

Supplementary Methods. FSAm-NPS score computation at food/beverage level, FSAm-NPS DI computation at individual level and link to the Nutri-Score (‘Santé Publique France’). DI, Dietary Index; FSAm-NPS, Nutrient Profiling System of the British Food Standards Agency

1) FSAm-NPS score computation at food/beverage level

Points are allocated according to the nutrient content for 100g of foods or beverages.

Points are allocated for ‘Negative’ nutrients (A points) and can be balanced according to ‘Positive’ nutrients (C points).

A points

Total A points = (points for energy) + (points for saturated fat) + (points for total sugar) + (points for sodium)

Points	Energy (kJ)	Saturated Fat (g)	Total Sugars (g)	Sodium (mg)
0	≤ 335	≤ 1	≤ 4.5	≤ 90
1	> 335	> 1	> 4.5	> 90
2	> 670	> 2	> 9	> 180
3	> 1005	> 3	> 13.5	> 270
4	> 1340	> 4	> 18	> 360
5	> 1675	> 5	> 22.5	> 450
6	> 2010	> 6	> 27	> 540
7	> 2345	> 7	> 31	> 630
8	> 2680	> 8	> 36	> 720
9	> 3015	> 9	> 40	> 810
10	> 3350	> 10	> 45	> 900

C points

Total C points = (points for fruits/vegetables/legumes/nuts) + (points for fibre) + (points for proteins)

Points	Fruits/vegetables/legumes/nuts (%)	Fibre (g) *	Protein (g)
0	≤ 40	≤ 0.7	≤ 1.6
1	> 40	> 0.7	> 1.6
2	> 60	> 1.4	> 3.2
3	-	> 2.1	> 4.8
4	-	> 2.8	> 6.4
5	> 80	> 3.5	> 8.0

* FSAm-NPS score allocates different thresholds for fibre, depending on the measurement method used. We used NSP cut-offs to compute fibre score.

For 100g of a given food, the percentage of fruits/vegetables/legumes/nuts is obtained by summing up the amount (in grams) of all fruits, legumes and vegetables (including oleaginous fruits, dried fruits and olives) contained in this food.

Overall score computation

- If Total A points <11, then FSAm-NPS score =Total A points – Total C points
- If Total A points ≥11,
 - If points for fruits/vegetables/legumes/nuts =5, then FSAm-NPS score =Total A points – Total C points
 - Else if points for fruits/vegetables/legumes/nuts <5, then FSAm-NPS score = Total A points – (points for fibre + points for fruits/vegetables/legumes/nuts).

Exceptions were made for cheese, added fat, and drinks to better rank them according to their nutrient profile, consistently with nutritional recommendations:

Score computation for cheese

For cheese, the score takes in account the protein content, whether the A score reaches 11 or not, i.e.: FSAm-NPS score =Total A points – Total C points

Score computation for added fat

For added fat, the grid for point attribution is based on the percentage of saturated fat among total lipids (instead of saturated fat (g)) and has a six-point homogenous ascending step, as shown thereafter:

Points	Saturated Fat/Lipids (%)
0	< 10
1	< 16
2	< 22
3	< 28
4	< 34
5	< 40
6	< 46
7	< 52
8	< 58
9	< 64
10	≥ 64

Points attribution for the other nutrients follows the grid displayed in “A points” and “C points” above.

Score computation for drinks

For drinks, the grids for point attribution regarding energy, sugars and fruits/vegetables/ legumes/nuts (%) were modified.

Points	Energy (kJ)	Sugars (g)	Fruits/vegetables/legumes/nuts (%)
0	≤ 0	≤ 0	< 40
1	≤ 30	≤ 1.5	
2	≤ 60	≤ 3	> 40
3	≤ 90	≤ 4.5	
4	≤ 120	≤ 6	> 60
5	≤ 150	≤ 7.5	
6	≤ 180	≤ 9	
7	≤ 210	≤ 10.5	
8	≤ 240	≤ 12	
9	≤ 270	≤ 13.5	
10	> 270	> 13.5	> 80

Points attribution for the other nutrients follows the grid displayed in “A points” and “C points” above.

Given the modification of the grid for fruit and vegetables for beverages, the threshold in the final computation to take into account protein content is set at 10 points:

- If Total A points < 11, then FSAm-NPS score = Total A points – Total C points
 - If Total A points ≥ 11,
 - If points for fruits/vegetables/legumes/nuts = 10, then FSAm-NPS score = Total A points – Total C points
 - Else if points for fruits/vegetables/legumes/nuts < 10, then FSAm-NPS score = Total A points – (points for fibre + points for fruits/vegetables/legumes/nuts).

Milk and vegetable milk are not concerned by this exception. Their scores are computed using the overall score computation system.

2) FSAm-NPS DI computation at individual level

The FSAm-NPS DI is computed at the individual level as an energy-weighted mean of the FSAm-NPS scores of all foods and beverages consumed, using the following equation [1] (FS_i: score of food/beverage i, E_i: energy intake from food/beverage i, n: number of food/beverage consumed)

$$\text{FSAm-NPS DI} = \frac{\sum_{i=1}^n (\text{FS}_i E_i)}{\sum_{i=1}^n E_i}$$

Higher FSAm-NPS DI therefore reflects lower nutritional quality in foods consumed.

Energy was chosen to weight the FSAm-NPS DI over food quantity (in grams) or portion size, as previously published [1-8]. Weighting by quantity gives excessive and disproportionate weight to water and thus to beverages and foods with high water content, as tested previously [9]. Weighting by portion size was not chosen because no standardized portion sizes have been defined at the EU level and it is therefore difficult to define a reference portion size to build the score.

3) Example of FSAm-NPS score computation and link to the Nutri-Score ('Santé Publique France')

Food/beverage composition

	A points				C points		
	Energy (kJ)	Saturated Fat (g)	Total Sugars (g)	Sodium (mg)	Protein (g)	Fibre (g)	Fruits/vegetables/legumes/nuts (%)
Food							
Fennel boiled	104.7	0	0.15	73.8	1.69	2.92	100
Anchovy in vinegar	439.6	1.26	0.03	307.9	18.4	0	0
Salami	2097.6	17.5	0.13	1817.3	26.0	0	0
Beverage							
Orange juice fresh	192.6	0.02	5.50	1	0.7	0.1	100
Cola, regular	227.6	0	10.51	4.18	3.03	0	0

Attribution of points

	A points				C points		
	Energy (kJ)	Saturated Fat (g)	Total Sugars (g)	Sodium (mg)	Protein (g)	Fibre (g)	Fruits/vegetables/legumes/nuts (%)
Food							
Fennel boiled	0	0	0	0	1	4	5
Anchovy in vinegar	1	1	0	3	5	0	0
Salami	6	10	0	10	5	0	0
Beverage							
Orange juice fresh	7	0	4	0	0	0	10
Cola, regular	8	0	8	0	1	0	0

FSAm-NPS score and Attribution of Nutri-Score colours

Foods (points)	Beverages (points)	Colour	
Min to -1	Water	Dark green	<i>Highest nutritional quality</i>
0 to 2	Min to 1	Light green	
3 to 10	2 to 5	Yellow	
11 to 18	6 to 9	Light orange	
19 to max	10 to max	Dark orange	<i>Lowest nutritional quality</i>



	FSAm-NPS score		Nutri-Score colour
Food			
Fennel boiled	A points – C points	-10	Dark green
Anchovy in vinegar	A points – C points	0	Light green
Salami	A points – points (fibre) – points (fruits/ veg./ leg./ nuts)	26	Dark orange
Beverage			
Orange juice fresh	A points – C points	1	Light green
Cola, regular	A points – points (fibre) – points (fruits/ veg./ leg./ nuts)	16	Dark orange

Examples of food products classified according to their Nutri-Score and corresponding FSAm-NPS score range

