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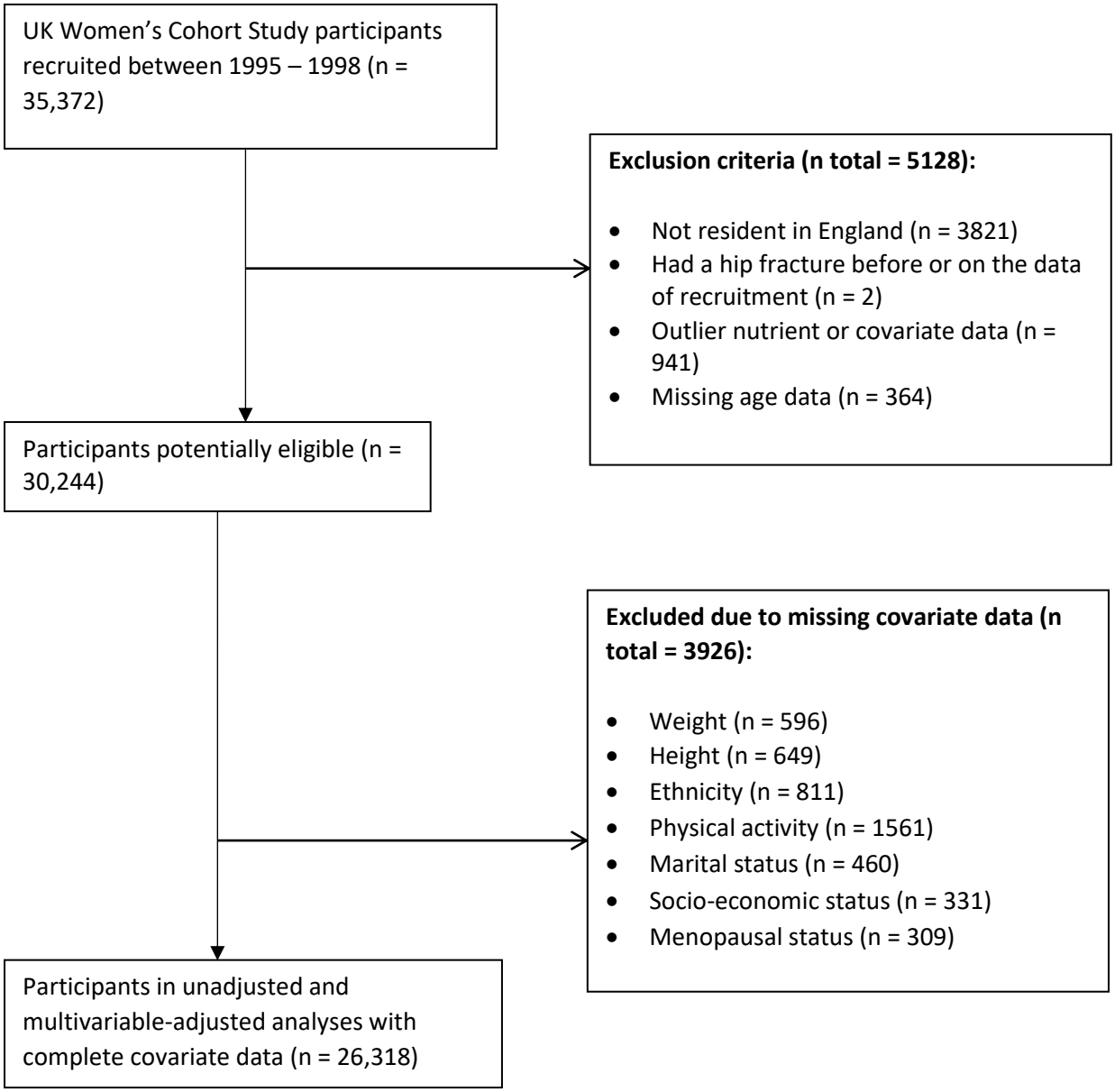

Figure S1: Flow chart of UK Women's Cohort Study participants.

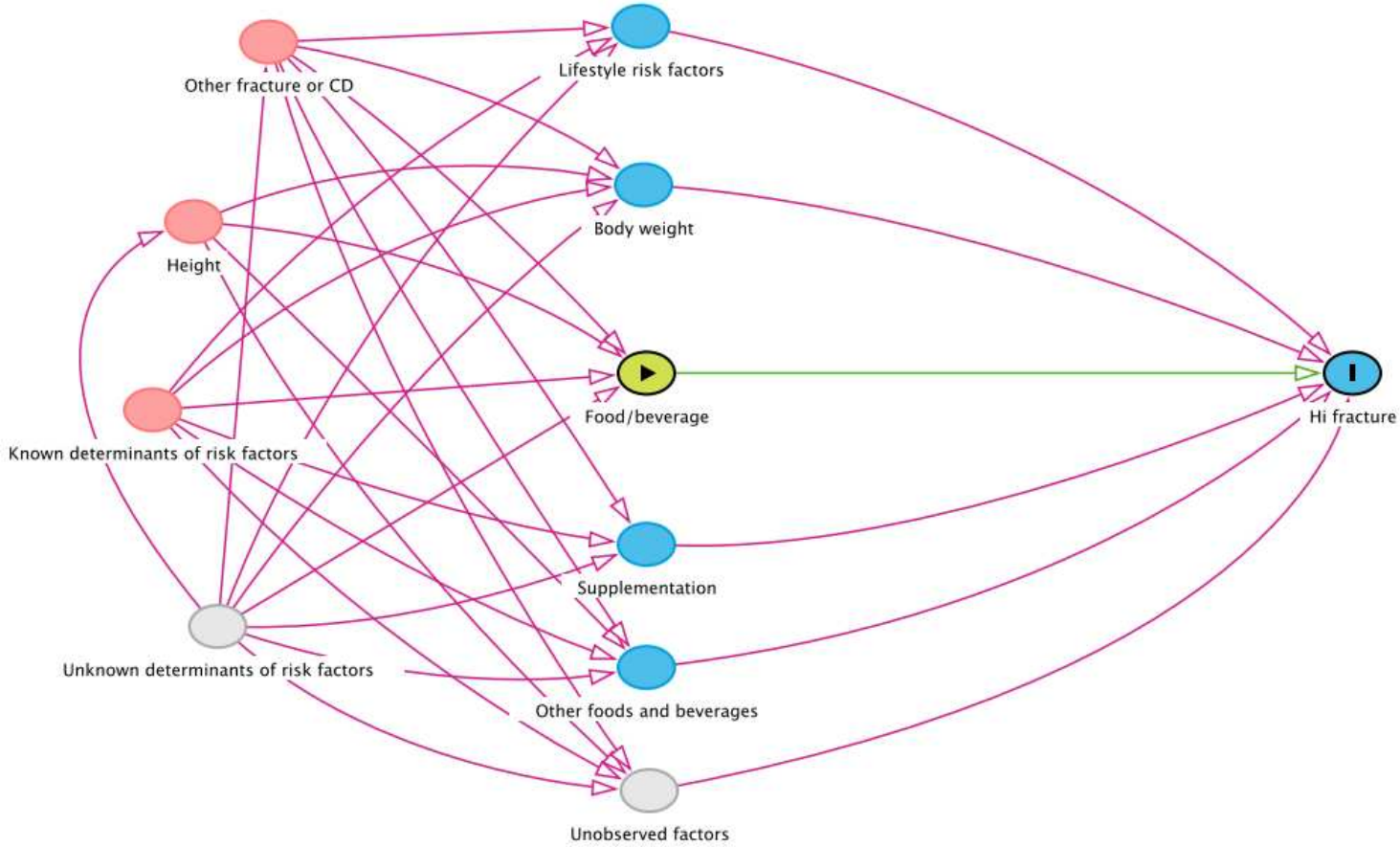

Figure S2: Directed Acyclic Graph showing the relationship between intake of foods and beverages, hip fracture incidence, and related factors. The exposure is depicted by the green oval and the outcome (hip fracture incidence) is depicted by the blue node with a black vertical line. Variables represented as pink nodes are ancestors of the exposure and outcome; variables represented as blue nodes are ancestors of the outcome only (competing exposures); and variables represented as grey nodes are unknown or unmeasured. The green line represents the causal link of interest. Pink lines are biasing paths. Known determinants of risk factors include age, ethnicity, education, socioeconomic status, marital status, menopausal status, and number of

children. Lifestyle risk factors include physical activity, smoking, and alcohol intake. Supplementation refers to use of any nutritional supplements. CD: chronic disease, defined as prevalence of cardiovascular disease, cancer, diabetes.

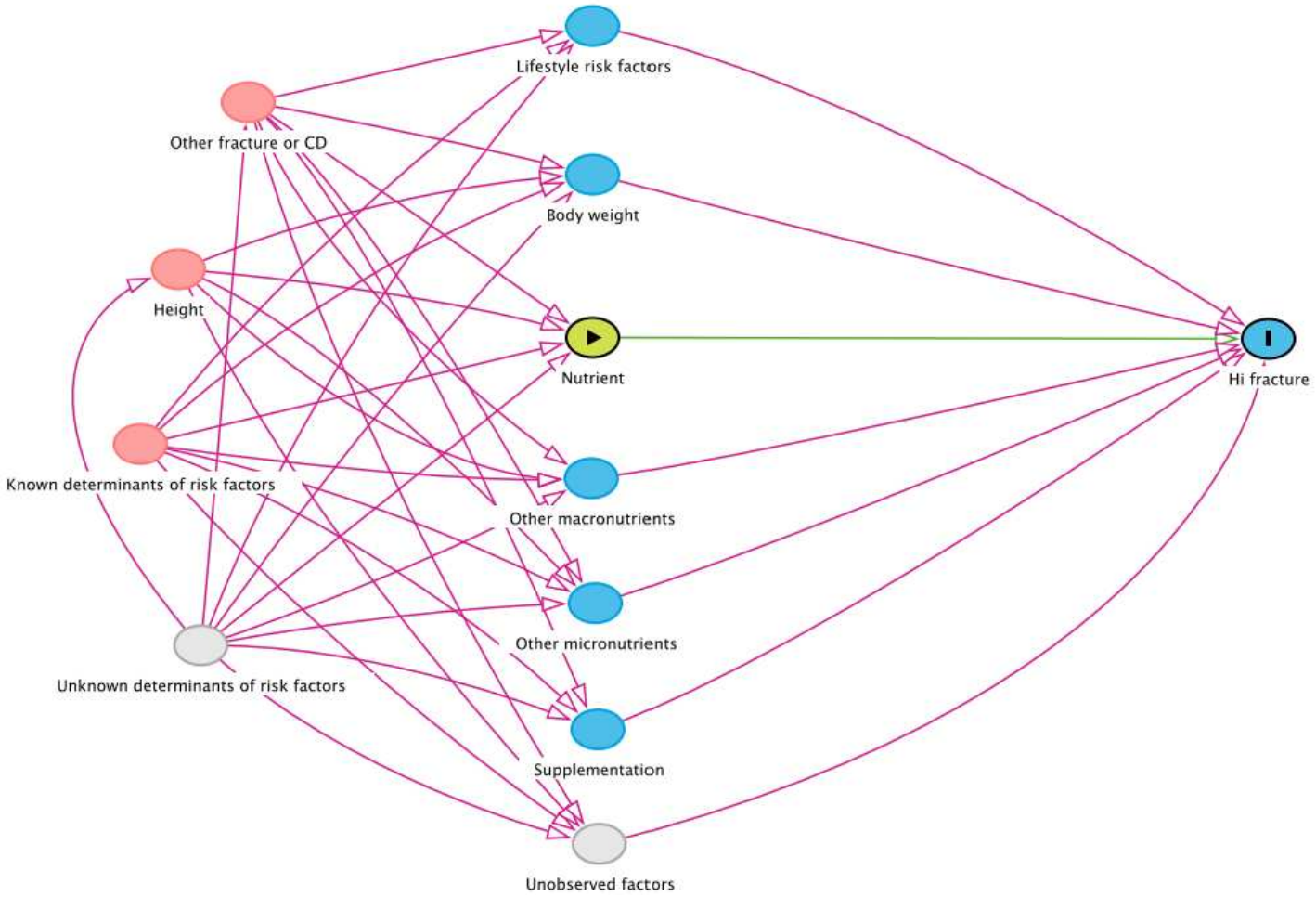

Figure S3: Directed Acyclic Graph showing the relationship between intake of nutrients, hip fracture incidence, and related factors. The exposure is depicted by the green oval and the outcome (hip fracture incidence) is depicted by the blue node with a black vertical line. Variables represented as pink

nodes are ancestors of the exposure and outcome; variables represented as blue nodes are ancestors of the outcome only (competing exposures); and variables represented as grey nodes are unknown or unmeasured. The green line represents the causal link of interest. Pink lines are biasing paths. Known determinants of risk factors include age, ethnicity, education, socioeconomic status, marital status, menopausal status, and number of children. Lifestyle risk factors include physical activity, smoking, and alcohol intake. Supplementation refers to use of any nutritional supplements. CD: chronic disease, defined as prevalence of cardiovascular disease, cancer, diabetes.

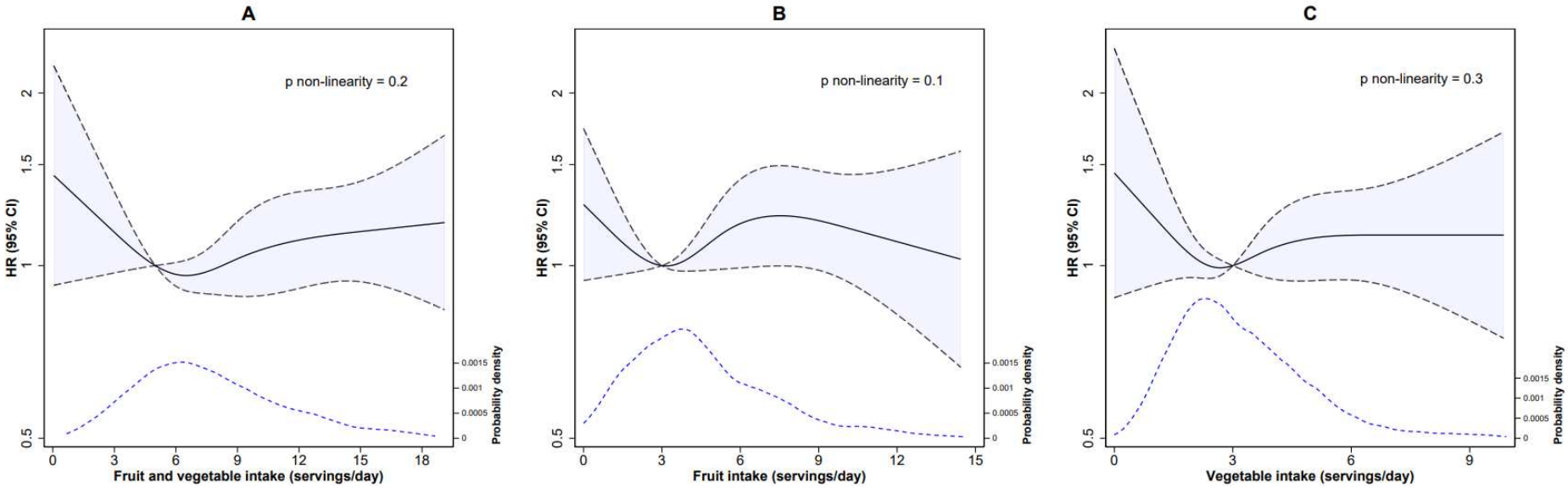

Figure S4: Risk of hip fracture as a function of fruit and vegetable intake (A), fruit intake (B), or vegetable intake (C). Dashed lines represent 95% CI's. Blue lines represent kernel density plots showing the distribution of daily fruit and vegetable intake in the cohort. Cox models were controlled for age, and were adjusted for ethnicity, socio-economic status, marital status, menopausal status, number of children, prevalence of cardiovascular disease, cancer, or diabetes, physical activity, smoking status, alcohol intake, height, body weight, use of any nutritional supplements, and intake of other major foods and beverages, and were mutually adjusted for fruit or vegetable intake as appropriate. HR (95% CI): adjusted hazard ratio, 95% confidence intervals.

