Supplementary Online Content

Thompson AS, Tresserra-Rimbau A, Karavasiloglou N, et al. Association of healthful plant-based diet adherence with risk of mortality and major chronic diseases among adults in the UK. *JAMA Netw Open*. 2023;6(3):e234714. doi:10.1001/jamanetworkopen.2023.4714

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eReferences

This supplementary material has been provided by the authors to give readers additional information about their work.

eMethods 1. Dietary Intake Assessment

The Oxford WebQ dietary questionnaire was issued at least once to UK Biobank study participants between 2009 and 2012 (n=210,965) on five separate occasions [4]. For this study, participants who completed a minimum of ≥ 2 diet recalls were considered eligible. The Oxford WebQ asked about the frequency of consumption of up to 206 types of food and 32 drinks over the past 24-hours [5]. The Oxford WebQ has been validated previously to represent approximate and true dietary intake [6,7].

eMethods 2. Covariate Information

Sociodemographic variables

Sociodemographic factors included sex, age at recruitment (<45, 45-49, 50-54, 55-59, 60-64, 65-73) and ethnicity, which involved grouping participants into six categories (Asian, Black, Multiple, White, Other, or unknown/missing); region, based on the recruitment center the participant attended. The ten regions covered by the 22 assessment centres included: London, Wales, North-West England, North-East England, Yorkshire, West Midlands, East Midlands, South-East England, South-West England, and Scotland; education, with qualification options including College or University degree, A Levels/AS levels or equivalent, O levels/ GCSes or equivalent, CSEs or equivalent, NVQ or HND or HNC or equivalent, Other professional qualifications eg: nursing, teaching, none of the above, prefer not to answer (participants had the option to select more than one of the qualification options). From this, participants were grouped into categories of 'low', 'medium', 'high', 'none of the above' or 'unknown/missing', based on their highest reported level of education (Low: CSEs or equivalent, O levels/GCSEs or equivalent; Medium: A levels/AS levels or equivalent, NVQ or HND or HNC or equivalent; High: College or University degree, other professional qualifications eg: nursing, teaching; missing/prefer not to say/unknown).

Physical activity

Participants were asked to answer questions on their total level of physical activity based on overall intensity. Using this information, excess metabolic equivalent tasks (MET)-hours/week were calculated to reflect the energy expenditure of those who were active during work and recreational time. Following the Internal Physical Activity Questionnaire (IPAQ) scoring guidelines, total physical activity (excess METs) was calculated from the sum of walking (2.3 excess METs), moderate activity (3.0 excess METs), and vigorous activity (7.0 excess METs (for at least 10 minutes of continuous exertion). From this, participants were ranked into quintiles based on their total physical activity level (excess METs hr/ week).

Smoking

Participants were asked to report on their smoking status. This involved the participant answering whether they were a “Never”, “Previous” or “Current” smoker. Participants who did not answer this question or those who answered with “prefer not to answer” were categorized as unknown/missing.

Alcohol consumption

Participants were asked to answer questions on alcohol consumption at recruitment. For those who reported drinking alcohol, they were asked to answer questions on intake frequency, type of beverage consumed and alcohol consumption with meals. For those who reported to be a former drinker, they were asked to provide the reason why they stopped, including the time since they last drank. From this, participants were categorized into groups of total alcohol intake in grams per day (based their weekly (preferable) or monthly consumption depending on data availability)). Intake groups included, <1g, 1-7g, 8-15g, 16+g per day or unknown/missing. Participants were coded as missing if they reported weekly or monthly alcohol consumption as 'prefer not to say' or 'do not know', except for 'other alcohol' consumption where participants were coded as 0g. If grams/day were 'unknown', but alcohol frequency was 'never' or 'special occasions', an intake of <1g/d was assumed.

Energy intake

Total energy intakes (Kilojoules (KJ)/day)) were derived from the 24hr dietary assessments. A mean energy intake value was calculated using data from all five dietary assessment timepoints. Excluding participants with implausible energy intakes (>17573KJ or < 3347KJ for men and > 14644KJ or < 2092KJ/day for women) [1], participants were ranked into quintiles based on their total energy intake (KJ/day).

Sex-specific factors

Data on female reproductive factors were collected at baseline via touchscreen questionnaire. Women were asked questions on age at menarche/parity/menopause, menopausal status, use of exogenous hormones and pregnancy history.

Age at menarche

To establish age at menarche, female participants were asked “How old were you when your periods started?”. Following this, participants were provided with the option to answer with their age at menarche, or “do not know” or “prefer not to answer”. Women were then categorised into age groups: ≤12 years, 13 years old, or ≥14 years old. Those who answered with “do not know” or “prefer not to answer” were categorised as ‘unknown’.

Parity and age at first live birth

To categorise women on parity, women were asked to answer the question, “How many children have you given birth to?”. If answered with “1+”, the participant was prompted to answer the question, “How old were you when you had your first child?”. From this, women were categorised into the number of children birthed, alongside their age at first birth or “do not remember” or “prefer not to answer”. For my analysis, women were categorised into age groups: ≤25, 25-29.9 or 30+. Those who responded, “do not remember” or “prefer not to answer” were coded as ‘unknown’.

Menopausal status

Participants were asked to provide information on menopausal status at recruitment. Women were asked to answer the question, "Have you had your menopause?". Those who responded with "yes" were prompted with the question, "How old were you when your periods stopped?". Women were also given the option to answer "no", "not sure – had hysterectomy", "not sure – other reason", or "prefer not to answer". From this, women were classified as 'pre-menopausal', 'postmenopausal', or 'unknown', depending on their response to a number of other sex-specific factors (see coding below).

	Pre-MP[a]	**Pre-MP[b]**	**Pre-MP[c]**	**Post-MP[a]**	**Post-MP[b]**	**Post-MP[c]**	**Unknown[a]**	**Unknown[b]**	**Unknown[c]**
Sex-specific factors									
Had menopause									
Yes				X					
No	X						X	X	X
Not sure		X	X		X	X			
Age									
<50 years		X	X						
≥55 years					X				
50-54.9 years									X
Had BO/ hysterectomy									
Yes						X			
No		X	X						
Not sure								X	
Ever used HRT									
Yes									
No		X							
Do not know							X		
Menstruating today									
Yes			X						
No									
Do not know									

Abbreviations: Pre-MP, Pre-menopausal; Post-MP, Post-menopausal; BO, Bilateral oophorectomy; HRT, Hormone replacement therapy.
[a]Pre-menopausal, post-menopausal and unknown menopausal status coding criteria (combination of questions/responses, option one)
[b]Pre-menopausal, post-menopausal and unknown menopausal status coding criteria (combination of questions/responses, option two)
[c]Pre-menopausal, post-menopausal and unknown menopausal status coding criteria (combination of questions/responses, option three)

Menopause hormone therapy

When asked about the use of exogenous hormones i.e., menopause hormone therapy (MHT) female participants were questioned about their "ever" use of hormone replacement therapy (HRT). If answered "yes", participants were prompted with the question: "How old were you when you last used HRT?". Participants were provided with the option to answer the following: the age they were when they last used HRT, "still taking HRT", "prefer not to answer" or "do not know". From this, respondents were categorised into 'yes', 'no', or 'missing/unknown'.

Oral contraception

At recruitment, women were asked the question, "Have you ever taken the contraceptive pill?". Participants had the option to answer with "yes", "no", "prefer not to answer" or "do not know". Following this, respondents were coded as 'yes', 'no', and those who responded with "prefer not to answer" or "do not know" were coded as 'unknown'.

Anthropometric measurements

At recruitment, height and weight were measured to determine BMI. To calculate BMI, the weight of each participant (kilograms) was divided by their recorded squared standing height (metres). BMI was coded as <18.5, 18.5-24.99, 25-29.99, 30-34.99, ≥35 kg/m^2. When data on height or weight was missing, participants were categorised as 'unknown/missing'.

Medications and vitamin/mineral supplements

Participants were asked to report their regular medication use against a range of common prescriptions, over-the-counter medications, vitamins, and mineral supplements. Participants could answer if they took medication for cholesterol, blood pressure, or diabetes; pain relief, constipation, or heartburn; vitamins and mineral supplements; and other prescription medications. Female participants also had the option to report if they were taking exogenous hormones. Participants were coded as missing if they reported: "prefer not to say". Those who reported "yes" to taking regular 'other' prescription medications were prompted by a trained interviewer to disclose these medication details. When participants reported "none of the above" or "do not know" to taking regular prescription medication, they were again prompted by an interviewer for confirmation. From this, 'regular' medication users were categorised as taking "aspirin" medication. Data obtained through the touchscreen questionnaire and verbal nurse-led interview permitted the name and type of medication to be categorised through a treatment/medicine code. Moreover, participants were asked to report their 'regular' vitamin and mineral supplement use from a list of commonly consumed vitamins/minerals. From this, respondents were coded as "non-user" and "regular user". When data on vitamin and mineral supplement use was missing, or participants answered with "prefer not to say", participants were categorised as 'unknown/missing'.

Polypharmacy

At baseline, participants were asked to report the number of treatments (medications) taken. The total number of self-reported medications reported at baseline was used to represent polypharmacy amongst UK Biobank participants [2]. Participants were coded as 0, 1-3, 4-6, 7-9, >10. Those who did not answer this question were recorded as 'missing'.

Multimorbidity

Data on self-reported medical conditions, including number and date of diagnosis, was collected via physician-led interview at baseline assessment. Prevalent morbidity was defined as having one of 43 long-term conditions as determined by Barnett et al. (2012). Participants with two or more long term-conditions (LTCs) were considered as having multimorbidity.

Polygenic risk scores

Polygenic risk scores (PRSs) obtained from external GWAS data provided by Genomics PLC for use upon request within UK Biobank were used for this study. Depending on the outcome of interest and data available, PRSs were categorized into tertiles from low to high genetic risk, or 'missing'. Further detail on the PRS Release has been described elsewhere [3].

eMethods 3. Outcome Ascertainment

Outcome – Mortality

All-cause, CVD and cancer mortality was defined by date and underlying cause of death using the International Classification of Disease 10th edition (ICD-10). The ICD-10 codes used to define CVD and cancer mortality included: fatal CVD (I00-I25, I27-I88, I95-I99); fatal cancer (C00-C97, excluding non-melanoma skin cancer: C44). Censoring dates for death data were provided by the NHS Information Centre for participants from England and Wales until September 2021, and the NHS Central Register Scotland for Scotland until October 2021 [8]. For mortality analysis, follow-up was censored using the death registry censoring date or death date, whichever occurred first.

Outcome – CVD

Incident CVD was defined as a primary myocardial infarction (MI) or stroke event using the UK Biobank linked Hospital Inpatient and Death Registry data. For incident CVD analysis, follow-up time was censored at date of hospitalisation, death, or end of follow-up, whichever occurred first. Hospital admission data was available up until September 2021 from the Hospital Episode Statistics (HES) for England, until the end of July 2021 for Scottish Morbidity Records (SMR), and until March 2016 for the Patient Episode Database for Wales (PEDW). Using the ICD-10, any CVD was defined as ischemic heart disease (IHD) (I20), MI (I21-I23, I24.1, I25.2), stroke (I60, I61, I63, or I64). Stroke subtypes were defined as ischemic (I63) and haemorrhagic (I61).

Outcome – Cancer

Incident cancer was defined as a primary cancer diagnosis. Cancer diagnosis data was provided through record linkage to National Cancer Registries in England, Wales (follow-up data available from the National Health Service (NHS) information centre until February 2020) and Scotland (follow-up data available from the NHS Central Register Scotland until January 2021). Participants contributed to follow-up time in person years from date of recruitment until the date of first cancer registration, death, or end of follow-up, whichever occurred first. Where Cancer Registry censoring dates did not extend past Hospital Inpatient dates (England and Scotland), participants were further followed using HES and SMR data. PEDW data did not extend past the Cancer Registry data for Wales, so only Cancer Registry dates were used for censoring the end of follow-up. Using ICD-10, cancers were defined as, any cancer (C00-C97, excluding non-melanoma skin cancer: C44), breast cancer (C50), colorectal cancer (C18-C20), and prostate cancer (C61). Breast cancer analyses were coded and restricted to postmenopausal breast cancer.

Outcome – Fracture

Using the UK Biobank linked hospital inpatient and death Registry data, incident fractures were defined according to ICD-10 as, any fracture (M484, M485, M800, M808-M8093, M8095-M8099, M843, M844, S12, S22, S32, S42, S52, S72, S82, T02, T08, T10, T12), hip fracture (S720, S721, S722) and vertebrae fracture (M484, M485, S320, S327), due to these fracture sites being most attributable to osteoporosis [9]. Fractures of the face, skull, hands, and feet were excluded from this analysis due to their typically traumatic nature, whilst other traumatic fractures could not be excluded due to a lack of ICD-10 information on the cause of trauma [10]. Hospital admission data was available up until September 2021 from the HES for England, until the end of July 2021 for SMR, and up until March 2016 from the PEDW. For incident fracture analysis, follow-up time was censored at the date of hospitalisation or first reported occurrence, death, or end of follow-up, whichever occurred first.

eMethods 4. Multivariable Adjustment

Minimally adjusted models were stratified by region (London, North-West England, North-East England, Yorkshire, West Midlands, East Midlands, South-East England, South-West England, Scotland and Wales), and were adjusted for education (CSEs or equivalent, O levels/GCSEs or equivalent; Medium: A levels/AS levels or equivalent, NVQ or HND or HNC or equivalent; High: College or University degree, Other professional qualifications e.g.: nursing, teaching or Missing/Prefer not to say/Unknown) and sex (male and female).

