

Leisure-time physical activity and all-cause mortality and cardiovascular disease in adults with type 2 diabetes: Cross-country comparison of cohort studies

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Supplementary Table 1. Comparison of variables in UK Biobank and China Kadoorie Biobank

	UK Biobank	China Kadoorie Biobank
Data collection procedures	Self-administered questionnaire on a touch-screen and a verbal interview	Interviewer administered questionnaire
Physical activity		
Leisure-time physical activity	<p>Derived from questionnaire; Intensity: In the last 4 weeks did you spend any time doing the following; walking for pleasure/do strenuous sports/other exercises/light do-it-yourself/heavy do-it-yourself? <i>You can select more than one answer</i> Frequency: How many times in the last 4 weeks did you go walking for pleasure/do strenuous sports/other exercises/light do-it-yourself/heavy do-it-yourself? Duration: Each time you went walking for pleasure/did strenuous sports/other exercises/light do-it-yourself/heavy do-it-yourself, about how long did you spend doing it?</p> <p>Intensities were assigned as follows; walking (3.3 metabolic equivalents of task [METs]), light do-it-yourself (2.25 METs), heavy do-it-yourself (4.5 METs), strenuous sport (8.0 METs) and 'other exercise' (4.5 METs) (1).</p> <p>Combined to MET-hrs/week</p>	<p>Derived from questionnaire; Intensity: What is your <i>main</i> type of exercise; Tai Chi/Qigong, jogging/aerobic exercise, ball games, walking, swimming, other. Tick one box only. Frequency: During the past 12 months, how often did you do exercise in your leisure-time? Duration: About how many hours per week did you do such exercise in leisure time?</p> <p>Intensities were assigned as follows; Taichi/Qiqong/leisure walking (3.3 METs), jogging/aerobic exercise (7.4 METs), ball games (5.5 METs), brisk walking/gymnastics/folk dancing (4.2 METs), swimming (7.2 METs) (2), and 'other exercises' (4.5 METs) (1).</p> <p>Combined to MET-hrs/week</p>
Transportation physical activity	<p>Questionnaire; What types of transport do you use to get to and from work? (You can select more than one answer)</p> <ul style="list-style-type: none"> - Car/motor vehicle - Walk - Public transport - Cycle <p>Working from home was based on questions on distance and/or frequency of travels between home and work</p> <p>Included as passive, walking, cycling, or working from home</p>	<p>During the past 12 months, how did you usually get to work?</p> <ul style="list-style-type: none"> - Mainly walk - By motorbike - By bicycle - By bus/car/ferry/train - Mainly stay at home or work near home <p>Included as passive, walking, cycling, or working from home</p>
Occupation	Questionnaire;	During past 12 months, how active were you at work?

physical activity	<p>Does your work involve walking or standing for most of the time? Does your work involve heavy manual or physical work?</p> <ul style="list-style-type: none"> - Never/rarely - Sometimes - Usually - Always <p>Included as sedentary work, some standing and no heavy work, heavy manual work, not in employment, or retired</p>	<ul style="list-style-type: none"> - Mainly sedentary - Standing occupation - Manual work - Heavy manual work - Retired or housewife/husband or unemployed or disabled <p>Included as sedentary work, standing, manual work, not in employment, or retired</p>
Sociodemographic		
Age	Attendance date minus birthdate, day of birth set to the 15 th	Attendance date minus birthdate
Education	<p>Questionnaire; Which of the following qualifications do you have? (You can select more than one)?</p> <ul style="list-style-type: none"> - 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 <p>Included as no qualifications, qualifications, not college/university degree, or college/university degree</p>	<p>What is the highest level of school education you ever received?</p> <ul style="list-style-type: none"> - No formal school - Primary school - Middle school - High School - Technical school / college - University <p>Included as no school or primary school, middle school, or High school or higher</p>
Income	na	<p>What is the total income last year in your household?</p> <ul style="list-style-type: none"> - <2500 yuan - 2500-4999 yuan - 5000-9999 yuan - 10,000-19,999 yuan - 20,000-34,999 yuan - ≥35,000 yuan <p>Included as <10,000 yuan/y, 10,000-19,999 yuan/y, 20,000-34,999 yuan/y, or ≥35,000 yuan/y</p>
Deprivation	Townsend deprivation index calculated from post-codes	na
Living with partner	<p>Questionnaire; How are the other people who live with you related to you? (You can select more than one answer)</p>	<p>What is your current marital status?</p> <ul style="list-style-type: none"> - Married - Widowed

	<ul style="list-style-type: none"> - Husband, wife or partner - Son and/or daughter (include step-children) - Brother and/or sister - Mother and/or father) - Grandparent - Grandchild - Other related - Other unrelated <p>Included as living with partner, yes/no</p>	<ul style="list-style-type: none"> - Separated / divorced - Never married <p>Included as married, yes/no</p>
Ethnicity	<p>Questionnaire; What is your ethnic group?</p> <ul style="list-style-type: none"> - White - Mixed - Asian or Asian British - Black or Black British - Chinese - Other ethnic group <p>Included as European, South Asian, African Caribbean, or other</p>	na
Has health cover	na	<p>Do you have any health care cover and the following items in your household?</p> <ul style="list-style-type: none"> - Health care cover <p>Included as health cover, yes/no</p>
Behavioral		
Smoking	<p>Derived from questionnaire; Do you smoke tobacco now?</p> <ul style="list-style-type: none"> - Yes, on most or all days - Only occasionally - No <p>In the past, how often have you smoked tobacco?</p> <ul style="list-style-type: none"> - Smoked on most or all days - Smoked occasionally - Just tried once or twice - I have never smoked 	<p>Derived from questionnaire; How often do you smoke tobacco now?</p> <ul style="list-style-type: none"> - Do not smoke now - Only occasionally - Yes, on most days - Yes, daily or almost every day <p>In the past, how frequently did you smoke?</p> <ul style="list-style-type: none"> - Did not smoke - Smoked only occasionally - Smoked on most days - Smoked daily or almost every day

	Included as never, former or current	Included as never, occasional, former regular, current
Alcohol intake	<p>Derived from questionnaire; About how often do you drink alcohol?</p> <ul style="list-style-type: none"> - Daily or almost daily - Three or four times a week - Once or twice a week - One to three times a month - Special occasions only - Never <p>Did you previously drink alcohol?</p> <ul style="list-style-type: none"> - Yes - No <p>Included as never, former, current (<3 times/week), or current (≥3 times/week)</p>	<p>Derived from questionnaire; During the past 12 months, how often did you drink any alcohol?</p> <ul style="list-style-type: none"> - Never or almost never - Only occasionally - Only at certain seasons - Every month but less than weekly - Usually at least once a week <p>In the past, did you ever have a period of at least 1 year during which you usually drank some alcohol at least once a week?</p> <ul style="list-style-type: none"> - Yes - No <p>During the past 12 months, on how many days did you drink alcohol in a typical week?</p> <ul style="list-style-type: none"> - 1-2 days/week - 3-5 days/week - Daily or almost every day <p>Included as never/occasionally, former weekly, current, <3 days/week, current ≥3 days/week</p>
Dietary quality	<p>Derived from questionnaire; How often do you eat processed meats (such as bacon, ham, sausages, meat pies, kebabs, burgers, chicken nuggets)? How often do you eat beef? (Do not count processed meats) How often do you eat lamb/mutton? (Do not count processed meats) How often do you eat pork? (Do not count processed meats such as bacon or ham) How often do you eat oily fish? (e.g. sardines, salmon, mackerel, herring) How often do you eat other types of fish? (e.g. cod, tinned tuna, haddock)</p> <ul style="list-style-type: none"> - Never - Less than once a week - Once a week - 2-4 times a week - 5-6 times a week 	<p>During the past 12 months, about how often did you eat the following foods?</p> <p>Meat</p> <ul style="list-style-type: none"> - Daily - 4-6 days per week - 1-3 days per week - Monthly - Never/rarely <p>Fresh fruit</p> <ul style="list-style-type: none"> - Daily - 4-6 days per week - 1-3 days per week - Monthly - Never/rarely