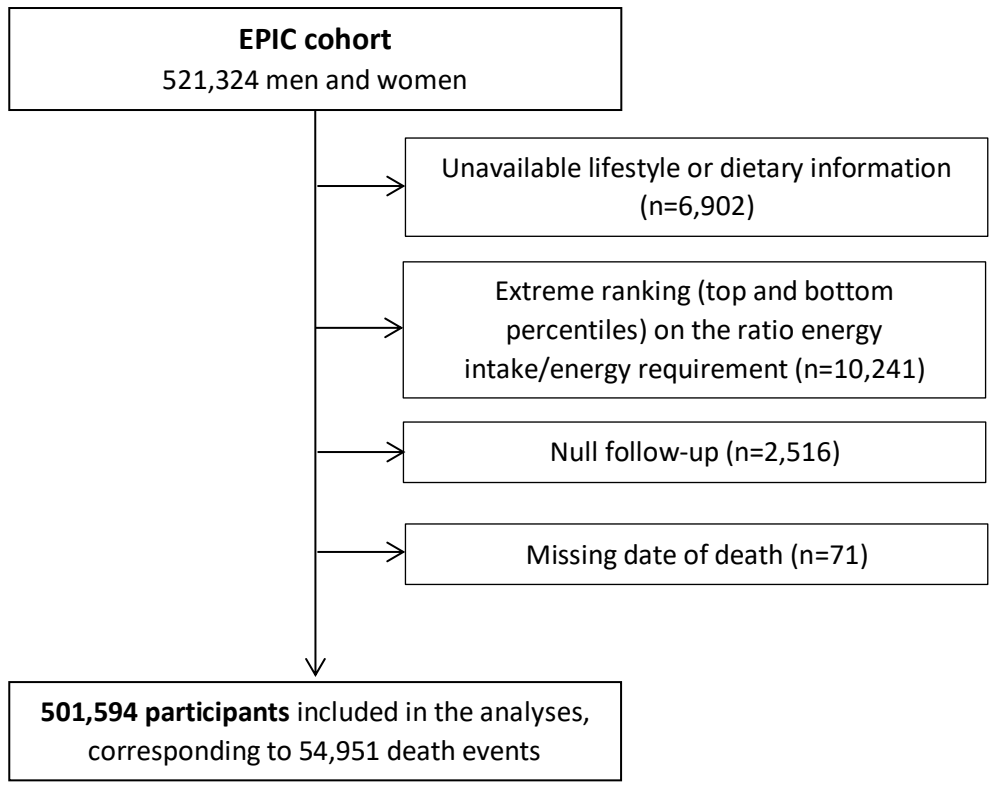


References

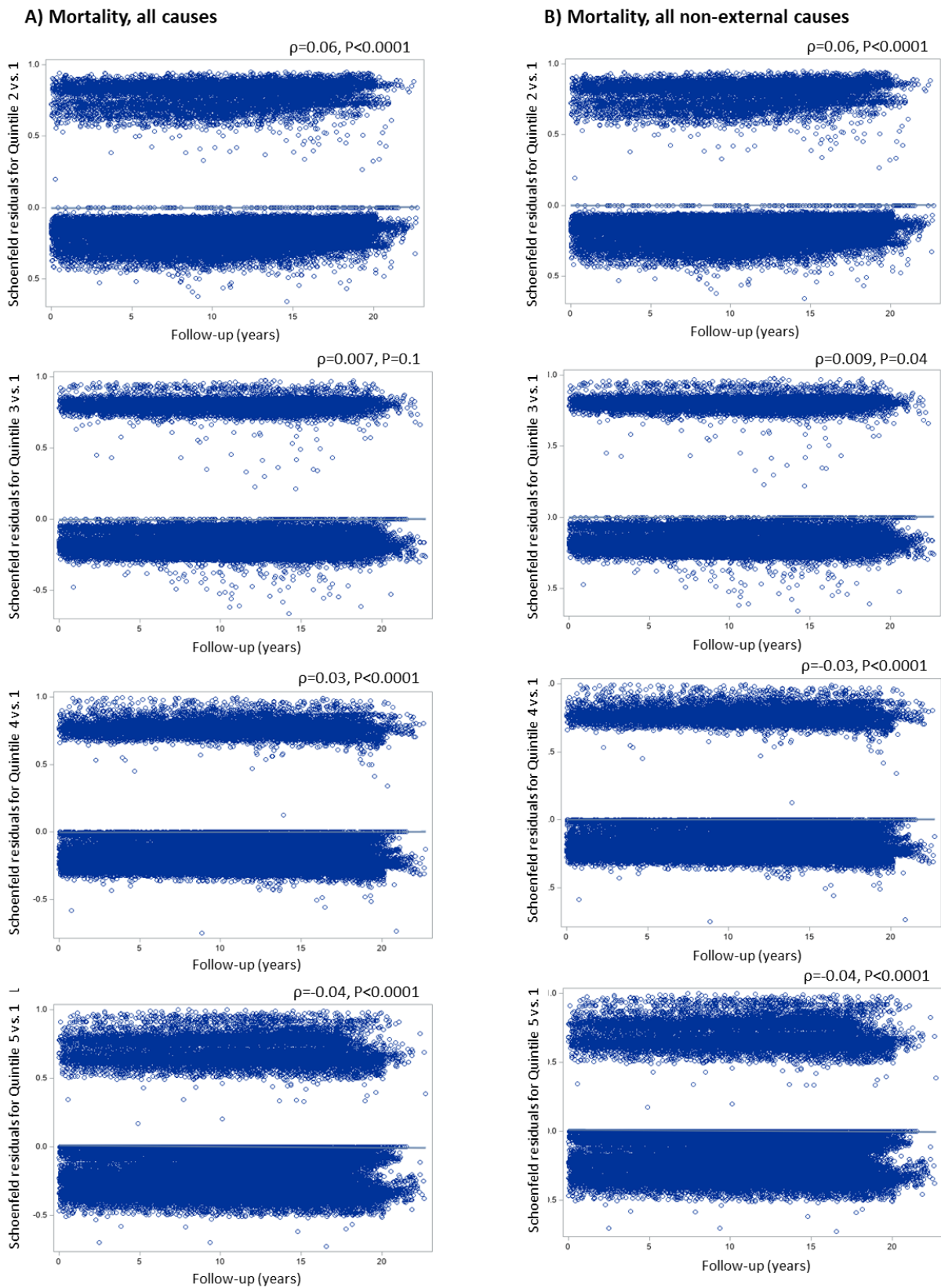
- (1) Julia C, Touvier M, Mejean C, Ducrot P, Peneau S, Hercberg S, et al. Development and validation of an individual dietary index based on the British Food Standard Agency nutrient profiling system in a French context. *J Nutr.* 2014;144:2009-17.
- (2) Adriouch S, Julia C, Kesse-Guyot E, Mejean C, Ducrot P, Peneau S, et al. Prospective association between a dietary quality index based on a nutrient profiling system and cardiovascular disease risk. *Eur J Prev Cardiol.* 2016;23:1669-76.
- (3) Adriouch S, Julia C, Kesse-Guyot E, Ducrot P, Peneau S, Mejean C, et al. Association between a dietary quality index based on the food standard agency nutrient profiling system and cardiovascular disease risk among French adults. *Int J Cardiol.* 2017;234:22-7.
- (4) Deschasaux M, Julia C, Kesse-Guyot E, Lecuyer L, Adriouch S, Mejean C, et al. Are self-reported unhealthy food choices associated with an increased risk of breast cancer? Prospective cohort study using the British Food Standards Agency nutrient profiling system. *BMJ Open.* 2017;7:e013718.
- (5) Donnenfeld M, Julia C, Kesse-Guyot E, Mejean C, Ducrot P, Peneau S, et al. Prospective association between cancer risk and an individual dietary index based on the British Food Standards Agency Nutrient Profiling System. *Br J Nutr.* 2015;114:1702-10.

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- (7) Julia C, Mejean C, Touvier M, Peneau S, Lassale C, Ducrot P, et al. Validation of the FSA nutrient profiling system dietary index in French adults-findings from SUVIMAX study. *Eur J Nutr.* 2016;55:1901-10.
- (8) Julia C, Fezeu LK, Ducrot P, Mejean C, Peneau S, Touvier M, et al. The Nutrient Profile of Foods Consumed Using the British Food Standards Agency Nutrient Profiling System Is Associated with Metabolic Syndrome in the SU.VI.MAX Cohort. *J Nutr.* 2015;145:2355-61.
- (9) Scarborough P, Arambepola C, Kaur A, Bhatnagar P, Rayner M. Should nutrient profile models be 'category specific' or 'across-the-board'? A comparison of the two systems using diets of British adults. *Eur J Clin Nutr.* 2010;64:553-60.