For all outcomes, multivariable Cox regression models were further adjusted for energy intake (KJ/day) and the following baseline covariates: BMI (<18.5 (underweight), ≥18.5-<25 (normal weight), ≥25-<30 (overweight), ≥30-<35 (obese grade I), ≥35 (obese grade II and III), or unknown/missing), smoking status (never, former, current, or unknown/missing), alcohol intake (none drinkers, <1 g/day, 1-7 g/day, 8-15 g/day, 16+ g/day, or unknown/missing), ethnicity (White, Mixed, Asian or Asian British, Black or Black British, other, or unknown/missing), physical activity (quintiles from low to high metabolic equivalent of task-hours /week, or missing), multimorbidity (number of pre-existing long term-conditions; 0, 1, 2, or >3), polypharmacy (total number of self-reported medications taken at baseline; 0, 1-3, 4-6, 7-9, >10, or missing)

Multivariate models for total mortality were further adjusted for prevalent CVD and cancer (no, yes). CVD-mortality analyses were further adjusted for prevalent CVD, whereas cancer mortality analyses were adjusted for prevalent cancer.

Cox regression analyses on total cancer risk were further adjusted for female-specific factors: menopausal hormone therapy use (no, yes, or unknown/missing among women; or male) and menopausal status at recruitment (premenopausal, postmenopausal, or unknown/missing among women; or male). Analyses on postmenopausal breast cancer risk were further adjusted for age at menarche (≤12, 13, ≥14 years old, or unknown/missing), ever use of oral contraception (no, yes, or unknown/missing), age at first live birth (<25, 25-29.9, ≥30 years of age, or unknown/missing) and polygenic risk score (PRS) for breast cancer (tertiles from low to high PRS for breast cancer or missing), as provided by the UK Biobank.[3] For colorectal cancer analyses, models were further adjusted bowel cancer PRS (tertiles from low to high PRS for bowel

cancer or missing). Analyses on prostate cancer analyses were further adjusted for prostate cancer PRS (tertiles from low to high PRS for prostate cancer or missing), but not for female-specific factors.[3]

For total CVD, MI and stroke analyses, multivariable models were further adjusted for a CVD PRS, ischaemic stroke (IS) PRS, or coronary artery disease (CAD) PRS (tertiles from low to high PRS for CVD/ ISS/CAD or missing).[3]

Finally, multivariable Cox regression analyses on fracture were further adjusted for an osteoporosis (OP) PRS (tertiles from low to high PRS for OP, or missing)[3] and vitamin and mineral supplement use (no use, regular use, unknown/missing).

eMethods 5. Missing Values

Missing values were treated by using 'missing/unknown' categories in multivariable statistical analyses. The frequencies of missing values were as follows:

- Education level: 6.81%
- BMI: 0.22%
- Smoking status: 0.22%
- Alcohol consumption: 16.73%
- Ethnicity: 0.34%
- Physical activity: 1.82%
- Polypharmacy: 0.02%
- Aspirin use: 27.78%
- Menopausal hormone therapy: 0.23%
- Menopausal status at recruitment: 14.76%
- Age at menarche: 2.58%
- Ever use of oral contraception: 0.17%
- Age at first live birth: 0.04%
- PRS: 2.13% (colon cancer), 1.82% (prostate cancer), 2.18% (CVD, CAD, and IS), and 2.15% (osteoporosis):
- Vitamin and mineral supplement use (0.23%)

eTable 1. Comparison of Baseline Characteristics of the UK Biobank Cohort (n = 502 411), Included Participants (n = 126 394), and Excluded Participants (n = 291 446)

	Participants, No. (%)[a]			
	Whole cohort (N=502,411)	**Dietary data (≥2 diet recalls) (N=126,394)**	**No dietary data (N=291,446)**	**P-value**
Characteristics				<0.001
Sex-Female	273,325 (54.4)	70,618 (55.9)	157,114 (53.9)	
Age at recruitment – years, mean (SD)	56.5 (8.1)	56.1 (7.8)	56.9 (8.2)	
BMI- kg/m^2, mean (SD)	27.4 (4.8)	26.7 (4.6)	27.8 (4.9)	
Ethnicity				
Asian	19,131 (3.8)	5,850 (4.6)	9,764 (3.4)	
Black	2,872 (0.6)	466 (0.4)	1,853 (0.6)	
Multiple	18,903 (3.8)	3,535 (2.8)	12,208 (4.2)	
White	454,170 (90.4)	115,371 (91.3)	262,599 (90.1)	
Other[b]	4,557 (0.9)	744 (0.6)	3,016 (1.0)	
Education				
Low	125,757 (25.0)	32,365 (25.6)	70,861 (24.3)	
Medium	85,122 (16.9)	20,249 (16.0)	49,628 (17.0)	
High	196,131 (39.0)	65,163 (51.6)	94,692 (32.5)	
Missing	95,391 (19.0)	8,617 (6.8)	76,265 (26.2)	
Smoking status				
Never	273,475 (54.4)	72,174 (57.1)	154,482 (53.0)	
Previous	173,024 (34.4)	45,209 (35.8)	98,164 (33.7)	
Current	52,962 (10.5)	8,738 (6.9)	36,416 (12.5)	
Missing	2,950 (0.6)	273 (0.2)	2,384 (0.8)	
Alcohol intake g/day, mean (SD)	12.1 (20.8)	12.7 (18.1)	11.7 (22.2)	

Abbreviations: Q, quartile; BMI, body mass index; SD, standard deviation.

[a]Relative frequencies (%) include missing values which may not equate to 100%.

[b]Other includes any race or ethnic group not otherwise specified.

eTable 2. Cases, Follow-up Years, and Number Lost to Follow-up for All-Cause Mortality and Incident Cancer, Cardiovascular Disease, and Fracture Outcomes

	Participants, No. (%)			
Characteristics	**All-Cause Mortality**	**Any Cancer**	**Any CVD**	**Any Fracture**
Number of participants	126,217	117,569	123,134	112,208
Cases	5,627 (4.5)	8,939 (7.6)	6,890 (5.6)	4,751 (4.3)
Follow-up – years, mean (SD)	12.2 (1.3)	10.6 (1.6)	11.9 (1.9)	11.9 (1.7)
Person-years	1,545,827	1,241,046	1,459,597	1,333,865
Lost to follow-up	363 (0.3)	349 (0.3)	360 (0.3)	329 (0.3)

Abbreviations: CVD, cardiovascular disease.

eTable 3. Key Nutrient Intakes Across Healthful Plant-based Diet Index Quartiles (n = 126 217)

Key nutrient intakes	Mean (SD)			
Quartiles of hPDI	**Q1**	**Q2**	**Q3**	**Q4**
Participants, No. (%)	33,901 (26.9)	30,427 (24.1)	30,007 (23.8)	31,882 (25.3)
hPDI score	47.7 (3)	53.7 (2)	57.6 (2)	63.4 (3)
Energy intake kJ/day,	9099.5 (1825.5)	8518.3 (1798.3)	8226.1 (1796.4)	7984.0 (1811.5)
Calcium intake mg/day	1010.2 (304.2)	971.9 (293.2)	965.2 (291.2)	969.2 (294.4)
Fibre intake g/day	15.6 (4.9)	16.9 (5.2)	18.2 (5.5)	21.0 (6.3)
Iodine intake μg/day	220.9 (88.3)	212.4 (83.0)	207.4 (81.4)	197.2 (81.2)
Saturated fat intake g/day	32.2 (10.9)	27.8 (9.8)	25.5 (9.4)	22.6 (8.9)
Vitamin B12 intake μg/day	6.6 (2.9)	6.3 (2.7)	6.1 (2.7)	5.7 (2.7)
Vitamin D intake μg/day	4.0 (2.4)	3.7 (2.3)	3.6 (2.4)	3.3 (2.4)

Abbreviations: SD, standard deviation; Q, quartile; hPDI, healthful plant-based diet index.

eTable 4. Food Groups and Key Nutrient Intakes Across Unhealthful Plant-based Diet Index Quartiles (n = 126 217)

Key Nutrient Intakes	Mean (SD)			
Quartiles of uPDI	**Q1**	**Q2**	**Q3**	**Q4**
Participants, No. (%)	34,808 (27.6)	31,273 (24.8)	30,401 (24.1)	29,735 (23.6)
uPDI score	46.6 (3.2)	52.4 (1.5)	56.3 (1.5)	61.8 (2.9)
Energy intake kJ/day	8854.7 (1867.3)	8500.9 (1832.7)	8319.3 (1820.2)	8141.1 (1828.6)
Calcium intake mg/day	1086.0 (306.1)	1001.2 (287.0)	943.6 (275.4)	870.4 (269.3)
Fibre intake g/day	21.2 (6.1)	18.5 (5.3)	16.8 (4.9)	14.5 (4.6)
Iodine intake μg/day	238.3 (90.0)	215.3 (81.7)	201.1 (77.9)	179.0 (72.8)
Saturated fat intake g/day	28.8 (11.2)	27.2 (10.4)	26.5 (9.9)	25.7 (9.6)
Vitamin B12 intake μg/day	7.2 (3.0)	6.3 (2.7)	5.8 (2.5)	5.2 (2.3)
Vitamin D intake μg/day	4.4 (2.8)	3.7 (2.3)	3.4 (2.1)	3.0 (1.8)

Abbreviations: SD, standard deviation; Q, quartile; uPDI, unhealthful plant-based diet index.

eTable 5. Baseline Characteristics Across Unhealthful Plant-based Diet Index Quartiles (n = 126 217)

	Participants, No. (%)[a]			
	Q1	**Q2**	**Q3**	**Q4**
Characteristics across uPDI				
Number of participants	34,808 (27.6)	31,273 (24.8)	30,401 (24.1)	29,735 (23.6)
uPDI, mean (SD)	46.6 (3.2)	52.4 (1.5)	56.3 (1.5)	61.8 (2.9)
Sex-Female	18,318 (52.6)	17,482 (55.9)	17,210 (56.6)	17,545 (59.0)
Age at recruitment – years, mean (SD)	57.5 (7.4)	56.7 (7.6)	56.0 (7.8)	54.1 (8.1)
BMI- kg/m^2, mean (SD)	26.5 (4.4)	26.5 (4.5)	26.7 (4.5)	27.2 (4.9)
Physical activity				
Low	9,735 (28.0)	9,797 (31.3)	10,379 (34.1)	11,415 (38.4)
Moderate	11,570 (33.2)	10,575 (33.8)	9,948 (32.7)	9,205 (31.0)
High	12,986 (37.3)	10,314 (33.0)	9,523 (31.3)	8,469 (28.5)
Ethnicity				
Asian	1,990 (5.7)	1,440 (4.6)	1,323 (4.4)	1,091 (3.7)
Black	127 (0.4)	107 (0.3)	105 (0.4)	127 (0.4)
Multiple	930 (2.7)	826 (2.6)	879 (2.9)	895 (3.0)
White	31,432 (90.3)	28,610 (91.4)	27,806 (91.5)	27,360 (92.0)
Other[b]	195 (0.6)	187 (0.6)	186 (0.6)	175 (0.6)
Education				
Low	8,162 (23.5)	7,742 (24.8)	7,917 (26.0)	8,505 (28.6)
Medium	5,045 (14.5)	4,764 (15.2)	4,975 (16.4)	5,437 (18.3)
High	19,614 (56.4)	16,782 (53.7)	15,275 (50.3)	13,408 (45.1)
Smoking status				
Never	18,832 (54.1)	17,768 (56.8)	17,550 (57.7)	17,953 (60.4)
Previous	13,776 (40.0)	11,445 (36.6)	10,661 (35.1)	9,230 (31.0)
Current	2,134 (6.1)	1,982 (6.3)	2,115 (7.0)	2,488 (8.4)
Alcohol intake g/day, mean (SD)	13.5 (18.5)	12.8 (17.5)	12.5 (17.9)	11.6 (18.5)
Medication use				
Aspirin	4,992 (14.3)	4,054 (13.0)	3,944 (13.0)	3,592 (12.1)
Multimorbidity				
0 LTCs	14,210 (40.8)	13,037 (41.7)	12,758 (42.0)	12,369 (41.6)
1 LTC	10,602 (30.5)	9,417 (30.1)	9,103 (29.9)	8,979 (30.2)
2 LTCs	5,830 (16.8)	5,183 (16.6)	5,039 (16.6)	4,780 (16.1)
≥3 LTCs	4,166 (12.0)	3,636 (11.6)	3,501 (11.5)	3,607 (12.1)
Polypharmacy				
0	10,965 (31.5)	9,834 (31.4)	9,449 (31.1)	8,936 (30.1)
1-3	16,047 (46.1)	14,532 (46.5)	14,186 (46.7)	14,086 (47.4)
4-6	5,755 (16.5)	5,128 (16.4)	5,015 (16.5)	4,871 (16.4)
7-9	1,536 (4.4)	1,334 (4.3)	1,269 (4.2)	1,312 (4.4)
≥10	499 (1.4)	451 (1.4)	477 (1.6)	525 (1.8)
Unhealthful Plant-Based Diet Index food item intake, portions/day[c]				
Wholegrains[d]	2.9 (1.5)	2.3 (1.4)	1.9 (1.3)	1.4 (1.1)
Fruit[d]	3.0 (1.7)	2.4 (1.5)	2.0 (1.4)	1.4 (1.2)
Vegetables[d]	3.4 (2.1)	2.6 (1.8)	2.1 (1.6)	1.6 (1.3)
Nuts[d]	0.3 (0.5)	0.2 (0.3)	0.1 (0.3)	0.1 (0.2)
Legumes[d]	0.5 (0.5)	0.4 (0.4)	0.3 (0.4)	0.3 (0.4)
Tea and coffee[d]	4.9 (1.6)	4.5 (1.6)	4.2 (1.6)	3.7 (1.6)
Refined grains[e]	0.7 (0.8)	1.0 (1.0)	1.2 (1.1)	1.5 (1.1)
Potatoes[e]	0.6 (0.5)	0.7 (0.5)	0.7 (0.5)	0.8 (0.6)
Sugary drinks[e]	0.3 (0.6)	0.4 (0.7)	0.5 (0.8)	0.9 (1.0)
Fruit juices[e]	0.4 (0.5)	0.4 (0.5)	0.5 (0.5)	0.6 (0.6)
Sweets and desserts[e]	1.1 (1.0)	1.3 (1.1)	1.5 (1.2)	1.8 (1.3)
Animal fat	0.9 (1.1)	0.7 (1.0)	0.6 (0.9)	0.5 (0.8)