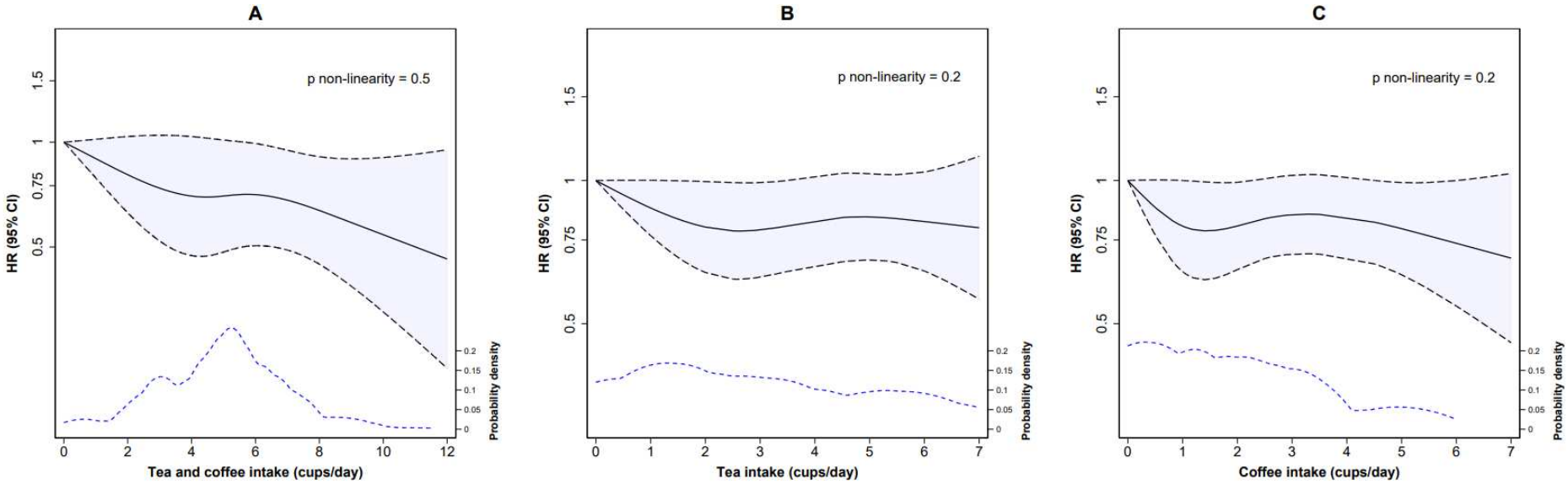

Figure S5: Risk of hip fracture as a function of tea and coffee intake (A), tea intake (B), or coffee intake (C). Dashed lines represent 95% CI's. Blue lines represent kernel density plots showing the distribution of daily tea and coffee intake in the cohort. Cox models were adjusted for ethnicity, socio-economic status, marital status, menopausal status, number of children, prevalence of cardiovascular disease, cancer, or diabetes, physical activity, smoking status, alcohol intake, height, body weight, use of any nutritional supplements, and intake of other major foods and beverages, and were mutually adjusted for tea or coffee intake as appropriate. HR (95% CI): adjusted hazard ratio, 95% confidence intervals.

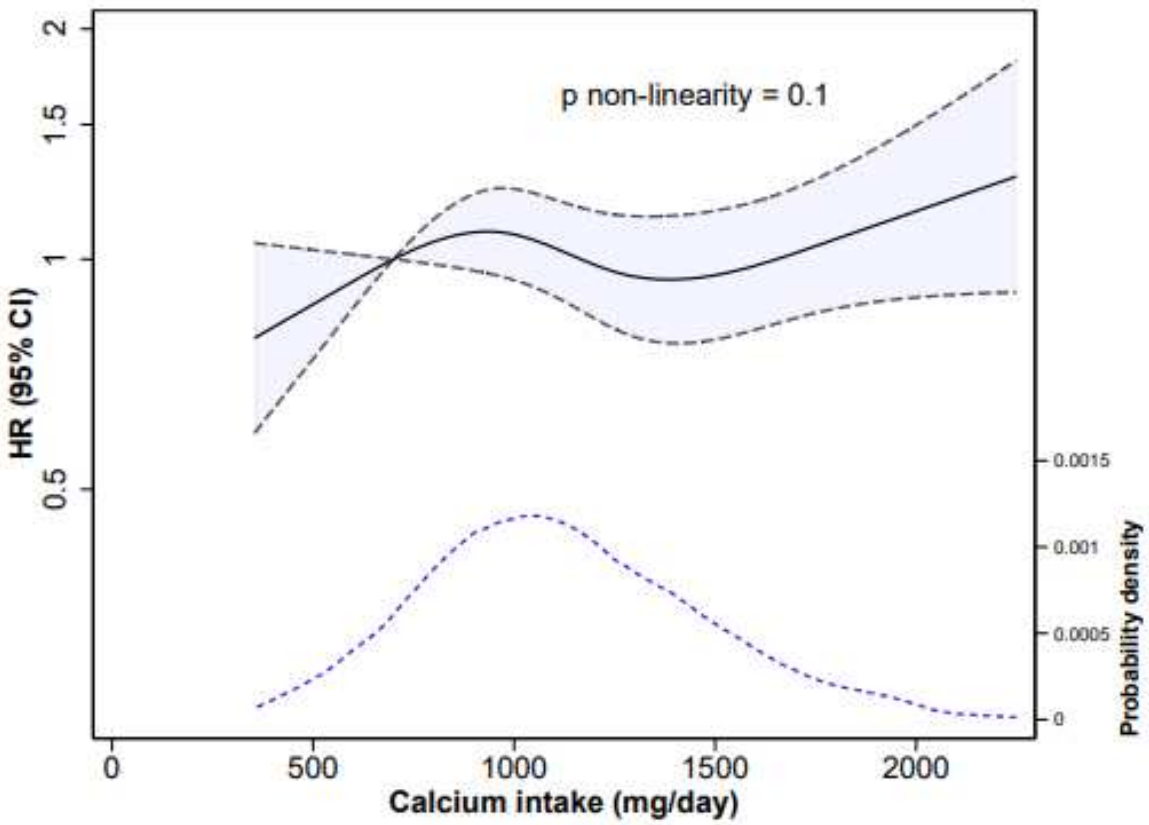

Figure S6: Risk of hip fracture as a function of calcium intake. Dashed lines represent 95% CI's. The blue line represents a kernel density plot showing the distribution of daily calcium intake in the cohort. Cox models were adjusted for ethnicity, socio-economic status, marital status, menopausal status, number of children, prevalence of cardiovascular disease, cancer, or diabetes, physical activity, smoking status, alcohol intake, height, body weight, use of any nutritional supplements, and dietary intake of protein, complex carbohydrates, fibre, sugar, saturated fat, monounsaturated fatty acids, polyunsaturated fatty acids, and vitamin D. HR (95% CI): adjusted hazard ratio, 95% confidence intervals.

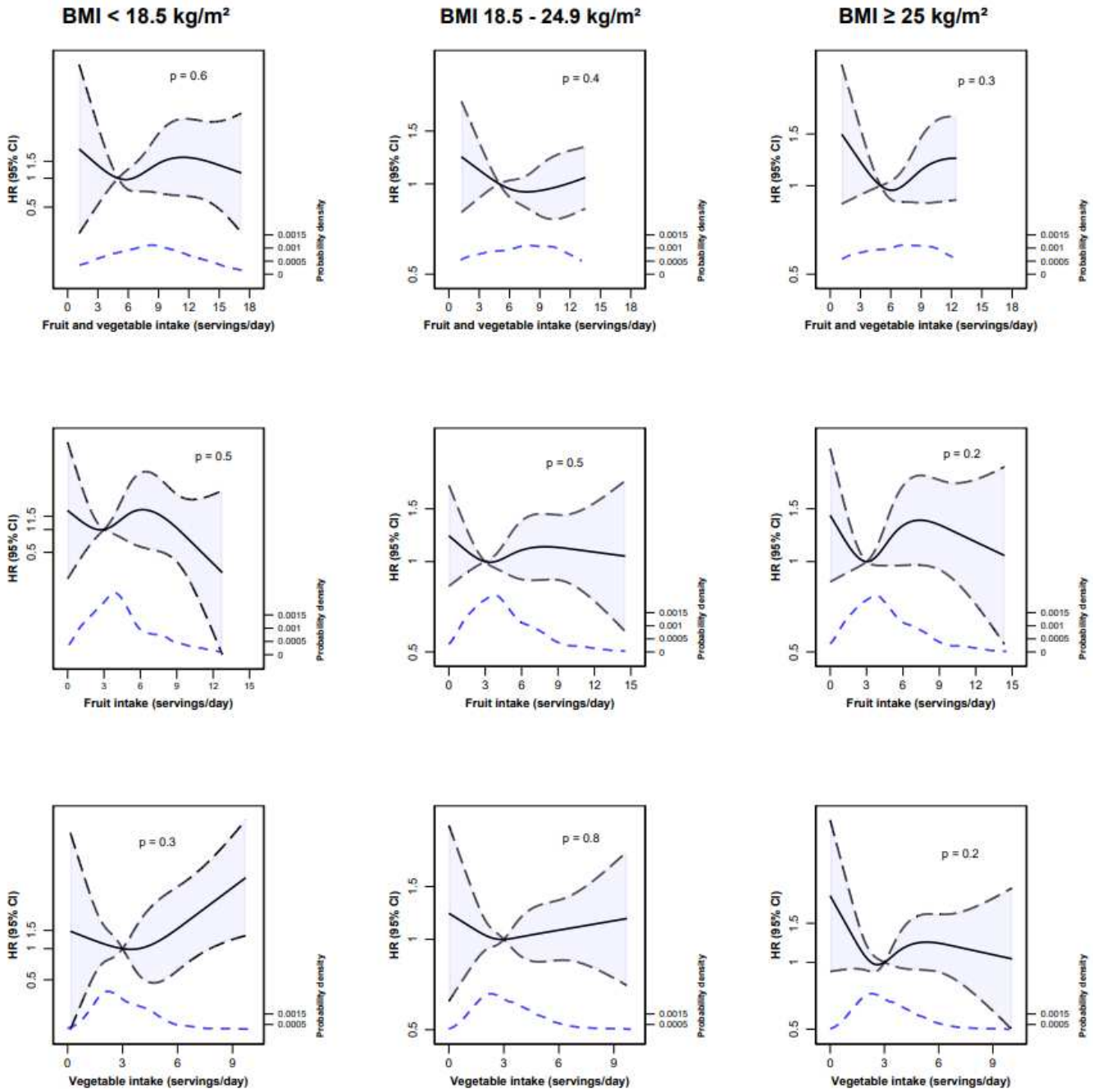

Figure S7: Risk of hip fracture as a function of fruit, vegetable, or fruit and vegetable intake stratified by body mass index (BMI). Dashed lines represent 95% CI's. Blue lines represent kernel density plots showing the distribution of daily fruit or vegetable intake in the cohort. Cox models were adjusted for ethnicity, socio-economic status, marital status, menopausal status, number of children, prevalence of cardiovascular disease, cancer, or diabetes, physical activity, smoking status, alcohol intake, use of any nutritional supplements, and intake of other major foods and beverages, and were mutually adjusted for fruit or vegetable intake as appropriate. HR (95% CI): adjusted hazard ratio, 95% confidence intervals; p refers to p non-linearity.

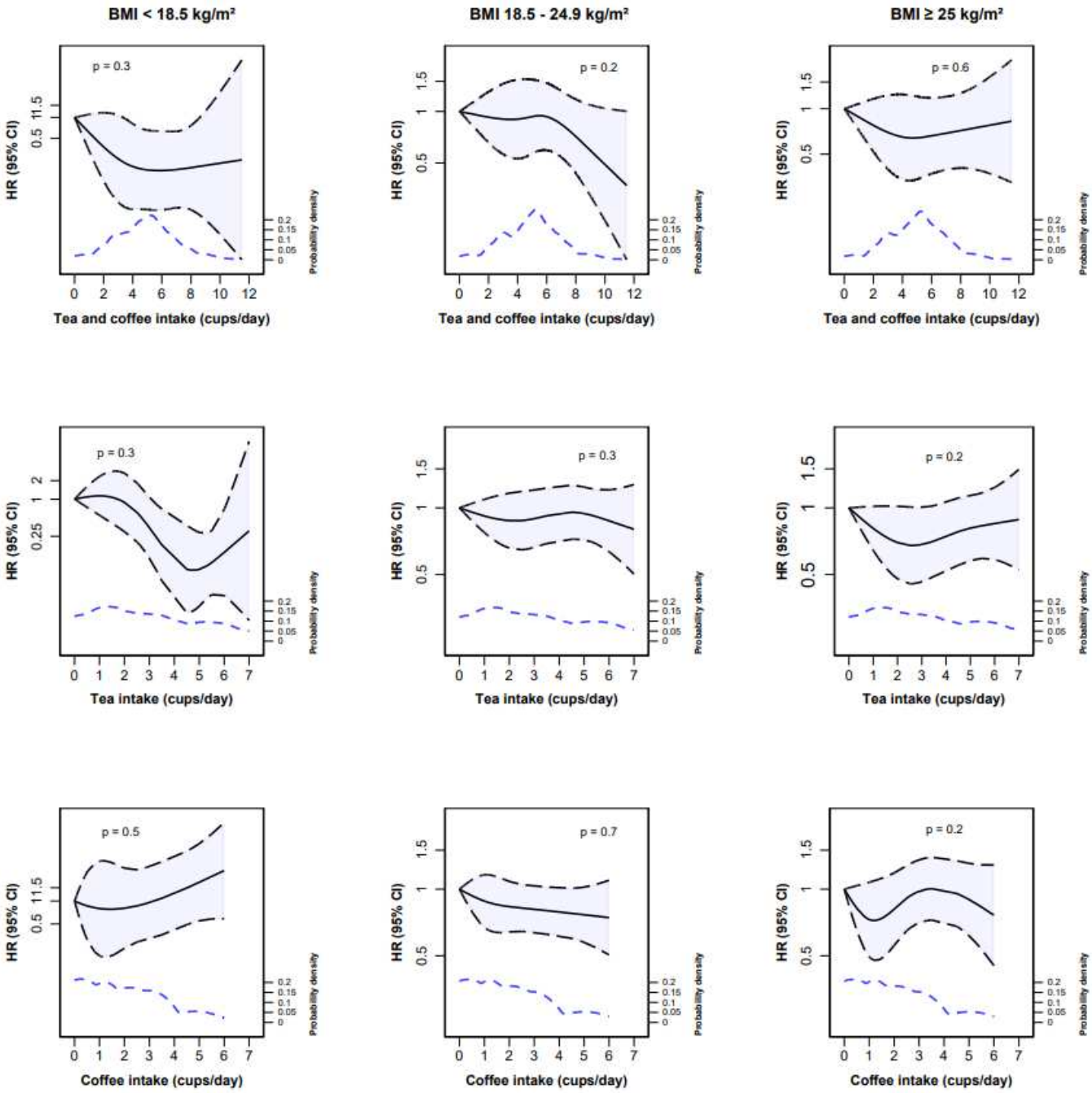

Figure S8: Risk of hip fracture as a function of tea, coffee, or tea and coffee intake stratified by body mass index (BMI). Dashed lines represent 95% CI's. Blue lines represent kernel density plots showing the distribution of daily tea or coffee intake in the cohort. Cox models were adjusted for ethnicity, socio-economic status, marital status, menopausal status, number of children, prevalence of cardiovascular disease, cancer, or diabetes, physical activity, smoking status, alcohol intake, use of any nutritional supplements, and intake of other major foods and beverages, and were mutually adjusted for tea or coffee intake as appropriate. HR (95% CI): adjusted hazard ratio, 95% confidence intervals.; p refers to p non-linearity.