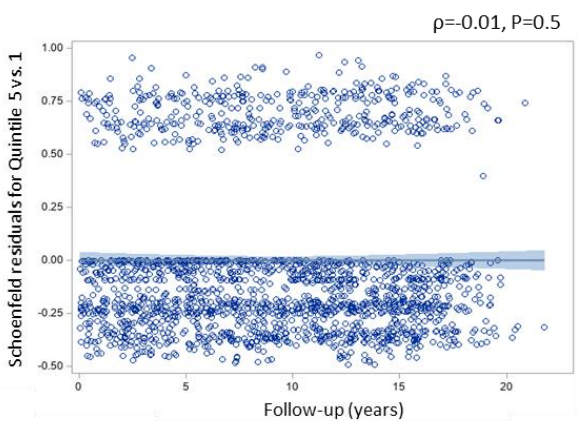
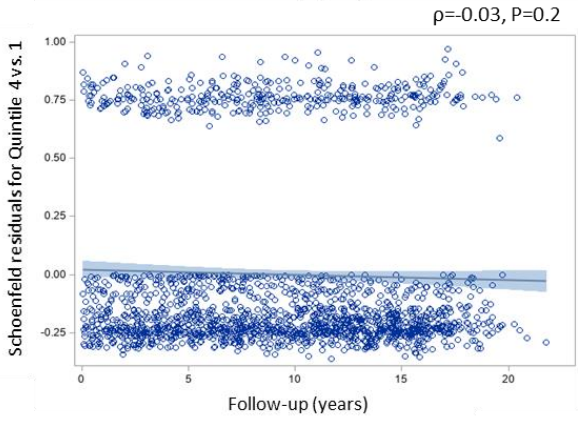
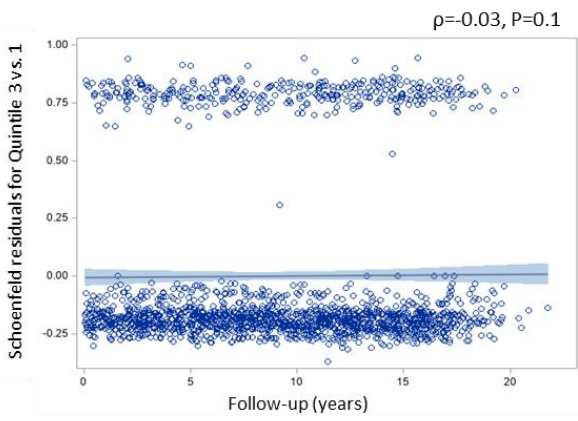
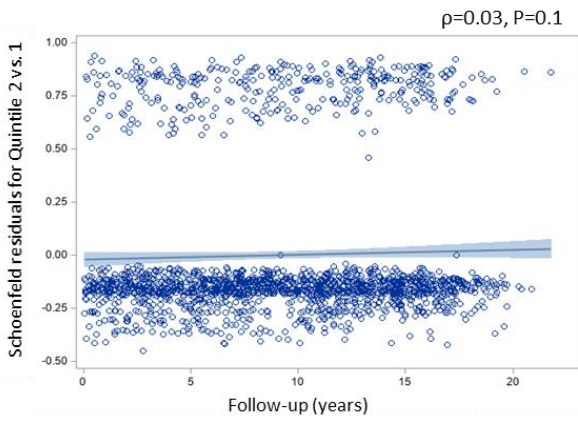
Supplementary Figure 1. Participants flowchart, EPIC cohort, 1992–2015.



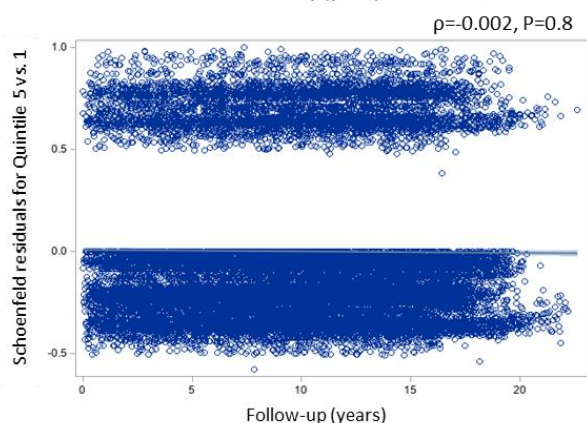
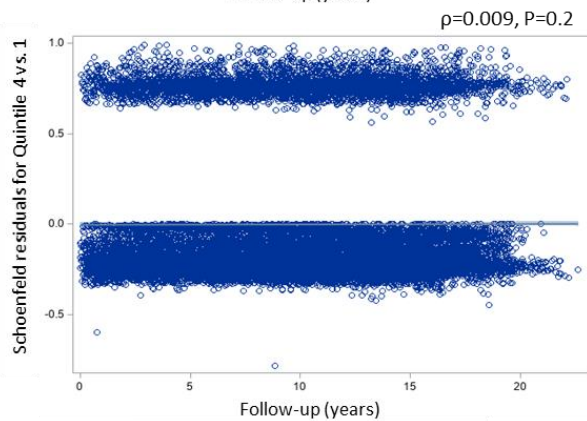
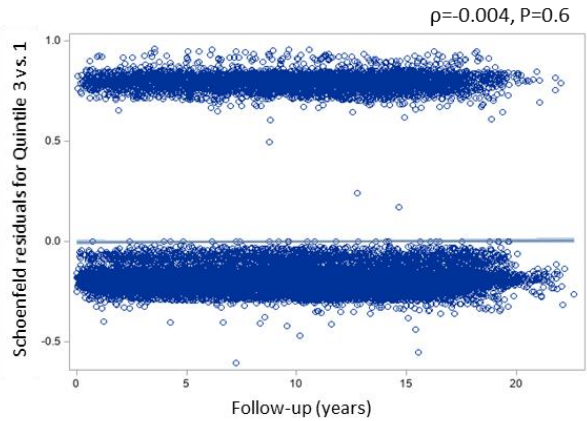
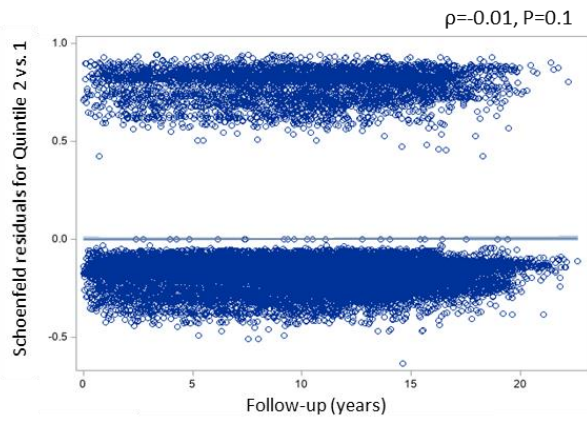
Supplementary Figure 2. Schoenfeld residuals according to follow-up time (years) for quintiles of the FSAm-NPS DI, EPIC cohort, 1992–2015. A higher FSAm-NPS DI indicates a lower nutritional quality of the foods consumed. The solid blue curve represents the smooth curve and its 95% confidence interval. Abbreviations: DI, Dietary Index; EPIC, European Prospective Investigation into Cancer and Nutrition; FSAm-NPS, Nutrient Profiling System of the British Food Standards Agency (modified version).



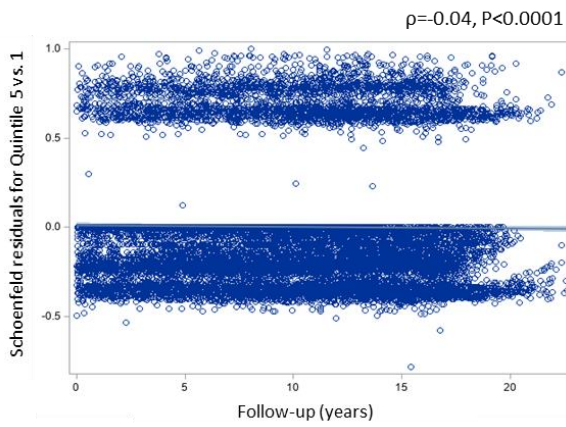
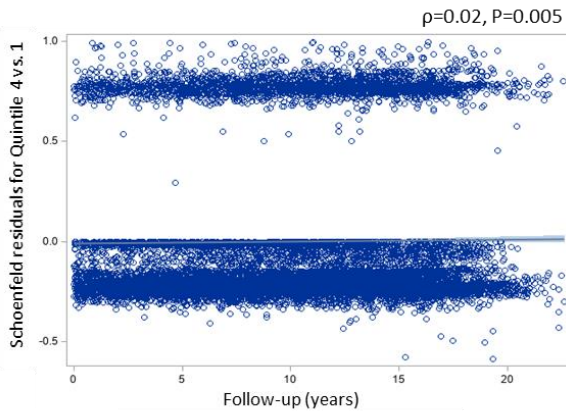
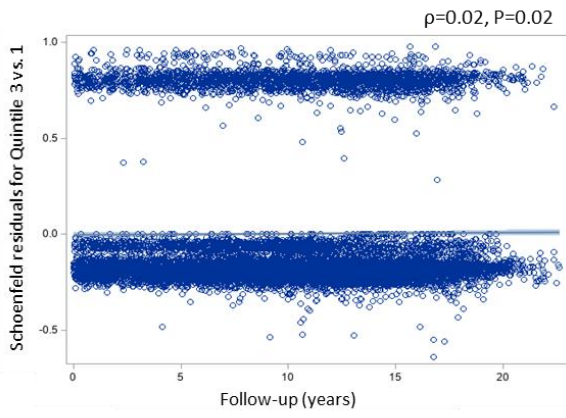
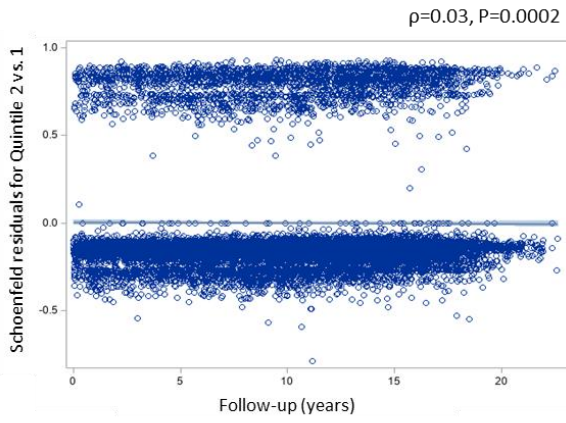
C) Mortality from external causes