Dairy	1.3 (0.8)	1.1 (0.7)	1.0 (0.7)	0.8 (0.7)
Eggs	0.4 (0.5)	0.3 (0.4)	0.2 (0.4)	0.2 (0.3)
Fish or seafood	0.5 (0.4)	0.3 (0.4)	0.3 (0.4)	0.2 (0.3)
Meat	1.2 (0.9)	1.2 (0.8)	1.0 (0.8)	1.1 (0.8)
Miscellaneous animal-based foods	0.1 (0.3)	0.1 (0.3)	0.1 (0.3)	0.1 (0.3)

Abbreviations: Q, quartile; uPDI, unhealthful plant-based diet index; BMI, body mass index; SD, standard deviation; LTC, long-term condition.

[a]Relative frequencies (%) include missing values which may not equate to 100%.

[b]Other includes any race or ethnic group not otherwise specified.

[c]Portions sizes were specified as a "serving" in the Oxford WebQ.

[d]Healthy plant-foods

[e]Unhealthy plant-foods

eTable 6. Intraclass Correlation Coefficients for Reproducibility of Plant-based Diet Index Scores Over Time

24-hr dietary recall cycles[a]	Ethnic Group					
T2+T3 *vs.* T4+T5	**Overall**	**Asian**	**Black**	**Multiple**	**White**	**Other[b]**
Number of participants	24,893	1,116	72	554	22,945	122
hPDI	0.58	0.65	0.54	0.62	0.58	0.62
uPDI	0.55	0.54	0.44	0.60	0.55	0.43

Abbreviations: hPDI, healthful plant-based diet index; uPDI, unhealthful plant-based diet index

[a]Intra-class correlation coefficients are calculated from the means of cycles 2 and 3, correlated with the means of cycles 4 and 5.

[b]Other includes any race or ethnic group not otherwise specified.

eTable 7. Hazard Ratios (95% CIs) of Mortality Across Sex-Specific Healthful Plant-based Diet Index Quartiles (n = 126 217)

hPDI	Q1	Q2	Q3	Q4	P-trend	P-corrected
Outcome						
All-Cause Mortality						
Cases/total	1,602/33,901	1,375/30,427	1,269/30,007	1,381/31,882		
HR (95% CI)[a]	1.00[c]	0.84 (0.78-0.90)	0.75 (0.70-0.81)	0.76 (0.70- 0.81)	<0.001	0.004
HR (95% CI)[b]	1.00[c]	0.90 (0.83-0.97)	0.82 (0.76-0.89)	0.84 (0.78-0.91)	<0.001	0.004
Cancer-Mortality						
Cases/total	873/33,901	803/30,427	758/30,007	841/31,882		
HR (95% CI)[a]	1.00[c]	0.90 (0.82-1.00)	0.83 (0.75-0.92)	0.85 (0.77- 0.93)	<0.001	0.004
HR (95% CI)[b]	1.00[c]	0.96 (0.87-1.06)	0.91 (0.82-1.00)	0.95 (0.86- 1.05)	0.10	0.22
CVD-Mortality						
Cases/total	195/33,901	178/30,427	158/30,007	167/31,882		
HR (95% CI)[a]	1.00[c]	0.89 (0.73-1.09)	0.77 (0.62-0.94)	0.75 (0.61- 0.92)	0.001	0.004
HR (95% CI)[b]	1.00[c]	0.97 (0.79-1.19)	0.86 (0.69-1.06)	0.85 (0.69- 1.06)	0.07	0.16

Abbreviations: Q, quartile; hPDI, healthful plant-based diet index; CVD, Cardiovascular Disease; HR, hazard ratios; CI, confidence intervals.

P-trend is for linear trend.

P-corrected is the P-trend corrected for multiple testing.

[a]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex and education; stratified by region.

[b]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex, BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.

For all-cause mortality analyses, models were further adjusted for prevalent CVD and prevalent cancer.

For CVD mortality analyses, models were further adjusted for prevalent CVD.

For cancer mortality analyses, models were further adjusted for prevalent cancer.

[c]Reference categories

eTable 8. Hazard Ratios (95% CIs) of Mortality Across Sex-Specific Unhealthful Plant-based Diet Index Quartiles (n = 126 217)

uPDI	Q1	Q2	Q3	Q4	P-trend	P-corrected
Outcome						
All-Cause Mortality						
Cases/total	1,579/34,808	1,399/31,273	1,352/30,401	1,297/29,735		
HR (95% CI)[a]	1.00[c]	1.06 (0.99-1.14)	1.12 (1.04-1.21)	1.30 (1.21- 1.40)	<0.001	0.004
HR (95% CI)[b]	1.00[c]	1.06 (0.99-1.14)	1.09 (1.02-1.18)	1.23 (1.14-1.32)	<0.001	0.004
Cancer-Mortality						
Cases/total	917/34,808	813/31,273	809/30,401	736/29,735		
HR (95% CI)[a]	1.00[c]	1.05 (0.96-1.16)	1.14 (1.04-1.25)	1.24 (1.13- 1.37)	<0.001	0.004
HR (95% CI)[b]	1.00[c]	1.06 (0.96-1.16)	1.12 (1.02-1.23)	1.19 (1.08- 1.32)	<0.001	0.004
CVD-Mortality						
Cases/total	205/34,808	184/31,273	164/30,401	145/29,735		
HR (95% CI)[a]	1.00[c]	1.09 (0.89-1.33)	1.06 (0.86-1.30)	1.16 (0.94- 1.43)	0.04	0.08
HR (95% CI)[b]	1.00[c]	1.09 (0.89-1.33)	1.04 (0.84-1.28)	1.08 (0.87- 1.34)	0.15	0.25

Abbreviations: Q, quartile; uPDI, unhealthful plant-based diet index; CVD, cardiovascular disease; HR, hazard ratios; CI, confidence intervals.

P-trend is for linear trend.

P-corrected is the P-trend corrected for multiple testing.

[a]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex and education; stratified by region.

[b]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex, BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.

For all-cause mortality analyses, models were further adjusted for prevalent CVD and prevalent cancer.

For CVD mortality analyses, models were further adjusted for prevalent CVD.

For cancer mortality analyses, models were further adjusted for prevalent cancer.

[c]Reference categories

eTable 9. Hazard Ratios (95% CIs) of Cancer (Postmenopausal Breast, Colorectal, Prostate, or Any) Across Sex-Specific Healthful Plant-based Diet Index Quartiles (n = 117 569)

hPDI	Q1	Q2	Q3	Q4	P-trend	P-corrected
Outcome						
Any Cancer						
Cases/total	2,331/31,642	2,178/28,348	2,162/27,930	2,268/29,649		
HR (95% CI)[a]	1.00[c]	0.94 (0.89-1.00)	0.91 (0.85-0.96)	0.87 (0.82- 0.92)	<0.001	0.004
HR (95% CI)[b]	1.00[c]	0.97 (0.91-1.03)	0.95 (0.90-1.01)	0.93 (0.88-0.99)	0.01	0.03
Postmenopausal Breast Cancer						
Cases/total	228/16,759	276/15,790	288/15,849	291/16,834		
HR (95% CI)[a]	1.00[c]	1.07 (0.90-1.27)	1.05 (0.88-1.24)	0.95 (0.80- 1.13)	0.21	0.29
HR (95% CI)[b]	1.00[c]	1.07 (0.89-1.28)	1.07 (0.89-1.28)	0.99 (0.83- 1.19)	0.52	0.61
Colorectal Cancer						
Cases/total	260/31,642	249/28,348	227/27,930	223/29,649		
HR (95% CI)[a]	1.00[c]	0.96 (0.81-1.15)	0.85 (0.71-1.02)	0.77 (0.64- 0.92)	0.002	0.007
HR (95% CI)[b]	1.00[c]	1.01 (0.85-1.21)	0.92 (0.77-1.11)	0.87 (0.72- 1.05)	0.11	0.22
Prostate Cancer						
Cases/total	515/14,883	514/12,558	540/12,081	568/12,815		
HR (95% CI)[a]	1.00[c]	1.01 (0.90-1.15)	1.03 (0.91-1.16)	0.98 (0.87- 1.10)	0.49	0.61
HR (95% CI)[b]	1.00[c]	1.00 (0.89-1.14)	1.02 (0.90-1.16)	0.98 (0.86- 1.11)	0.50	0.61

Abbreviations: Q, quartile; hPDI, healthful plant-based diet index; BC, breast cancer; PRS, polygenic risk score; BMI, body mass index; CRC, colorectal cancer; MHT, menopause hormone therapy; PC, prostate Cancer; HR, hazard ratios; CI, confidence intervals.

P-trend is for linear tren.

P-corrected is the P-trend corrected for multiple testing.

[a]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex and education; stratified by region.

[b]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex (excluding breast and prostate cancer analyses), BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.

For any cancer analyses, models were further adjusted for menopausal status and use of MHT.

For breast cancer analyses, models were restricted to postmenopausal breast cancer cases and were further adjusted for use of MHT, use of oral contraception, PRS (BC), age at menarche and age at first live birth.

For colorectal cancer analyses, models were further adjusted for menopausal status, PRS (CRC) and MHT.

For prostate cancer analyses, models were further adjusted for PRS (PC).

[c]Reference categories.

eTable 10. Hazard Ratios (95% CIs) of Cancer (Postmenopausal Breast, Colorectal, Prostate, or Any) Across Sex-Specific Unhealthful Plant-based Diet Index Quartiles (n = 117 569)

uPDI	Q1	Q2	Q3	Q4	P-trend	P-corrected
Outcome						
Any Cancer						
Cases/total	2,622/33,372	2,260/29,079	2,117/28,302	1,940/27,816		
HR (95% CI)[a]	1.00[c]	1.02 (0.97-1.08)	1.04 (0.98-1.10)	1.12 (1.06- 1.19)	<0.001	0.004
HR (95% CI)[b]	1.00[c]	1.03 (0.97-1.09)	1.04 (0.98-1.10)	1.10 (1.03-1.17)	<0.001	0.004
Postmenopausal Breast Cancer						
Cases/total	306/16,855	288/16,170	258/15,925	231/16,282		
HR (95% CI)[a]	1.00[c]	1.06 (0.90-1.25)	1.06 (0.90-1.25)	1.17 (0.98- 1.39)	0.11	0.22
HR (95% CI)[b]	1.00[c]	1.07 (0.91-1.26)	1.07 (0.90-1.26)	1.16 (0.97- 1.38)	0.13	0.23
Colorectal Cancer						
Cases/total	268/33,372	265/29,079	244/28,302	182/27,816		
HR (95% CI)[a]	1.00[c]	1.19 (1.00-1.40)	1.18 (0.99-1.41)	1.04 (0.86- 1.26)	0.14	0.24
HR (95% CI)[b]	1.00[c]	1.20 (1.01-1.42)	1.19 (1.00-1.42)	1.05 (0.86- 1.27)	0.12	0.22
Prostate Cancer						
Cases/total	717/15,517	540/12,909	482/12,377	398/11,534		
HR (95% CI)[a]	1.00[c]	0.97 (0.87-1.09)	0.97 (0.86-1.09)	1.02 (0.90- 1.15)	0.73	0.80
HR (95% CI)[b]	1.00[c]	0.99 (0.88-1.11)	0.99 (0.88-1.11)	1.05 (0.93- 1.19)	0.45	0.57

Abbreviations: Q, quartile; uPDI, unhealthful plant-based diet index; BC, breast cancer; PRS, polygenic risk score; BMI, body mass index; CRC, colorectal cancer; MHT, menopause hormone therapy; PC, prostate Cancer; HR, hazard ratios; CI, confidence intervals

P-trend is for linear trend.

P-corrected is the P-trend corrected for multiple testing..

[a]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex and education; stratified by region.

[b]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex (excluding breast and prostate cancer analyses), BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.

For any cancer analyses, models were further adjusted for menopausal status and use of MHT.

For breast cancer analyses, models were restricted to postmenopausal breast cancer cases and were further adjusted for use of MHT, use of oral contraception, PRS (BC), age at menarche and age at first live birth.

For colorectal cancer analyses, models were further adjusted for menopausal status, PRS (CRC) and MHT.