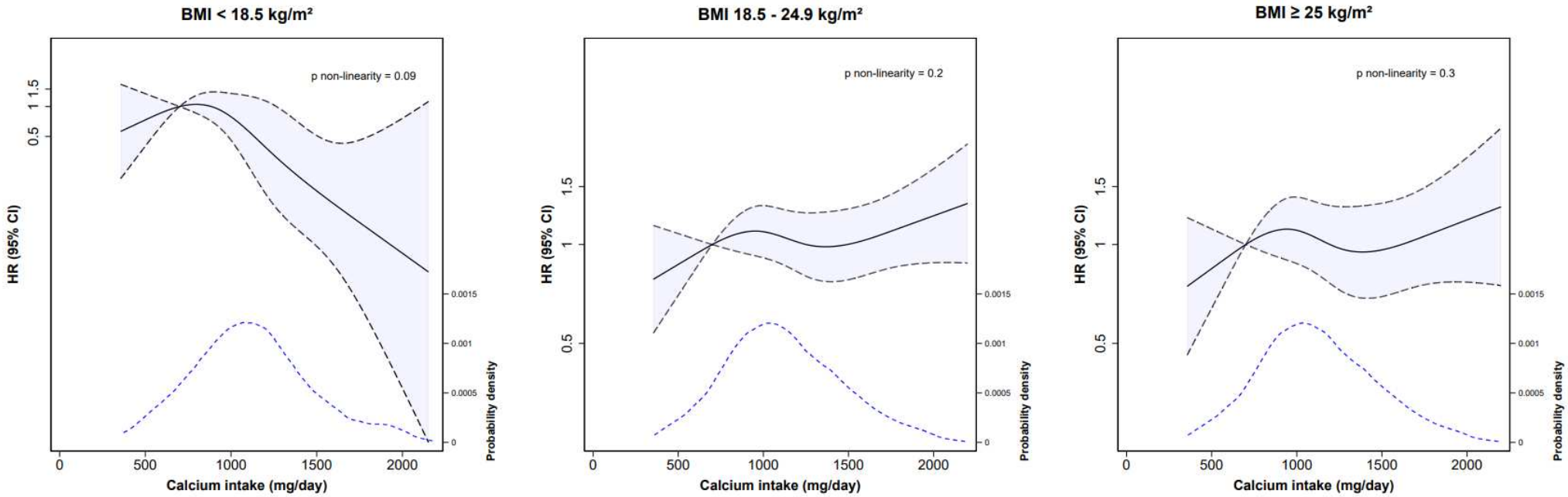

Figure S9: Risk of hip fracture as a function of calcium intake stratified by BMI (A = underweight: < 18.5 kg/m2; B = healthy weight: 18.5 – 24.9 kg/m2; or C = overweight: ≥ 25 kg/m2). Dashed lines represent 95% CI's. Blue lines represent kernel density plots showing the distribution of daily calcium intake in the cohort. Cox models were adjusted for ethnicity, socio-economic status, marital status, menopausal status, number of children, prevalence of cardiovascular disease, cancer, or diabetes, physical activity, smoking status, alcohol intake, use of any nutritional supplements, and dietary intake of protein, complex carbohydrates, fibre, sugar, saturated fat, monounsaturated fatty acids, polyunsaturated fatty acids, and vitamin D. HR (95% CI): adjusted hazard ratio, 95% confidence intervals.

Supplementary Tables

Table S1: Strengthening the reporting of observational studies in nutritional epidemiology (STROBE-Nut) checklist.

Section/topic	Item number	Recommendation	Page (line number)
Title and abstract	1	Indicate the study's design with a commonly used term in the title or the abstract	1 (1-3); 2 (11-13)
		Provide in the abstract an informative and balanced summary of what was done and what was found	2 (1-55); 3 (1-21)
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4 (1-57); 5 (1-20)
Objectives	3	State specific objectives, including any prespecified hypotheses	5 (19-24)
Methods			
Study design	4	Present key elements of study design early in the manuscript	6 (11-43)
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	6 (11-43)
Participants	6	Cohort study - give the eligibility criteria, and the sources and methods of selection of participants; describe methods of follow-up	6 (11-43); Additional file 1: Fig S1
		Cohort study - for matched studies, give matching criteria and number of exposed and unexposed Case-control study - for matched studies, give matching criteria and the number of controls per case	N/A
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers; give diagnostic criteria, if applicable	6 (46-54); 7 (1-57); 8 (1-57); 9 (1-57); 10 (1-10); Additional file 1: Figs S2 and S3, and Tables S2 and S3
Data sources/measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement); describe comparability of assessment methods if there is more than one group	6 (46-54); 7 (1-57); 8 (1-57); 9 (1-57); 10 (1-10); Additional file 1: Tables S2 and S3

Bias	9	Describe any efforts to address potential sources of bias	8 (18-25; 49-57); 9 (1-45); 10 (12-36); Additional file 1: Figs S2 and S3
Study size	10	Explain how the study size was arrived at	6 (11-34); 10 (46-55); Additional file 1: Fig S1
Quantitative variables	11	Explain how quantitative variables were handled in the analyses; if applicable, describe which groupings were chosen and why	9 (48-59); 10 (1-9)
Statistical methods	12	Describe all statistical methods, including those used to control for confounding	8 (1-57); 9 (1-57); 10 (1-36)
		Describe any methods used to examine subgroups and interactions	9 (48-59); 10 (1-9)
		Explain how missing data were addressed	10 (31-34)
		Cohort study - if applicable, explain how loss to follow-up was addressed	N/A
		Describe any sensitivity analyses	10 (12-36)
Results			
Participants	13*	Report numbers of individuals at each stage of study - e.g., numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analyzed	10 (46-55); Additional file 1: Fig S1
		Give reasons for nonparticipation at each stage Consider use of a flow diagram	10 (46-55); Additional file 1: Fig S1
Descriptive data	14*	Give characteristics of study participants (e.g., demographic, clinical, social) and information on exposures and potential confounders	11 (1-37); Table 1; Additional file 1: Table S5
		Indicate number of participants with missing data for each variable of interest Cohort study - summarize follow-up time (e.g., average and total amount)	10 (46-55); 11 (1-9) Additional file 1: Fig S1
Outcome data	15*	Cohort study - report numbers of outcome events or summary measures over time	11 (6-8)
Main results	16	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval); make clear which confounders were adjusted for and	11 (40-55); 12 (1-13); Fig 1

		why they were included Report category boundaries when continuous variables were categorized	
		If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done - e.g., analyses of subgroups and interactions, and sensitivity analyses	12 (15-57); 13 (1-8); Fig 2; Additional file 1: Figs S4-S9, Tables S7-S15, and Supplementary results
Discussion			
Key results	18	Summarize key results with reference to study objectives	20 (1-19)
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision; discuss both direction and magnitude of any potential bias	23 (15-57); 24 (1-7)
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	21 (44-57); 22 (1-56);-23 (1-9)
Generalizability	21	Discuss the generalizability (external validity) of the study results	24 (2-7)
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	24 (42-48)

Table S2: Derivation of food intakes at recruitment.

Food	Subtypes of foods included
Food exposures	
Fruit	Apples, avocado, bananas, grapes, kiwi, mangoes, oranges, satsumas, grapefruit, papaya, pears, pineapple, apricots, melon, nectarines, peaches, plums, raspberries, redcurrants/blackcurrants, rhubarb, strawberries, dates, figs, prunes, mixed dried fruit, currants, raisins, sultanas, fruit bars, fresh orange juice, other fruit juice
Vegetables	Bean sprouts, butter beans/broad beans, beetroot, broccoli, spring greens, kale, brussels, cabbage, carrots, cauliflower, celery, coleslaw, low calorie coleslaw, courgettes, marrow, squash, cucumber, garlic, green beans, runner beans, leeks, lettuce, mushrooms, aubergine, olives, parsnips, peas, peppers, swedes, sweetcorn, tomatoes, turnip, mustard and cress, watercress
Fruits and vegetables	Fruits, vegetables
Processed meat	Chicken nuggets/kievs, bacon, ham, luncheon meat, sausages, pies, pasties, sausage rolls, meat lasagne, meat pizza
Unprocessed red meat	Beef steak, beef stew, casserole, mince, or curry, beefburger, roast pork, pork stew, lamb roast, lamb stew/casserole
Unprocessed poultry	Roast chicken/turkey
Offal	Liver, kidney
Total meat	Processed meat, unprocessed red meat, unprocessed poultry, or offal
Oily fish	Mackerel, sardines, tuna
Nonoily fish	Fishfingers, fishcakes, fried fish in batter, white fish, shellfish fish roe, taramasalata, fish pie/lasagne
Total fish	Oily or non-oily fish
Eggs	Boiled, poached, omelette, scrambled, fried, quiche
Milk	Whole milk, half fat milk, fat free milk, channel island milk, dried milk, sterilised milk
Yoghurt	Thick and creamy yoghurt, low fat yoghurt, diet yoghurt, Greek yoghurt, fromage frais/crème frais
Cheese	Low fat cheese, cheddar, brie, edam type cheese, cottage cheese, cheese and onion pastie
Cream	Sour cream, double/clotted cream
Dairy desserts	Ice cream, milk puddings, other
Total dairy	Milk, yoghurt, cheese, cream, or dairy desserts

Tea	Any tea
Coffee	Coffee caffeinated, decaffeinated, ground or instant
Tea and coffee	Any tea or coffee
Caffeinated coffee	Caffeinated coffee, ground or instant
Decaffeinated coffee	Decaffeinated coffee, ground or instant
Energy-contributing food covariates	**Foods included**
Grains	White bread, brown bread, wholemeal bread, chapati, papadum, tortilla, pitta bread, crispbread, cream crackers, barley, oats, bulgar wheat, wheatgerm, couscous
Cereals	Porridge, sugar coated cereals, non-sugar coated cereal, muesli, allbran, bran flakes, Weetabix, shredded wheat
Potatoes, rice, and pasta	Boiled, mashed, chips, jacket, roast, salad, white pasta, wholemeal pasta, white rice, brown rice, wild rice, macaroni cheese
Soya alternatives	Soya cheese, soya yoghurt, soya milk
Spreads	Butter, block margarine, low or very low fat spread, marmite, Bovril, vegemite, peanut butter, chocolate nut spread, jam, marmalade, honey, vegetable pate, nut pate
Sauces and soups	Salad cream, mayonnaise, French type dressing, curry sauce, tomato ketchup, pickles, chutney, pesto sauce, packet soup, vegetable soup, meat soup
Nuts and seeds	Pistachios, peanuts, cashew nuts, almonds, pecan nuts, walnuts, sunflower/sesame seeds
Beans and pulses	Lentils, dals, chick peas, hummus, baked beans, mung beans, red kidney beans, black eyed beans
Sweets and confectionery	Cereal bars, flapjack, chocolate bars, boiled sweets, toffees, mints, biscuits, cake, buns, pastries, croissants, scones, pancakes, muffins, crumpets, tarts, crumbles, sponge puddings
Savoury snacks	Crisps, fried snacks, Bombay mix
Textured vegetable protein	Quorn, sosmix, soy protein
Other hot beverages	Coffee substitute, coffee whitener, hot chocolate, cocoa, Horlick, Ovaltine
Other beverages	Squash, soft drinks

Table S3: Covariates at recruitment and their derivation.

Covariate	How the variable was derived
Socio-demographic variables	
Age	Calculated as year differences between date of birth and date of recruitment and was considered a continuous variable in adjustment sets.
Ethnicity	Participants were asked to select which ethnic group they belong to of 'white, 'Bangladeshi', 'Indian', 'Chinese', 'Pakistani', 'Black-Caribbean', 'Black – other', 'other'. We regrouped ethnicity into 'White', 'Asian', 'Black', and 'Other'.
Socio-economic status	Participants were asked about their occupation. Options were 'never had paid job', 'managers and administrators', 'professional', 'technical and associate professional', 'clerical and secretarial', 'craft and skilled', 'personal and protective', 'sales', 'plant and machine operatives', or 'other'. We condensed these options into 'routine/manual', 'intermediate', or 'managerial/professional'.
Education	Participants were asked what their highest educational qualification was. Options were 'no qualifications', 'O level', 'A level', 'degree', or 'missing'.
Marriage	Participants were asked 'what is your marital status?' with options of 'married or living as married', 'divorced', 'widowed', 'single', or 'separated'. We combined 'divorced' and 'separated' together, and 'widowed' and 'single' together.
Lifestyle and other variables	
Physical activity	Participants were asked how long they perform exercises that makes them sweat per week (in hours and minutes per week). This was computed as hours per day.
Smoking	Participants were asked to describe their smoking habit as 'smoke daily', 'smoke occasionally', 'ex-smoker', or 'never'. We combined daily and occasional smokers into 'smokers', and kept 'ex-smoker' and 'never smoked' the same.
Alcohol	Participants were asked how often they drink alcohol. Options were "more than once per week"; "once per week", "less than once per week", "never drink alcohol"
Body weight	Self-reported continuous variable
Height	Self-reported continuous variable
Body mass index	Calculated as self-reported weight divided by the square of self-reported height, considered as a continuous variable
Number of children	Self-reported continuous variable
Menopausal status	Categorised participants as pre-menopausal or post-menopausal. Criteria for postmenopausal was: age > 55 years, both ovaries removed, currently on hormone replacement therapy, or no periods in the last 12 months.

Hormone replacement therapy use	Participants were asked ‘have you ever used hormone replacement therapy?’ and ‘are you using HRT now?’ – based on these yes or no answers, we categorised hormone replacement therapy use as ‘current’, ‘ex-user’, and ‘never’.

Table S4: Adjustment sets for each multivariable-adjusted model of associations between intake of primary foods and nutrients and hip fracture risk in the UK Women's Cohort Study.