	<ul style="list-style-type: none"> - Once or more daily <p>On average how many heaped tablespoons of COOKED vegetables would you eat per DAY? (Do not include potatoes; put '0' if you do not eat any)</p> <p>On average how many heaped tablespoons of SALAD or RAW vegetables would you eat per DAY? (Include lettuce, tomato in sandwiches; put '0' if you do not eat any)</p> <p>About how many pieces of FRESH fruit would you eat per DAY? (Count one apple, one banana, 10 grapes etc as one piece; put '0' if you do not eat any)</p> <p>About how many pieces of DRIED fruit would you eat per DAY? (Count one prune, one dried apricot, 10 raisins as one piece; put '0' if you do not eat any)</p> <ul style="list-style-type: none"> - <i>Free text answer</i> <p>Included as dietary quality index based on minimum 400 grams of fruit or vegetable/day, ≤3 servings of red meat + ≤ 1 serving of processed meat/week, and ≥2 servings of fish including 1 with oily fish/week. Meeting 0, 1 or 2-3 targets.</p>	<p>Included as fruit consumption ≥4 days/week, yes/no and meat consumption ≥4 days/week, yes/no</p>
Health-related		
<p>Family history of type 2 diabetes, CVD, or cancer</p>	<p>Questionnaire;</p> <p>Has/did your father ever suffer from? (You can select more than one answer)</p> <p>Has/did your mother ever suffer from? (You can select more than one answer)</p> <p>Have any of your brothers or sisters suffered from any of the following diseases? (You can select more than one answer)</p> <p>Has/did your ADOPTED father ever suffer from? (You can select more than one answer)</p> <p>Has/did your ADOPTED mother ever suffer from? (You can select more than one answer)</p> <p>Have any of your ADOPTED brothers or sisters suffered from any of the following diseases? (You can select more than one answer)</p> <ul style="list-style-type: none"> - Prostate cancer - Severe depression - Parkinson's disease 	<p>Did any of your parents, siblings or children have the following diseases?</p> <ul style="list-style-type: none"> - Stroke - Heart attack - Diabetes - Mental disorder - Cancer

	<ul style="list-style-type: none"> - Alzheimer's disease/dementia - Diabetes - High blood pressure - Chronic bronchitis/emphysema - Breast cancer - Bowel cancer - Lung cancer - Stroke - Heart disease <p>Included as family history of diabetes, cardiovascular disease, or cancer, yes/no</p>	<p>Included as family history of diabetes, cardiovascular disease, or cancer, yes/no</p>
<p>Inclusion method</p>	<p>Derived from questionnaire and verbal interview; Has a doctor ever told you that you have diabetes?</p> <ul style="list-style-type: none"> - Yes - No <p>Did you only have diabetes during pregnancy?</p> <ul style="list-style-type: none"> - Yes - No - Not applicable <p>What was your age when the diabetes was first diagnosed?</p> <ul style="list-style-type: none"> - <i>Free text answer</i> <p>Did you start insulin within one year of your diagnosis of diabetes?</p> <ul style="list-style-type: none"> - <i>Free text answer</i> <p>Do you regularly take any of the following medications? (You can select more than one answer)</p> <ul style="list-style-type: none"> - Cholesterol lowering medication - Blood pressure medication - Insulin - Hormone replacement therapy - Oral contraceptive pill or mini pill - None of the above <p>What is your ethnic group?</p> <ul style="list-style-type: none"> - White - Mixed - Asian or Asian British - Black or Black British - Chinese 	<p>Derived from questionnaire; Has a doctor ever told you that you had had the following disease?</p> <ul style="list-style-type: none"> - Diabetes <p>Age at first diagnosis?</p> <ul style="list-style-type: none"> - <i>Free text answer</i> <p>Still on treatment?</p> <ul style="list-style-type: none"> - <i>Free text answer</i>

	<p>- Other ethnic group</p> <p>Combined with measured Hba1c and included as inclusion from self-reported type 2 diabetes/use of diabetes medication or from biochemistry</p>	<p>Combined with measured random glucose and included as inclusion from self-reported type 2 diabetes or from biochemistry</p>
Experienced food shortage with weight-loss	na	<p>Derived from questionnaire;</p> <p>Have you ever experienced any severe food shortage?</p> <ul style="list-style-type: none"> - Yes - No <p>During the most severe food shortage you experienced: did you lose weight?</p> <ul style="list-style-type: none"> - Yes - No <p>Included as experienced food shortage with weight loss, yes/no</p>
Depression	<p>Verbal interview;</p> <p>Included as depression, yes/no</p>	<p>Composite International Diagnostic Interview</p> <p>Included as major depression in last 12 months, yes/no</p>
Loneliness	<p>Questionnaire;</p> <p>Do you often feel lonely?</p> <p>Included as yes/no</p>	na
Diabetes duration	Calculated as attendance date minus age at diabetes diagnosis	Calculated as attendance date minus age at diabetes diagnosis
Use of medication	<p>Derived from verbal interview;</p> <p>Type and number of prescription medications taken.</p> <p>Included as;</p> <p>use of statins, yes/no</p> <p>use of blood-pressure lowering drugs, 0, 1, 2, or ≥ 3</p> <p>Use of glucose-lowering drugs, none, insulin only, oral only, or oral + insulin</p>	<p>For CHD, stroke, hypertension and diabetes what is the current medication?</p> <ul style="list-style-type: none"> - Aspirin - ACE-I - Beta-blocker - Statins - Diuretics - Ca⁺⁺ antagonist - Chlorpropamide or metformin - Insulin <p>Included as;</p> <p>use of statins, yes/no</p> <p>use of blood-pressure lowering drugs, 0, 1 or ≥ 2</p> <p>use of glucose-lowering drugs, none, insulin only, oral only, or oral + insulin</p>

Na: not applicable

Supplementary Table 2. Outcome censoring dates

	All-cause mortality	Cardiovascular mortality	Major adverse cardiovascular events
UK Biobank			
England	30 September 2021	30 September 2021	30 September 2021
Wales	30 September 2021	30 September 2021	31 March 2016
Scotland	31 October 2021	31 October 2021	31 July 2021
China Kadoorie Biobank	31 December 2016	31 December 2016	31 December 2016

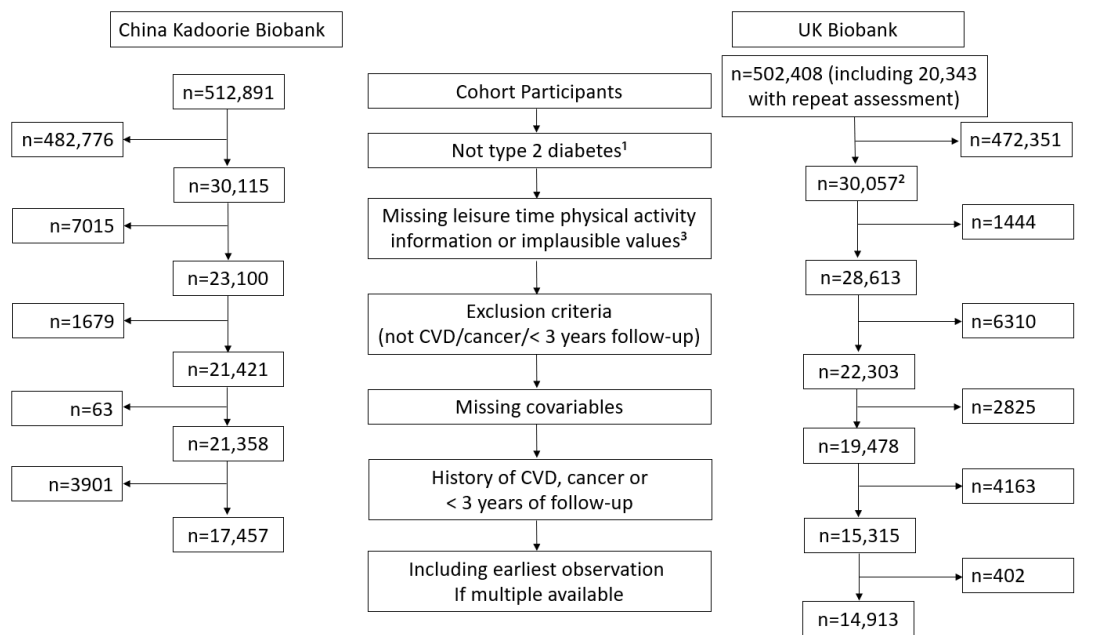
Supplementary Table 3. Exclusion criteria