For prostate cancer analyses, models were further adjusted for PRS (PC).

[c]Reference categories.

eTable 11. Hazard Ratios (95% CIs) of Cardiovascular Disease (Myocardial Infarction, Stroke, or Any) Across Sex-Specific Healthful Plant-based Diet Index Quartiles (n = 123 134)

hPDI	Q1	Q2	Q3	Q4	P-trend	P-corrected
Outcome						
Any CVD						
Cases/total	1,839/33,108	1,679/29,656	1,623/29,264	1,749/31,106		
HR (95% CI)[a]	1.00[c]	0.92 (0.86-0.98)	0.87 (0.81-0.93)	0.86 (0.80- 0.92)	<0.001	0.004
HR (95% CI)[b]	1.00[c]	0.95 (0.89-1.02)	0.92 (0.86-0.99)	0.92 (0.86-0.99)	0.002	0.007
Ischaemic stroke						
Cases/total	307/33,108	295/29,656	265/29,264	284/31,106		
HR (95% CI)[a]	1.00[c]	0.94 (0.80-1.10)	0.81 (0.69-0.95)	0.79 (0.68- 0.93)	0.002	0.007
HR (95% CI)[b]	1.00[c]	0.96 (0.82-1.13)	0.85 (0.72-1.00)	0.84 (0.71- 0.99)	0.03	0.08
Haemorrhagic stroke						
Cases/total	127/33,108	133/29,656	101/29,264	128/31,106		
HR (95% CI)[a]	1.00[c]	0.85 (0.66-1.10)	0.74 (0.57-0.96)	0.85 (0.66- 1.08)	0.06	0.15
HR (95% CI)[b]	1.00[c]	0.90 (0.69-1.16)	0.80 (0.61-1.05)	0.92 (0.71- 1.20)	0.30	0.44
MI						
Cases/total	899/33,108	758/29,656	797/29,264	799/31,106		
HR (95% CI)[a]	1.00[c]	0.85 (0.77-0.94)	0.89 (0.81-0.98)	0.81 (0.74- 0.89)	<0.001	0.004
HR (95% CI)[b]	1.00[c]	0.88 (0.80-0.97)	0.94 (0.85-1.04)	0.86 (0.78- 0.95)	<0.001	0.004

Abbreviations: Q, quartile; hPDI, healthful plant-based diet index; BMI, Body Mass Index; CVD, cardiovascular disease; PRS, polygenic risk score; IS, Ischaemic stroke; MI, myocardial infarction; CAD, coronary artery disease; HR, hazard ratios; CI, confidence intervals.

P-trend is for linear trend.

P-corrected is the P-trend corrected for multiple testing.

[a]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex and education; stratified by region.

[b]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex, BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.

For any CVD and haemorrhagic stroke, models were further adjusted for PRS (CVD).

For ischaemic stroke analyses, models were further adjusted for PRS (IS).

For MI, models were further adjusted for PRS (CAD).

[c]Reference categories.

eTable 12. Hazard Ratios (95% CIs) of Cardiovascular Disease (Myocardial Infarction, Stroke, or Any) Across Sex-Specific Unhealthful Plant-based Diet Index Quartiles (n = 123 134)

uPDI	Q1	Q2	Q3	Q4	P-trend	P-corrected
Outcome						
Any CVD						
Cases/total	2,023/33,970	1,671/30,494	1,699/29,637	1,497/29,033		
HR (95% CI)[a]	1.00[c]	1.00 (0.94-1.07)	1.11 (1.04-1.118)	1.18 (1.10- 1.26)	<0.001	0.004
HR (95% CI)[b]	1.00[c]	1.01 (0.95-1.08)	1.09 (1.03-1.17)	1.21 (1.05-1.20)	<0.001	0.004
Ischaemic stroke						
Cases/total	358/33,970	266/30,494	274/29,637	253/29,033		
HR (95% CI)[a]	1.00[c]	0.90 (0.77-1.06)	1.03 (0.88-1.20)	1.17 (1.00- 1.38)	<0.001	0.004
HR (95% CI)[b]	1.00[c]	0.90 (0.77-1.06)	1.01 (0.87-1.19)	1.23 (0.95- 1.33)	0.008	0.02
Haemorrhagic stroke						
Cases/total	144/33,970	124/30,494	106/29,637	95/29,033		
HR (95% CI)[a]	1.00[c]	1.07 (0.83-1.35)	1.00 (0.78-1.29)	1.13 (0.87- 1.46)	0.15	0.25
HR (95% CI)[b]	1.00[c]	1.06 (0.83-1.36)	0.98 (0.76-1.26)	1.06 (0.82- 1.39)	0.33	0.46
MI						
Cases/total	931/33,970	778/30,494	829/29,637	715/29,033		
HR (95% CI)[a]	1.00[c]	1.02 (0.93-1.12)	1.18 (1.08-1.30)	1.23 (1.12- 1.36)	<0.001	0.004
HR (95% CI)[b]	1.00[c]	1.03 (0.94-1.13)	1.17 (1.07-1.29)	1.17 (1.06- 1.29)	<0.001	0.004

Abbreviations: Q, quartile; uPDI, unhealthful plant-based diet index; BMI, Body Mass Index; CVD, cardiovascular disease; PRS, polygenic risk score; IS, Ischaemic stroke; MI, myocardial infarction; CAD, coronary artery disease; HR, hazard ratios; CI, confidence intervals.

P-trend is for linear trend.

P-corrected is the P-trend corrected for multiple testing.

[a]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex and education; stratified by region.

[b]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex, BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.

For any CVD and haemorrhagic stroke, models were further adjusted for PRS (CVD).

For ischaemic stroke analyses, models were further adjusted for PRS (IS).

For MI, models were further adjusted for PRS (CAD).

[c]Reference categories.

eTable 13. Hazard Ratios (95% CIs) of Fracture (Hip, Vertebrae, or Any) Across Sex-Specific Healthful Plant-based Diet Index Quartiles (n = 112 208)

hPDI	Q1	Q2	Q3	Q4	P-trend	P-corrected
Outcome						
Any Fracture						
Cases/total	1,151/30,283	1,104/27,008	1,198/26,721	1,298/28,196		
HR (95% CI)[a]	1.00[c]	0.96 (0.89-1.05)	1.01 (0.92-1.10)	1.02 (0.94- 1.10)	0.58	0.68
HR (95% CI)[b]	1.00[c]	0.98 (0.90-1.06)	1.02 (0.94-1.11)	1.03 (0.95-1.12)	0.45	0.57
Hip Fracture						
Cases/total	176/30,283	166/27,008	175/26,721	219/28,196		
HR (95% CI)[a]	1.00[c]	0.89 (0.72-1.10)	0.89 (0.72-1.10)	1.03 (0.84- 1.26)	0.69	0.78
HR (95% CI)[b]	1.00[c]	0.91 (0.73-1.13)	0.91 (0.73-1.13)	1.03 (0.84- 1.27)	0.70	0.78
Vertebrae Fracture						
Cases/total	85/30,283	71/27,008	73/26,721	90/28,196		
HR (95% CI)[a]	1.00[c]	0.83 (0.61-1.14)	0.83 (0.61-1.13)	0.95 (0.70- 1.28)	0.35	0.47
HR (95% CI)[b]	1.00[c]	0.86 (0.63-1.19)	0.88 (0.64-1.22)	1.05 (0.77- 1.44)	0.80	0.86

Abbreviations: Q, quartile; hPDI, healthful plant-based diet index; PRS, polygenic risk score; OP, Osteoporosis; BMI, Body Mass Index; HR, hazard ratios; CI, confidence intervals.

P-trend is for linear trend.

P-corrected is the P-trend corrected for multiple testing.

[a]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex and education; stratified by age, region.

[b]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex, BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, vitamin/mineral supplement use, PRS (OP), polypharmacy index, multimorbidity index and aspirin use; stratified by age, region.

[c]Reference categories.

eTable 14. Hazard Ratios (95% CIs) of Fracture (Hip, Vertebrae, or Any) Across Sex-Specific Unhealthful Plant-based Diet Index Quartiles (n = 112 208)

uPDI	Q1	Q2	Q3	Q4	P-trend	P-corrected
Outcome						
Any Fracture						
Cases/total	1,364/30,728	1,204/27,835	1,325/30,187	858/23,458		
HR (95% CI)[a]	1.00[c]	1.00 (0.93-1.09)	1.05 (0.97-1.14)	1.03 (0.94- 1.12)	0.35	0.47
HR (95% CI)[b]	1.00[c]	1.01 (0.93-1.09)	1.06 (0.98-1.14)	1.03 (0.95-1.13)	0.29	0.44
Hip Fracture						
Cases/total	217/30,728	212/27,835	179/30,187	128/23,458		
HR (95% CI)[a]	1.00[c]	1.14 (0.95-1.38)	0.95 (0.78-1.16)	1.10 (0.88- 1.38)	0.89	0.91
HR (95% CI)[b]	1.00[c]	1.15 (0.95-1.39)	0.95 (0.78-1.16)	1.12 (0.89- 1.40)	0.95	0.95
Vertebrae Fracture						
Cases/total	100/30,728	77/27,835	80/30,187	62/23,458		
HR (95% CI)[a]	1.00[c]	0.90 (0.67-1.21)	0.91 (0.68-1.22)	1.05 (0.76- 1.44)	0.91	0.92
HR (95% CI)[b]	1.00[c]	0.89 (0.66-1.20)	0.89 (0.66-1.20)	1.01 (0.73- 1.40)	0.94	0.95

Abbreviations: Q, quartile; uPDI, unhealthful plant-based diet index; PRS, polygenic risk score; OP, Osteoporosis; BMI, Body Mass Index; HR, hazard ratios; CI, confidence intervals.

P-trend is for linear trend.

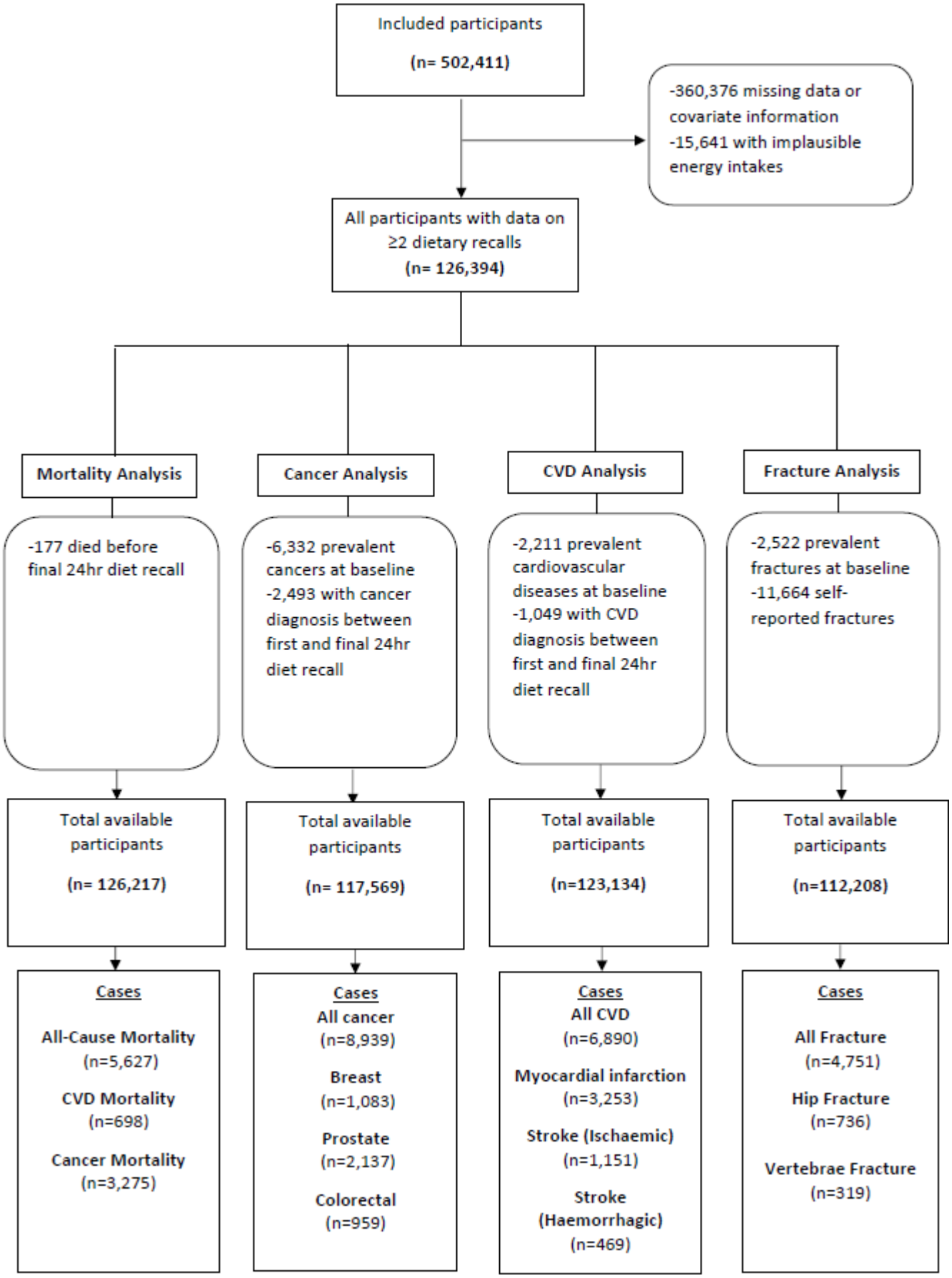
P-corrected is the P-trend corrected for multiple testing.