	Variables adjusted for
Common adjustment set	Ethnicity (white, Asian, black, other), socio-economic status (SES; professional/managerial, intermediate, routine/manual), marital status (married/living as married, separated/divorced, single/widowed), menopausal status (premenopausal, postmenopausal), number of children (continuous), prevalence of cardiovascular disease, cancer, or diabetes (yes, no), physical activity in hours per day (continuous), smoking status (current, former, never), alcohol intake (> 1/week, ≤ 1/week, never), height (continuous), body weight (continuous), and use of any nutritional supplements (yes, no).
Primary foods	
Fruit and vegetables	Common adjustment set + total meat, total fish, eggs, total dairy, tea and coffee, grains, cereals, potatoes, soya alternative products, spreads, sauces, nuts and seeds, pulses, textured vegetable protein, confectionery, savoury snacks, other hot beverages, other beverages
Fruit	Common adjustment set + total meat, total fish, eggs, total dairy, tea and coffee, grains, total cereals, potatoes, soya alternative products, spreads, sauces, nuts and seeds, pulses, textured vegetable protein, confectionery, savoury snacks, other hot beverages, other beverages, vegetables
Vegetables	Common adjustment set + total meat, total fish, eggs, total dairy, tea and coffee, grains, total cereals, potatoes, soya alternative products, spreads, sauces, nuts and seeds, pulses, textured vegetable protein, confectionery, savoury snacks, other hot beverages, other beverages, fruit
Total meat	Common adjustment set + fruit and vegetables, total fish, eggs, total dairy, tea and coffee, grains, total cereals, potatoes, soya alternative products, spreads, sauces, nuts and seeds, pulses, textured vegetable protein, confectionery, savoury snacks, other hot beverages, other beverages

Total fish	Common adjustment set + fruit and vegetables, total meat, eggs, total dairy, tea and coffee, grains, total cereals, potatoes, soya alternative products, spreads, sauces, nuts and seeds, pulses, textured vegetable protein, confectionery, savoury snacks, other hot beverages, other beverages
Total dairy	Common adjustment set + fruit and vegetables, total meat, total fish, eggs, tea and coffee, grains, total cereals, potatoes, soya alternative products, spreads, sauces, nuts and seeds, pulses, textured vegetable protein, confectionery, savoury snacks, other hot beverages, other beverages
Milk	Common adjustment set + fruit and vegetables, total meat, total fish, eggs, yoghurt, cheese, cream, dairy desserts, tea and coffee, grains, total cereals, potatoes, soya alternative products, spreads, sauces, nuts and seeds, pulses, textured vegetable protein, confectionery, savoury snacks, other hot beverages, other beverages
Yoghurt	Common adjustment set + fruit and vegetables, total meat, total fish, eggs, milk, cheese, cream, dairy desserts, tea and coffee, grains, total cereals, potatoes, soya alternative products, spreads, sauces, nuts and seeds, pulses, textured vegetable protein, confectionery, savoury snacks, other hot beverages, other beverages
Cheese	Common adjustment set + fruit and vegetables, total meat, total fish, eggs, milk, yoghurt, cream, dairy desserts, tea and coffee, grains, total cereals, potatoes, soya alternative products, spreads, sauces, nuts and seeds, pulses, textured vegetable protein, confectionery, savoury snacks, other hot beverages, other beverages
Tea and coffee	Common adjustment set + fruit and vegetables, total meat, total fish, eggs, total dairy, grains, total cereals, potatoes, soya alternative products, spreads, sauces, nuts and seeds, pulses, textured vegetable protein, confectionery, savoury snacks, other hot beverages, other beverages
Tea	Common adjustment set + fruit and vegetables, total meat, total fish, eggs, total dairy, grains, total cereals, potatoes, soya alternative products, spreads, sauces, nuts and seeds, pulses, textured vegetable protein, confectionery, savoury snacks, coffee, other hot beverages, other beverages
Coffee	Common adjustment set + fruit and vegetables, total meat, total fish, eggs, total dairy, grains, total cereals, potatoes, soya alternative products, spreads, sauces, nuts and seeds, pulses, textured vegetable protein, confectionery, savoury snacks, tea, other hot beverages, other beverages

Primary nutrients	
Protein	Common adjustment set + carbohydrates, fibre, sugar, SFA, MUFA, PUFA, vitamin D, calcium
Calcium	Common adjustment set + protein, carbohydrates, fibre, sugar, SFA, MUFA, PUFA, vitamin D
Vitamin D	Common adjustment set + protein, carbohydrates, fibre, sugar, SFA, MUFA, PUFA, calcium

All foods and beverages in adjustment sets were continuous variables measured in g/day or ml/day as appropriate. SFA: saturated fat; MUFA: monounsaturated fatty acids; PUFA: polyunsaturated fatty acids.

Table S5: Further dietary characteristics of UK Women's Cohort Study participants at recruitment by hip fracture incidence.

Dietary intake, M (SD)	**Total**	**Cases**	**Non-cases**
Participants (%)	26,318	822 (3.1)	25496 (96.9)
Foods and beverages			
Red meat (g/day)	39.4 (47.0)	43.8 (48.5)	39.3 (46.9)
Poultry (g/day)	16.8 (20.0)	15.7 (17.5)	16.8 (20.1)
Processed meat (g/day)	28.3 (30.9)	25.8 (28.3)	28.4 (31.0)
Offal (g/day)	1.9 (3.6)	2.3 (3.9)	1.9 (3.6)
Oily fish (g/day)	9.0 (12.0)	9.5 (13.9)	9.0 (11.9)
Non-oily fish (g/day)	24.7 (22.9)	26.7 (23.4)	24.7 (22.8)
Cream (g/day)	1.7 (3.4)	2.0 (4.4)	1.7 (3.4)
Dairy desserts (g/day)	20.0 (25.9)	25.5 (31.2)	19.8 (25.7)
Eggs (number/day)	0.3 (0.2)	0.3 (0.3)	0.3 (0.2)
Caffeinated coffee (cups/day)	1.5 (1.7)	1.4 (1.5)	1.5 (1.7)
Decaffeinated coffee (cups/day)	0.5 (1.1)	0.4 (1.0)	0.5 (1.1)
Nutrients			
Protein (% energy)	15.5 (2.6)	15.5 (2.6)	15.5 (2.6)
Protein (g/kg-BW/day)	1.4 (0.4)	1.4 (0.5)	1.4 (0.4)
Carbohydrate (g/day)	304.2 (93.7)	311.3 (98.8)	304.0 (93.6)
Carbohydrate (% energy)	53.0 (6.7)	53.2 (6.9)	52.9 (6.7)
Fibre intake (g/day)	24.8 (9.1)	25.5 (9.7)	24.7 (9.1)
Fibre (% energy)	2.2 (0.6)	2.2 (0.6)	2.2 (0.6)
Fat (g/day)	83.2 (30.4)	85.7 (33.1)	83.2 (30.3)
Fat (% energy)	32.2 (5.6)	32.5 (5.8)	32.2 (5.6)
SFA (g/day)	28.9 (12.7)	30.2 (14.2)	28.9 (12.7)
SFA (% energy)	11.1 (3.1)	11.4 (3.3)	11.1 (3.1)

MUFA (g/day)	27.3 (10.5)	28.0 (11.5)	27.3 (10.4)
MUFA (% energy)	10.6 (2.2)	10.6 (2.4)	10.6 (2.2)
PUFA (g/day)	15.9 (6.4)	15.9 (6.8)	15.9 (6.4)
PUFA (% energy)	6.2 (1.6)	6.1 (1.8)	6.2 (1.6)
Vitamin B12 (µg/day)	5.7 (3.0)	6.1 (3.2)	5.7 (3.0)
Vitamin C (mg/day)	165.2 (70.6)	171.9 (71.5)	165.0 (70.6)

BW: body weight; SFA: saturated fat, MUFA: monounsaturated fatty acids; PUFA: polyunsaturated fatty acids. M (SD): mean (standard deviation).

Table S6: Characteristics of UK Women's Cohort Study participants at recruitment that were included or excluded from adjusted analyses.

	26,318 participants included in adjusted analyses			3,923 participants excluded from adjusted analyses		
Characteristics, n (%) or M (SD)	**Total**	**Cases**	**Non-cases**	**Total**	**Cases**	**Non-cases**
Participants (%)	26318	822 (3.1)	25496 (96.9)	3926	171 (4.4)	3755 (95.6)
Socio-demographics						
Age, years (SD)	52.1 (9.2)	62.1 (8.0)	51.8 (9.1)	54.0 (10.0)	62.3 (7.8)	53.6 (9.9)
Degree-level education (%)	6502 (26.8)	155 (22.2)	6347 (27.0)	882 (22.5)	34 (19.9)	848 (22.6)
SES						
Professional or managerial (%)	19057 (72.4)	565 (68.7)	18492 (72.5)	2387 (60.8)	93 (54.4)	2294 (61.1)
Intermediate (%)	2440 (9.3)	111 (13.5)	2329 (9.1)	484 (12.3)	26 (15.2)	458 (12.2)
Routine or manual (%)	4821 (18.3)	146 (17.8)	4675 (18.3)	724 (18.4)	34 (19.9)	690 (18.4)
Married (%)	20268 (77.0)	586 (71.3)	19682 (77.2)	2146 (54.7)	69 (40.4)	2077 (55.3)
White ethnicity (%)	25992 (98.8)	815 (99.1)	25177 (98.7)	3053 (77.8)	128 (74.9)	2925 (77.9)
Lifestyle						
Exercise, hours/day (SD)	0.2 (0.5)	0.2 (0.4)	0.2 (0.5)	0.2 (0.4)	0.2 (0.6)	0.2 (0.4)
Smoking status						
Current (%)	3513 (13.3)	112 (13.6)	3401 (13.3)	677 (17.2)	35 (20.5)	642 (17.1)
Former (%)	7947 (30.2)	255 (31.0)	7692 (30.2)	1193 (30.4)	47 (27.5)	1146 (30.5)
Never (%)	14858 (56.5)	455 (55.4)	14403 (56.5)	2056 (52.4)	89 (52.0)	1967 (52.4)
Alcohol consumption						
>1/week (%)	13918 (52.9)	389 (47.3)	13529 (53.1)	1743 (44.4)	64 (37.4)	1679 (44.7)
≤ 1/week (%)	9290 (35.3)	280 (34.1)	9010 (35.3)	1449 (36.9)	60 (35.1)	1389 (37.0)
Never (%)	3110 (11.8)	153 (18.6)	2957 (11.6)	734 (18.7)	47 (27.5)	687 (18.3)
Nutritional supplementation (%)	14009 (53.2)	425 (51.7)	13584 (53.3)	1984 (50.5)	94 (55.0)	1890 (50.3)
Anthropometrics						
BMI, kg/m^2 (SD)	24.4 (4.2)	24.2 (4.3)	24.4 (4.2)	24.7 (4.5)	24.7 (4.6)	24.7 (4.5)

< 18.5 (%)	545 (2.1)	28 (3.4)	517 (2.0)	78 (2.0)	5 (2.9)	73 (1.9)
18.5 – 24.9 (%)	16659 (63.3)	514 (62.5)	16145 (63.3)	1664 (42.4)	74 (43.3)	1590 (42.3)
≥ 25 (%)	9114 (34.6)	280 (34.1)	8834 (34.6)	2184 (55.6)	92 (53.8)	2092 (55.7)
Height, m (SD)	1.6 (0.1)	1.6 (0.1)	1.6 (0.1)	1.6 (0.1)	1.6 (0.1)	1.6 (0.1)
Diet						
Dietary pattern						
Regular meat-eater (%)	12221 (46.4)	394 (47.9)	11827 (46.4)	1763 (44.9)	77 (45.0)	1686 (44.9)
Occasional meat-eater (%)	6902 (26.2)	247 (30.0)	6655 (26.1)	1098 (28.0)	49 (28.7)	1049 (27.9)
Pescatarian (%)	3377 (12.8)	80 (9.7)	3297 (12.9)	490 (12.5)	18 (10.5)	472 (12.6)
Vegetarian (%)	3818 (14.5)	101 (12.3)	3717 (14.6)	575 (14.6)	27 (15.8)	548 (14.6)
Energy intake (kcal/day)	2300 (654.8)	2346 (696.6)	2298 (653.4)	2251 (680.5)	2224 (727.4)	2252 (678.3)
Protein, g/day (SD)	88.1 (26.3)	89.7 (27.2)	88.1 (26.2)	86.2 (27.4)	86.6 (28.2)	86.1 (27.3)
Calcium, mg/day (SD)	1135 (365.4)	1160 (377.1)	1134 (365.0)	1109 (382.2)	1106 (365.3)	1110 (382.9)
Vitamin D intake (µg/day)	3.1 (1.7)	3.4 (1.8)	3.1 (1.7)	3.0 (1.7)	3.1 (1.7)	3.0 (1.7)
Other						
Menopausal status						
Postmenopausal (%)	14611 (55.5)	734 (89.3)	13877 (54.4)	2338 (59.6)	149 (87.1)	2189 (58.3)
Premenopausal (%)	11707 (44.5)	88 (10.7)	11619 (45.6)	1279 (32.6)	18 (10.5)	1261 (33.6)
≥ 1 children (%)	20723 (78.7)	667 (81.1)	20056 (78.7)	2789 (71.0)	119 (69.6)	2670 (71.1)
Prevalence of CVD, cancer, or diabetes (%)	2388 (9.1)	126 (15.3)	2262 (8.9)	407 (10.4)	23 (13.5)	384 (10.2)

SD: standard deviation; SES: social economic status; BMI: body mass index; CVD: cardiovascular disease.

Table S7: Associations between dietary intake of secondary foods and nutrients and hip fracture risk in UK Women's Cohort Study participants.

	Unadjusted		Multivariable-adjusted	
Exposure (per serving increment/day)	**HR (95% CI)**	**p**	**HR (95% CI)**	**P**
Foods				
Red meat (189 g)	1.02 (0.78, 1.35)	0.9	1.14 (0.82, 1.59)	0.4
Processed meat (74 g)	0.89 (0.71, 1.12)	0.3	0.86 (0.66, 1.14)	0.3
Poultry (143 g)	0.56 (0.32, 0.99)	0.05	0.65 (0.36, 1.17)	0.1
Oily fish (90 g)	0.95 (0.49, 1.83)	0.9	1.03 (0.51, 2.09)	0.9
Non-oily fish (127 g)	0.83 (0.55, 1.25)	0.4	0.75 (0.47, 1.20)	0.2
Cream (25 g)	1.17 (0.77, 1.77)	0.5	1.10 (0.70, 1.72)	0.7
Dairy desserts (148 g)	1.36 (0.98, 1.89)	0.07	1.31 (0.93, 1.89)	0.1
Eggs (88 g)	1.19 (0.87, 1.64)	0.3	1.18 (0.84, 1.65)	0.3
Caffeinated coffee (260 ml)	0.98 (0.94, 1.03)	0.5	0.96 (0.91, 1.02)	0.2
Decaffeinated coffee (260 ml)	0.94 (0.88, 1.02)	0.1	0.93 (0.86, 1.00)	0.07
Nutrients				
Carbohydrates (50 g)	1.03 (0.99, 1.07)	0.1	1.02 (0.92, 1.14)	0.7
Fibre (5 g)	1.00 (0.96, 1.07)	0.8	0.99 (0.92, 1.06)	0.7
Fat (10 g)	1.03 (1.00, 1.05)	0.03	1.04 (1.00, 1.08)	0.06
SFA (10 g)	1.06 (1.00, 1.12)	0.04	1.00 (0.84, 1.19)	1
MUFA (10 g)	1.08 (1.01, 1.16)	0.03	1.12 (0.81, 1.54)	0.5
PUFA (10 g)	1.10 (0.98, 1.24)	0.09	0.97 (0.71, 1.32)	0.9

Vitamin B1 (mg)	1.01 (0.97, 1.04)	0.7	1.01 (0.97, 1.05)	0.6
Vitamin B2 (mg)	0.99 (0.91, 1.08)	0.9	0.95 (0.80, 1.12)	0.5
Vitamin B6 (mg)	1.02 (0.93, 1.12)	0.7	1.04 (0.88, 1.23)	0.6
Vitamin B12 (µg)	0.99 (0.97, 1.02)	0.7	0.99 (0.95, 1.03)	0.6
Vitamin C (10 mg)	1.01 (1.00, 1.02)	0.3	1.01 (0.997, 1.03)	0.1
Iron (5 mg)	0.98 (0.93, 1.04)	0.6	0.92 (0.82, 1.02)	0.1
Folate (100 µg)	1.03 (0.97, 1.09)	0.4	1.09 (0.98, 1.22)	0.1
Sodium (1 g)	1.05 (0.97, 1.13)	0.2	1.14 (0.97, 1.34)	0.1
Zinc (5 mg)	0.99 (0.89, 1.10)	0.8	0.89 (0.63, 1.28)	0.5
Sugar (20 g)	1.03 (1.00, 1.05)	0.06	1.02 (0.96, 1.08)	0.5
Phosphorus (225 mg)	1.00 (0.97, 1.02)	0.8	1.00 (0.97, 1.02)	0.7
Magnesium (135 mg)	1.00 (0.93, 1.02)	0.9	0.98 (0.90, 1.07)	0.7
Potassium (1750 mg)	1.00 (0.92, 1.09)	0.5	1.01 (0.91, 1.11)	0.9
Selenium (30 µg)	1.00 (0.98, 1.01)	0.9	0.96 (0.85, 1.09)	0.5

Unadjusted and adjusted models were based on 26,318 women with 822 hip fracture cases (556,331 person-years), and both controlled for age (continuous). All adjusted models were also adjusted for (all at recruitment): ethnicity (white, Asian, black, other), socio-economic status (SES; professional/managerial, intermediate, routine/manual), marital status (married/living as married, separated/divorced, single/widowed), menopausal status (premenopausal, postmenopausal), number of children (continuous), prevalence of cardiovascular disease, cancer, or diabetes (yes, no), physical activity in hours per day (continuous), smoking status (current, former, never), alcohol intake (> 1/week, ≤ 1/week, never), height (continuous), body weight (continuous), and use of any nutritional supplements (yes, no). Models with food exposures were mutually adjusted for other major foods and beverages. Models for nutrient exposures were also adjusted for protein, complex carbohydrates, fibre, sugar, saturated fat (SFA), monounsaturated fatty acid (MUFA), polyunsaturated fatty acid (PUFA), calcium, and vitamin D intakes from dietary sources. HR (95% CI): hazard ratio 95% confidence interval.