	Conditions	Data source
UK Biobank		
Cardiovascular disease	Myocardial infarction, stroke, ischaemic stroke, subarachnoid haemorrhage, brain haemorrhage Angina, heart failure	Algorithmically defined outcomes (Field IDs: 42000, 42006, 42008, 42010, 42012) Hospital In-patient data (Field IDs: 41270, 41280, 41271, 41281)
Cancer	Any cancer, excluding non-melanoma skin cancer	Touch-screen questionnaire (Field ID: 2453) Verbal interview (Field ID: 20001) Cancer registry (Field ID: 40006)
COPD		Algorithmically defined outcomes (Field ID: 42016)
Other chronic respiratory diseases	Bronchiectasis, interstitial lung disease, asbestosis, pulmonary fibrosis, fibrosing alveolitis/unspecified alveolitis, respiratory failure	Verbal interview (Field ID: 20002)
Chronic immunological/systemic diseases	Rheumatoid arthritis, vasculitis, giant cell/temporal arteritis, polymyalgia rheumatica, Wegners granulomatosis, microscopic polyarteritis, polyarteritis nodosa, systemic lupus erythematosus/sle, sjogren's syndrome/sicca syndrome, dermatopolymyositis, dermatomyositis, polymyositis, scleroderma/systemic sclerosis, chronic fatigue syndrome, antiphospholipid syndrome	Verbal interview (Field ID: 20002)
Liver failure/cirrhosis	Liver failure/cirrhosis, primary biliary cirrhosis, alcoholic liver disease / alcoholic cirrhosis	Verbal interview (Field ID: 20002)
Renal failure	Renal/kidney failure, renal failure requiring dialysis, renal failure not requiring dialysis, kidney nephropathy, iga nephropathy, diabetic nephropathy, nephritis, glomerulonephritis	Verbal interview (Field ID: 20002)
Psychological/psychiatric problems	Schizophrenia, mania/bipolar disorder/manic depression, deliberate self-harm/suicide attempt, post-traumatic stress disorder	Verbal interview (Field ID: 20002)
Substance abuse/dependency	Alcohol dependency, opioid dependency, other substance abuse/dependency	Verbal interview (Field ID: 20002)
Anorexia/bulimia/other eating disorder	Anorexia/bulimia/other eating disorder	Verbal interview (Field ID: 20002)
Chronic/degenerative neurological problem	Chronic/degenerative neurological problem, Parkinson's disease, dementia/Alzheimer's/cognitive impairment, motor neuron disease, myasthenia gravis, multiple sclerosis, other	Verbal interview (Field ID: 20002)

	demyelinating disease (not multiple sclerosis)	
Chronic widespread pain		Touch-screen questionnaire (Field ID: 2956)
Unable to walk		Touch-screen questionnaire (Field ID: 864)
Living in care home		Touch-screen questionnaire (Field ID: 670)
Mobility allowance/receiving disability allowance/blue badge		Touch-screen questionnaire (Field ID: 6146)
Underweight	Body mass index < 18.5	Height and weight measured by trained staff (Field ID: 21001)
China Kadoorie Biobank		
Cardiovascular disease	Coronary heart disease, stroke, transient ischaemic attack,	Interviewer-assisted questionnaire
Rheumatic heart disease		Interviewer-assisted questionnaire
Cancer		Interviewer-assisted questionnaire
Chronic respiratory diseases	Emphysema/bronchitis	Interviewer-assisted questionnaire
Tuberculosis, still on treatment		Interviewer-assisted questionnaire
Cirrhosis/chronic hepatitis, still on treatment		Interviewer-assisted questionnaire
Kidney disease, still on treatment		Interviewer-assisted questionnaire
Rheumatic arthritis, still on treatment		Interviewer-assisted questionnaire
Psychiatric disorders, still on treatment		Interviewer-assisted questionnaire
Neurasthenia, still on		Interviewer-assisted questionnaire

treatment		
Generalized anxiety disorder		Composite International Diagnostic Interview (CIDI) B
Continuous pain/discomfort		Interviewer-assisted questionnaire
Underweight	Body mass index < 18.5	Height and weight measured by trained staff

Supplementary Figure 1. Participant flowchart



¹Prevalent type 2 diabetes defined by algorithm by Eastwood et al. 2016 or from measured Hba1c ≥ 48 mmol/mol in UK Biobank and from self-reported current diabetes with a diagnosis age above 30 years, a random plasma blood glucose ≥ 11.1 mmol/L, or fasting plasma blood glucose ≥ 7.0 mmol/L in China Kadoorie Biobank.

²Observations, not unique participants

³Implausible values defined as sum of self-reported behaviors > 24 hours/day. In China Kadoorie Biobank, 7006 participants were excluded because they completed a separate physical activity questionnaire (section for rural farmers).

Supplementary Table 4. UK Biobank expanded descriptive characteristics

	No leisure-time physical activity	Leisure-time physical activity below recommendation	Leisure-time physical activity at recommendation	Leisure-time physical activity above recommendation
UK Biobank				
N (% Women)	1391 (47.0)	5775 (41.2)	2956 (37.3)	4791 (29.2)
Age (years), mean (SD)	58.2 (7.3)	59.1 (7.3)	59.7 (7.2)	60.3 (7.1)
Body mass index (kg/m ²), mean (SD)	33.3 (6.6)	31.6 (5.7)	30.6 (5.3)	29.9 (5.0)
LTPA (MET-hours/wk), mean (SD)	0.0 (0.0)	3.2 (2.1)	10.8 (2.1)	36.8 (26.7)
Participation in sports (yes), No. (%)	0 (0.0)	36 (0.6)	93 (3.1)	594 (12.4)
Duration of diabetes (years), mean (SD)	5.4 (7.2)	5.1 (6.6)	5.1 (6.7)	5.4 (7.1)
Education, No. (%)				
No qualifications	392 (28.2)	1278 (22.1)	542 (18.3)	901 (18.8)
Other qualifications than college/university degree	691 (49.7)	2986 (51.7)	1471 (49.8)	2418 (50.5)
College/University degree	308 (22.1)	1511 (26.2)	943 (31.9)	1472 (30.7)
Townsend Index, mean (SD)	0.4 (3.5)	-0.7 (3.3)	-1.1 (3.1)	-1.4 (3.0)
living with partner (yes), No. (%)	859 (61.8)	3988 (69.1)	2120 (71.7)	3575 (74.6)
Ethnicity, No. (%)				
European	1115 (80.2)	5028 (87.1)	2653 (89.7)	4400 (91.8)
South Asian	98 (7.0)	305 (5.3)	132 (4.5)	153 (3.2)
African Caribbean	98 (7.0)	216 (3.7)	82 (2.8)	103 (2.1)
Other	80 (5.8)	226 (3.9)	89 (3.0)	135 (2.8)
Occupational Physical activity, No. (%)				
Sedentary	272 (19.6)	1058 (18.3)	483 (16.3)	566 (11.8)
Some standing, No heavy	223 (16.0)	1032 (17.9)	496 (16.8)	645 (13.5)
Heavy manual work	352 (25.3)	1170 (20.3)	506 (17.1)	790 (16.5)
Not in employment	157 (11.3)	463 (8.0)	205 (6.9)	294 (6.1)
Retired	387 (27.8)	2052 (35.5)	1266 (42.8)	2496 (52.1)
Transportation, No. (%)				
Passive	650 (46.7)	2575 (44.6)	1127 (38.1)	1465 (30.6)
Walking	119 (8.6)	361 (6.3)	172 (5.8)	214 (4.5)
Cycling	7 (0.5)	67 (1.2)	51 (1.7)	123 (2.6)
Working from home	71 (5.1)	257 (4.5)	135 (4.6)	199 (4.2)
Not in employment/retired	544 (39.1)	2515 (43.5)	1471 (49.8)	2790 (58.2)