[a]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex and education; stratified by region.

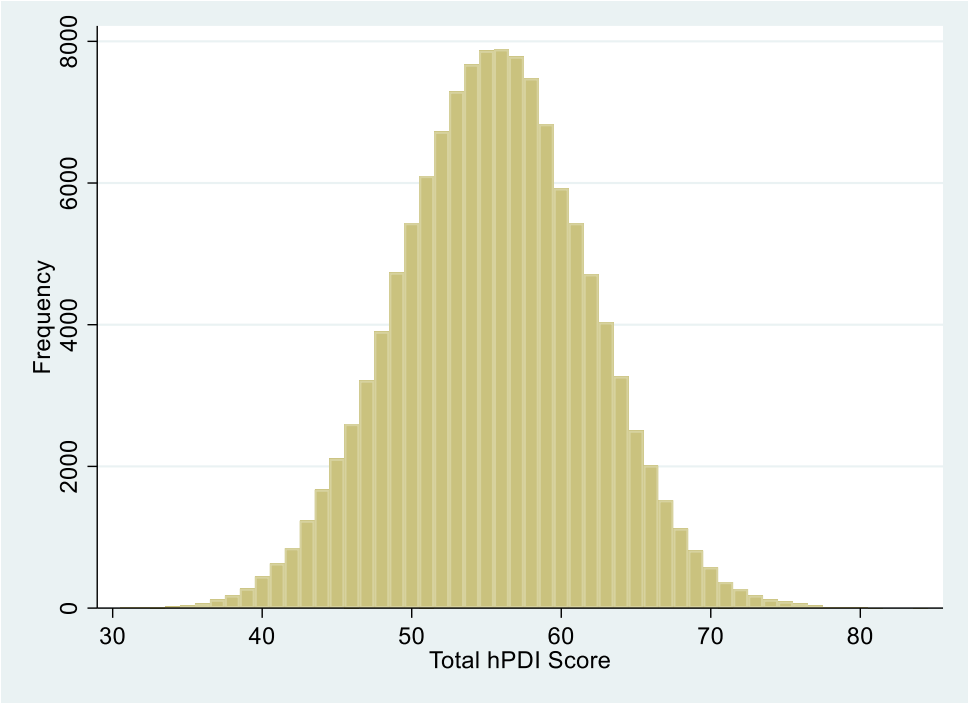
[b]Hazard Ratios with 95% Confidence Intervals (CI), adjusted for sex, BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, vitamin/mineral supplement use, PRS (OP), polypharmacy index, multimorbidity index and aspirin use; stratified by region.

[c]Reference categories.

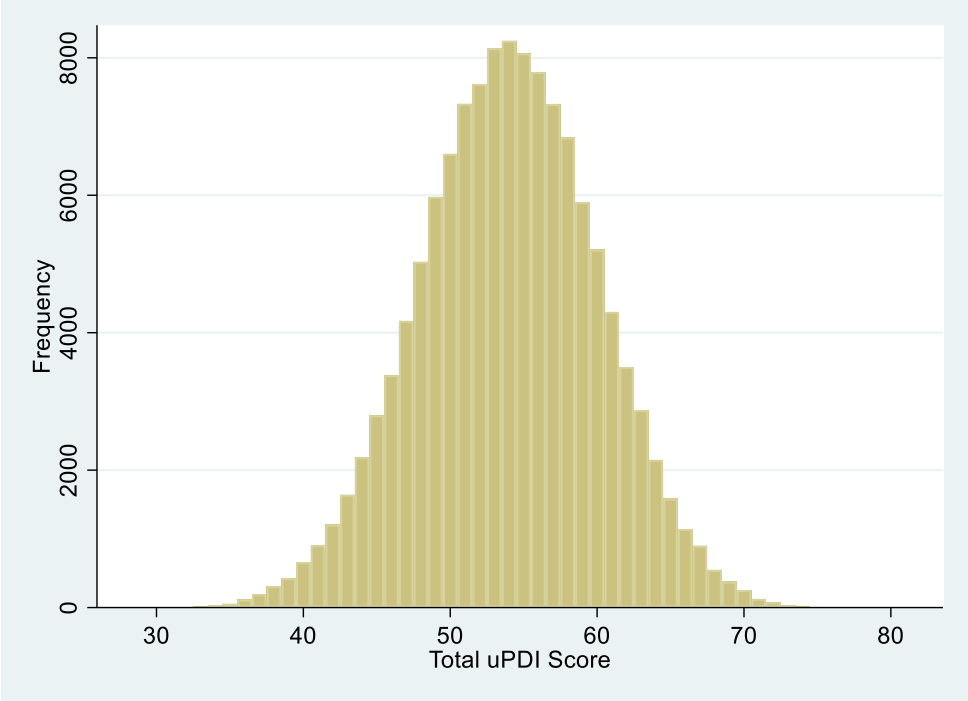
eFigure 1. Flow Diagram of UK Biobank Participants Excluded From Analysis



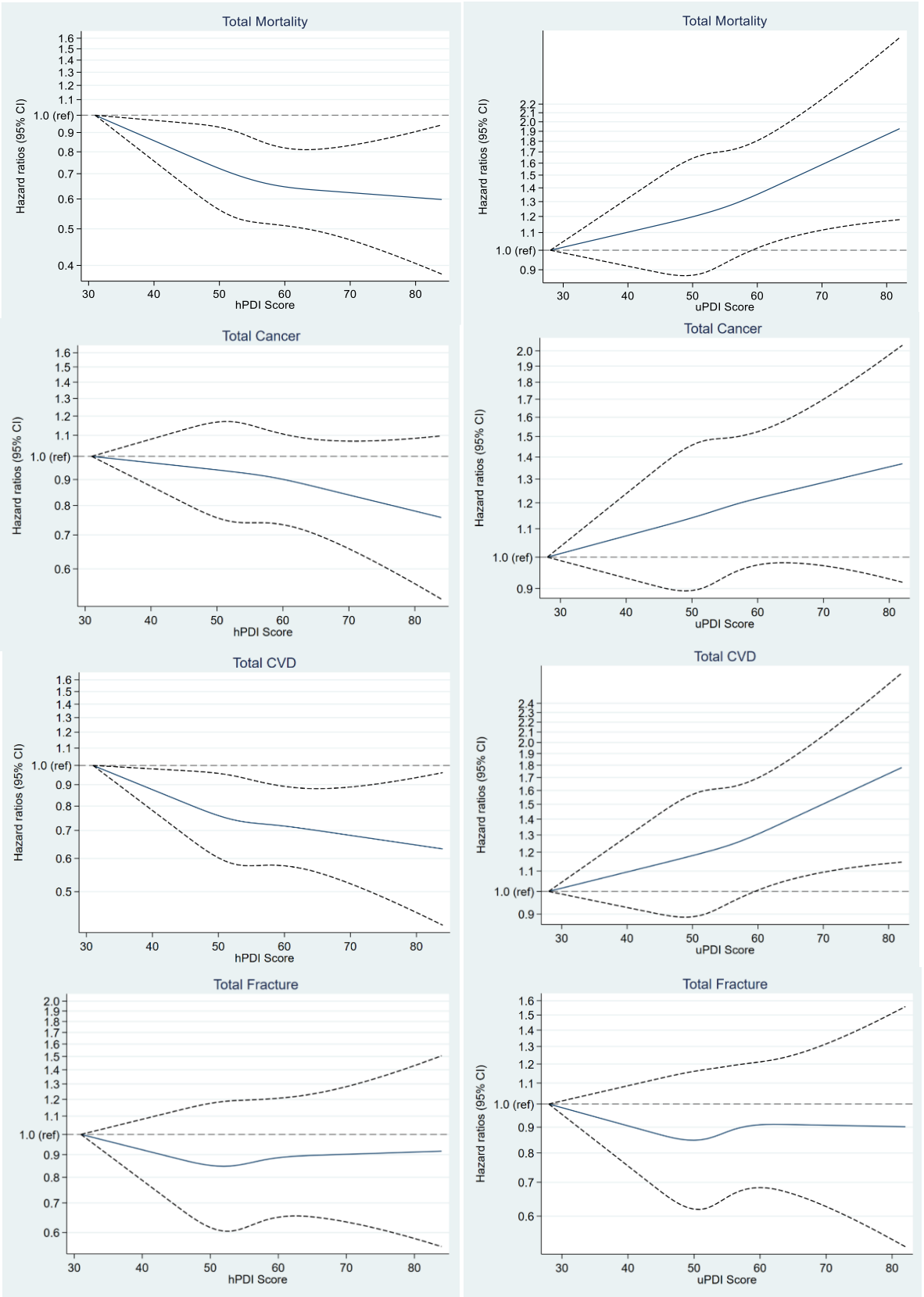
eFigure 2. Histogram Showing Total Healthful Plant-based Diet Index (hPDI) Scores of UK Biobank Participants (n = 126 217)



eFigure 3. Histogram Showing Total Unhealthful Plant-based Diet Index (uPDI) Scores of UK Biobank Participants (n = 126 217)

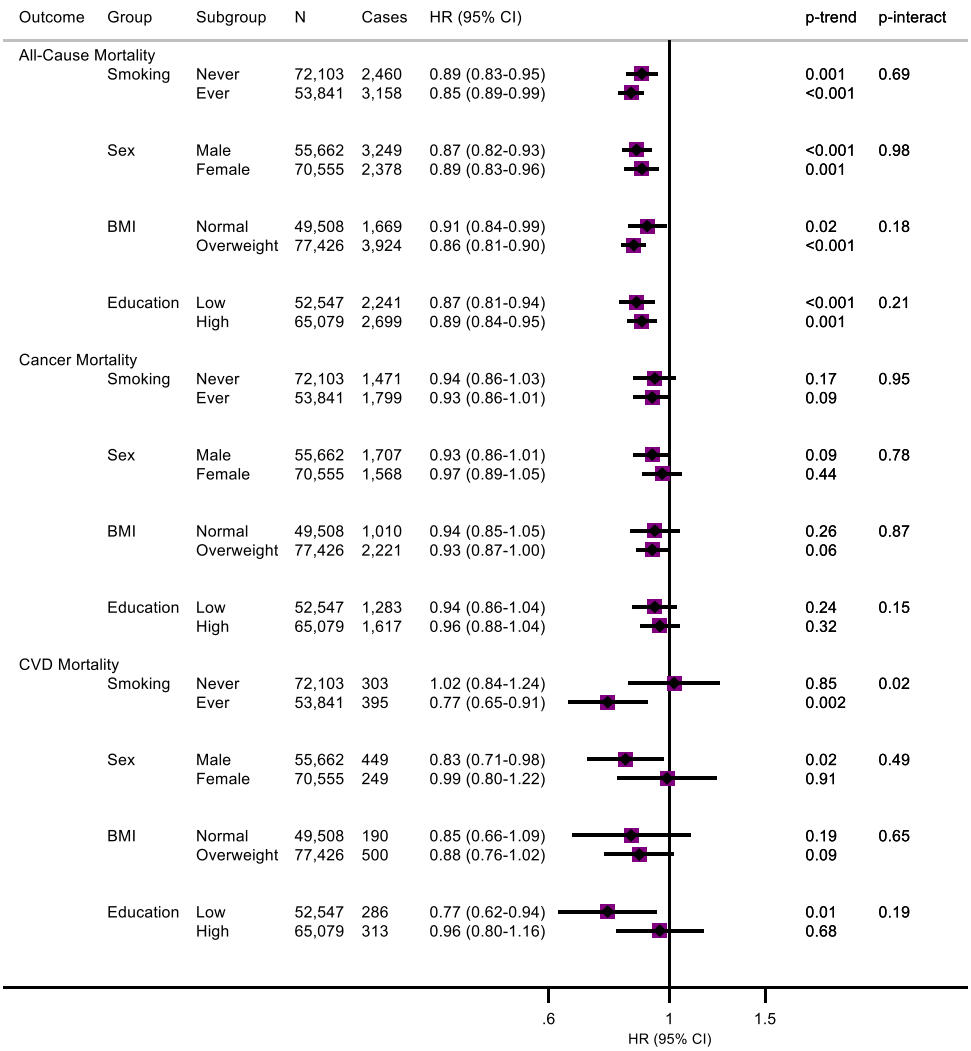


eFigure 4. Cubic Spline Graphs Showing Fully Adjusted Linear Associations of Healthful Plant-based Diet Index (hPDI) and Unhealthful Plant-based Diet Index (uPDI) Scores With All-Cause Mortality, Cancer, Cardiovascular Disease (CVD), and Fracture Risk



Associations were examined by multivariate Cox regression models with restricted cubic splines of 4 knots. The solid line represents hazard ratio estimates, while the dashed lines represent the 95% confidence intervals (95% CI).

eFigure 5. Hazard Ratios (95% CIs) of All-Cause, Cancer, and Cardiovascular Disease Mortality Among UK Biobank Population Subgroups, With Healthful Plant-based Diet Score Modeled as a Continuous Trend (10-Point Increments)



Analyses used age as the underlying time variable and were adjusted for sex (excluding subgroup analysis), BMI (excluding subgroup analysis), ethnicity, physical activity, smoking status (excluding subgroup analysis), alcohol intake, education (excluding subgroup analysis), energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.