Table S8: Associations between dietary intake of secondary foods and nutrients and hip fracture risk in UK Women's Cohort Study participants, stratified by BMI.

	Multivariable-adjusted HR (95% CI), cases/subjects			
	BMI			
Exposure (per serving increment/day)	**< 18.5 (28/545)**	**18.5 – 24.9 (514/16659)**	**≥ 25 (280/9114)**	***p* interaction**
Secondary foods and beverages				
Red meat (189 g)	0.16 (0.02, 1.43)	1.18 (0.79, 1.77)	1.13 (0.72, 1.77)	0.2
Processed meat (74 g)	0.45 (0.13, 1.58)	1.05 (0.76, 1.45)	0.68 (0.46, 1.00)	0.1
Poultry (143 g)		0.81 (0.42, 1.59)	0.42 (0.15, 1.17)	0.6
Oily fish (90 g)		0.93 (0.39, 1.08)	1.51 (0.53, 4.27)	0.5
Non-oily fish (127 g)	0.37 (0.04, 3.47)	0.73 (0.41, 1.29)	0.82 (0.41, 1.64)	0.8
Cream (25 g)	0.82 (0.30, 2.21)	1.09 (0.65, 1.81)	1.24 (0.57, 2.72)	0.8
Dairy desserts (148 g)	0.60 (0.06, 5.99)	1.40 (0.93, 2.11)	1.25 (0.69, 2.24)	0.7
Eggs (88 g)	1.27 (0.25, 6.43)	1.31 (0.89, 1.93)	0.93 (0.53, 1.63)	0.6
Caffeinated coffee (260 ml)	0.90 (0.55, 1.49)	0.94 (0.87, 1.00)	1.01 (0.94, 1.09)	0.3
Decaffeinated coffee (260 ml)	1.33 (0.97, 1.83)	0.95 (0.86, 1.04)	0.90 (0.79, 1.02)	0.07
Secondary nutrients				
Carbohydrates (50 g)	0.90 (0.71, 1.14)	1.02 (0.92, 1.14)	1.04 (0.93, 1.16)	0.4
Fibre (5 g)	0.92 (0.73, 1.16)	0.98 (0.90, 1.06)	1.00 (0.91, 1.10)	0.7
Fat (10 g)	0.96 (0.85, 1.10)	1.04 (1.00, 1.08)	1.04 (0.99, 1.09)	0.5
SFA (10 g)	0.82 (0.59, 1.14)	1.00 (0.98, 1.02)	1.02 (0.85, 1.22)	0.4

MUFA (10 g)	0.96 (0.57, 1.62)	1.11 (0.81, 1.53)	1.11 (0.80, 1.56)	0.8
PUFA (10 g)	0.98 (0.45, 2.12)	1.01 (0.73, 1.40)	0.94 (0.67, 1.33)	0.8
Vitamin B1 (mg)	1.14 (0.91, 1.43)	1.00 (0.95, 1.05)	1.02 (0.97, 1.07)	0.5
Vitamin B2 (mg)	0.54 (0.35, 0.84)	0.94 (0.79, 1.12)	1.04 (0.84, 1.27)	0.02
Vitamin B6 (mg)	0.80 (0.49, 1.31)	1.04 (0.87, 1.24)	1.10 (0.88, 1.36)	0.4
Vitamin B12 (µg)	0.83 (0.71, 0.97)	0.98 (0.94, 1.02)	1.01 (0.96, 1.07)	0.03
Vitamin C (10 mg)	0.98 (0.90, 1.05)	1.01 (0.99, 1.03)	1.01 (0.99, 1.03)	0.6
Iron (5 mg)	0.74 (0.57, 0.96)	0.91 (0.80, 1.02)	0.96 (0.85, 1.08)	0.1
Folate (100 µg)	0.82 (0.59, 1.13)	1.08 (0.96, 1.21)	1.12 (0.98, 1.29)	0.2
Sodium (1 g)	0.82 (0.60, 1.13)	1.15 (0.96, 1.37)	1.14 (0.94, 1.38)	0.09
Zinc (5 mg)	0.46 (0.26, 0.83)	0.89 (0.62, 1.27)	0.94 (0.64, 1.37)	0.02
Sugar (20 g)	0.96 (0.80, 1.16)	1.02 (0.96, 1.08)	1.02 (0.96, 1.09)	0.8
Phosphorus (225 mg)	0.95 (0.80, 1.12)	0.99 (0.96, 1.02)	1.01 (0.96, 1.05)	0.7
Magnesium (135 mg)	1.02 (0.67, 1.55)	0.96 (0.87, 1.06)	1.01 (0.89, 1.16)	0.7
Potassium (1750 mg)	0.97 (0.57, 1.65)	0.98 (0.87, 1.10)	1.05 (0.90, 1.22)	0.7
Selenium (30 µg)	0.81 (0.50, 1.30)	0.95 (0.82, 1.10)	0.98 (0.82, 1.17)	0.8

All models controlled for age (continuous), and were adjusted for (all at recruitment): ethnicity (white, Asian, black, other), socio-economic status (SES; professional/managerial, intermediate, routine/manual), marital status (married/living as married, separated/divorced, single/widowed), menopausal status (premenopausal, postmenopausal), number of children (continuous), prevalence of cardiovascular disease, cancer, or diabetes (yes, no), physical activity in hours per day (continuous), smoking status (current, former, never), alcohol intake (> 1/week, ≤ 1/week, never), and use of any nutritional supplements (yes, no). Models with food exposures were mutually adjusted for other major foods and beverages. Models for nutrient exposures were also adjusted for protein, complex carbohydrates, fibre, sugar, saturated fat (SFA), monounsaturated fatty acid (MUFA), polyunsaturated fatty acid (PUFA), calcium, and vitamin D intakes from dietary sources. Associations between poultry and oily fish intakes and hip fracture risk could not be estimated in the underweight group due to low heterogeneity in consumption among cases. HR (95% CI): hazard ratio 95% confidence interval.

Table S9: Associations between dietary intake of foods, nutrients, and hip fracture risk in UK Women's Cohort Study participants, stratified by age.

	Multivariable-adjusted HR (95% CI), cases/subjects		
	Age (years)		
Exposure (per serving increment/day)	**≤ 60 (262/20384)**	**> 60 (560/5934)**	***p* interaction**
Primary foods and beverages			
Fruits and vegetables (80 g)	1.02 (0.98, 1.06)	1.01 (0.98, 1.03)	0.6
Fruits (80 g)	1.02 (0.98, 1.06)	1.01 (0.98, 1.04)	0.7
Vegetables (80 g)	1.03 (0.95, 1.10)	1.00 (0.95, 1.06)	0.6
Total meat (150 g)	0.93 (0.71, 1.23)	0.92 (0.75, 1.12)	0.9
Total fish (140 g)	0.87 (0.45 1.70)	0.78 (0.49, 1.23)	0.8
Total dairy (105 g)	1.01 (0.95, 1.08)	1.01 (0.96, 1.05)	0.9
Milk (240 ml)	1.02 (0.87, 1.21)	1.01 (0.90, 1.14)	0.9
Yoghurt (125 g)	0.97 (0.77, 1.21)	1.01 (0.87, 1.18)	0.7
Cheese (83 g)	0.94 (0.61, 1.45)	0.89 (0.60, 1.31)	0.9
Tea and coffee (260 ml)	0.91 (0.86, 0.97)	0.98 (0.94, 1.03)	0.04
Tea (260 ml)	0.93 (0.86, 1.00)	0.98 (0.93, 1.03)	0.2
Coffee (260 ml)	0.93 (0.86, 1.00)	0.97 (0.91, 1.03)	0.4
Primary nutrients			
Protein (25 g)	0.85 (0.70, 1.03)	0.85 (0.73, 1.01)	0.9
Calcium (300 mg)	1.01 (0.89, 1.15)	1.00 (0.89, 1.12)	0.9
Vitamin D (ug)	1.00 (0.92, 1.09)	1.06 (0.99, 1.12)	0.3

Secondary foods and beverages			
Red meat (189 g)	1.25 (0.75, 2.09)	1.09 (0.75, 1.60)	0.6
Processed meat (74 g)	0.92 (0.62, 1.37)	0.83 (0.60, 1.15)	0.7
Poultry (143 g)	0.50 (0.18, 1.38)	0.73 (0.37, 1.45)	0.5
Oily fish (90 g)	0.47 (0.13, 1.67)	1.38 (0.67, 2.83)	0.1
Non-oily fish (127 g)	1.11 (0.51, 2.41)	0.64 (0.38, 1.08)	0.2
Cream (25 g)	1.22 (0.33, 4.58)	1.07 (0.70, 1.64)	0.8
Dairy desserts (148 g)	1.86 (1.20, 2.90)	1.10 (0.72, 1.70)	0.1
Eggs (88 g)	1.32 (0.81, 2.17)	1.12 (0.74, 1.70)	0.6
Caffeinated coffee (260 ml)	0.93 (0.86, 1.01)	0.98 (0.92, 1.05)	0.3
Decaffeinated coffee (260 ml)	0.93 (0.82, 1.06)	0.93 (0.85, 1.02)	0.9
Secondary nutrients			
Carbohydrates (50 g)	1.03 (0.92, 1.16)	1.02 (0.92, 1.13)	0.8
Fibre (5 g)	0.97 (0.88, 1.06)	0.99 (0.92, 1.08)	0.5
Fat (10 g)	1.04 (0.99, 1.10)	1.03 (0.99, 1.08)	0.8
SFA (10 g)	1.00 (0.82, 1.22)	1.01 (0.85, 1.20)	0.9
MUFA (10 g)	1.15 (0.82, 1.60)	1.10 (0.80, 1.52)	0.6
PUFA (10 g)	1.04 (0.73, 1.48)	0.95 (0.69, 1.30)	0.4
Vitamin B1 (mg)	1.01 (0.96, 1.07)	1.01 (0.96, 1.06)	0.9
Vitamin B2 (mg)	0.93 (0.76, 1.14)	0.96 (0.80, 1.14)	0.7
Vitamin B6 (mg)	1.12 (0.90, 1.40)	1.01 (0.85, 1.21)	0.3
Vitamin B12 (μg)	0.98 (0.92, 1.03)	0.99 (0.95, 1.04)	0.6
Vitamin C (10 mg)	1.01 (0.99, 1.03)	1.01 (0.99, 2.03)	0.9

Iron (5 mg)	0.86 (0.74, 0.98)	0.93 (0.83, 1.05)	0.2
Folate (100 µg)	1.12 (0.97, 1.29)	1.08 (0.96, 1.21)	0.5
Sodium (1 g)	1.12 (0.92, 1.38)	1.14 (0.96, 1.36)	0.8
Zinc (5 mg)	0.85 (0.57, 1.26)	0.91 (0.63, 1.30)	0.6
Sugar (20 g)	1.03 (0.96, 1.10)	1.02 (0.96, 1.08)	0.6
Phosphorus (225 mg)	0.99 (0.94, 1.04)	1.00 (0.97, 1.03)	0.8
Magnesium (135 mg)	0.97 (0.84, 1.12)	0.99 (0.90, 1.09)	0.8
Potassium (1750 mg)	1.05 (0.88, 1.24)	1.00 (0.90, 1.11)	0.6
Selenium (30 µg)	0.91 (0.75, 1.09)	0.98 (0.85, 1.12)	0.5

All models controlled for age (continuous), and were adjusted for (all at recruitment): ethnicity (white, Asian, black, other), socio-economic status (SES; professional/managerial, intermediate, routine/manual), marital status (married/living as married, separated/divorced, single/widowed), menopausal status (premenopausal, postmenopausal), number of children (continuous), prevalence of cardiovascular disease, cancer, or diabetes (yes, no), physical activity in hours per day (continuous), smoking status (current, former, never), alcohol intake (> 1/week, ≤ 1/week, never), height (continuous), body weight (continuous), and use of any nutritional supplements (yes, no). Models with food exposures were mutually adjusted for other major foods and beverages. Models for nutrient exposures were also adjusted for protein, complex carbohydrates, fibre, sugar, saturated fat (SFA), monounsaturated fatty acid (MUFA), polyunsaturated fatty acid (PUFA), calcium, and vitamin D intakes from dietary sources. HR (95% CI): hazard ratio 95% confidence interval.

Table S10: Associations between dietary intake of foods, nutrients, and hip fracture risk in UK Women's Cohort Study participants, stratified by menopausal status.