Smoking, No. (%)				
Never	685 (49.2)	2885 (50.0)	1498 (50.7)	2255 (47.1)
Former	514 (37.0)	2273 (39.4)	1203 (40.7)	2120 (44.2)
Current	192 (13.8)	617 (10.7)	255 (8.6)	416 (8.7)
Alcohol intake, No. (%)				
Never	165 (11.9)	454 (7.9)	175 (5.9)	252 (5.3)
Former	105 (7.5)	275 (4.8)	145 (4.9)	222 (4.6)
Current, <3 times/week	812 (58.4)	3249 (56.3)	1577 (53.3)	2365 (49.4)
Current, ≥3 times/week	309 (22.2)	1797 (31.1)	1059 (35.8)	1952 (40.7)
Diet quality index, No. (%)				
0 (lowest diet quality)	382 (27.5)	1279 (22.2)	569 (19.3)	871 (18.2)
1	617 (44.4)	2405 (41.7)	1151 (38.9)	1745 (36.4)
2-3 (highest diet quality)	392 (28.2)	2091 (36.2)	1236 (41.8)	2175 (45.4)
Body mass index categories (kg/m²), No. (%)				
18.5-25	107 (7.7)	589 (10.2)	373 (12.6)	701 (14.6)
25-30	365 (26.2)	1936 (33.5)	1080 (36.5)	1989 (41.5)
30-35	428 (30.8)	1861 (32.2)	953 (32.2)	1415 (29.5)
≥35	491 (35.3)	1389 (24.1)	550 (18.6)	686 (14.3)
Family history of CVD, cancer or diabetes (yes), No. (%)	1194 (85.8)	4910 (85.0)	2520 (85.3)	4069 (84.9)
Depression (yes), No. (%)	103 (7.4)	311 (5.4)	118 (4.0)	203 (4.2)
Loneliness (yes), No. (%)	411 (29.5)	1223 (21.2)	521 (17.6)	797 (16.6)
Beta-blockers (yes), No. (%)	197 (14.2)	728 (12.6)	326 (11.0)	537 (11.2)
Calcium-channel blockers (yes), No. (%)	319 (22.9)	1139 (19.7)	554 (18.7)	923 (19.3)
Renin-angiotensin-system antagonists (yes), No. (%)	701 (50.4)	2775 (48.1)	1436 (48.6)	2196 (45.8)
Thiazide diuretics (yes), No. (%)	278 (20.0)	978 (16.9)	525 (17.8)	701 (14.6)
Loop diuretics (yes), No. (%)	47 (3.4)	134 (2.3)	52 (1.8)	75 (1.6)
Potassium-sparing diuretics (yes), No. (%)	7 (0.5)	33 (0.6)	16 (0.5)	20 (0.4)
Statins (yes), No. (%)	881 (63.3)	3649 (63.2)	1934 (65.4)	3067 (64.0)
Hba1c (mmol/mol), mean (SD)*	55.8 (14.3)	54.7 (14.3)	53.1 (13.7)	52.9 (13.9)
Doctor diagnosis or on treatment for type 2 diabetes (yes), No. (%)**	1101 (79.2)	4578 (79.3)	2405 (81.4)	3921 (81.8)
Insulin medication (yes), No. (%)***	148 (13.4)	559 (12.2)	274 (11.4)	469 (12.0)
Metformin medication (yes), No. (%)***	723 (65.7)	2910 (63.6)	1376 (57.2)	2219 (56.6)
Other glucose-lowering medication (yes), No. (%)***	347 (31.5)	1273 (27.8)	625 (26.0)	1001 (25.5)
Any non-insulin glucose-lowering drug (yes), No. (%)***	778 (70.7)	3125 (68.3)	1489 (61.9)	2401 (61.2)

Categories of leisure-time physical activity defined as; none (0 MET-hrs/week), below recommendation (>0 to 7.49 MET-hrs/week), at recommendation (7.5-14.9 MET-hrs/week), and above recommendation (\geq 15 MET-hrs/week).

*n=14,078

**Individuals with type 2 diabetes identified from self-report or use of glucose-lowering drugs (Eastwood et al., 2016)

***Reported use at nurse interview, individuals identified with type 2 diabetes solely from measured Hba1c are not included in the percentage denominator.

MET: metabolic equivalent, CVD: cardiovascular disease, ACE: angiotensin-converting enzyme

Supplementary Table 5. China Kadoorie Biobank expanded descriptive characteristics

	No leisure-time physical activity	Leisure-time physical activity below recommendation	Leisure-time physical activity at recommendation	Leisure-time physical activity above recommendation
China Kadoorie Biobank				
% Women	9523 (61.7)	616 (53.4)	1186 (54.3)	6132 (60.3)
Age (years), mean (SD)	55.4 (9.7)	56.8 (9.6)	58.7 (9.4)	61.2 (8.4)
Body mass index (kg/m ²), mean (SD)	25.5 (3.5)	25.5 (3.3)	25.3 (3.2)	25.3 (3.2)
LTPA (MET-hours/wk), mean (SD)	0.0 (0.0)	5.3 (1.6)	11.7 (1.8)	35.9 (19.2)
Participation in heavy physical activity/exercise, No. (%)*	1002 (10.5)	53 (8.6)	147 (12.4)	803 (13.1)
Duration of diabetes (years), mean (SD)	2.6 (4.2)	3.5 (4.9)	3.5 (4.7)	4.2 (5.3)
Education, No. (%)				
No school or primary school	4831 (50.7)	230 (37.3)	449 (37.9)	2327 (37.9)
Middle school	2609 (27.4)	201 (32.6)	366 (30.9)	1849 (30.2)
High school or higher	2083 (21.9)	185 (30.0)	371 (31.3)	1956 (31.9)
Household income, No. (%)				
<10,000 yuan/year	1660 (17.4)	88 (14.3)	185 (15.6)	815 (13.3)
10,000-19,999 yuan/year	2651 (27.8)	215 (34.9)	376 (31.7)	2098 (34.2)
20,000-34,999 yuan/year	2838 (29.8)	172 (27.9)	329 (27.7)	1851 (30.2)
≥35,000 yuan/year	2374 (24.9)	141 (22.9)	296 (25.0)	1368 (22.3)
Marital Status (Married), No. (%)	8392 (88.1)	527 (85.6)	1024 (86.3)	5235 (85.4)
Health cover (yes), No. (%)	8157 (85.7)	522 (84.7)	982 (82.8)	5170 (84.3)
Occupational Physical activity, No. (%)				
Sedentary	1691 (17.8)	125 (20.3)	180 (15.2)	492 (8.0)
Standing	907 (9.5)	57 (9.3)	67 (5.6)	174 (2.8)
Manual work	1439 (15.1)	56 (9.1)	94 (7.9)	169 (2.8)
Not in employment	2784 (29.2)	122 (19.8)	235 (19.8)	979 (16.0)
Retired	2702 (28.4)	256 (41.6)	610 (51.4)	4318 (70.4)
Transportation, No. (%)				
Passive	1712 (18.0)	109 (17.7)	133 (11.2)	360 (5.9)
Walking	693 (7.3)	44 (7.1)	80 (6.7)	199 (3.2)
Cycling	794 (8.3)	46 (7.5)	70 (5.9)	124 (2.0)
Working from home	838 (8.8)	39 (6.3)	58 (4.9)	152 (2.5)
Not in employment/retired	5486 (57.6)	378 (61.4)	845 (71.2)	5297 (86.4)

Smoking, No. (%)				
Never	6179 (64.9)	338 (54.9)	707 (59.6)	4078 (66.5)
Occasional	431 (4.5)	37 (6.0)	75 (6.3)	341 (5.6)
Former	637 (6.7)	64 (10.4)	129 (10.9)	696 (11.4)
Current	2276 (23.9)	177 (28.7)	275 (23.2)	1017 (16.6)
Alcohol intake, No. (%)				
Never/rarely	7336 (77.0)	438 (71.1)	886 (74.7)	4912 (80.1)
Former weekly	352 (3.7)	31 (5.0)	73 (6.2)	354 (5.8)
Current, <3 times/week	647 (6.8)	69 (11.2)	91 (7.7)	341 (5.6)
Current, ≥3 times/week	1188 (12.5)	78 (12.7)	136 (11.5)	525 (8.6)
Regular fruit consumption (≥4 days/week), No. (%)	2582 (27.1)	234 (38.0)	454 (38.3)	2916 (47.6)
Regular meat consumption (≥4 days/week), No. (%)	5385 (56.5)	394 (64.0)	780 (65.8)	4291 (70.0)
Body mass index categories (kg/m²), No. (%)				
18.5-25	4446 (46.7)	281 (45.6)	594 (50.1)	2987 (48.7)
25-30	4120 (43.3)	282 (45.8)	491 (41.4)	2673 (43.6)
30-35	853 (9.0)	50 (8.1)	93 (7.8)	430 (7.0)
≥35	104 (1.1)	3 (0.5)	8 (0.7)	42 (0.7)
Family history of CVD, cancer or diabetes (yes), No. (%)	4524 (47.5)	319 (51.8)	617 (52.0)	2952 (48.1)
Experienced food shortage with weight loss (yes), No. (%)	851 (8.9)	32 (5.2)	81 (6.8)	376 (6.1)
Major depression in last 12 months (yes), No. (%)	50 (0.5)	2 (0.3)	5 (0.4)	11 (0.2)
Beta-blockers (yes), No. (%)	240 (2.5)	15 (2.4)	26 (2.2)	222 (3.6)
ACE-inhibitors (yes), No. (%)	232 (2.4)	16 (2.6)	31 (2.6)	231 (3.8)
Diuretics (yes), No. (%)	76 (0.8)	3 (0.5)	6 (0.5)	49 (0.8)
Calcium-antagonists (yes), No. (%)	427 (4.5)	44 (7.1)	80 (6.7)	501 (8.2)
Statins (yes), No. (%)	44 (0.5)	2 (0.3)	6 (0.5)	20 (0.3)
Random blood glucose (mmol/L), mean (SD)**	12.2 (5.5)	12.3 (5.6)	12.0 (5.5)	11.5 (5.3)
Doctor diagnosis of type 2 diabetes (yes), No. (%)***	4379 (46.0)	337 (54.7)	701 (59.1)	3810 (62.1)
Insulin medication (yes), No. (%)****	460 (10.5)	52 (15.4)	83 (11.8)	503 (13.2)
Chlorpropamide or metformin medication (yes), No. (%)****	2382 (54.4)	177 (52.5)	386 (55.1)	2094 (55.0)

Categories of leisure-time physical activity defined as; none (0 MET-hrs/week), below recommendation (>0 to 7.49 MET-hrs/week), at recommendation (7.5-14.9 MET-hrs/week), and above recommendation (≥15 MET-hrs/week).