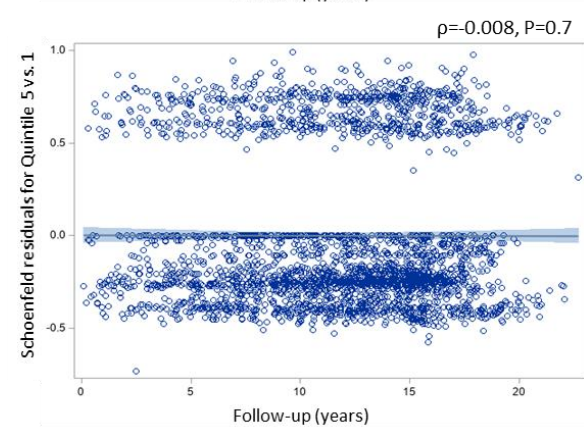
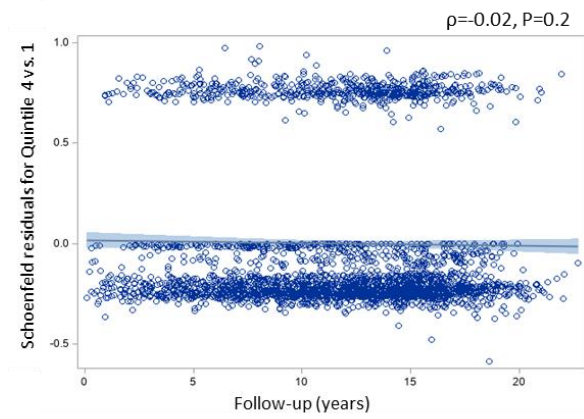
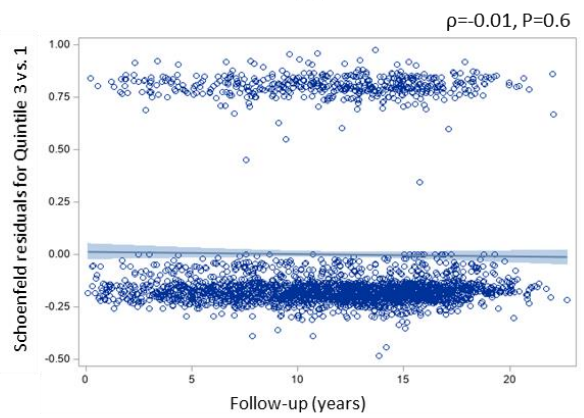
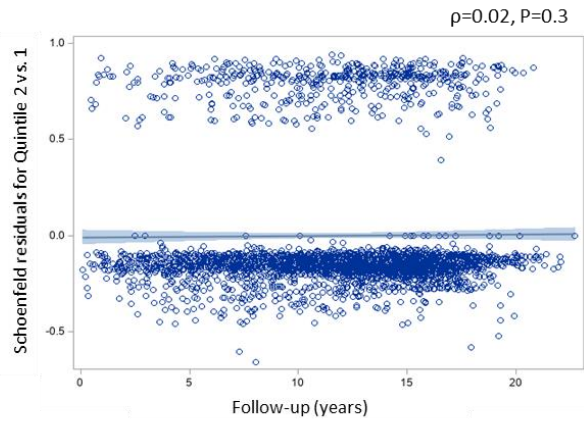
D) Mortality from cancer



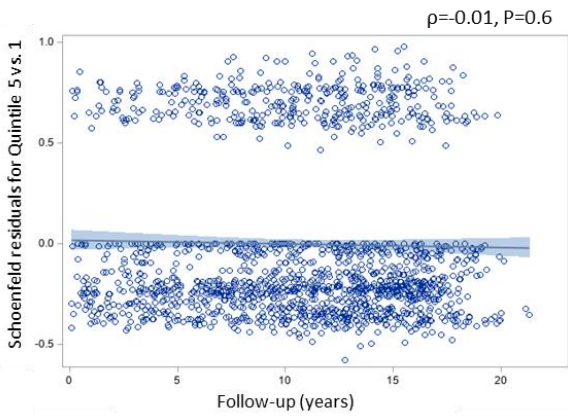
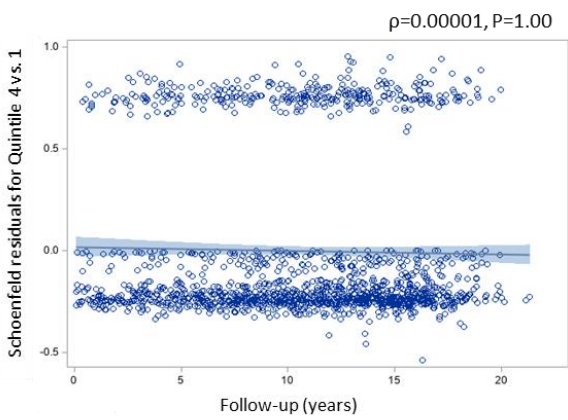
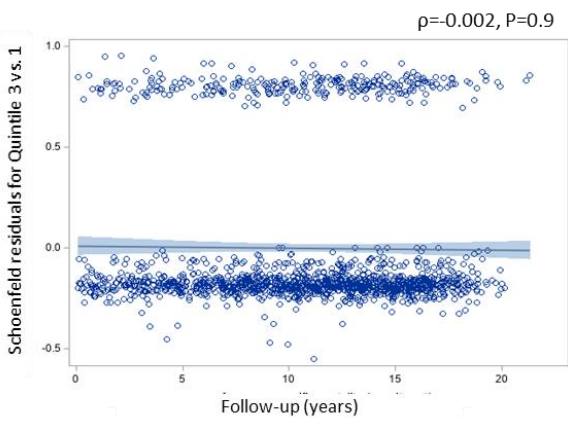
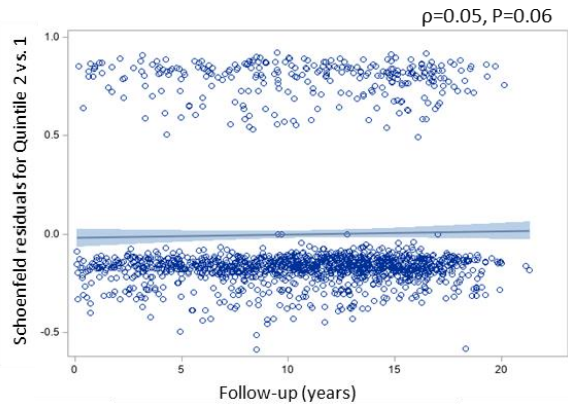
E) Mortality from cardiovascular diseases