For all-cause mortality analyses, models were further adjusted for prevalent CVD and prevalent cancer.

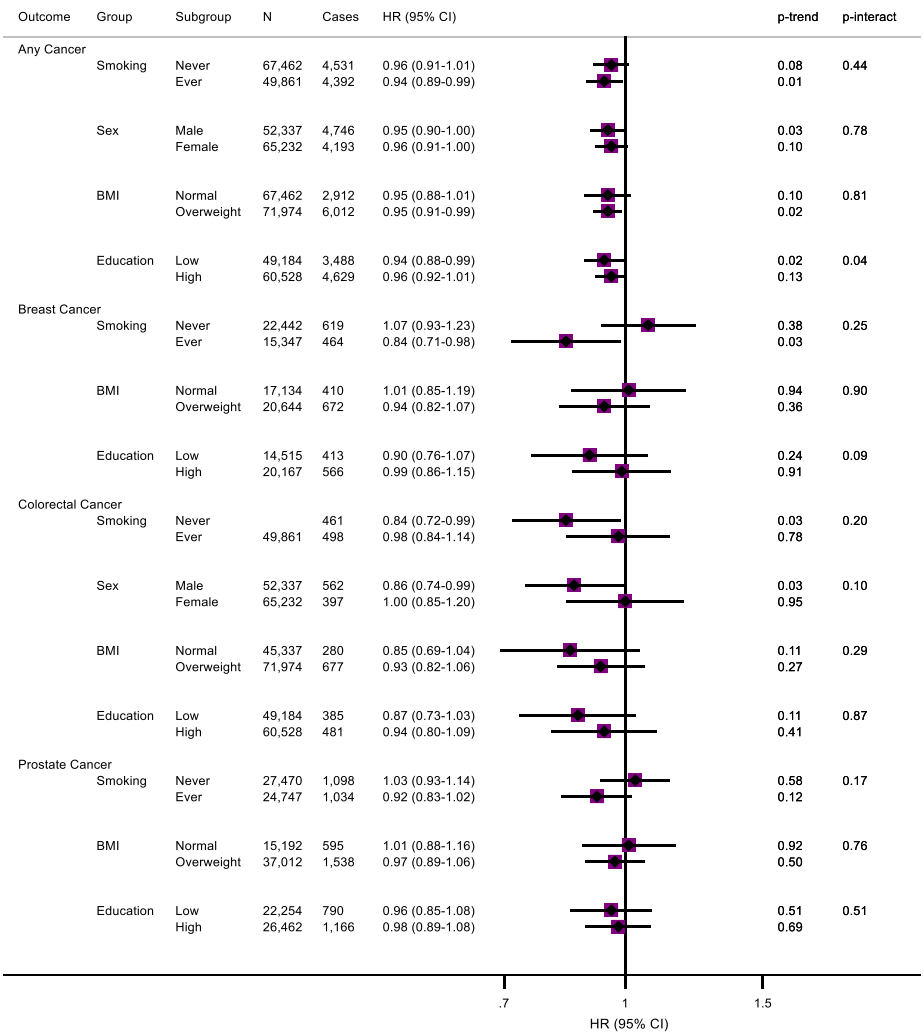
For CVD mortality analyses, models were further adjusted for prevalent CVD.

For cancer mortality analyses, models were further adjusted for prevalent cancer.

Heterogeneity was tested by comparing two models – one without an interaction term between subgroup of interest and hPDI (categorical), with a model that included an interaction term. The likelihood ratio test was used to produce p-interaction values.

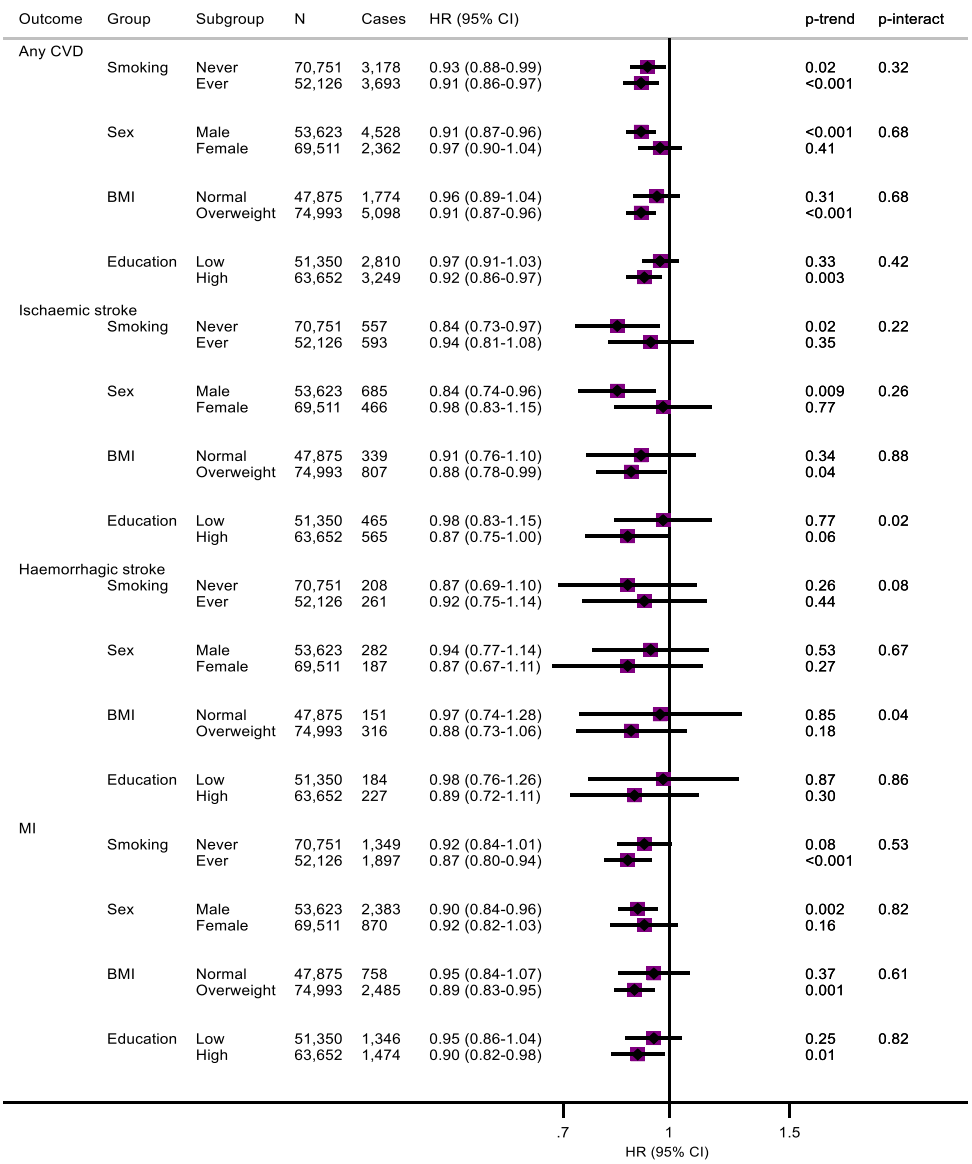
Abbreviations: CVD, cardiovascular disease; BMI, Body Mass Index; HR, hazard ratios; CI, confidence intervals.

eFigure 6. Hazard Ratios (95% CIs) of Cancer Among UK Biobank Subgroups, With Healthful Plant-based Diet Score Modeled as a Continuous Trend (10-Point Increments)



Analyses used age as the underlying time variable and were adjusted for sex (excluding breast and prostate cancer analyses and in subgroup analysis), BMI (excluding subgroup analysis), ethnicity, physical activity, smoking status (excluding subgroup analysis), alcohol intake, education (excluding subgroup analysis), energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.
For any cancer analyses, models were further adjusted for menopausal status and use of MHT.
For breast cancer analyses, models were restricted to postmenopausal breast cancer cases and were further adjusted for use of MHT, use of oral contraception, PRS (BC), age at menarche and age at first live birth.
For colorectal cancer analyses, models were further adjusted for menopausal status, PRS (CRC) and MHT.
For prostate cancer analyses, models were further adjusted for PRS (PC).
Heterogeneity was tested by comparing two models – one without an interaction term between subgroup of interest and hPDI (categorical), with a model that included an interaction term. The likelihood ratio test was used to produce p-interaction values.
Abbreviations: BMI, body mass index; MHT, Menopause hormone therapy; BC, breast cancer; PRS, polygenic risk score; CRC, Colorectal cancer; PC, Prostate Cancer; HR, hazard ratios; CI, confidence intervals.

eFigure 7. Hazard Ratios (95% CIs) of Cardiovascular Disease Among UK Biobank Subgroups, With Healthful Plant-based Diet Score Modeled as a Continuous Trend (10-Point Increments)



Analyses used age as the underlying time variable and were adjusted for sex (excluding subgroup analysis), BMI (excluding subgroup analysis), ethnicity, physical activity, smoking status (excluding subgroup analysis), alcohol intake, education (excluding subgroup analyses), energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.

For any CVD and haemorrhagic stroke, models were further adjusted for PRS (CVD).

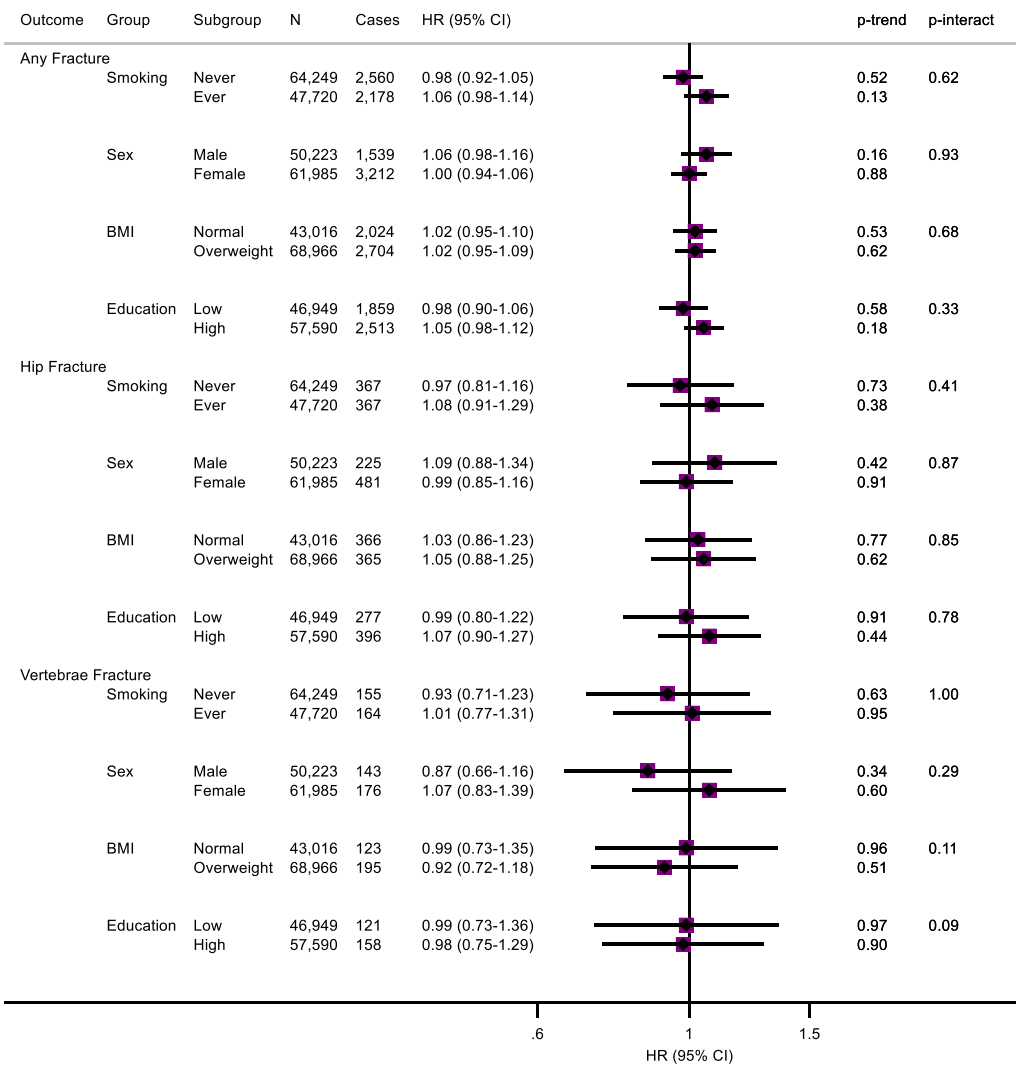
For ischaemic stroke analyses, models were further adjusted for PRS (IS).

For MI, models were further adjusted for PRS (CAD).

Heterogeneity was tested by comparing two models – one without an interaction term between subgroup of interest and hPDI (categorical), with a model that included an interaction term. The likelihood ratio test was used to produce p-interaction values.