*Includes work, transportation, domestic and leisure activities

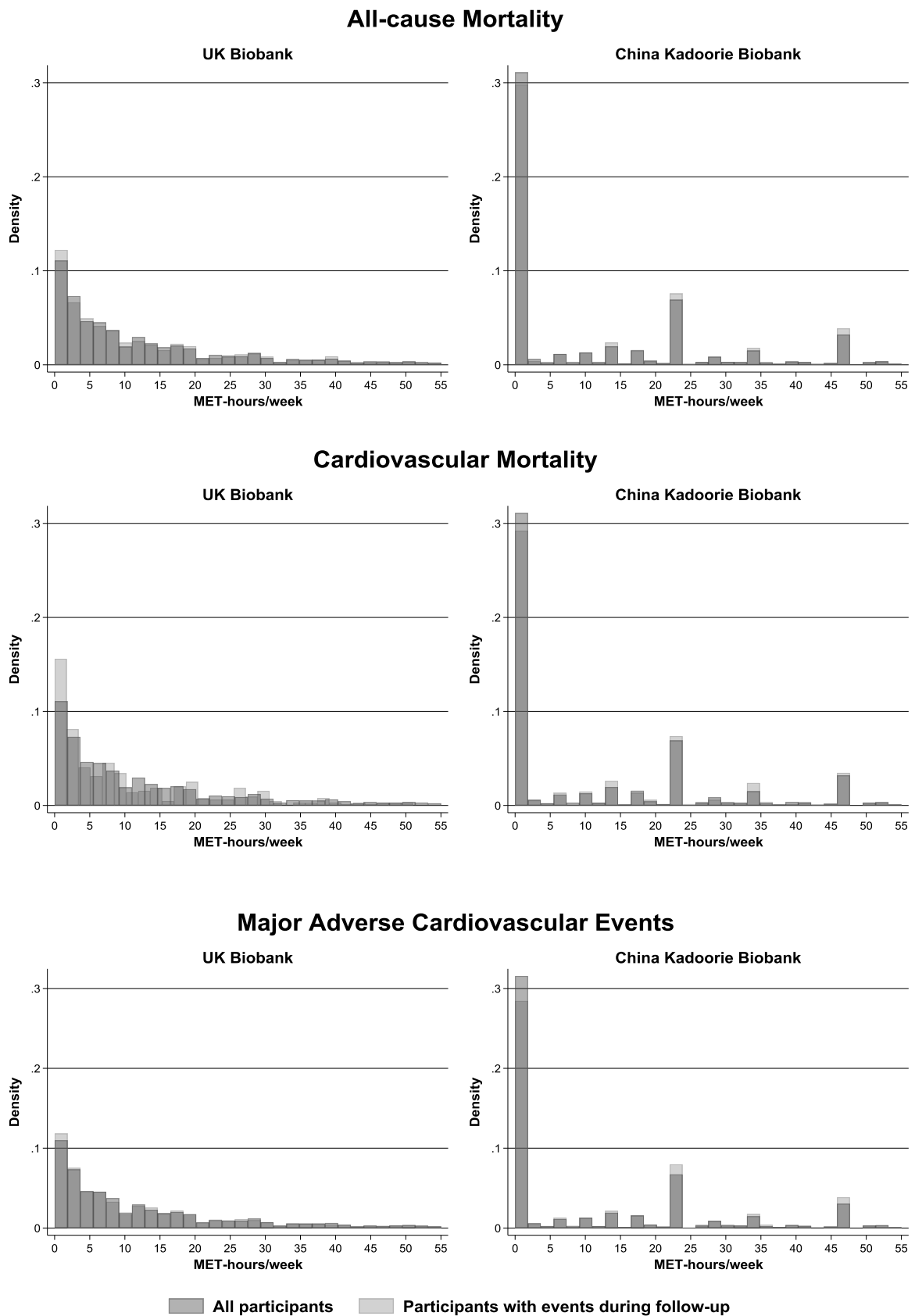
**n=17,402

***Self-reported diagnosis of diabetes from a doctor

****The denominator in the percentage is individuals with a doctor diagnosis of T2D.

MET: metabolic equivalent, CVD: cardiovascular disease, ACE: angiotensin-converting enzyme

Supplementary Figure 2. Exposure distribution among cases and in all participants



Supplementary Table 6. Adjusted (standardized) 10-year cumulative all-cause mortality (%)

	No leisure-time physical activity	Leisure-time physical activity below recommendation	Leisure-time physical activity at recommendation	Leisure-time physical activity above recommendation
All-Cause Mortality				
UK Biobank				
Adjusted 10-year cumulative mortality (%)	6.1 (5.7, 6.5)	5.9 (5.2, 6.6)	5.6 (4.8, 6.7)	5.5 (4.8, 6.3)
Adjusted difference in 10-year cumulative mortality	reference	-0.2 (-0.8, 0.4)	-0.4 (-1.3, 0.4)	-0.6 (-1.3, 0.0)
China Kadoorie Biobank				
Adjusted 10-year cumulative mortality (%)	13.2 (12.7, 13.7)	11.8 (9.6, 14.4)	11.9 (10.4, 13.7)	11.6 (10.9, 12.3)
Adjusted difference in 10-year cumulative mortality	reference	-1.4 (-3.8, 0.9)	-1.3 (-2.9, 0.3)	-1.6 (-2.3, -1.0)

Categories of leisure-time physical activity defined as; none (0 MET-hrs/week), below recommendation (>0 to 7.49 MET-hrs/week), at recommendation (7.5-14.9 MET-hrs/week), and above recommendation (≥ 15 MET-hrs/week).

Based on model 3. Estimates were obtained from a flexible parametric survival model using restricted cubic spline functions with three knots (25th, 50th and 75th of the uncensored log survival times) to model the baseline cumulative hazard.

Supplementary Table 7. Sensitivity analyses, all-cause mortality

	No leisure-time physical activity	Leisure-time physical activity below recommendation	Leisure-time physical activity at recommendation	Leisure-time physical activity above recommendation
UK Biobank				
Main analysis, N = 14,913, deaths = 1571				
HR (95%CI)	1 [reference]	0.94 (0.79, 1.12)	0.90 (0.74, 1.10)	0.85 (0.70, 1.02)
Excluding ever smokers, N = 7323, deaths = 583	685 / 64	2885 / 216	1498 / 121	2255 / 182
HR (95%CI)	1 [reference]	0.87 (0.65, 1.15)	0.92 (0.67, 1.25)	0.85 (0.63, 1.15)
Excluding individuals classified as 'possible type 2 diabetes' and Hba1c <48 mmol/mol, N = 13,681, deaths = 1393	1360 / 156	5679 / 596	2908 / 299	4689 / 482
HR (95%CI)	1 [reference]	0.95 (0.80, 1.14)	0.91 (0.75, 1.12)	0.86 (0.71, 1.05)
24hr dietary recall sample, N = 5780, deaths = 410	441 / 29	2116 / 150	1192 / 86	2031 / 145
No adjustment for 24hr dietary recall (HR [95%CI])	1 [reference]	1.12 (0.75, 1.67)	1.19 (0.77, 1.84)	1.06 (0.70, 1.60)
Adjustment for 24hr dietary recalls* (HR [95%CI])	1 [reference]	1.12 (0.75, 1.68)	1.19 (0.77, 1.84)	1.06 (0.70, 1.61)
China Kadoorie Biobank				
Main analysis, N = 17,457, deaths = 2357				
HR (95%CI)	1 [reference]	0.87 (0.68, 1.10)	0.88 (0.74, 1.03)	0.77 (0.70, 0.85)
Excluding ever smokers, N = 11,302, deaths = 1406	6179 / 783	338 / 38	707 / 88	4078 / 497
HR (95%CI)	1 [reference]	0.89 (0.64, 1.23)	0.84 (0.67, 1.05)	0.77 (0.68, 0.88)

Categories of leisure-time physical activity defined as; none (0 MET-hrs/week), below recommendation (>0 to 7.49 MET-hrs/week), at recommendation (7.5-14.9 MET-hrs/week), and above recommendation (≥15 MET-hrs/week).

