6)v,l |

BMI, Body mass index; PA, Physical activity; RPM, Red and processed meat

a Geometric mean and 95% CIs for LG10 transformed and back-transformed alcohol consumption variable, which was analyzed with analyses of covariance (Bonferroni corrections), adjusted for daily energy intake. All other variables were analyzed unadjusted (Chi-square test).

b The lowest red and processed meat consumption quintile in the year 2017: cutoff point 54 g/day, excluding vegetarians.

c The highest red and processed meat consumption quintile in the year 2017: cutoff point 160 g/day.

d Measured as ethanol g/day.

v Statistically significant difference at level p <.05 with vegetarians.

l Statistically significant difference at level p <.05 with the low-RPM group.

h Statistically significant difference at level p <.05 with the high-RPM group.

† Gender interaction: men in the high-RPM group consumed more alcohol than those in the low-RPM group, no differences between groups among women.

Appendix 6. Adjusted means and 95% confidence intervals (CI)a for consumption (g/day) of selected foods in the year 2017 in the groups of vegetarians, low red and processed meat (RPM) consumption, or high RPM consumption.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Vegetarians (n=80) | Low-RPMb group (n=812) | High-RPMc group (n=888) |
|  | n | Mean (95% CI) | Mean (95% CI) | Mean (95% CI) |
| RPM | 1690 | 11 (10-13)l,h | 34 (33-36)v,h | 195 (187-203)v,l |
| Poultry | 1690 | 2 (1-3)l,h | 23 (21-26)v | 28 (26-31)v |
| Fish | 1690 | 12 (9-14)l,h | 40 (37-43)v | 40 (37-42)v |
| Eggs | 1690 | 18 (15-21)h | 22 (21-24)h | 30 (28-32)v,l |
| Liquid dairy products | 1690 | 298 (248-357)l | 394 (367-422)v,h | 311 (291-333)l |
| Cheese | 1690 | 39 (33-48) | 42 (39-45)h | 34 (32-37)l |
| Butter and butter-based fat spreads | 1690 | 6 (5-8)h | 7 (7-8)h | 9 (9-10)v,l |
| Vegetable margarine and oil | 1690 | 15 (13-19) | 16 (15-17) | 15 (14-16) |
| FV | 1690 | 533 (468-608)l,h | 401 (381-422)v,h | 348 (331-366)v,l |
| Legumes | 1690 | 37 (31-44)l,h | 10 (9-11)v | 10 (9-11)v |
| Nuts and seeds | 1690 | 8 (6-10)l,h | 5 (5-6)v,h | 2 (2-3)v,l |
| Cereal products | 1690 | 124 (113-136)h | 122 (117-126)h | 105 (101-109)v,l |
| Ryee | 1689 | 32 (26-42) | 31 (28-34)h | 25 (23-27)l |
| Sweets and chocolate | 1690 | 12 (10-15)l | 9 (8-10)v | 10 (9-11) |
| Sugary beverages | 1674 | 30 (22-43) | 24 (21-27)h | 35 (31-40)l |

FV, Fruit and vegetables; RPM, Red and processed meat

a Geometric means and 95% CIs for LG10 transformed and back-transformed food consumption variables, which were analyzed with analyses of covariance (Bonferroni corrections), adjusted for daily energy intake, gender, age, education level and relative household income.

b The lowest red and processed meat consumption quintile in the year 2017: cutoff point 54 g/day, excluding vegetarians.

c The highest red and processed meat consumption quintile in the year 2017: cutoff point 160 g/day.

e Rye is the most important determinant of whole grain intake in Finland.

v Statistically significant difference at level p <.05 with vegetarians.

l Statistically significant difference at level p <.05 with the low-RPM group.

h Statistically significant difference at level p <.05 with the high-RPM group.