	Multivariable-adjusted HR (95% CI), cases/subjects		
	Menopausal status		
Exposure (per serving increment/day)	**Pre-menopausal (88/11707)**	**Post-menopausal (734/14611)**	***p* interaction**
Primary foods and beverages			
Fruits and vegetables (80 g)	1.01 (0.96, 1.07)	1.01 (0.99, 1.03)	0.7
Fruits (80 g)	1.01 (0.94, 1.09)	1.01 (0.98, 1.03)	0.6
Vegetables (80 g)	1.02 (0.90, 1.15)	1.02 (0.98, 1.07)	0.9
Total meat (150 g)	0.98 (0.66, 1.45)	0.91 (0.77, 1.08)	0.3
Total fish (140 g)	0.40 (0.13, 1.29)	0.81 (0.57, 1.16)	0.5
Total dairy (105 g)	0.98 (0.88, 1.08)	1.01 (0.97, 1.05)	0.7
Milk (240 ml)	0.98 (0.75, 1.28)	1.02 (0.92, 1.12)	0.9
Yoghurt (125 g)	0.81 (0.51, 1.28)	1.00 (0.88, 1.14)	0.4
Cheese (83 g)	0.34 (0.14, 0.83)	1.02 (0.82, 1.26)	0.04
Tea and coffee (260 ml)	0.88 (0.80, 0.97)	0.99 (0.95, 1.02)	0.08
Tea (260 ml)	0.87 (0.78, 0.97)	1.00 (0.96, 1.04)	0.05
Coffee (260 ml)	0.96 (0.86, 1.08)	0.97 (0.92, 1.01)	0.7
Primary nutrients			
Protein (25 g)	0.81 (0.63, 1.03)	0.85 (0.73, 0.98)	0.7

Calcium (300 mg)	0.98 (0.81, 1.19)	1.02 (0.93, 1.13)	0.9
Vitamin D (ug)	0.97 (0.84, 1.11)	1.04 (0.98, 1.09)	0.9
Secondary foods and beverages			
Red meat (189 g)	1.40 (0.57, 3.45)	1.13 (0.81, 1.59)	0.3
Processed meat (74 g)	0.89 (0.53, 1.50)	0.86 (0.66, 1.12)	0.6
Poultry (143 g)	1.55 (0.34, 7.16)	0.58 (0.31, 1.09)	0.04
Oily fish (90 g)	0.13 (0.01, 2.05)	1.18 (0.95, 2.35)	0.1
Non-oily fish (127 g)	0.58 (0.16, 2.17)	0.73 (0.47, 1.14)	1.0
Cream (25 g)	3.50 (1.61, 7.60)	0.90 (0.57, 1.44)	0.005
Dairy desserts (148 g)	2.12 (0.80, 5.59)	1.29 (0.91, 1.83)	0.07
Eggs (88 g)	0.98 (0.34, 2.85)	1.12 (0.81, 1.56)	0.4
Caffeinated coffee (260 ml)	0.99 (0.88, 1.12)	0.97 (0.92, 1.02)	0.5
Decaffeinated coffee (260 ml)	0.88 (0.71, 1.09)	0.95 (0.88, 1.03)	0.5
Secondary nutrients			
Carbohydrates (50 g)	1.02 (0.92, 1.13)	1.09 (0.94, 1.27)	0.3
Fibre (5 g)	0.99 (0.92, 1.07)	0.95 (0.81. 1.11)	0.6
Fat (10 g)	1.03 (0.99, 1.07)	1.11 (1.03. 1.21)	0.05
SFA (10 g)	0.99 (0.83, 1.18)	1.18 (0.93. 1.50)	0.06
MUFA (10 g)	1.09 (0.79, 1.50)	1.36 (0.95. 1.95)	0.05
PUFA (10 g)	0.93 (0.68, 1.27)	1.34 (0.89. 2.03)	0.03
Vitamin B1 (mg)	1.01 (0.97, 1.05)	1.01 (0.92. 1.10)	1.0

Vitamin B2 (mg)	0.95 (0.80, 1.13)	0.90 (0.67. 1.22)	0.7
Vitamin B6 (mg)	1.03 (0.87, 1.22)	1.19 (0.84. 1.67)	0.4
Vitamin B12 (µg)	0.99 (0.95, 1.03)	0.98 (0.87. 1.09)	0.8
Vitamin C (10 mg)	1.01 (1.00, 1.03)	1.01 (0.97. 1.04)	0.7
Iron (5 mg)	0.91 (0.82, 1.02)	0.94 (0.76. 1.16)	0.8
Folate (100 µg)	1.09 (0.97, 1.22)	1.11 (0.89. 1.37)	0.9
Sodium (1 g)	1.13 (0.96, 1.34)	1.25 (0.92. 1.71)	0.5
Zinc (5 mg)	0.89 (0.62, 1.27)	0.96 (0.56. 1.66)	0.7
Sugar (20 g)	1.01 (0.96, 1.07)	1.07 (0.98. 1.17)	0.2
Phosphorus (225 mg)	0.99 (0.97, 1.02)	1.00 (0.92. 1.09)	0.9
Magnesium (135 mg)	0.98 (0.90, 1.07)	1.01 (0.81. 1.26)	0.8
Potassium (1750 mg)	1.00 (0.91, 1.11)	1.09 (0.83. 1.45)	0.6
Selenium (30 µg)	0.96 (0.84, 1.09)	0.96 (0.68. 1.36)	0.9

All models controlled for age (continuous), and were adjusted for (all at recruitment): ethnicity (white, Asian, black, other), socio-economic status (SES; professional/managerial, intermediate, routine/manual), marital status (married/living as married, separated/divorced, single/widowed), number of children (continuous), prevalence of cardiovascular disease, cancer, or diabetes (yes, no), physical activity in hours per day (continuous), smoking status (current, former, never), alcohol intake (> 1/week, ≤ 1/week, never), height (continuous), body weight (continuous), and use of any nutritional supplements (yes, no). Models with food exposures were mutually adjusted for other major foods and beverages. Models for nutrient exposures were also adjusted for protein, complex carbohydrates, fibre, sugar, saturated fat (SFA), monounsaturated fatty acid (MUFA), polyunsaturated fatty acid (PUFA), calcium, and vitamin D intakes from dietary sources. HR (95% CI): hazard ratio 95% confidence interval.

Table S11: Associations between dietary intake of foods, nutrients, and hip fracture risk in UK Women's Cohort Study participants, stratified by use of nutritional supplements.

	Multivariable-adjusted HR (95% CI), cases/subjects		
	Use of nutritional supplements		
Exposure (per serving increment/day)	**Yes (425/14009)**	**No (397/12309)**	***p* interaction**
Primary foods and beverages			
Fruits and vegetables (80 g)	1.00 (0.97, 1.03)	1.03 (1.00, 1.05)	0.1
Fruits (80 g)	0.99 (0.96, 1.03)	1.03 (1.00, 1.06)	0.1
Vegetables (80 g)	0.99 (0.93, 1.05)	1.03 (0.97, 1.10)	0.4
Total meat (150 g)	0.87 (0.69, 1.10)	0.97 (0.78, 1.21)	0.5
Total fish (140 g)	0.76 (0.44, 1.30)	0.85 (0.51, 1.44)	0.8
Total dairy (105 g)	1.00 (0.95, 1.05)	1.02 (0.97, 1.07)	0.6
Milk (240 ml)	0.99 (0.87, 1.14)	1.04 (0.91, 1.20)	0.6
Yoghurt (125 g)	1.03 (0.86, 1.22)	0.97 (0.81, 1.17)	0.7
Cheese (83 g)	0.80 (0.53, 1.19)	0.98 (0.68, 1.41)	0.4
Tea and coffee (260 ml)	0.92 (0.88, 0.97)	1.00 (0.95, 1.05)	0.03
Tea (260 ml)	0.95 (0.90, 1.01)	0.98 (0.92, 1.04)	0.5
Coffee (260 ml)	0.90 (0.84, 0.97)	1.00 (0.94, 1.06)	0.04
Primary nutrients			
Protein (25 g)	0.83 (0.70, 0.99)	0.88 (0.74, 1.05)	0.4
Calcium (300 mg)	1.00 (0.88, 1.13)	1.01 (0.89, 1.13)	0.9

Vitamin D (ug)	1.04 (0.97, 1.11)	1.04 (0.97, 1.12)	0.9
Secondary foods and beverages			
Red meat (189 g)	1.04 (0.67, 1.63)	1.22 (0.81, 1.85)	0.6
Processed meat (74 g)	0.82 (0.57, 1.19)	0.90 (0.64, 1.27)	0.7
Poultry (143 g)	0.67 (0.33, 1.39)	0.62 (0.25, 1.53)	0.9
Oily fish (90 g)	0.81 (0.34, 1.96)	1.32 (0.55, 3.17)	0.4
Non-oily fish (127 g)	0.76 (0.40, 1.41)	0.75 (0.41, 1.38)	0.9
Cream (25 g)	1.12 (0.66, 1.90)	1.07 (0.52, 2.20)	0.9
Dairy desserts (148 g)	1.18 (0.74, 1.88)	1.49 (0.90, 2.46)	0.5
Eggs (88 g)	1.01 (0.61, 1.69)	1.32 (0.88, 1.98)	0.4
Caffeinated coffee (260 ml)	0.91 (0.84, 0.99)	1.00 (0.94, 1.07)	0.08
Decaffeinated coffee (260 ml)	0.91 (0.81, 1.01)	0.95 (0.86, 1.06)	0.5
Secondary nutrients			
Carbohydrates (50 g)	1.03 (0.93, 1.15)	1.01 (0.91, 1.13)	0.6
Fibre (5 g)	0.98 (0.89, 1.06)	0.95 (0.81, 1.11)	0.6
Fat (10 g)	1.05 (1.00, 1.10)	1.02 (0.98, 1.07)	0.3
SFA (10 g)	1.05 (0.87, 1.25)	0.96 (0.80, 1.16)	0.1
MUFA (10 g)	1.15 (0.83, 1.60)	1.09 (0.78, 1.51)	0.4
PUFA (10 g)	0.99 (0.72, 1.36)	0.95 (0.67, 1.34)	0.7
Vitamin B1 (mg)	1.02 (0.97, 1.07)	0.99 (0.94, 1.05)	0.4
Vitamin B2 (mg)	0.94 (0.78, 1.13)	0.96 (0.80, 1.15)	0.8
Vitamin B6 (mg)	1.02 (0.84, 1.25)	1.06 (0.88, 1.27)	0.7
Vitamin B12 (µg)	0.97 (0.92, 1.02)	1.01 (0.96, 1.05)	0.1

Vitamin C (10 mg)	1.01 (0.99, 1.02)	1.02 (1.00, 1.03)	0.3
Iron (5 mg)	0.92 (0.81, 1.04)	0.92 (0.81, 1.03)	0.9
Folate (100 µg)	1.08 (0.95, 1.22)	1.10 (0.98, 1.24)	0.7
Sodium (1 g)	1.14 (0.95, 1.36)	1.14 (0.95, 1.38)	0.9
Zinc (5 mg)	0.86 (0.60, 1.25)	0.92 (0.64, 1.33)	0.5
Sugar (20 g)	1.03 (0.97, 1.09)	1.01 (0.95, 1.07)	0.5
Phosphorus (225 mg)	1.01 (0.97, 1.04)	0.98 (0.95, 1.02)	0.4
Magnesium (135 mg)	1.00 (0.89, 1.12)	0.97 (0.87, 1.08)	0.7
Potassium (1750 mg)	1.03 (0.90, 1.18)	0.99 (0.88, 1.12)	0.7
Selenium (30 µg)	0.95 (0.81, 1.10)	0.97 (0.83, 1.13)	0.8

All models controlled for age (continuous), and were adjusted for (all at recruitment): ethnicity (white, Asian, black, other), socio-economic status (SES; professional/managerial, intermediate, routine/manual), marital status (married/living as married, separated/divorced, single/widowed), menopausal status (premenopausal, postmenopausal), number of children (continuous), prevalence of cardiovascular disease, cancer, or diabetes (yes, no), physical activity in hours per day (continuous), smoking status (current, former, never), alcohol intake (> 1/week, ≤ 1/week, never), height (continuous), and body weight (continuous). Models with food exposures were mutually adjusted for other major foods and beverages. Models for nutrient exposures were also adjusted for protein, complex carbohydrates, fibre, sugar, saturated fat (SFA), monounsaturated fatty acid (MUFA), polyunsaturated fatty acid (PUFA), calcium, and vitamin D intakes from dietary sources. HR (95% CI): hazard ratio 95% confidence interval.

Table S12: Associations between dietary intake of foods, nutrients, and hip fracture risk in UK Women's Cohort Study participants, stratified by physical activity level.

	Multivariable-adjusted HR (95% CI), cases/subjects		
	Physical activity (minutes/week)		
Exposure (per serving increment/day)	**< 150 (665/20494)**	**≥ 150 (157/5824)**	***p* interaction**
Primary foods and beverages			
Fruits and vegetables (80 g)	1.01 (0.99, 1.04)	1.01 (0.96, 1.05)	0.8
Fruits (80 g)	1.01 (0.98, 1.04)	1.01 (0.95, 1.07)	0.9
Vegetables (80 g)	1.01 (0.96, 1.07)	1.00 (0.92, 1.09)	0.8
Total meat (150 g)	0.92 (0.77, 1.11)	0.93 (0.65, 1.34)	0.9
Total fish (140 g)	0.78 (0.51, 1.20)	0.92 (0.38, 2.20)	0.8
Total dairy (105 g)	1.01 (0.97, 1.06)	0.99 (0.92, 1.07)	0.6
Milk (240 ml)	1.03 (0.92, 1.16)	0.95 (0.78, 1.15)	0.5
Yoghurt (125 g)	0.99 (0.86, 1.14)	1.04 (0.79, 1.37)	0.8
Cheese (83 g)	0.92 (0.64, 1.30)	0.85 (0.50, 1.45)	0.8
Tea and coffee (260 ml)	0.97 (0.93, 1.01)	0.93 (0.86, 1.01)	0.5
Tea (260 ml)	0.97 (0.93, 1.02)	0.93 (0.85, 1.02)	0.4
Coffee (260 ml)	0.95 (0.90, 1.01)	0.95 (0.86, 1.06)	0.9
Primary nutrients			
Protein (25 g)	0.86 (0.73, 1.01)	0.84 (0.69, 1.03)	0.8
Calcium (300 mg)	1.00 (0.90, 1.12)	0.99 (0.85, 1.16)	0.9

Vitamin D (ug)	1.04 (0.98, 1.10)	1.07 (0.97, 1.18)	0.5
Secondary foods and beverages			
Red meat (189 g)	1.11 (0.76, 1.61)	1.33 (0.77, 2.29)	0.5
Processed meat (74 g)	0.87 (0.66, 1.13)	0.86 (0.43, 1.70)	0.9
Poultry (143 g)	0.76 (0.41, 1.38)	0.31 (0.07, 1.42)	0.3
Oily fish (90 g)	1.01 (0.45, 2.25)	1.12 (0.29, 4.31)	0.9
Non-oily fish (127 g)	0.73 (0.44, 1.21)	0.86 (0.32, 2.34)	0.8
Cream (25 g)	1.12 (0.69, 1.80)	0.98 (0.31, 3.09)	0.8
Dairy desserts (148 g)	1.22 (0.84, 1.77)	1.95 (0.85, 4.44)	0.3
Eggs (88 g)	1.15 (0.80, 1.66)	1.32 (0.61, 2.86)	0.8
Caffeinated coffee (260 ml)	0.97 (0.91, 1.03)	0.94 (0.83, 1.06)	0.6
Decaffeinated coffee (260 ml)	0.92 (0.84, 1.00)	0.98 (0.84, 1.14)	0.5
Secondary nutrients			
Carbohydrates (50 g)	1.03 (0.93, 1.14)	1.01 (0.89, 1.15)	0.7
Fibre (5 g)	0.99 (0.92, 1.07)	0.95 (0.81, 1.11)	0.5
Fat (10 g)	1.03 (0.99, 1.07)	1.05 (0.99, 1.12)	0.5
SFA (10 g)	1.00 (0.84, 1.19)	1.03 (0.84, 1.26)	0.7
MUFA (10 g)	1.09 (0.80, 1.51)	1.18 (0.84, 1.66)	0.4
PUFA (10 g)	0.95 (0.69, 1.30)	1.06 (0.74, 1.52)	0.4
Vitamin B1 (mg)	1.02 (0.98, 1.06)	0.99 (0.91, 1.07)	0.5
Vitamin B2 (mg)	0.95 (0.80, 1.13)	0.94 (0.75, 1.18)	0.9
Vitamin B6 (mg)	1.05 (0.88, 1.26)	1.00 (0.80, 1.26)	0.7
Vitamin B12 (µg)	0.99 (0.94, 1.03)	0.98 (0.93, 1.05)	0.9