Based on model 3. MET: metabolic equivalent, CVD: cardiovascular disease

*Adjustment for total energy intake, dietary intake of fibers, and the ratio of polyunsaturated to saturated fat. Follow-up was started 3 years after the last completed dietary recall.

**As model 3 + adjusted for prevalent CVD and prevalent cancer

Supplementary Table 8. Descriptive characteristics by mode of transportation to work among adults with type 2 diabetes in employment

	Passive transportation	Walking	Cycling
UK Biobank			
N (% Women)	5817 (32.2)	866 (44.2)	248 (16.5)
Age (years), mean (SD)	55.8 (6.7)	55.1 (6.6)	53.6 (7.0)
Body mass index (kg/m ²), mean (SD)	31.6 (5.8)	30.8 (5.9)	29.2 (5.0)
LTPA (MET-hours/wk), mean (SD)	12.3 (18.9)	11.8 (17.4)	20.6 (22.7)
Participation in sports, No. (%)	346 (5.9)	48 (5.5)	29 (11.7)
Duration of diabetes (years), mean (SD)	4.5 (6.3)	3.8 (5.1)	3.8 (5.7)
Education, No. (%)			
No qualifications	775 (13.3)	107 (12.4)	29 (11.7)
Other qualifications than college/university degree	3284 (56.5)	432 (49.9)	102 (41.1)
College/University degree	1758 (30.2)	327 (37.8)	117 (47.2)
Townsend Index, mean (SD)	-0.9 (3.2)	0.0 (3.4)	-0.8 (3.1)
Smoking, No. (%)			
Never	2927 (50.3)	495 (57.2)	114 (46.0)
Former	2237 (38.5)	292 (33.7)	106 (42.7)
Current	653 (11.2)	79 (9.1)	28 (11.3)
Family history of CVD, cancer or diabetes (yes), No. (%)	4917 (84.5)	741 (85.6)	198 (79.8)
Statins (yes), No. (%)	3457 (59.4)	500 (57.7)	139 (56.0)
Use of blood-pressure lowering drugs, No (%)			
0	3711 (63.8)	574 (66.3)	183 (73.8)
1	1243 (21.4)	177 (20.4)	40 (16.1)
2	681 (11.7)	88 (10.2)	19 (7.7)
3 or more	182 (3.1)	27 (3.1)	6 (2.4)
Doctor diagnosis or on treatment for type 2 diabetes (yes), No. (%)*	4488 (77.2)	641 (74.0)	170 (68.5)
Use of blood-glucose lowering drugs, No (%)**			
None	1301 (29.0)	198 (30.9)	54 (31.8)
Insulin only	208 (4.6)	28 (4.4)	10 (5.9)
Non-insulin only	2651 (59.1)	378 (59.0)	95 (55.9)
Insulin and non-insulin	328 (7.3)	37 (5.8)	11 (6.5)
China Kadoorie Biobank			
% Women	2229 (25.6)	990 (42.0)	1000 (38.7)
Age (years), mean (SD)	48.1 (6.7)	49.7 (7.0)	50.3 (6.9)

Body mass index (kg/m ²), mean (SD)	25.8 (3.3)	25.5 (3.2)	24.8 (3.2)
LTPA (MET-hours/wk), mean (SD)	5.9 (13.9)	7.4 (14.8)	4.9 (12.1)
Participation in heavy physical activity/exercise, No. (%)***	259 (11.6)	107 (10.8)	127 (12.7)
Duration of diabetes (years), mean (SD)	1.9 (3.2)	2.2 (3.5)	1.8 (3.4)
Education, No. (%)			
No school or primary school	425 (19.1)	201 (20.3)	376 (37.6)
Middle school	808 (36.2)	319 (32.2)	325 (32.5)
High school or higher	996 (44.7)	470 (47.5)	299 (29.9)
Smoking, No. (%)			
Never	766 (34.4)	508 (51.3)	476 (47.6)
Occasional	185 (8.3)	56 (5.7)	82 (8.2)
Former	219 (9.8)	93 (9.4)	94 (9.4)
Current	1059 (47.5)	333 (33.6)	348 (34.8)
Family history of CVD, cancer or diabetes (yes), No. (%)	1265 (56.8)	569 (57.5)	518 (51.8)
Statins (yes), No. (%)	6 (0.3)	2 (0.2)	2 (0.2)
Use of blood-pressure lowering drugs, No (%)			
0	2077 (93.2)	907 (91.6)	943 (94.3)
1	128 (5.7)	74 (7.5)	49 (4.9)
2 or more	24 (1.1)	9 (0.9)	8 (0.8)
Doctor diagnosis or on treatment for type 2 diabetes (yes), No. (%)*	942 (42.3)	448 (45.3)	384 (38.4)
Use of blood-glucose lowering drugs, No (%)**			
None	364 (38.6)	179 (40.0)	155 (40.4)
Insulin only	95 (10.1)	77 (17.2)	24 (6.3)
Chlorpropamide or metformin only	466 (49.5)	187 (41.7)	204 (53.1)
Insulin and Chlorpropamide or metformin	17 (1.8)	5 (1.1)	1 (0.3)

LTPA: leisure-time physical activity, MET: metabolic equivalent, CVD: cardiovascular disease

*Individuals with type 2 diabetes identified from self-report or use of glucose-lowering drugs (Eastwood et al., 2016, UKB Biobank) or from self-reported diagnosis of diabetes from a doctor (China Kadoorie Biobank).

**Individuals identified with type 2 diabetes solely from measured HbA1c (UK Biobank) or random blood glucose (China Kadoorie Biobank) are not included in the denominator.

***Includes work, transportation, domestic and leisure activities

Supplementary Table 9. Descriptive characteristics by occupational physical activity in adults with type 2 diabetes in employment

	Sedentary	Standing/walking	Manual work*
UK Biobank			
N (% Women)	2379 (34.3)	2396 (34.4)	2818 (28.9)
Age (years), mean (SD)	55.3 (6.8)	56.5 (6.7)	55.7 (6.7)
Body mass index (kg/m ²), mean (SD)	31.7 (6.2)	31.3 (5.7)	31.3 (5.4)
LTPA (MET-hours/wk), mean (SD)	10.7 (14.2)	12.2 (16.3)	14.8 (24.4)
Participation in sports, No. (%)	168 (7.1)	162 (6.8)	133 (4.7)
Duration of diabetes (years), mean (SD)	4.4 (6.0)	4.5 (6.2)	4.5 (6.4)
Education, No. (%)			
No qualifications	124 (5.2)	215 (9.0)	644 (22.9)
Other qualifications than college/university degree	1247 (52.4)	1215 (50.7)	1685 (59.8)
College/University degree	1008 (42.4)	966 (40.3)	489 (17.4)
Townsend Index, mean (SD)	-1.1 (3.0)	-1.0 (3.2)	-0.3 (3.3)
Smoking, No. (%)			
Never	1223 (51.4)	1251 (52.2)	1383 (49.1)
Former	923 (38.8)	920 (38.4)	1068 (37.9)
Current	233 (9.8)	225 (9.4)	367 (13.0)
Family history of CVD, cancer or diabetes (yes), No. (%)	2033 (85.5)	2007 (83.8)	2381 (84.5)
Statins (yes), No. (%)	1449 (60.9)	1422 (59.3)	1634 (58.0)
Use of blood-pressure lowering drugs, No (%)			
0	1526 (64.1)	1513 (63.1)	1862 (66.1)
1	505 (21.2)	523 (21.8)	577 (20.5)
2	279 (11.7)	279 (11.6)	292 (10.4)
3 or more	69 (2.9)	81 (3.4)	87 (3.1)
Doctor diagnosis or on treatment for type 2 diabetes (yes), No. (%)**	1838 (77.3)	1838 (76.7)	2155 (76.5)
Use of blood-glucose lowering drugs, No (%)***			
None	550 (29.9)	526 (28.6)	636 (29.5)
Insulin only	101 (5.5)	77 (4.2)	85 (3.9)
Non-insulin only	1059 (57.6)	1101 (59.9)	1287 (59.7)
Insulin and non-insulin	128 (7.0)	134 (7.3)	147 (6.8)
China Kadoorie Biobank			
% Women	2321 (30.9)	1156 (39.0)	1654 (34.3)
Age (years), mean (SD)	49.4 (7.2)	49.2 (7.2)	49.0 (7.0)
Body mass index (kg/m ²), mean (SD)	25.8 (3.3)	25.5 (3.3)	25.1 (3.4)