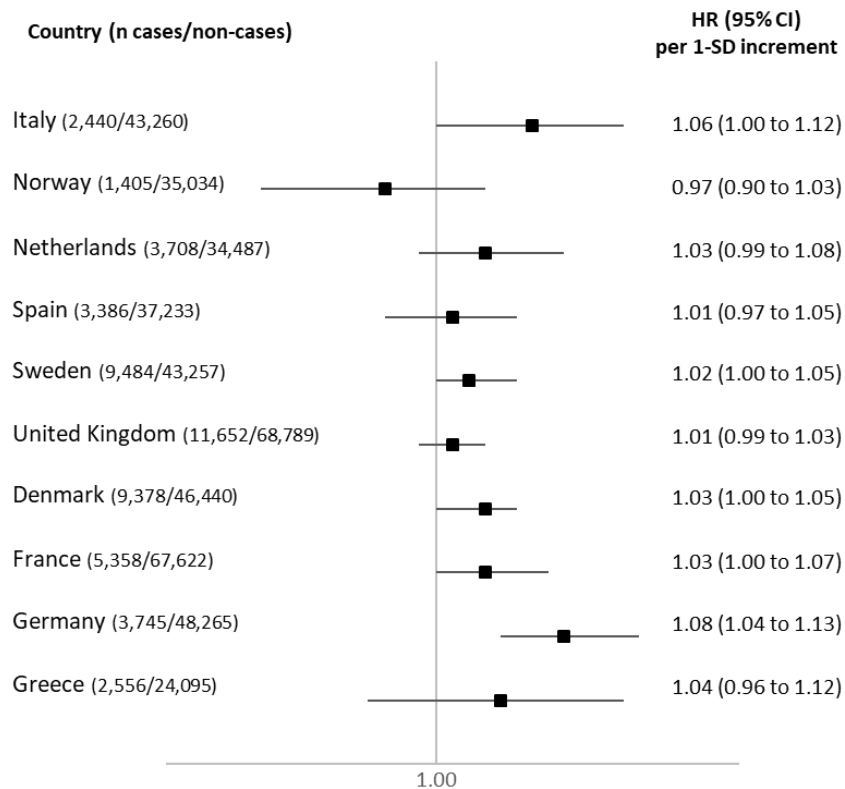
F) Mortality from respiratory diseases



G) Mortality from digestive diseases



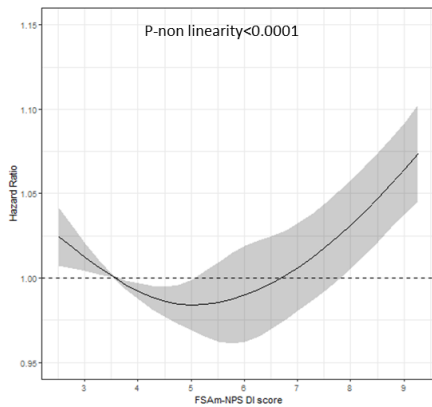
Supplementary Figure 3. Associations between the FSAm-NPS DI and mortality from all non-external causes, by country, EPIC cohort, 1992–2015. A higher FSAm-NPS DI indicates a lower nutritional quality of the foods consumed. The Cox proportional hazard model was stratified for age (1-y interval) and study centre and adjusted for age (time-scale), sex, body mass index, height, educational level (longer education, including university degree; technical/professional school; secondary school; primary school; missing), combined total physical activity (sex-specific categories: active; moderately active; moderately inactive; inactive; missing), smoking status and intensity of smoking (current, 1–15 cigarettes/d; current, 16–25 cigarettes/d; current, 26+ cigarettes/d; current, pipe/cigar/occasional; current/former, missing; former, quit 11–20 y; former, quit 20+y; former, quit ≤ 10 y; non-smoker; missing), baseline alcohol intake, baseline energy intake and personal history of cancer (yes; no), cardiovascular diseases (yes; no; missing) and diabetes (yes; no; missing). Abbreviations: DI, Dietary Index; EPIC, European Prospective Investigation into Cancer and Nutrition; FSAm-NPS, Nutrient Profiling System of the British Food Standards Agency (modified version).



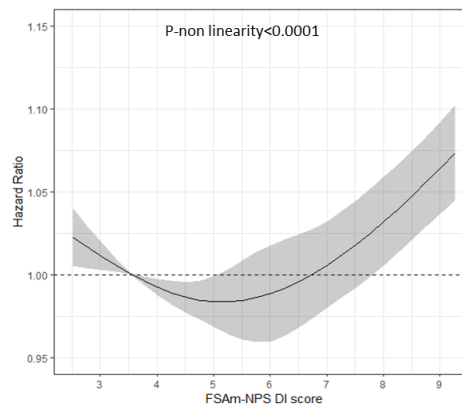
Supplementary Figure 4. Associations between the FSAm-NPS DI and mortality from all non-external causes, non-linear modelling using restricted cubic splines, EPIC cohort, 1992–2015.

A higher FSAm-NPS DI indicates a lower nutritional quality of the foods consumed. The Cox proportional hazard model was stratified for age (1-y interval) and study centre and adjusted for age (time-scale), sex, body mass index, height, educational level (longer education, including university degree; technical/professional school; secondary school; primary school; missing), combined total physical activity (sex-specific categories: active; moderately active; moderately inactive; inactive; missing), smoking status and intensity of smoking (current, 1–15 cigarettes/d; current, 16–25 cigarettes/d; current, 26+ cigarettes/d; current, pipe/cigar/occasional; current/former, missing; former, quit 11–20 y; former, quit 20+y; former, quit ≤ 10 y; non-smoker; missing), baseline alcohol intake, baseline energy intake and personal history of cancer (yes; no), cardiovascular diseases (yes; no; missing) and diabetes (yes; no; missing). Abbreviations: DI, Dietary Index; EPIC, European Prospective Investigation into Cancer and Nutrition; FSAm-NPS, Nutrient Profiling System of the British Food Standards Agency (modified version).

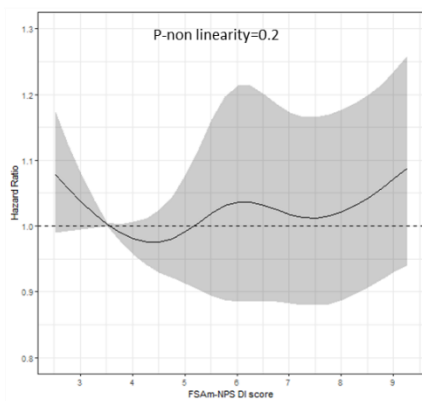
A) Mortality, all causes



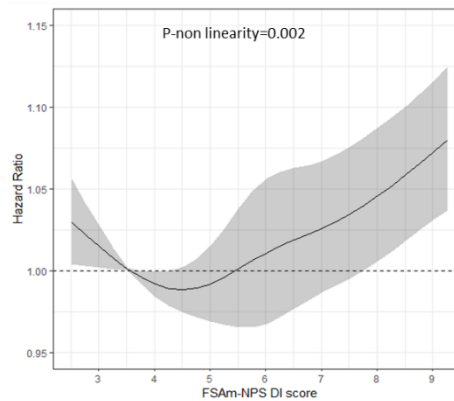
B) Mortality, all non-external causes



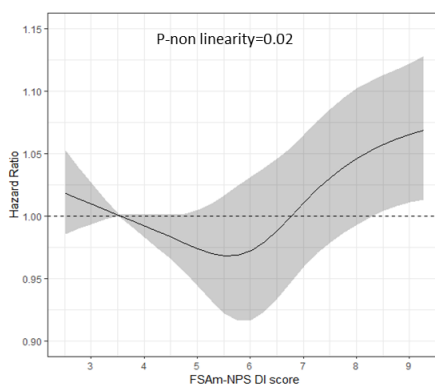
C) Mortality from external causes



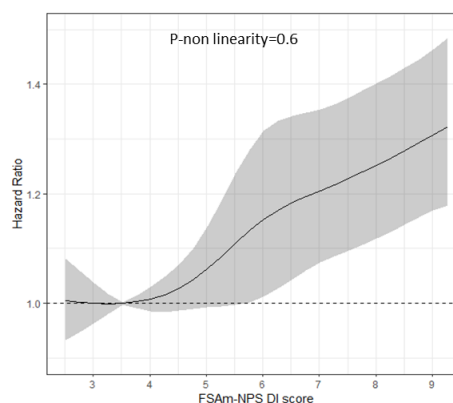
D) Mortality from cancer



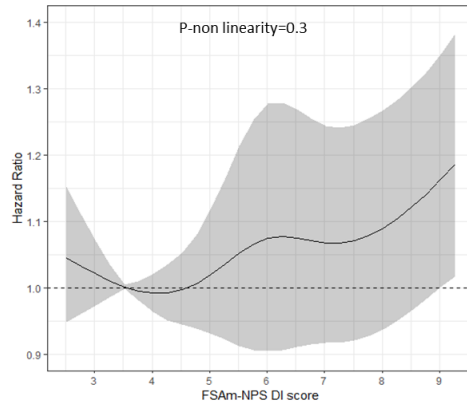
E) Mortality from cardiovascular diseases



F) Mortality from respiratory diseases



G) Mortality from digestive diseases



Supplementary Table 1 – Associations between the FSAm-NPS DI and mortality, sensitivity analyses, EPIC cohort, 1992–2015.