Vitamin C (10 mg)	1.01 (1.00, 1.03)	1.00 (0.97, 1.02)	0.2
Iron (5 mg)	0.92 (0.83, 1.03)	0.87 (0.75, 1.02)	0.4
Folate (100 µg)	1.09 (0.98, 1.22)	1.08 (0.92, 1.26)	0.8
Sodium (1 g)	1.15 (0.97, 1.36)	1.11 (0.89, 1.39)	0.8
Zinc (5 mg)	0.89 (0.63, 1.28)	0.86 (0.57, 1.30)	0.9
Sugar (20 g)	1.02 (0.96, 1.08)	1.01 (0.94, 1.09)	0.8
Phosphorus (225 mg)	1.00 (0.97, 1.03)	0.97 (0.92, 1.03)	0.3
Magnesium (135 mg)	1.00 (0.91, 1.10)	0.92 (0.79, 1.08)	0.4
Potassium (1750 mg)	1.03 (0.92, 1.15)	0.92 (0.76, 1.11)	0.3
Selenium (30 µg)	0.97 (0.85, 1.11)	0.90 (0.72, 1.14)	0.6

All models controlled for age (continuous), and were adjusted for (all at recruitment): ethnicity (white, Asian, black, other), socio-economic status (SES; professional/managerial, intermediate, routine/manual), marital status (married/living as married, separated/divorced, single/widowed), menopausal status (premenopausal, postmenopausal), number of children (continuous), prevalence of cardiovascular disease, cancer, or diabetes (yes, no), smoking status (current, former, never), alcohol intake (> 1/week, ≤ 1/week, never), height (continuous), body weight (continuous), and use of any nutritional supplements (yes, no). Models with food exposures were mutually adjusted for other major foods and beverages. Models for nutrient exposures were also adjusted for protein, complex carbohydrates, fibre, sugar, saturated fat (SFA), monounsaturated fatty acid (MUFA), polyunsaturated fatty acid (PUFA), calcium, and vitamin D intakes from dietary sources. HR (95% CI): hazard ratio 95% confidence interval.

Table S13: Associations between dietary intake of foods, nutrients, and hip fracture risk in UK Women's Cohort Study participants, stratified by socio-economic status.

	Multivariable-adjusted HR (95% CI), cases/subjects			
	Socio-economic status			
Exposure (per serving increment/day)	**Professional/managerial (565/19057)**	**Intermediate (111/2440)**	**Routine/manual (146/4821)**	***p* interaction**
Primary foods and beverages				
Fruits and vegetables (80 g)	1.01 (0.99, 1.04)	1.01 (0.96, 1.07)	1.00 (0.96, 1.06)	0.9
Fruits (80 g)	1.01 (0.98, 1.04)	1.02 (0.95, 1.10)	1.01 (0.95, 1.07)	0.9
Vegetables (80 g)	1.02 (0.97, 1.08)	0.98 (0.88, 1.10)	0.98 (0.88, 1.09)	0.6
Total meat (150 g)	0.85 (0.70, 1.03)	0.87 (0.56, 1.34)	1.28 (0.91, 1.80)	0.1
Total fish (140 g)	0.73 (0.46, 1.18)	0.94 (0.32, 2.80)	1.04 (0.51, 2.14)	0.7
Total dairy (105 g)	0.98 (0.94, 1.03)	1.08 (0.99, 1.18)	1.05 (0.97, 1.14)	0.09
Milk (240 ml)	0.96 (0.85, 1.08)	1.13 (0.87, 1.46)	1.15 (0.93, 1.42)	0.2
Yoghurt (125 g)	1.00 (0.87, 1.16)	1.24 (0.95, 1.61)	0.77 (0.53, 1.14)	0.1
Cheese (83 g)	0.79 (0.57, 1.10)	1.10 (0.51, 2.38)	1.09 (0.74, 1.61)	0.4
Tea and coffee (260 ml)	0.97 (0.93, 1.01)	0.96 (0.88, 1.04)	0.93 (0.85, 1.00)	0.6
Tea (260 ml)	0.98 (0.93, 1.03)	0.92 (0.82, 1.03)	0.94 (0.86, 1.03)	0.4
Coffee (260 ml)	0.95 (0.89, 1.00)	1.01 (0.90, 1.14)	0.93 (0.83, 1.04)	0.5
Primary nutrients				
Protein (25 g)	0.82 (0.69, 0.97)	0.90 (0.72, 1.13)	0.96 (0.78, 1.17)	0.2

Calcium (300 mg)	0.97 (0.86, 1.08)	1.09 (0.91, 1.30)	1.06 (0.90, 1.25)	0.2
Vitamin D (ug)	1.01 (0.95, 1.09)	1.11 (0.99, 1.23)	1.09 (0.99, 1.19)	0.2
Secondary foods and beverages				
Red meat (189 g)	1.05 (0.71, 1.56)	0.82 (0.34, 1.97)	1.72 (0.99, 2.97)	0.2
Processed meat (74 g)	0.75 (0.56, 1.01)	1.01 (0.57, 1.79)	1.19 (0.64, 2.24)	0.3
Poultry (143 g)	0.47 (0.22, 1.01)	0.64 (0.11, 3.79)	1.34 (0.65, 2.73)	0.1
Oily fish (90 g)	1.14 (0.50, 2.60)	0.87 (0.18, 4.12)	0.76 (0.20, 2.94)	0.9
Non-oily fish (127 g)	0.62 (0.35, 1.11)	1.00 (0.32, 3.10)	1.18 (0.56, 2.45)	0.4
Cream (25 g)	1.03 (0.63, 1.67)	0.65 (0.24, 1.77)	2.70 (0.77, 9.52)	0.2
Dairy desserts (148 g)	0.97 (0.60, 1.56)	1.94 (0.85, 4.42)	2.08 (1.22, 3.56)	0.07
Eggs (88 g)	1.02 (0.67, 1.56)	1.28 (0.49, 3.34)	1.72 (0.97, 3.05)	0.4
Caffeinated coffee (260 ml)	0.96 (0.90, 1.02)	1.01 (0.89, 1.15)	0.93 (0.81, 1.06)	0.6
Decaffeinated coffee (260 ml)	0.92 (0.83, 1.01)	0.97 (0.81, 1.16)	0.95 (0.80, 1.12)	0.8
Secondary nutrients				
Carbohydrates (50 g)	0.99 (0.89, 1.11)	1.10 (0.96, 1.25)	1.07 (0.95, 1.20)	0.1
Fibre (5 g)	0.98 (0.91, 1.06)	1.03 (0.91, 1.17)	0.98 (0.87, 1.10)	0.7
Fat (10 g)	1.02 (0.98, 1.06)	1.05 (0.98, 1.13)	1.02 (1.15, 1.08)	0.1
SFA (10 g)	0.96 (0.81, 1.15)	1.02 (0.83, 1.26)	1.12 (0.92, 1.36)	0.09
MUFA (10 g)	1.08 (0.78, 1.49)	1.19 (0.82, 1.73)	1.28 (0.91, 1.81)	0.1
PUFA (10 g)	0.89 (0.65, 1.23)	1.11 (0.75, 1.66)	1.08 (0.73, 1.59)	0.2
Vitamin B1 (mg)	1.01 (0.96, 1.06)	1.05 (0.98, 1.13)	0.98 (0.91, 1.05)	0.3
Vitamin B2 (mg)	0.91 (0.76, 1.08)	1.13 (0.87, 1.47)	0.98 (0.78, 1.23)	0.2
Vitamin B6 (mg)	0.98 (0.81, 1.18)	1.23 (0.94, 1.60)	1.13 (0.89, 1.42)	0.1

Vitamin B12 (µg)	0.98 (0.93, 1.03)	1.01 (0.94, 1.08)	1.00 (0.94, 1.06)	0.7
Vitamin C (10 mg)	1.01 (1.00, 1.03)	1.01 (0.98, 1.04)	1.01 (0.99, 1.04)	0.9
Iron (5 mg)	0.90 (0.79, 1.01)	1.00 (0.87, 1.16)	0.90 (0.77, 1.06)	0.3
Folate (100 µg)	1.08 (0.96, 1.21)	1.18 (0.98, 1.41)	1.07 (0.91, 1.27)	0.6
Sodium (1 g)	1.11 (0.93, 1.32)	1.25 (0.95, 1.65)	1.17 (0.94, 1.46)	0.5
Zinc (5 mg)	0.84 (0.58, 1.21)	0.96 (0.63, 1.46)	1.05 (0.69, 1.60)	0.3
Sugar (20 g)	1.00 (0.94, 1.06)	1.06 (0.99, 1.15)	1.06 (0.98, 1.14)	0.06
Phosphorus (225 mg)	0.98 (0.95, 1.01)	1.01 (0.95, 1.07)	1.02 (0.96, 1.09)	0.4
Magnesium (135 mg)	0.96 (0.88, 1.06)	1.03 (0.86, 1.23)	1.01 (0.84, 1.23)	0.7
Potassium (1750 mg)	0.98 (0.88, 1.09)	1.06 (0.86, 1.31)	1.06 (0.85, 1.32)	0.7
Selenium (30 µg)	0.93 (0.81, 1.06)	0.98 (0.75, 1.28)	1.05 (0.83, 1.32)	0.7

All models controlled for age (continuous), and were adjusted for (all at recruitment): ethnicity (white, Asian, black, other), marital status (married/living as married, separated/divorced, single/widowed), menopausal status (premenopausal, postmenopausal), number of children (continuous), prevalence of cardiovascular disease, cancer, or diabetes (yes, no), physical activity in hours per day (continuous), smoking status (current, former, never), alcohol intake (> 1/week, ≤ 1/week, never), height (continuous), body weight (continuous), and use of any nutritional supplements (yes, no). Models with food exposures were mutually adjusted for other major foods and beverages. Models for nutrient exposures were also adjusted for protein, complex carbohydrates, fibre, sugar, saturated fat (SFA), monounsaturated fatty acid (MUFA), polyunsaturated fatty acid (PUFA), calcium, and vitamin D intakes from dietary sources. HR (95% CI): hazard ratio 95% confidence interval.

Table S14: Associations between dietary intake of foods, nutrients, and hip fracture risk in UK Women's Cohort Study participants, stratified by smoking status.

	Multivariable-adjusted HR (95% CI), cases/subjects			
	Smoking status			
Exposure (per serving increment/day)	**Current (112/3513)**	**Former (255/7947)**	**Never (455/14858)**	***p* interaction**
Primary foods and beverages				
Fruits and vegetables (80 g)	1.03 (0.97, 1.08)	0.99 (0.95 1.02)	1.03 (0.99, 1.06)	0.2
Fruits (80 g)	1.02 (0.96, 1.09)	0.98 (0.95, 1.03)	1.02 (0.96, 1.08)	0.3
Vegetables (80 g)	1.07 (0.95, 1.20)	0.98 (0.90, 1.06)	0.86 (0.69, 1.07)	0.4
Total meat (150 g)	1.03 (0.66, 1.60)	0.99 (0.76, 1.28)	0.69 (0.49, 0.97)	0.6
Total fish (140 g)	0.73 (0.27, 1.97)	0.90 (0.46, 1.77)	1.10 (0.45, 2.72)	0.9
Total dairy (105 g)	0.98 (0.89, 1.08)	1.03 (0.97, 1.10)	1.00 (0.87, 1.14)	0.7
Milk (240 ml)	0.97 (0.76, 1.25)	1.07 (0.90, 1.27)	1.03 (0.89, 1.20)	0.7
Yoghurt (125 g)	0.83 (0.54, 1.26)	0.99 (0.78, 1.27)	0.81 (0.55, 1.19)	0.6
Cheese (83 g)	1.16 (0.89, 1.51)	0.78 (0.48, 1.27)	1.11 (0.65, 1.90)	0.2
Tea and coffee (260 ml)	1.00 (0.92, 1.09)	0.92 (0.86, 0.98)	0.94 (0.89, 0.99)	0.2
Tea (260 ml)	1.07 (0.96, 1.19)	0.96 (0.89, 1.03)	1.01 (0.95, 1.07)	0.1
Coffee (260 ml)	0.89 (0.79, 1.02)	0.89 (0.82, 0.97)	1.00 (0.94, 1.08)	0.03
Primary nutrients				
Protein (25 g)	0.87 (0.68, 1.10)	0.90 (0.75, 1.07)	1.00 (0.88, 1.12)	0.6
Calcium (300 mg)	0.97 (0.82, 1.16)	1.03 (0.90, 1.18)	1.04 (0.97, 1.12)	0.8

Vitamin D (ug)	1.04 (0.93, 1.18)	1.04 (0.96, 1.12)	0.97 (0.70, 1.34)	0.9
Secondary foods and beverages				
Red meat (189 g)	0.87 (0.42, 1.84)	1.31 (0.82, 2.10)	0.54 (0.23, 1.26)	0.6
Processed meat (74 g)	1.35 (0.70, 2.60)	0.98 (0.68, 1.42)	1.11 (0.71, 1.74)	0.1
Poultry (143 g)		0.52 (0.22, 1.24)	0.78 (0.47, 1.29)	0.08
Oily fish (90 g)		0.78 (0.26, 2.32)	1.10 (0.45, 2.72)	0.8
Non-oily fish (127 g)	0.59 (0.21, 1.71)	0.97 (0.44, 2.14)	1.05 (0.64, 1.72)	0.7
Cream (25 g)	0.46 (0.08, 2.59)	1.38 (0.65, 2.92)	1.28 (0.82, 2.00)	0.5
Dairy desserts (148 g)	0.62 (0.18, 2.13)	1.70 (1.01, 2.86)	0.97 (0.93, 1.02)	0.3
Eggs (88 g)	1.55 (0.93, 2.58)	1.15 (0.64, 2.08)	1.01 (0.96, 1.06)	0.5
Caffeinated coffee (260 ml)	0.93 (0.82, 1.07)	0.91 (0.83, 1.00)	0.98 (0.90, 1.08)	0.2
Decaffeinated coffee (260 ml)	0.78 (0.62, 0.99)	0.88 (0.75, 1.03)	0.83 (0.70, 0.98)	0.1
Secondary nutrients				
Carbohydrates (50 g)	1.00 (0.88, 1.13)	1.06 (0.94, 1.19)	0.98 (0.91, 1.07)	0.4
Fibre (5 g)	1.03 (0.90, 1.18)	0.97 (0.89, 1.07)	0.98 (1.07, 1.02)	0.7
Fat (10 g)	1.02 (0.96, 1.10)	1.06 (1.01, 1.11)	0.97 (0.81, 1.16)	0.4
SFA (10 g)	0.97 (0.78, 1.21)	1.08 (0.90, 1.29)	1.08 (0.78, 1.50)	0.2
MUFA (10 g)	1.09 (0.76, 1.56)	1.19 (0.86, 1.64)	1.08 (0.78, 1.50)	0.5
PUFA (10 g)	1.00 (0.88, 1.13)	1.06 (0.94, 1.19)	0.98 (0.91, 1.07)	0.4
Vitamin B1 (mg)	1.02 (0.95, 1.10)	1.00 (0.94, 1.06)	0.94 (0.78, 1.13)	0.9
Vitamin B2 (mg)	1.00 (0.74, 1.35)	0.95 (0.78, 1.14)	1.03 (0.84, 1.25)	0.9
Vitamin B6 (mg)	1.11 (0.85, 1.44)	1.03 (0.84, 1.27)	0.99 (0.95, 1.04)	0.8
Vitamin B12 (µg)	0.97 (0.89, 1.05)	0.99 (0.93, 1.04)	1.01 (1.00, 1.03)	0.8