LTPA (MET-hours/wk), mean (SD)	7.5 (14.7)	6.0 (14.9)	3.7 (10.2)
Participation in heavy physical activity/exercise, No. (%)****	205 (8.8)	126 (10.9)	272 (16.4)
Duration of diabetes (years), mean (SD)	2.4 (3.7)	1.6 (2.9)	1.7 (3.1)
Education, No. (%)			
No school or primary school	330 (14.2)	345 (29.8)	641 (38.8)
Middle school	716 (30.8)	438 (37.9)	613 (37.1)
High school or higher	1275 (54.9)	373 (32.3)	400 (24.2)
Smoking, No. (%)			
Never	961 (41.4)	539 (46.6)	670 (40.5)
Occasional	184 (7.9)	85 (7.4)	117 (7.1)
Former	224 (9.7)	99 (8.6)	173 (10.5)
Current	952 (41.0)	433 (37.5)	694 (42.0)
Family history of CVD, cancer or diabetes (yes), No. (%)	1342 (57.8)	612 (52.9)	838 (50.7)
Statins (yes), No. (%)	7 (0.3)	7 (0.6)	2 (0.1)
Use of blood-pressure lowering drugs, No (%)			
0	2146 (92.5)	1082 (93.6)	1547 (93.5)
1	154 (6.6)	65 (5.6)	90 (5.4)
2 or more	21 (0.9)	9 (0.8)	17 (1.0)
Doctor diagnosis or on treatment for type 2 diabetes (yes), No. (%)*	1132 (48.8)	446 (38.6)	644 (38.9)
Use of blood-glucose lowering drugs, No (%)**			
None	392 (34.6)	199 (44.6)	266 (41.3)
Insulin only	157 (13.9)	27 (6.1)	55 (8.5)
Chlorpropamide or metformin only	564 (49.8)	209 (46.9)	313 (48.6)
Insulin and Chlorpropamide or metformin	19 (1.7)	11 (2.5)	10 (1.6)

LTPA: leisure-time physical activity, MET: metabolic equivalent, CVD: cardiovascular disease

*Participants reporting any heavy manual work in UK Biobank. Combining 'manual work' and 'heavy manual work' in China Kadoorie Biobank

**Individuals with type 2 diabetes identified from self-report or use of glucose-lowering drugs (Eastwood et al., 2016, UKB Biobank) or from self-reported diagnosis of diabetes from a doctor (China Kadoorie Biobank).

***Individuals identified with type 2 diabetes solely from measured HbA1c (UK Biobank) or random blood glucose (China Kadoorie Biobank) are not included in the denominator.

****Includes work, transportation, domestic and leisure activities

Supplementary Table 10. Physical activity for transportation to work and all-cause mortality and cardiovascular disease among adults with type 2 diabetes in employment

	Ref (Passive transportation)	Walking	Cycling
All-cause mortality			
UK Biobank			
N = 7593, deaths = 549*	5817 / 415	866 / 61	248 / 9
Crude incidence rate/1000 person-years	7.7 (7.0, 8.4)	7.5 (5.9, 9.7)	3.9 (2.0, 7.5)
Model 1 (HR [95%CI])	1 [reference]	1.10 (0.84, 1.44)	0.56 (0.29, 1.09)
Model 2 (HR [95%CI])	1 [reference]	1.07 (0.82, 1.41)	0.58 (0.30, 1.13)
Model 3 (HR [95%CI])	1 [reference]	1.12 (0.85, 1.48)	0.63 (0.32, 1.22)
Model 4 (HR [95%CI])	1 [reference]	1.12 (0.85, 1.47)	0.61 (0.32, 1.19)
China Kadoorie Biobank			
N = 5131, deaths = 284*	2229 / 104	990 / 65	1000 / 53
Crude incidence rate/1000 person-years	6.6 (5.4, 8.0)	9.6 (7.5, 12.2)	7.6 (5.8, 9.9)
Model 1 (HR [95%CI])	1 [reference]	1.42 (1.04, 1.95)	1.00 (0.71, 1.40)
Model 2 (HR [95%CI])	1 [reference]	1.25 (0.91, 1.72)	0.94 (0.67, 1.32)
Model 3 (HR [95%CI])	1 [reference]	1.25 (0.91, 1.72)	0.94 (0.66, 1.32)
Model 4 (HR [95%CI])	1 [reference]	1.25 (0.91, 1.72)	0.94 (0.67, 1.33)
Cardiovascular mortality			
UK Biobank			
N = 7593, deaths = 158*	5817 / 119	866 / 15	248 / 6
Crude incidence rate/1000 person-years	2.2 (1.8, 2.6)	1.9 (1.1, 3.1)	2.6 (1.2, 5.8)
Model 1 (HR [95%CI])	1 [reference]	0.97 (0.56, 1.67)	1.32 (0.58, 3.00)
Model 2 (HR [95%CI])	1 [reference]	0.95 (0.55, 1.64)	1.44 (0.63, 3.29)
Model 3 (HR [95%CI])	1 [reference]	1.01 (0.58, 1.75)	1.61 (0.70, 3.67)
Model 4 (HR [95%CI])	1 [reference]	1.00 (0.58, 1.74)	1.53 (0.66, 3.54)
China Kadoorie Biobank			
N = 5131, deaths = 99*	2229 / 34	990 / 22	1000 / 21
Crude incidence rate/1000 person-years	2.8 (2.3, 3.4)	2.7 (2.2, 3.3)	2.7 (2.2, 3.3)
Model 1 (HR [95%CI])	1 [reference]	1.53 (0.89, 2.65)	0.91 (0.44, 1.87)
Model 2 (HR [95%CI])	1 [reference]	1.26 (0.72, 2.19)	0.74 (0.35, 1.53)
Model 3 (HR [95%CI])	1 [reference]	1.27 (0.73, 2.21)	0.78 (0.38, 1.63)
Model 4 (HR [95%CI])	1 [reference]	1.20 (0.68, 2.21)	0.80 (0.38, 1.69)
Major adverse cardiovascular events			
UK Biobank			
N = 7365, cases = 1055*	5643 / 823	841 / 101	244 / 30
Crude incidence rate/1000 person-years	16.7 (15.6, 17.8)	13.5 (11.1, 16.4)	13.8 (9.6, 19.7)
Model 1 (HR [95%CI])	1 [reference]	0.88 (0.72, 1.09)	0.87 (0.60, 1.25)
Model 2 (HR [95%CI])	1 [reference]	0.87 (0.70, 1.07)	0.91 (0.63, 1.32)
Model 3 (HR [95%CI])	1 [reference]	0.90 (0.73, 1.12)	0.98 (0.68, 1.41)
Model 4 (HR [95%CI])	1 [reference]	0.90 (0.73, 1.12)	0.96 (0.66, 1.38)
China Kadoorie Biobank			
N = 4919, deaths = 875*	2136 / 362	940 / 184	969 / 150
Crude incidence rate/1000 person-years	25.9 (23.4, 28.7)	31.0 (26.8, 35.8)	23.5 (20.0, 27.6)
Model 1 (HR [95%CI])	1 [reference]	1.19 (0.99, 1.42)	0.89 (0.74, 1.08)

Model 2 (HR [95%CI])	1 [reference]	1.08 (0.89, 1.30)	0.89 (0.73, 1.08)
Model 3 (HR [95%CI])	1 [reference]	1.08 (0.90, 1.31)	0.93 (0.77, 1.13)
Model 4 (HR [95%CI])	1 [reference]	1.06 (0.88, 1.28)	0.93 (0.77, 1.13)

HR: hazard ratio, sHR: subdistribution hazard ratio

In UK Biobank, participants using mixed modes are coded according to their active transportation. Participants reporting any cycling are coded as cyclist. Only the primary mode of transportation is reported in China Kadoorie Biobank. *Total also includes individuals working from home.

Model 1: adjusted for sex and age (time-scale).