	Continuous (per 1-SD increment)		Quintiles ^a					P-trend	P- non-trend
	HR (95%CI)	P-value	Q1	Q2	Q3	Q4	Q5		
Mortality, all non-external causes									
<i>All (n for cases/non-cases)</i>	53,112/448,482		10,515/89,803	9,605/90,714	9,922/90,397	10,728/89,591	12,342/87,977		
Main model without BMI ^b	1.02 (1.02 to 1.03)	<0.001	1.00 (ref)	0.99 (0.96 to 1.02)	0.99 (0.96 to 1.02)	1.01 (0.98 to 1.04)	1.06 (1.03 to 1.10)	<0.001	<0.001
Main model without energy ^c	1.02 (1.01 to 1.03)	<0.001	1.00 (ref)	0.98 (0.96 to 1.01)	0.98 (0.96 to 1.01)	1.00 (0.97 to 1.03)	1.05 (1.02 to 1.09)	<0.001	<0.001
Main model + coffee intake ^d	1.03 (1.02 to 1.04)	<0.001	1.00 (ref)	0.99 (0.96 to 1.02)	0.99 (0.96 to 1.02)	1.01 (0.98 to 1.04)	1.07 (1.03 to 1.10)	<0.001	<0.001
Main model + soft drinks intake ^e	1.02 (1.01 to 1.03)	<0.001	1.00 (ref)	0.98 (0.96 to 1.01)	0.98 (0.96 to 1.01)	1.00 (0.97 to 1.03)	1.05 (1.02 to 1.09)	<0.001	<0.001
<i>Exclusion of participants with prevalent disease ^f (n for cases/non-cases)</i>	20,209/288,259		4,011/57,891	3,710/58,773	3,871/58,058	4,103/57,404	4,514/56,133		
Main model without prevalent diseases ^g	1.04 (1.02 to 1.05)	<0.001	1.00 (ref)	0.99 (0.94 to 1.03)	1.01 (0.97 to 1.06)	1.02 (0.97 to 1.07)	1.13 (1.07 to 1.18)	<0.001	<0.001
<i>Exclusion of cases with < 5-year-follow-up ^h (n for cases/non-cases)</i>	45,248/448,482		8,872/89,803	8,144/90,714	8,458/90,397	9,210/89,591	10,564/87,977		
Main model	1.02 (1.01 to 1.04)	<0.001	1.00 (ref)	0.99 (0.96 to 1.02)	0.99 (0.96 to 1.02)	1.01 (0.98 to 1.05)	1.06 (1.03 to 1.10)	<0.001	<0.001
<i>Complete case ⁱ (n for cases/non-cases)</i>	27,000/264,213		6,747/60,149	5,332/56,515	4,988/52,782	4,927/49,682	5,006/45,085		
Main model	1.04 (1.02 to 1.05)	<0.001	1.00 (ref)	0.97 (0.93 to 1.00)	1.00 (0.96 to 1.04)	1.01 (0.97 to 1.05)	1.10 (1.06 to 1.15)	<0.001	<0.001
<i>Fine and Gray competing risks analysis ^j (n for cases/competing cases/non-cases)</i>	53,112/1,839/ 446,643		10,515/372/ 89,431	9,605/329/90,385	9,922/353/90,044	10,728/370/ 89,221	12,342/415/ 87,562		
Main model	1.03 (1.02 to 1.04)	<0.001	1.00 (ref)	0.99 (0.96 to 1.02)	0.99 (0.96 to 1.02)	1.01 (0.98 to 1.04)	1.07 (1.03 to 1.10)	<0.001	<0.001
Mortality from cancer									
<i>All (n for cases/non-cases)</i>	23,143/478,451		4,550/95,768	4,288/96,031	4,482/95,837	4,700/95,619	5,123/95,196		
Main model without BMI	1.03 (1.01 to 1.04)	<0.001	1.00 (ref)	0.99 (0.95 to 1.04)	1.02 (0.98 to 1.07)	1.03 (0.99 to 1.08)	1.08 (1.03 to 1.13)	<0.001	0.005
Main model without energy	1.02 (1.01 to 1.04)	0.003	1.00 (ref)	0.99 (0.95 to 1.03)	1.01 (0.97 to 1.06)	1.02 (0.98 to 1.07)	1.06 (1.02 to 1.11)	0.002	0.01
Main model + coffee intake	1.03 (1.01 to 1.04)	<0.001	1.00 (ref)	0.99 (0.95 to 1.03)	1.02 (0.97 to 1.06)	1.03 (0.98 to 1.08)	1.08 (1.03 to 1.13)	<0.001	0.004
Main model + soft drinks intake	1.03 (1.01 to 1.04)	<0.001	1.00 (ref)	0.99 (0.95 to 1.03)	1.02 (0.97 to 1.06)	1.03 (0.98 to 1.08)	1.07 (1.02 to 1.12)	<0.001	0.006
<i>Exclusion of participants with prevalent disease (n for cases/non-cases)</i>	10,264/298,204		2,087/59,815	1,924/60,559	2,056/59,873	2,090/59,417	2,107/58,540		
Main model without prevalent diseases	1.03 (1.01 to 1.05)	0.01	1.00 (ref)	0.98 (0.92 to 1.05)	1.05 (0.98 to 1.12)	1.05 (0.98 to 1.13)	1.12 (1.04 to 1.20)	<0.001	0.003
<i>Exclusion of cases with < 5-year-follow-up (n for cases/non-cases)</i>	18,958/478,451		3,709/95,768	3,542/96,031	3,672/95,837	3,853/95,619	4,182/95,196		
Main model	1.03 (1.01 to 1.04)	0.002	1.00 (ref)	1.01 (0.96 to 1.06)	1.02 (0.97 to 1.07)	1.04 (0.99 to 1.09)	1.08 (1.03 to 1.14)	0.001	0.02
<i>Complete case (n for cases/non-cases)</i>	12,498/278,715		2,961/63,935	2,522/59,325	2,425/55,345	2,375/52,234	2,215/47,876		
Main model	1.02 (1.00 to 1.05)	0.03	1.00 (ref)	0.99 (0.94 to 1.05)	1.04 (0.98 to 1.10)	1.05 (0.99 to 1.11)	1.07 (1.01 to 1.14)	0.01	0.09
<i>Fine and Gray competing risks analysis (n for cases/competing cases/non-cases)</i>	23,143/31,808/ 446,643		4,550/6,337/ 89,431	4,288/5,646/ 90,385	4,482/5,793/ 90,044	4,700/6,398/ 89,221	5,123/7,634/ 87,562		
Main model	1.02 (1.01 to 1.04)	0.003	1.00 (ref)	0.99 (0.95 to 1.03)	1.02 (0.98 to 1.06)	1.03 (0.98 to 1.08)	1.07 (1.02 to 1.12)	0.002	0.01
Mortality from diseases of the circulatory system									
<i>All (n for cases/non-cases)</i>	13,246/488,348		2,973/97,345	2,432/97,887	2,377/97,942	2,526/97,793	2,938/97,381		
Main model without BMI	1.02 (1.00 to 1.04)	0.04	1.00 (ref)	0.96 (0.91 to 1.02)	0.97 (0.91 to 1.03)	1.00 (0.94 to 1.06)	1.04 (0.98 to 1.11)	0.09	0.06
Main model without energy	1.02 (1.00 to 1.04)	0.04	1.00 (ref)	0.96 (0.91 to 1.01)	0.96 (0.91 to 1.02)	0.99 (0.94 to 1.05)	1.04 (0.98 to 1.10)	0.07	0.02
Main model + coffee intake	1.02 (1.00 to 1.04)	0.03	1.00 (ref)	0.96 (0.91 to 1.01)	0.96 (0.91 to 1.02)	1.00 (0.94 to 1.06)	1.05 (0.99 to 1.11)	0.05	0.02
Main model + soft drinks intake	1.02 (1.00 to 1.04)	0.08	1.00 (ref)	0.96 (0.90 to 1.01)	0.96 (0.90 to 1.02)	0.99 (0.93 to 1.05)	1.03 (0.97 to 1.10)	0.15	0.04