Vitamin C (10 mg)	1.02 (0.99, 1.05)	1.00 (0.98, 1.02)	0.90 (0.81, 1.01)	0.4
Iron (5 mg)	0.99 (0.78, 1.26)	0.91 (0.80, 1.04)	1.09 (0.96, 1.24)	0.7
Folate (100 µg)	1.15 (0.97, 1.37)	1.06 (0.93, 1.20)	1.12 (0.94, 1.35)	0.6
Sodium (1 g)	1.13 (0.88, 1.45)	1.17 (0.97, 1.42)	0.86 (0.60, 1.25)	0.9
Zinc (5 mg)	0.86 (0.55, 1.35)	0.97 (0.66, 1.42)	1.01 (0.95, 1.07)	0.6
Sugar (20 g)	1.01 (0.92, 1.10)	1.04 (0.98, 1.11)	1.00 (0.97, 1.03)	0.5
Phosphorus (225 mg)	0.99 (0.93, 1.06)	0.99 (0.94, 1.04)	1.00 (0.91, 1.11)	0.9
Magnesium (135 mg)	1.01 (0.84, 1.22)	0.94 (0.82, 1.09)	0.98 (0.85, 1.13)	0.7
Potassium (1750 mg)	1.02 (0.83, 1.26)	0.96 (0.81, 1.13)	1.01 (0.91, 1.13)	0.7
Selenium (30 µg)	0.94 (0.73, 1.22)	0.93 (0.77, 1.13)	1.04 (0.92, 1.17)	0.9

All models controlled for age (continuous), and were adjusted for (all at recruitment): ethnicity (white, Asian, black, other), socio-economic status (SES; professional/managerial, intermediate, routine/manual), marital status (married/living as married, separated/divorced, single/widowed), menopausal status (premenopausal, postmenopausal), number of children (continuous), prevalence of cardiovascular disease, cancer, or diabetes (yes, no), physical activity in hours per day (continuous), alcohol intake (> 1/week, ≤ 1/week, never), height (continuous), body weight (continuous), and use of any nutritional supplements (yes, no). Models with food exposures were mutually adjusted for other major foods and beverages. Models for nutrient exposures were also adjusted for protein, complex carbohydrates, fibre, sugar, saturated fat (SFA), monounsaturated fatty acid (MUFA), polyunsaturated fatty acid (PUFA), calcium, and vitamin D intakes from dietary sources. HR (95% CI): hazard ratio 95% confidence interval.

Table S15: Associations between dietary intake of foods, nutrients, and hip fracture risk in UK Women's Cohort Study participants, with varying restrictions.

Exposure (per serving increment/day)	HR (95% CI)	p
Adjusted models (822 cases / 26,318 participants)[a]		
Fruits and vegetables (80 g)	1.01 (0.99, 1.03)	0.3
Fruits (80 g)	1.01 (0.99, 1.04)	0.4
Vegetables (80 g)	1.01 (0.97, 1.06)	0.6
Total meat (150 g)	0.92 (0.78. 1.09)	0.4
Total fish (140 g)	0.81 (0.55, 1.19)	0.3
Total dairy (105 g)	1.01 (0.97, 1.05)	0.6
Milk (240 ml)	1.02 (0.92, 1.12)	0.8
Yoghurt (125 g)	1.00 (0.88, 1.14)	0.9
Cheese (83 g)	0.90 (0.66, 1.23)	0.5
Tea and coffee (260 ml)	0.96 (0.92, 1.00)	0.03
Tea (260 ml)	0.96 (0.92, 1.01)	0.1
Coffee (260 ml)	0.95 (0.91, 1.00)	0.05
Protein (25 g)	0.86 (0.73, 1.00)	0.05
Calcium (300 mg)	1.00 (0.90, 1.11)	0.9
Vitamin D (μg)	1.04 (0.99, 1.10)	0.1
Adjusting for energy intake using the energy-partition method (822 cases / 26,318 participants)[b]		

Fruits and vegetables (80 g)	1.01 (0.99, 1.03)	0.4
Fruits (80 g)	1.01 (0.99, 1.04)	0.4
Vegetables (80 g)	1.00 (0.96, 1.05)	0.9
Total meat (150 g)	0.94 (0.80, 1.10)	0.4
Total fish (140 g)	0.81 (0.56, 1.19)	0.3
Total dairy (105 g)	1.00 (0.96, 1.04)	0.9
Milk (240 ml)	0.99 (0.90, 1.09)	0.9
Yoghurt (125 g)	0.99 (0.88, 1.12)	0.9
Cheese (83 g)	0.92 (0.68, 1.24)	0.5
Tea and coffee (260 ml)	0.96 (0.92, 0.99)	0.02
Tea (260 ml)	0.97 (0.94, 1.01)	0.2
Coffee (260 ml)	0.92 (0.92, 1.01)	0.1
Protein (25 g)	0.85 (0.73, 0.98)	0.02
Calcium (300 mg)	0.95 (0.87, 1.04)	0.3
Vitamin D (μg)	1.02 (0.97, 1.07)	0.5
Without adjustment for body weight (822 cases / 26,318 participants)		
Fruits and vegetables (80 g)	1.01 (0.99, 1.03)	0.3
Fruits (80 g)	1.01 (0.99, 1.04)	0.4
Vegetables (80 g)	1.01 (0.96, 1.06)	0.7
Total meat (150 g)	0.89 (0.75, 1.05)	0.2
Total fish (140 g)	0.82 (0.56, 1.21)	0.3
Total dairy (105 g)	1.01 (0.97, 1.05)	0.7
Milk (240 ml)	1.01 (0.92, 1.12)	0.8

Yoghurt (125 g)	1.00 (0.88, 1.13)	0.9
Cheese (83 g)	0.91 (0.67, 1.25)	0.6
Tea and coffee (260 ml)	0.96 (0.92, 0.99)	0.02
Tea (260 ml)	0.96 (0.92, 1.01)	0.09
Coffee (260 ml)	0.95 (0.90, 1.00)	0.04
Protein (25 g)	0.83 (0.71, 0.97)	0.02
Calcium (300 mg)	1.01 (0.91, 1.12)	0.9
Vitamin D (μg)	1.04 (0.99, 1.10)	0.1
Adjusting for BMI rather than height and weight (822 cases / 26,318 participants)		
Fruits and vegetables (80 g)	1.01 (0.99, 1.03)	0.3
Fruits (80 g)	1.01 (0.99, 1.04)	0.3
Vegetables (80 g)	1.01 (0.96, 1.06)	0.7
Total meat (150 g)	0.93 (0.78, 1.12)	0.5
Total fish (140 g)	0.81 (0.55, 1.19)	0.3
Total dairy (105 g)	1.01 (0.97, 1.05)	0.6
Milk (240 ml)	1.02 (0.92, 1.13)	0.7
Yoghurt (125 g)	1.01 (0.88, 1.14)	0.9
Cheese (83 g)	0.90 (0.67, 1.22)	0.5
Tea and coffee (260 ml)	0.96 (0.92, 0.99)	0.03
Tea (260 ml)	0.96 (0.92, 1.01)	0.09
Coffee (260 ml)	0.95 (0.91, 1.00)	0.05
Protein (25 g)	0.87 (0.74, 1.02)	0.08
Calcium (300 mg)	1.00 (0.90, 1.11)	0.9

Vitamin D (μg)	1.04 (0.98, 1.10)	0.2
Excluding those with survival times < 5 years (782 cases / 25,987 participants)		
Fruits and vegetables (80 g)	1.01 (0.99, 1.04)	0.2
Fruits (80 g)	1.02 (0.99, 1.04)	0.3
Vegetables (80 g)	1.01 (0.97, 1.06)	0.6
Total meat (150 g)	0.90 (0.75, 1.07)	0.2
Total fish (140 g)	0.82 (0.55, 1.22)	0.3
Total dairy (105 g)	1.01 (0.97, 1.05)	0.6
Milk (240 ml)	1.02 (0.92, 1.13)	0.7
Yoghurt (125 g)	1.00 (0.88, 1.14)	0.9
Cheese (83 g)	0.92 (0.67, 1.26)	0.6
Tea and coffee (260 ml)	0.97 (0.93, 1.01)	0.1
Tea (260 ml)	0.97 (0.93, 1.02)	0.2
Coffee (260 ml)	0.96 (0.92, 1.01)	0.2
Protein (25 g)	0.83 (0.71, 0.98)	0.0
Calcium (300 mg)	1.03 (0.92, 1.15)	0.6
Vitamin D (μg)	1.05 (1.00, 1.11)	0.07
Excluding participants on long-term treatment for illness (468 cases / 18,435 participants)		
Fruits and vegetables (80 g)	1.01 (0.98, 1.04)	0.5
Fruits (80 g)	1.01 (0.97, 1.04)	0.8
Vegetables (80 g)	1.02 (0.96, 1.08)	0.5
Total meat (150 g)	0.88 (0.70, 1.10)	0.3
Total fish (140 g)	1.16 (0.74, 1.82)	0.5

Total dairy (105 g)	1.02 (0.97, 1.08)	0.3
Milk (240 ml)	1.03 (0.90, 1.18)	0.6
Yoghurt (125 g)	1.05 (0.91, 1.21)	0.5
Cheese (83 g)	0.81 (0.55, 1.20)	0.3
Tea and coffee (260 ml)	0.94 (0.90, 0.99)	0.02
Tea (260 ml)	0.94 (0.88, 0.99)	0.03
Coffee (260 ml)	0.95 (0.89, 1.01)	0.1
Protein (25 g)	0.83 (0.67, 1.02)	0.07
Calcium (300 mg)	1.05 (0.91, 1.21)	0.5
Vitamin D (μg)	1.07 (1.00, 1.15)	0.04
Further adjusting for HRT use (822 cases / 26,318 participants)		
Fruits and vegetables (80 g)	1.01 (0.99, 1.03)	0.3
Fruits (80 g)	1.01 (0.98, 1.04)	0.5
Vegetables (80 g)	1.02 (0.97, 1.06)	0.5
Total meat (150 g)	0.97 (0.81, 1.15)	0.7
Total fish (140 g)	0.70 (0.47, 1.05)	0.09
Total dairy (105 g)	1.00 (0.96, 1.05)	0.8
Milk (240 ml)	1.01 (0.91, 1.12)	0.9
Yoghurt (125 g)	0.97 (0.84, 1.13)	0.7
Cheese (83 g)	0.90 (0.65, 1.24)	0.5
Tea and coffee (260 ml)	0.95 (0.92, 0.99)	0.01
Tea (260 ml)	0.96 (0.92, 1.00)	0.07
Coffee (260 ml)	0.94 (0.89, 0.99)	0.02

Protein (25 g)	0.86 (0.73, 1.02)	0.07
Calcium (300 mg)	1.00 (0.89, 1.11)	0.9
Vitamin D (μg)	1.03 (0.97, 1.09)	0.4
Further adjusting for other fracture prevalence (822 cases / 26,318 participants)		
Fruits and vegetables (80 g)	1.01 (0.99, 1.03)	0.3
Fruits (80 g)	1.01 (0.99, 1.04)	0.4
Vegetables (80 g)	1.01 (0.97, 1.06)	0.7
Total meat (150 g)	0.93 (0.78, 1.10)	0.4
Total fish (140 g)	0.81 (0.55, 1.19)	0.3
Total dairy (105 g)	1.01 (0.97, 1.05)	0.6
Milk (240 ml)	1.01 (0.92, 1.12)	0.8
Yoghurt (125 g)	1.00 (0.88, 1.14)	0.9
Cheese (83 g)	0.90 (0.66, 1.23)	0.5
Tea and coffee (260 ml)	0.96 (0.92, 1.00)	0.03
Tea (260 ml)	0.96 (0.92, 1.01)	0.10
Coffee (260 ml)	0.95 (0.91, 1.00)	0.05
Protein (25 g)	0.86 (0.73, 1.01)	0.06
Calcium (300 mg)	1.00 (0.90, 1.11)	0.9
Vitamin D (μg)	1.04 (0.99, 1.10)	0.1

[a]All adjusted models controlled for age (continuous), and were adjusted for (all at recruitment): ethnicity (white, Asian, black, other), socio-economic status (SES; professional/managerial, intermediate, routine/manual), marital status (married/living as married, separated/divorced, single/widowed), menopausal status (premenopausal, postmenopausal), number of children (continuous), prevalence of cardiovascular disease, cancer, or diabetes (yes, no), physical activity in hours per day (continuous), smoking status (current, former, never), alcohol intake (> 1/week, ≤ 1/week, never), height (continuous), body weight (continuous), and use of any nutritional supplements (yes, no). Models with food exposures were mutually adjusted for other major foods and beverages. Models for nutrient exposures were also adjusted for protein, complex carbohydrates, fibre, sugar, saturated fat (SFA), monounsaturated fatty acid (MUFA),

polyunsaturated fatty acid (PUFA), calcium, and vitamin D intakes from dietary sources.

[b]Based on the adjusted models, but adjusted for energy intake from all sources except the exposure of interest combined rather than adjusting for each energy-contributing food or nutrient individually.

All other sensitivity analyses were based on the adjusted models. HR (95% CI): hazard ratio (95% confidence interval).

Supplementary methods

Secondary exposures

Secondary exposures of interest included dietary intake of the following nutrients: carbohydrates, sugar, fibre, fat, saturated fat, monounsaturated fatty acids (MUFAs), polyunsaturated fatty acids (PUFAs), vitamins B1, B2, B6, B12, and C, iron, folate, sodium zinc, phosphorus, magnesium, potassium, and selenium.

Sensitivity analysis adjusting for energy intake using the energy-partition method

As a sensitivity analysis, we repeated the adjusted Cox proportional hazard regression models for primary foods and nutrients with adjustment for energy intake using the energy-partition method. This method targets the same estimand as the all-components method used in the main analyses (the total causal effect), and involves adjusting for total energy intake minus energy intake from the exposure.

Supplementary results

In exploratory subgroup analyses, age (≤ 60 years, > 60 years) modified linear associations between tea and coffee consumption and hip fracture risk, where the association was more protective in younger adults ($p_{interaction}$= 0.04; Table S9). Menopausal status modified associations between hip fracture risk and dietary intake of tea ($p_{interaction}$= 0.05), poultry ($p_{interaction}$= 0.04), cream ($p_{interaction}$= 0.005), fat ($p_{interaction}$= 0.06), saturated fat ($p_{interaction}$= 0.06, monounsaturated fat ($p_{interaction}$= 0.05), and polyunsaturated fat ($p_{interaction}$= 0.03; Table S10). Linear associations of consumption of coffee individually and tea and coffee combined with hip fracture risk were modified by nutritional supplementation status, and were more protective in those who reported using nutritional

supplements compared to those that did not ($p_{interaction}$= 0.04 and 0.03, respectively; Table S11). There was some evidence that the association between coffee consumption (per cup/day) and hip fracture risk depended on smoking status ($p_{interaction}$= 0.03; Table S14). There was no evidence of effect modification for any food or nutrient by physical activity level or socio-economic status (Tables S12 and S13).