Model 2: Multivariable-adjusted,

UK Biobank: Model 1 + education (no qualifications, qualifications, not college/university degree, college/university degree), Townsend deprivation index (continuous), living with partner (yes/no), ethnicity (European, South Asian, African Caribbean, other), employment (sedentary work, some standing and no heavy work, heavy manual work, not in employment, retired), smoking (never, former, current), alcohol intake (never, former, current-<3 times/week, current->3 times/week), diet quality index (0, 1, 2-3), body mass index (continuous), family history of diabetes, cardiovascular disease, or cancer (yes/no), inclusion method (self-reported type 2 diabetes/use of medication or biochemistry), depression (yes/no), loneliness (yes/no), diabetes duration (continuous), leisure-time physical activity (continuous),

China Kadoorie Biobank: Model 1 + education (no school or primary school, middle school, High school or higher), household income (<10,000 yuan/y, 10,000-19,999 yuan/y, 20,000-34,999 yuan/y, ≥35,000 yuan/y), marital status (married, yes/no), has health cover (yes/no), employment (sedentary, standing, manual work, not in employment, retired), smoking (never, occasional, former regular, current), alcohol intake (never/occasionally, former weekly, current, <3 days/week, current ≥3 days/week), regular fruit consumption (≥4 days/week, yes/no), regular meat consumption (≥4 days/week, yes/no), body mass index (continuous), family history of diabetes, cardiovascular disease, or cancer (yes/no), inclusion method (self-report or biochemistry), experienced food shortage with weight loss (yes/no), major depression in last 12 months (yes/no), diabetes duration (continuous), leisure-time physical activity (continuous).

Model 3: Model 2 + adjustment for body mass index

Model 4: Model 3 + adjustment for use of glucose-lowering drugs, statins, and blood-pressure-lowering drugs

Supplementary Table 11. Occupational physical activity and all-cause mortality and cardiovascular disease among adults with type 2 diabetes in employment

	Sedentary	Standing/walking	Manual work*
All-cause mortality			
UK Biobank			
N = 7593, deaths = 549	2379 / 144	2396 / 183	2818 / 222
Crude incidence rate/1000 person-years	6.5 (5.5, 7.7)	8.2 (7.1, 9.5)	8.5 (7.4, 9.7)
Model 1 (HR [95%CI])	1 [reference]	1.14 (0.92, 1.42)	1.23 (1.00, 1.52)
Model 2 (HR [95%CI])	1 [reference]	1.15 (0.92, 1.43)	1.15 (0.92, 1.44)
Model 3 (HR [95%CI])	1 [reference]	1.16 (0.93, 1.45)	1.16 (0.93, 1.45)
Model 4 (HR [95%CI])	1 [reference]	1.15 (0.92, 1.43)	1.17 (0.93, 1.46)
China Kadoorie Biobank			
N = 5131, deaths = 284	2331 / 125	1156 / 53	1654 / 106
Crude incidence rate/1000 person-years	7.6 (6.4, 9.1)	6.6 (5.0, 8.6)	9.2 (7.6, 11.2)
Model 1 (HR [95%CI])	1 [reference]	0.90 (0.65, 1.24)	1.35 (1.04, 1.76)
Model 2 (HR [95%CI])	1 [reference]	0.92 (0.66, 1.29)	1.32 (0.99, 1.75)
Model 3 (HR [95%CI])	1 [reference]	0.92 (0.66, 1.29)	1.32 (0.99, 1.75)
Model 4 (HR [95%CI])	1 [reference]	0.92 (0.66, 1.29)	1.31 (0.99, 1.74)
Cardiovascular mortality			
UK Biobank			
N = 7593, deaths = 158	2379 / 35	2396 / 48	2818 / 75
Crude incidence rate/1000 person-years	1.6 (1.1, 2.2)	2.6 (1.6, 2.9)	2.9 (2.3, 3.6)
Model 1 (HR [95%CI])	1 [reference]	1.26 (0.81, 1.94)	1.70 (1.13, 2.53)
Model 2 (HR [95%CI])	1 [reference]	1.29 (0.83, 2.01)	1.57 (1.02, 2.41)
Model 3 (HR [95%CI])	1 [reference]	1.32 (0.85, 2.06)	1.62 (1.05, 2.48)
Model 4 (HR [95%CI])	1 [reference]	1.30 (0.83, 2.02)	1.62 (1.05, 2.49)
China Kadoorie Biobank			
N = 5131, deaths = 99	2321 / 44	1156 / 20	1654 / 35
Crude incidence rate/1000 person-years	2.8 (2.3, 3.4)	2.8 (2.3, 3.4)	2.7 (2.2, 3.3)
Model 1 (HR [95%CI])	1 [reference]	0.97 (0.57, 1.63)	1.22 (0.77, 1.93)
Model 2 (HR [95%CI])	1 [reference]	1.04 (0.61, 1.79)	1.19 (0.73, 1.94)
Model 3 (HR [95%CI])	1 [reference]	1.05 (0.61, 1.80)	1.22 (0.75, 1.97)
Model 4 (HR [95%CI])	1 [reference]	1.06 (0.61, 1.83)	1.19 (0.73, 1.94)
Major adverse cardiovascular events			
UK Biobank			
N = 7365, cases = 1055	2323 / 276	2334 / 343	2708 / 436
Crude incidence rate/1000 person-years	13.4 (11.9, 15.1)	16.9 (15.2, 18.8)	18.5 (16.8, 20.3)
Model 1 (HR [95%CI])	1 [reference]	1.20 (1.02, 1.40)	1.33 (1.14, 1.55)
Model 2 (HR [95%CI])	1 [reference]	1.22 (1.04, 1.43)	1.34 (1.14, 1.58)
Model 3 (HR [95%CI])	1 [reference]	1.24 (1.05, 1.45)	1.36 (1.16, 1.60)
Model 4 (HR [95%CI])	1 [reference]	1.23 (1.05, 1.45)	1.39 (1.18, 1.64)
China Kadoorie Biobank			
N = 4919, deaths = 875*	2199 / 445	1117 / 171	1603 / 259
Crude incidence rate/1000 person-years	31.5 (28.7, 34.4)	23.4 (20.2, 27.2)	24.8 (22.0, 28.0)
Model 1 (HR [95%CI])	1 [reference]	0.77 (0.65, 0.92)	0.82 (0.71, 0.96)
Model 2 (HR [95%CI])	1 [reference]	0.87 (0.73, 1.04)	0.94 (0.80, 1.11)
Model 3 (HR [95%CI])	1 [reference]	0.88 (0.74, 1.05)	0.97 (0.82, 1.14)

Model 4 (HR [95%CI])	1 [reference]	0.89 (0.74, 1.07)	0.97 (0.82, 1.14)
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LTPA: leisure-time physical activity, MET: metabolic equivalent, HR: hazard ratio, sHR: subdistribution hazard ratio

*Participants reporting any heavy manual work in UK Biobank. Combining 'manual work' and 'heavy manual work' in China Kadoorie Biobank.

Model 1: adjusted for sex and age (time-scale).

Model 2: Multivariable-adjusted,

UK Biobank: Model 1 + education (no qualifications, qualifications, not college/university degree, college/university degree), Townsend deprivation index (continuous), living with partner (yes/no), ethnicity (European, South Asian, African Caribbean, other), transportation (passive, walking, cycling, working from home), smoking (never, former, current), alcohol intake (never, former, current-<3 times/week, current->3 times/week), diet quality index (0, 1, 2-3), body mass index (continuous), family history of diabetes, cardiovascular disease, or cancer (yes/no), inclusion method (self-reported type 2 diabetes/use of medication or biochemistry), depression (yes/no), loneliness (yes/no), diabetes duration (continuous), leisure-time physical activity (continuous),

China Kadoorie Biobank: Model 1 + education (no school or primary school, middle school, High school or higher), household income (<10,000 yuan/y, 10,000-19,999 yuan/y, 20,000-34,999 yuan/y, ≥35,000 yuan/y), marital status (married, yes/no), has health cover (yes/no), transportation (passive, walking, cycling, working from home), smoking (never, occasional, former regular, current), alcohol intake (never/occasionally, former weekly, current, <3 days/week, current ≥3 days/week), regular fruit consumption (≥4 days/week, yes/no), regular meat consumption (≥4 days/week, yes/no), body mass index (continuous), family history of diabetes, cardiovascular disease, or cancer (yes/no), inclusion method (self-report or biochemistry), experienced food shortage with weight loss (yes/no), major depression in last 12 months (yes/no), diabetes duration (continuous), leisure-time physical activity (continuous)

Model 3: Model 2 + adjustment for body mass index

Model 4: Model 3 + adjustment for use of glucose-lowering drugs, statins, and blood-pressure-lowering drugs

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