<i>Exclusion of participants with prevalent disease (n for cases/non-cases)</i>	3,569/304,899		857/61,045	678/61,805	645/61,284	642/60,865	747/59,900		
Main model without prevalent diseases	1.04 (1.00 to 1.08)	0.04	1.00 (ref)	0.89 (0.80 to 0.99)	0.95 (0.85 to 1.06)	0.94 (0.83 to 1.05)	1.10 (0.98 to 1.23)	0.09	0.003
<i>Exclusion of cases with < 5-year-follow-up (n for cases/non-cases)</i>	10,827/488,348		2,414/97,345	1,960/97,887	1,944/97,942	2,095/97,793	2,414/97,381		
Main model	1.02 (1.00 to 1.04)	0.10	1.00 (ref)	0.94 (0.89 to 1.00)	0.95 (0.89 to 1.01)	0.99 (0.93 to 1.06)	1.03 (0.96 to 1.10)	0.14	0.02
<i>Complete case (n for cases/non-cases)</i>	7,117/284,096		2,046/64,850	1,400/60,447	1,220/56,550	1,182/53,427	1,269/48,822		
Main model	1.04 (1.01 to 1.07)	0.006	1.00 (ref)	0.91 (0.85 to 0.98)	0.96 (0.88 to 1.04)	0.99 (0.91 to 1.08)	1.13 (1.03 to 1.22)	0.004	<0.001
<i>Fine and Gray competing risks analysis (n for cases/competing cases/non-cases)</i>	13,246/41,705/ 446,643		2,973/7,914/ 89,431	2,432/7,502/90,38 5	2,377/7,898/90,04 4	2,526/8,572/ 89,221	2,938/9,819/ 87,562		
Main model	1.01 (0.99 to 1.03)	0.17	1.00 (ref)	0.96 (0.9 to 1.01)	0.96 (0.90 to 1.02)	0.99 (0.93 to 1.05)	1.02 (0.96 to 1.09)	0.24	0.09
Mortality from diseases of the respiratory system									
<i>All (n for cases/non-cases)</i>	2,857/498,737		508/99,810	501/99,818	507/99,812	591/99,728	750/99,569		
Main model without BMI	1.11 (1.07 to 1.16)	<0.001	1.00 (ref)	1.14 (1.01 to 1.30)	1.15 (1.01 to 1.32)	1.27 (1.11 to 1.45)	1.40 (1.23 to 1.60)	<0.001	<0.001
Main model without energy	1.10 (1.06 to 1.14)	<0.001	1.00 (ref)	1.14 (1.00 to 1.30)	1.14 (1.00 to 1.30)	1.25 (1.09 to 1.42)	1.36 (1.19 to 1.54)	<0.001	<0.001
Main model + coffee intake	1.11 (1.06 to 1.15)	<0.001	1.00 (ref)	1.15 (1.01 to 1.31)	1.16 (1.01 to 1.32)	1.27 (1.11 to 1.45)	1.39 (1.22 to 1.59)	<0.001	<0.001
Main model + soft drinks intake	1.10 (1.06 to 1.15)	<0.001	1.00 (ref)	1.15 (1.01 to 1.30)	1.15 (1.01 to 1.32)	1.26 (1.10 to 1.44)	1.37 (1.20 to 1.57)	<0.001	<0.001
<i>Exclusion of participants with prevalent disease (n for cases/non-cases)</i>	1,085/307,383		205/61,697	213/62,270	174/61,755	227/61,280	266/60,381		
Main model without prevalent diseases	1.08 (1.00 to 1.15)	0.03	1.00 (ref)	1.16 (0.95 to 1.42)	0.96 (0.77 to 1.19)	1.17 (0.94 to 1.46)	1.33 (1.07 to 1.64)	0.01	0.01
<i>Exclusion of cases with < 5-year-follow-up (n for cases/non-cases)</i>	2,575/498,737		454/99,810	458/99,818	456/99,812	538/99,728	669/99,569		
Main model	1.10 (1.06 to 1.15)	<0.001	1.00 (ref)	1.17 (1.02 to 1.34)	1.14 (0.99 to 1.32)	1.26 (1.10 to 1.45)	1.37 (1.19 to 1.57)	<0.001	<0.001
<i>Complete case (n for cases/non-cases)</i>	1,470/289,743		332/66,564	309/61,538	246/57,524	278/54,331	305/49,786		
Main model	1.11 (1.05 to 1.18)	<0.001	1.00 (ref)	1.23 (1.04 to 1.45)	1.12 (0.93 to 1.34)	1.29 (1.07 to 1.54)	1.48 (1.23 to 1.78)	<0.001	<0.001
<i>Fine and Gray competing risks analysis (n for cases/competing cases/non-cases)</i>	2,857/52,094/ 446,643		508/10,379/ 89,431	501/9,433/90,385	507/9,768/90,044	591/10,507/ 89,221	750/12,007/ 87,562		
Main model	1.10 (1.05 to 1.14)	<0.001	1.00 (ref)	1.15 (1.02 to 1.31)	1.16 (1.01 to 1.32)	1.26 (1.11 to 1.43)	1.37 (1.20 to 1.56)	<0.001	<0.001
Mortality from diseases of the digestive system									
<i>All (n for cases/non-cases)</i>	1,561/500,033		294/100,024	286/100,033	282/100,037	326/99,993	373/99,946		
Main model without BMI	1.07 (1.01 to 1.13)	0.01	1.00 (ref)	1.09 (0.92 to 1.29)	1.05 (0.88 to 1.25)	1.15 (0.97 to 1.37)	1.21 (1.01 to 1.44)	0.03	0.23
Main model without energy	1.05 (1.00 to 1.11)	0.05	1.00 (ref)	1.07 (0.90 to 1.26)	1.02 (0.86 to 1.22)	1.12 (0.94 to 1.33)	1.16 (0.97 to 1.37)	0.08	0.41
Main model + coffee intake	1.08 (1.02 to 1.14)	0.006	1.00 (ref)	1.10 (0.93 to 1.30)	1.07 (0.90 to 1.27)	1.18 (0.99 to 1.41)	1.24 (1.04 to 1.48)	0.01	0.12
Main model + soft drinks intake	1.07 (1.01 to 1.13)	0.02	1.00 (ref)	1.08 (0.91 to 1.28)	1.04 (0.87 to 1.24)	1.14 (0.96 to 1.36)	1.19 (1.00 to 1.42)	0.04	0.29
<i>Exclusion of participants with prevalent disease (n for cases/non-cases)</i>	589/307,879		113/61,789	118/62,365	101/61,828	118/61,389	139/60,508		
Main model without prevalent diseases	1.08 (0.99 to 1.19)	0.09	1.00 (ref)	1.21 (0.92 to 1.59)	1.05 (0.79 to 1.41)	1.18 (0.89 to 1.58)	1.34 (1.00 to 1.80)	0.07	0.26
<i>Exclusion of cases with < 5-year-follow-up (n for cases/non-cases)</i>	1,315/500,033		256/100,024	239/100,033	233/100,037	267/99,993	320/99,946		
Main model	1.07 (1.00 to 1.13)	0.04	1.00 (ref)	1.04 (0.87 to 1.25)	0.99 (0.82 to 1.20)	1.09 (0.90 to 1.31)	1.20 (0.99 to 1.45)	0.05	0.23
<i>Complete case (n for cases/non-cases)</i>	901/290,312		207/66,689	171/61,676	165/57,605	173/54,436	185/49,906		
Main model	1.12 (1.04 to 1.21)	0.004	1.00 (ref)	0.99 (0.80 to 1.23)	1.06 (0.85 to 1.33)	1.14 (0.91 to 1.43)	1.30 (1.03 to 1.64)	0.02	0.14
<i>Fine and Gray competing risks analysis (n for cases/competing cases/non-cases)</i>	1,561/53,390/ 446,643		294/10,593/ 89,431	286/9,648/90,385	282/9,993/90,044	326/10,772/ 89,221	373/12,384/ 87,562		
Main model	1.07 (1.01 to 1.13)	0.03	1.00 (ref)	1.07 (0.91 to 1.27)	1.04 (0.87 to 1.24)	1.14 (0.95 to 1.36)	1.19 (1.00 to 1.43)	0.04	0.29

^a Cut-offs for sex-specific quintiles of the FSAm-NPS DI were, for women: 4.14/5.35/6.43/7.68, for men: 4.32/5.55/6.63/7.88. A higher FSAm-NPS DI indicates a lower nutritional quality of the foods consumed. The main model was stratified for age (1-y interval) and study centre and adjusted for age (time-scale), sex, body mass index, height, educational level (longer education, including university degree; technical/professional school; secondary school; primary school; missing), combined total physical activity (sex-specific categories: active; moderately active; moderately inactive; inactive; missing), smoking status and intensity of smoking (current, 1–15 cigarettes/d; current, 16–25 cigarettes/d; current, 26+ cigarettes/d; current, pipe/cigar/occasional; current/former, missing; former, quit 11–20 y; former, quit 20+y; former, quit ≤10 y; non-smoker; missing), baseline alcohol intake, baseline energy intake and personal history of cancer (yes; no), cardiovascular diseases (yes; no; missing) and diabetes (yes; no; missing).

^b Main model without adjustment for BMI.

^c Main model without adjustment for energy intake.

^d Main model with additional adjustment for coffee intake.

^e Main model with additional adjustment for soft drinks intake

^f Exclusion of participants who declared a prevalent cancer, cardiovascular disease or diabetes at baseline (n=122,857).

^g Main model without adjustment for personal history of cancer, cardiovascular diseases and diabetes.

^h Exclusion of participants whose death occurred during the first 5 years of follow-up (n=7,854).

ⁱ Missing data in covariates was handled using a complete case approach, i.e. by excluding participants with missing data on covariates (n=210,381)

^j Competing risk analyses using Fine and Gray models

Abbreviations: BMI, body mass index; DI, Dietary Index; EPIC, European Prospective Investigation into Cancer and Nutrition; FSAm-NPS, Nutrient Profiling System of the British Food Standards Agency (modified version)

Supplementary Table 2 – Associations between the FSAm-NPS DI and all-cause mortality, analyses of mediation through BMI variation during follow-up, EPIC cohort, 1992–2015.