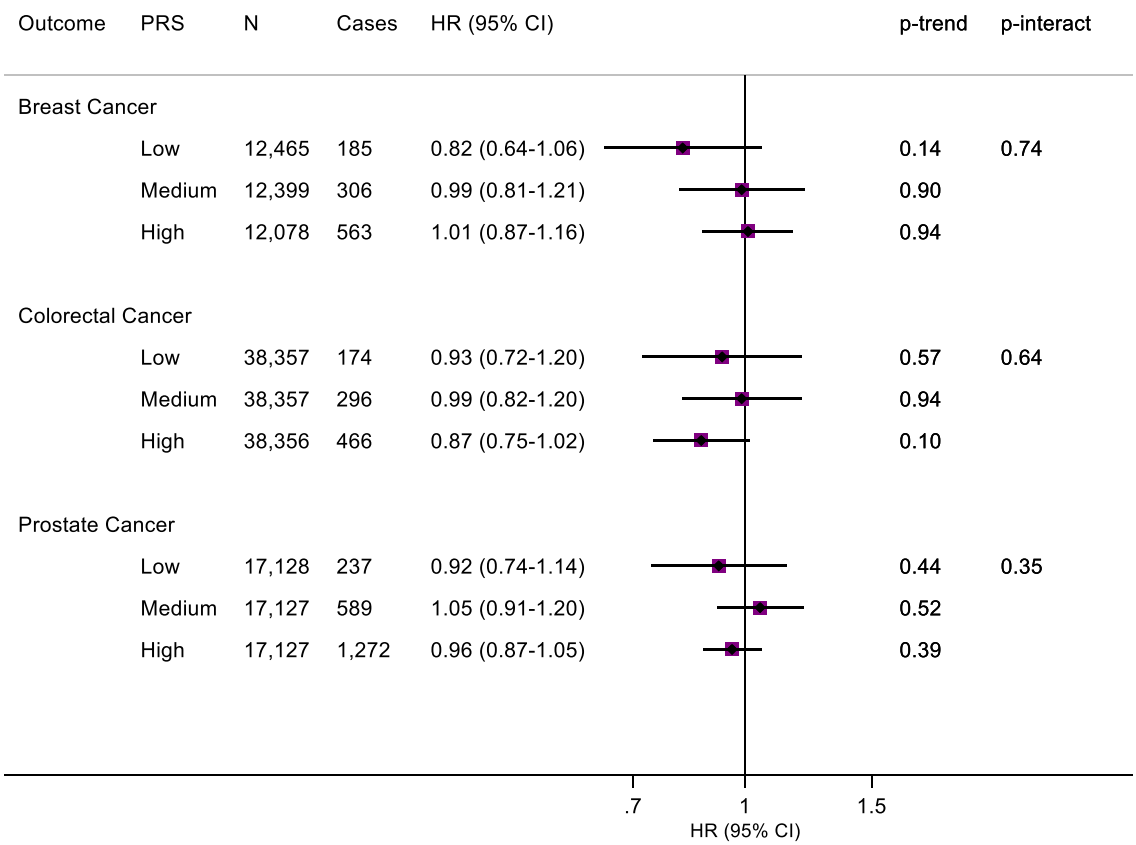
Abbreviation: BMI, Body Mass Index; CVD, cardiovascular disease; PRS, polygenic risk score; IS, Ischaemic stroke; MI, myocardial infarction; CAD, coronary artery disease; HR, hazard ratios; CI, confidence intervals.

eFigure 8. Hazard Ratios (95% CIs) of Fracture Among UK Biobank Subgroups, With Healthful Plant-based Diet Score Modeled as a Continuous Trend (10-Point Increments)



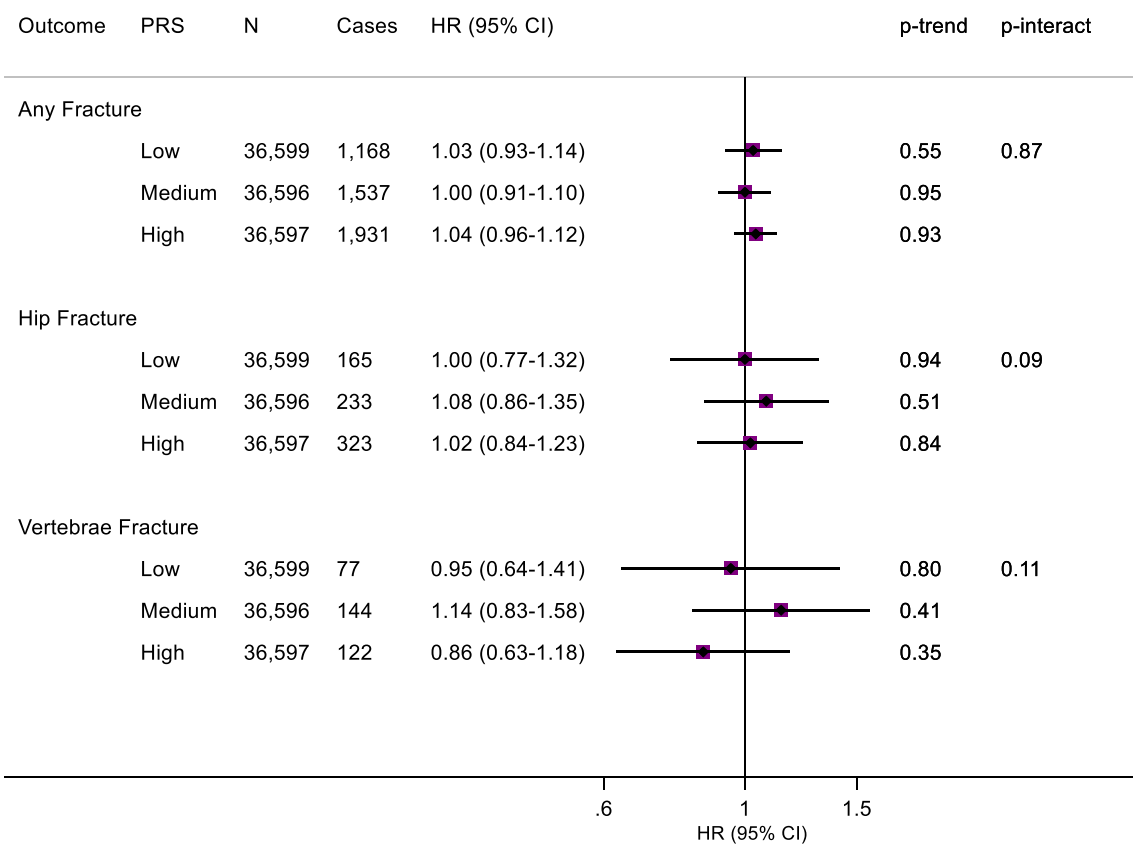
Analyses used age as the underlying time variable and were adjusted for sex (excluding subgroup analysis), BMI (excluding subgroup analysis), ethnicity, physical activity, smoking status (excluding subgroup analysis), alcohol intake, education (excluding subgroup analyses), energy intake, vitamin/mineral supplement use, PRS (OP), polypharmacy index, multimorbidity index and aspirin use; stratified by region.
Heterogeneity was tested by comparing two models – one without an interaction term between subgroup of interest and hPDI (categorical), with a model that included an interaction term. The likelihood ratio test was used to produce p-interaction values.
Abbreviations: BMI, Body Mass Index; PRS, polygenic risk score; OP, osteoporosis; HR, hazard ratios; CI, confidence intervals.

eFigure 9. Hazard Ratios (95% CIs) of Cancer Across Strata of Genetic Cancer Risk, With Healthful Plant-based Diet Score Modeled as a Continuous Trend (10-Point Increments)



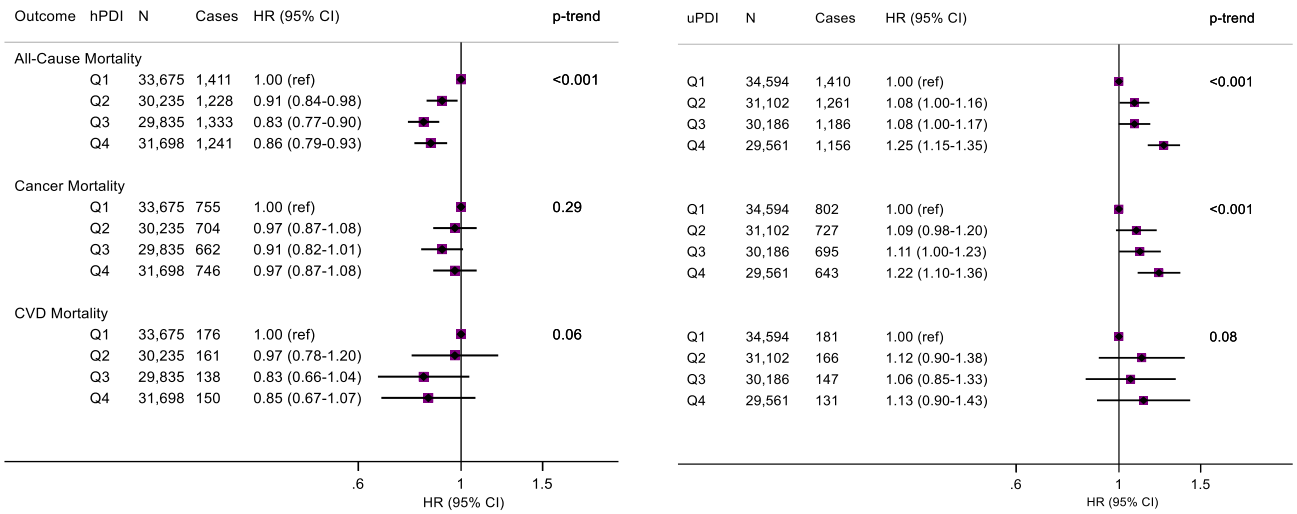
PRS were obtained from the UK Biobank Showcase for breast, bowel, and prostate cancer.
Analyses used age as the underlying time variable and were adjusted for sex (excluding breast and prostate cancer analyses), BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.
For breast cancer analyses, models were restricted to postmenopausal breast cancer cases and were further adjusted for use of MHT, use of oral contraception, age at menarche and age at first live birth.
For colorectal cancer analyses, models were further adjusted for menopausal status, and MHT.
Heterogeneity was tested by comparing two models – one without an interaction term between subgroup of interest and hPDI (categorical), with a model that included an interaction term. The likelihood ratio test was used to produce p-interaction values.
Abbreviations: BMI, Body Mass Index; PRS, polygenic risk score; MHT, Menopause hormone therapy; HR, hazard ratios; CI, confidence intervals.

eFigure 10. Hazard Ratios (95% CIs) of Fracture Across Strata of Genetic Osteoporosis Risk, With Healthful Plant-based Diet Score Modeled as a Continuous Trend (10-Point Increments)



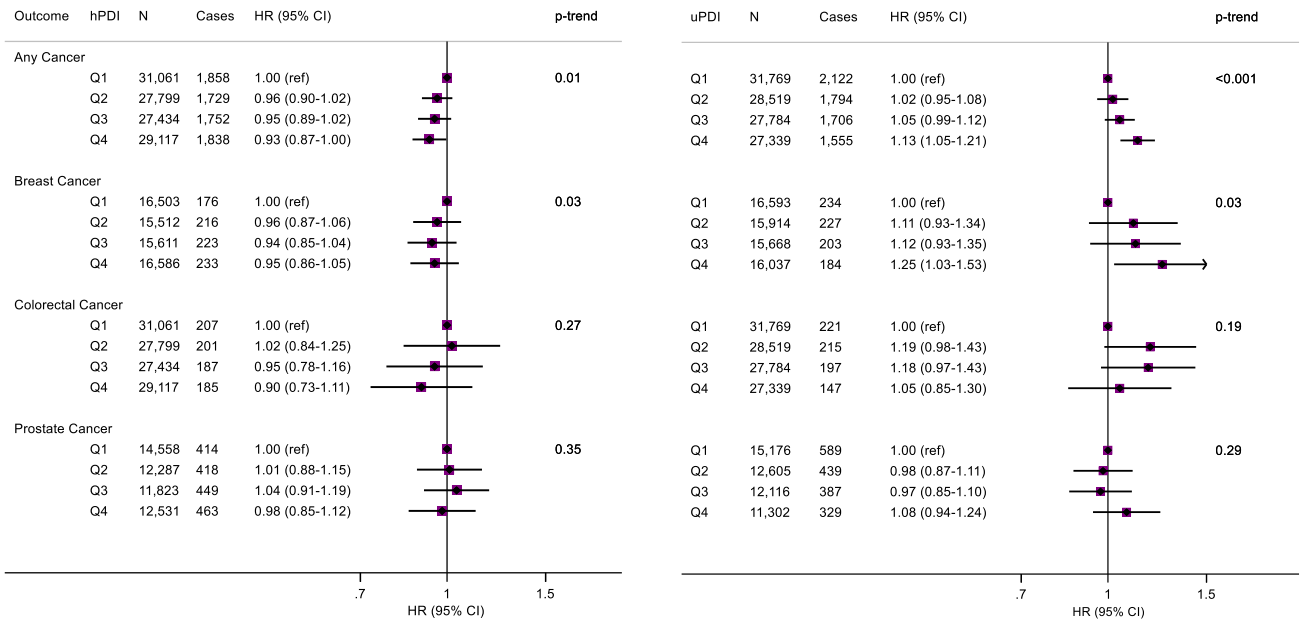
PRS were obtained from the UK Biobank Showcase for OP.
Analyses used age as the underlying time variable and were adjusted for sex, BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, vitamin/mineral supplement use, polypharmacy index, multimorbidity index and aspirin use; stratified by region.
Heterogeneity was tested by comparing two models – one without an interaction term between subgroup of interest and hPDI (categorical), with a model that included an interaction term. The likelihood ratio test was used to produce p-interaction values.
Abbreviations: PRS, polygenic risk score; OP, Osteoporosis; BMI, Body Mass Index; HR, hazard ratios; CI, confidence intervals.