	Quintiles ^a				
	Q1	Q2	Q3	Q4	Q5
	HR (95%CI)	HR (95%CI)	HR (95%CI)	HR (95%CI)	HR (95%CI)
Mortality, all non-external causes (<i>n</i> for cases/non-cases)	5,304/58,939	4,969/58,632	5,651/64,444	6,446/68,346	7,347/68,244
Total effect	1.00 (ref)	1.00 (0.97 to 1.05)	0.99 (0.95 to 1.03)	1.01 (0.97 to 1.05)	1.04 (1.00 to 1.09)
Direct effect	1.00 (ref)	1.00 (0.99 to 1.02)	0.99 (0.97 to 1.01)	1.01 (0.99 to 1.03)	1.04 (1.02 to 1.06)
Indirect effect through BMI variation during follow-up ^b	1.00 (ref)	1.00 (0.99 to 1.02)	1.00 (0.99 to 1.02)	1.00 (0.99 to 1.02)	1.00 (0.99 to 1.02)
Mortality from cancer	2,433/61,810	2,233/61,368	2,560/67,535	2,842/71,950	3,053/72,538
Total effect	1.00 (ref)	0.99 (0.94 to 1.05)	1.02 (0.96 to 1.08)	1.04 (0.98 to 1.10)	1.05 (0.99 to 1.12)
Direct effect	1.00 (ref)	0.99 (0.97 to 1.02)	1.02 (0.99 to 1.05)	1.03 (1.01 to 1.06)	1.05 (1.02 to 1.08)
Indirect effect through BMI variation during follow-up	1.00 (ref)	1.00 (0.98 to 1.03)	1.00 (0.98 to 1.03)	1.00 (0.98 to 1.03)	1.00 (0.98 to 1.03)
Mortality from diseases of the circulatory system	1,268/62,975	1,097/62,504	1,235/68,860	1,357/73,435	1,548/74,043
Total effect	1.00 (ref)	0.98 (0.90 to 1.06)	0.97 (0.89 to 1.06)	1.00 (0.92 to 1.09)	1.01 (0.92 to 1.10)
Direct effect	1.00 (ref)	0.98 (0.94 to 1.02)	0.98 (0.94 to 1.02)	1.00 (0.96 to 1.04)	1.00 (0.96 to 1.04)
Indirect effect through BMI variation during follow-up	1.00 (ref)	1.00 (0.97 to 1.04)	1.00 (0.97 to 1.04)	1.00 (0.97 to 1.04)	1.00 (0.97 to 1.04)
Mortality from diseases of the respiratory system	247/63,996	256/63,345	279/69,816	326/74,466	414/75,177
Total effect	1.00 (ref)	1.18 (0.98 to 1.42)	1.14 (0.95 to 1.37)	1.21 (1.01 to 1.45)	1.33 (1.11 to 1.59)
Direct effect	1.00 (ref)	1.16 (1.07 to 1.26)	1.12 (1.04 to 1.22)	1.20 (1.10 to 1.30)	1.32 (1.21 to 1.43)
Indirect effect through BMI variation during follow-up	1.00 (ref)	1.00 (0.94 to 1.08)	1.00 (0.94 to 1.08)	1.00 (0.94 to 1.08)	1.00 (0.93 to 1.08)
Mortality from diseases of the digestive system	158/64,085	140/63,461	150/69,945	171/74,621	202/75,389
Total effect	1.00 (ref)	1.04 (0.82 to 1.31)	1.00 (0.79 to 1.27)	1.06 (0.84 to 1.35)	1.15 (0.90 to 1.46)
Direct effect	1.00 (ref)	1.03 (0.93 to 1.15)	1.00 (0.90 to 1.12)	1.06 (0.95 to 1.18)	1.13 (1.01 to 1.27)
Indirect effect through BMI variation during follow-up	1.00 (ref)	1.01 (0.91 to 1.11)	1.01 (0.91 to 1.11)	1.01 (0.91 to 1.11)	1.00 (0.91 to 1.11)

^a Cut-offs for sex-specific quintiles of the FSAm-NPS DI were, for women: 4.14/5.35/6.43/7.68, for men: 4.32/5.55/6.63/7.88. A higher FSAm-NPS DI indicates a lower nutritional quality of the foods consumed. The model was stratified for age (1-y interval) and study centre and adjusted for age (time-scale), sex, height, educational level (longer education, including university degree; technical/professional school; secondary school; primary school; missing), combined total physical activity (sex-specific categories: active; moderately active; moderately inactive; inactive; missing), smoking status and intensity of smoking (current, 1–15 cigarettes/d; current, 16–25 cigarettes/d; current, 26+ cigarettes/d; current, pipe/cigar/occasional; current/former, missing; former, quit 11–20 y; former, quit 20+y; former, quit ≤10 y; non-smoker; missing), baseline alcohol intake, baseline energy intake and personal history of cancer (yes; no), cardiovascular diseases (yes; no; missing) and diabetes (yes; no; missing).

^b Analyses of mediation through BMI variation during follow-up conducted using the method proposed by Lange et al. (doi:10.1093/aje/kwr525)

Supplementary Table 3. E-values for HR and 95% confidence intervals, associations between the FSAm-NPS DI and mortality, EPIC cohort, 1992–2015.

	Continuous (per 1-SD increment)		Q1	Q2	Q3	Q4	Q5				
	HR (95%CI)	E-value	HR (95%CI)	HR (95%CI)	E-value	HR (95%CI)	E-value	HR (95%CI)	E-value		
Mortality, all causes	1.02 (1.01 to 1.03)	1.16 (1.11)	1.00 (ref)	0.98 (0.96 to 1.01)	1.16 (1.00)	0.99 (0.96 to 1.02)	1.11 (1.00)	1.01 (0.98 to 1.04)	1.11 (1.00)	1.06 (1.03 to 1.09)	1.31 (1.21)
Mortality, all non-external causes	1.03 (1.02 to 1.04)	1.21 (1.16)	1.00 (ref)	0.94 (0.81 to 1.10)	1.32 (1.00)	0.98 (0.84 to 1.15)	1.16 (1.00)	0.96 (0.82 to 1.13)	1.25 (1.00)	1.07 (1.03 to 1.1)	1.34 (1.21)
Mortality, external causes	1.00 (0.95 to 1.05)	1.00 (1.00)	1.00 (ref)	0.99 (0.96 to 1.02)	1.11 (1.00)	0.99 (0.96 to 1.02)	1.11 (1.00)	1.01 (0.98 to 1.04)	1.11 (1.00)	0.99 (0.84 to 1.16)	1.11 (1.00)
Mortality from cancer	1.03 (1.01 to 1.04)	1.21 (1.11)	1.00 (ref)	0.99 (0.95 to 1.04)	1.11 (1.00)	1.02 (0.98 to 1.07)	1.16 (1.00)	1.03 (0.99 to 1.08)	1.21 (1.00)	1.08 (1.03 to 1.13)	1.37 (1.21)
Mortality from diseases of the circulatory system	1.02 (1.00 to 1.04)	1.16 (1.00)	1.00 (ref)	0.96 (0.91 to 1.01)	1.25 (1.00)	0.96 (0.91 to 1.02)	1.25 (1.00)	1.00 (0.94 to 1.06)	1.00 (1.00)	1.04 (0.98 to 1.11)	1.24 (1.00)
Mortality from diseases of the respiratory system	1.11 (1.06 to 1.15)	1.46 (1.31)	1.00 (ref)	1.15 (1.01 to 1.31)	1.57 (1.11)	1.16 (1.01 to 1.32)	1.59 (1.11)	1.27 (1.11 to 1.45)	1.86 (1.46)	1.39 (1.22 to 1.59)	2.13 (1.74)
Mortality from diseases of the digestive system	1.08 (1.02 to 1.14)	1.37 (1.16)	1.00 (ref)	1.08 (0.91 to 1.28)	1.37 (1.00)	1.05 (0.88 to 1.25)	1.28 (1.00)	1.15 (0.97 to 1.37)	1.57 (1.00)	1.22 (1.02 to 1.45)	1.74 (1.16)

Cut-offs for sex-specific quintiles of the FSAm-NPS DI were, for women: 4.14/5.35/6.43/7.68, for men: 4.32/5.55/6.63/7.88. A higher FSAm-NPS DI indicates a lower nutritional quality of the foods consumed. The model was stratified for age (1-y interval) and study centre and adjusted for age (time-scale), sex, height, educational level (longer education, including university degree; technical/professional school; secondary school; primary school; missing), combined total physical activity (sex-specific categories: active; moderately active; moderately inactive; inactive; missing), smoking status and intensity of smoking (current, 1–15 cigarettes/d; current, 16–25 cigarettes/d; current, 26+ cigarettes/d; current, pipe/cigar/occasional; current/former, missing; former, quit 11–20 y; former, quit 20+y; former, quit ≤10 y; non-smoker; missing), baseline alcohol intake, baseline energy intake and personal history of cancer (yes; no), cardiovascular diseases (yes; no; missing) and diabetes (yes; no; missing). E-values were calculated from Mathur et al. (doi:10.1097/EDE.0000000000000864) and VanderWeele et al. (doi:10.7326/M16-2607).