eFigure 11. Sensitivity Analyses Showing Hazard Ratios (95% CIs) Across Sex-Specific Healthful vs Unhealthful Plant-based Diet Index Quartiles, Removing the First 2 Years of Follow-up for Participants Who Completed 2 or More Dietary Assessments and the Associated Risk of All-Cause, Cancer, and Cardiovascular Disease Mortality



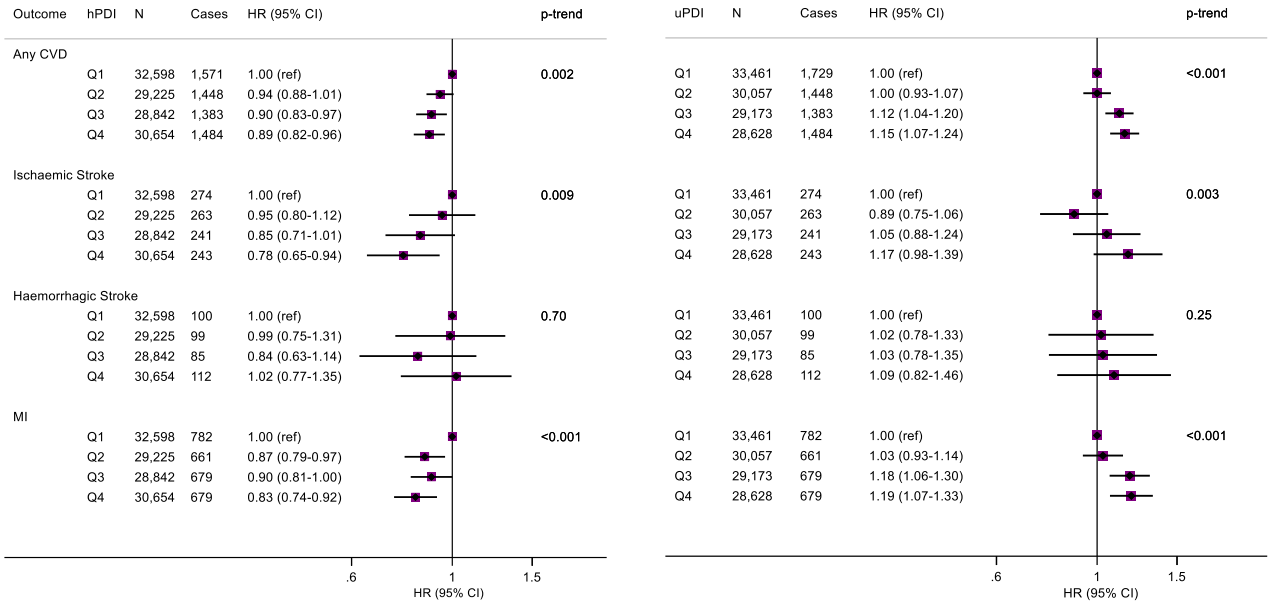
Analyses used age as the underlying time variable and were adjusted for sex, BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.
For all-cause mortality analyses, models were further adjusted for prevalent CVD and prevalent cancer.
For CVD mortality analyses, models were further adjusted for prevalent CVD.
For cancer mortality analyses, models were further adjusted for prevalent cancer.
Abbreviations: hPDI, healthful plant-based diet index; uPDI, unhealthful plant-based diet index; CVD, cardiovascular disease; BMI, Body Mass Index HR, hazard ratios; CI, confidence intervals.

eFigure 12. Sensitivity Analyses Showing Hazard Ratios (95% CIs) Across Sex-Specific Healthful vs Unhealthful Plant-based Diet Index Quartiles, Removing the First 2 Years of Follow-up for Participants Who Completed 2 or More Dietary Assessments and the Associated Risk of Any Cancer, Postmenopausal Breast Cancer, Colorectal Cancer, and Prostate Cancer



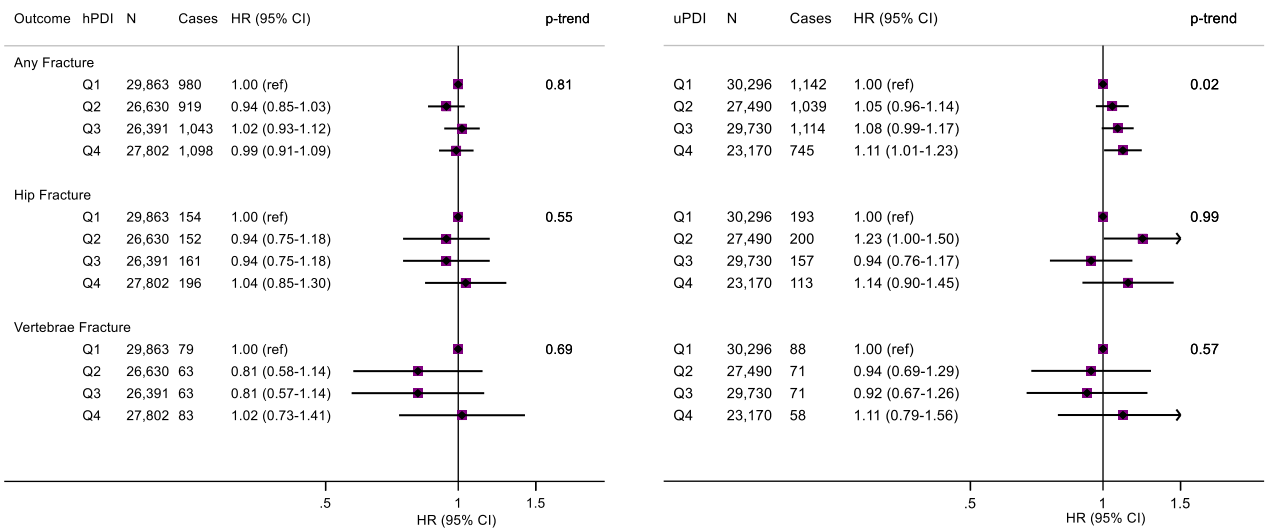
Analyses use age as the underlying time variable and were adjusted for adjusted for sex (excluding breast and prostate cancer analyses), BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.
For any cancer analyses, models were further adjusted for menopausal status and use of MHT.
For breast cancer analyses, models were restricted to postmenopausal breast cancer cases and were further adjusted for use of MHT, use of oral contraception, PRS (BC), age at menarche and age at first live birth.
For colorectal cancer analyses, models were further adjusted for menopausal status, PRS (CRC) and MHT.
For prostate cancer analyses, models were further adjusted for PRS (PC).
Abbreviations: hPDI, healthful plant-based diet index; uPDI, unhealthful plant-based diet index; BMI, Body Mass Index; MHT, Menopause hormone therapy; PRS, polygenic risk score; BC, breast cancer; CRC, Colorectal cancer; PC, Prostate Cancer; HR, hazard ratios; CI, confidence intervals.

eFigure 13. Sensitivity Analyses Showing Hazard Ratios (95% CIs) Across Sex-Specific Healthful vs Unhealthful Plant-based Diet Index Quartiles, Removing the First 2 Years of Follow-up for Participants Who Completed 2 or More Dietary Assessments and the Associated Risk of Any Cardiovascular Disease, Ischemic Stroke, Hemorrhagic Stroke, and Myocardial Infarction



Analyses used age as the underlying time variable and were adjusted for sex, BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.
For any CVD and haemorrhagic stroke analyses, models were further adjusted for PRS (CVD).
For ischaemic stroke analyses, models were further adjusted for PRS (IS).
For MI analyses, models were further adjusted for PRS (CAD).
Abbreviations: hPDI, healthful plant-based diet index; uPDI, unhealthful plant-based diet index; CVD, cardiovascular disease; MI, myocardial infarction; BMI, Body Mass Index; PRS, polygenic risk score; IS, Ischaemic stroke; CAD, coronary artery disease; HR, hazard ratios; CI, confidence intervals.

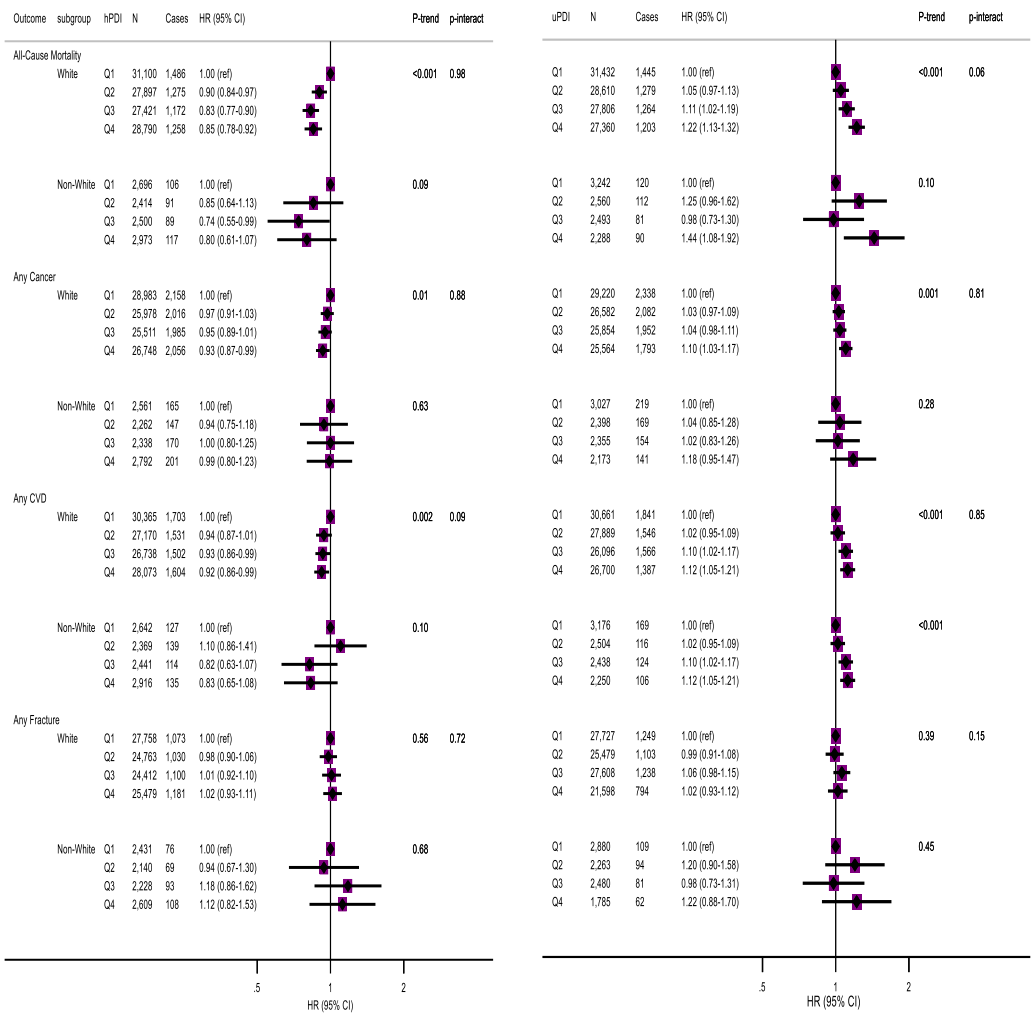
eFigure 14. Sensitivity Analyses Showing Hazard Ratios (95% CIs) Across Sex-Specific Healthful vs Unhealthful Plant-based Diet Index Quartiles, Removing the First 2 Years of Follow-up for Participants Who Completed 2 or More Dietary Assessments and the Associated Risk of Any Fracture, Hip Fracture, and Vertebrae Fracture



Analyses used age as the underlying time variable and were adjusted for sex, BMI, ethnicity, physical activity, smoking status, alcohol intake, education, energy intake, vitamin/mineral supplement use, PRS (OP), polypharmacy index, multimorbidity index and aspirin use; stratified by region.

Abbreviations: hPDI, healthful plant-based diet index; uPDI, unhealthful plant-based diet index; BMI, Body Mass Index; PRS, polygenic risk score; OP, osteoporosis; HR, hazard ratios; CI, confidence intervals.

eFigure 15. Multivariable-Adjusted Hazard Ratios (95% CIs) of All-Cause Mortality (n = 126 217), Cancer (n = 117 569), Cardiovascular Disease (n = 123 134), and Fracture (n = 112 208) Among Ethnic Subgroups Across Sex-Specific Healthful vs Unhealthful Plant-based Diet Index Quartiles



All models used age as the underlying time variable and were adjusted for sex, BMI, physical activity, smoking status, alcohol intake, education, energy intake, polypharmacy index, multimorbidity index and aspirin use; stratified by region.
For all-cause mortality analyses, models were further adjusted for prevalent CVD and prevalent cancer.
For any cancer analyses, models were further adjusted for menopausal status and use of MHT.
For any CVD analyses, models were further adjusted for PRS (CVD).
For any fracture analyses, models further adjusted for vitamin/mineral supplement use and PRS (OP).
P-trend is for linear trend.
Heterogeneity was tested by comparing two models – one without an interaction term between subgroup of interest and hPDI (categorical), with a model that included an interaction term. The likelihood ratio test was used to produce p-interaction values.
Abbreviations: Q, quartile; hPDI, healthful plant-based diet index; uPDI, unhealthful plant-based diet index; CVD, Cardiovascular Disease; BMI, body mass index; PRS, polygenic risk score; MHT, menopause hormone therapy; OP, Osteoporosis; HR, hazard ratios; CI, confidence intervals.

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