

Supplemental Online Content

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eReferences

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

eMethods. Supplemental methods

MVPA Classification

We utilized a previously validated machine learning-based method of MVPA classification developed by Walmsley et al.¹ Briefly, algorithms were trained on 150 individuals wearing an Axivity AX3 device whose free-living activities were classified manually using visual inspection. A wide range of activity types (e.g., walking, jogging, stationary cycling, elliptical, and others) were labeled. Daily proportion of time spent performing MVPA was converted to daily minutes of MVPA, which was then classified into categories of Inactive, Active-Weekend Warrior, and Active-Regular as described in the main manuscript. To ensure accurate classification of activity patterns, we excluded individuals with less than a full week of acceleration data available (allowing imputed values, see **eFigure 1**). All variables utilized are available to registered researchers using the UK Biobank Data Showcase (Moderate-Vigorous Day average: Field 40045, Daily wear time: Fields 90053-90059, Completeness of acceleration epochs: Field 90004).

Covariate ascertainment

Clinical factors for multivariable adjustment were selected *a priori* based on known or suspected associations with physical activity and cardiovascular disease.^{1,2} A detailed list of covariate definitions and categorization (when relevant) is provided in **eTable 2**. Diabetes was defined using a combination of self-reported diagnoses, medication use, and inpatient diagnosis codes (**eTable 1**). All other factors were defined based on baseline data from study visits. The majority of data was ascertained at the initial assessment visit, spanning 3/2006-10/2010. However, roughly 10% of individuals provided further data at the first follow-up visit, spanning 12/2009-6/2013. Where indicated, we prioritized data from the follow-up visit given closer proximity prior to accelerometry.

Incident disease analyses

For longitudinal analyses, person-time began at the end of accelerometer wear. Individuals with a given disease (e.g., atrial fibrillation) prevalent at the start of follow-up were excluded from longitudinal analyses for that outcome. Follow-up was censored at the earliest of an event, death, or last follow-up. Given a low 5-year cumulative risk of death (2.1%, 95% CI 2.0-2.2), death was treated as a censoring event in all analyses. The date of last follow-up was March 31, 2021 for individuals enrolled in England and Scotland, and February 28, 2018 for individuals enrolled in Wales.

Secondary analyses

We performed several secondary analyses to assess the robustness of our findings. First, given that varying activity patterns may affect injury risk,³ we assessed for associations between activity pattern and incident musculoskeletal injuries and related

conditions (definitions provided in **eTable 1**). Second, to assess whether associations between activity and disease may have been driven by reverse causation, we repeated association testing in a landmark analysis in which person-time began two years after measured activity exposure. Third, since certain factors may confound associations between physical activity and disease (e.g., body mass index), yet are likely on the causal pathway, we fit models additionally adjusted for body mass index, systolic blood pressure, diastolic blood pressure, and prevalent diabetes. Fourth, to assess whether our results may be biased by exclusion of individuals based on accelerometer data availability criteria, we repeated the primary analyses while including individuals with less than one week of data available and classifying them as Inactive. Fifth, we assessed alternative definitions of the WW pattern, including $\geq 75\%$ of total MVPA over 1-2 days, $\geq 50\%$ of total MVPA over 1-2 consecutive days, and $\geq 50\%$ of total MVPA over 1-2 weekend days.

Data and code availability

UK Biobank data are available by application (<https://www.ukbiobank.ac.uk/enable-your-research/register>). Data processing scripts underlying the current analysis can be found at www.github.com/shaankhurshid/ukb_weekend_warrior.

eTable 1. Disease definitions

Phenotype	Data fields	Field names	Data codes	Data code definitions
Atrial fibrillation	20002	Non-cancer illness code, self-reported	1471, 1483	Atrial fibrillation, Atrial flutter
Atrial fibrillation	20004	Operation code, self-reported	1524	Cardioversion
Atrial fibrillation	41202 41204 40001 40002	Diagnoses - main ICD10 Diagnoses – secondary ICD10 Underlying (primary) cause of death: ICD10 Contributory (secondary) cause of death: ICD10	I48, I48.0, I48.1, I48.2, I48.3, I48.4, I48.9	Atrial fibrillation and flutter, Paroxysmal atrial fibrillation, Persistent atrial fibrillation, Chronic atrial fibrillation, Typical atrial flutter, Atypical atrial flutter, Atrial fibrillation and flutter, unspecified
Atrial fibrillation	41203 41205	Diagnosis - main ICD9 Diagnoses - secondary ICD9	4273	Atrial fibrillation and flutter
Atrial fibrillation	41200 41210	Operative procedures – main OPCS Operative procedures – secondary OPCS	K57.1, K62.1, K62.2, K62.3, K62.4, X50.1, X50.2	Percutaneous transluminal ablation of atrioventricular node, Percutaneous transluminal ablation of pulmonary vein to left atrium conducting system, Percutaneous transluminal ablation of atrial wall for atrial flutter, Percutaneous transluminal ablation of conducting system of heart for atrial flutter NEC, Percutaneous transluminal internal cardioversion NEC, Direct current cardioversion, External cardioversion NEC
Diabetes	2443	Diabetes diagnosed by doctor	1	Yes
Diabetes	20002	Non-cancer illness code, self-reported	1220, 1221, 1222, 1223	Diabetes, Gestational diabetes, Type 1 diabetes, Type 2 diabetes
Diabetes	2986	Insulin use within one year	1	Started insulin within one year diagnosis of diabetes - Yes
Diabetes	6177	Medication for cholesterol, blood pressure or diabetes	3	Insulin
Diabetes	6153	Medication for cholesterol, blood pressure, diabetes, or take exogenous hormones	3	Insulin
Diabetes	41202 41204 40001 40002	Diagnoses - main ICD10 Diagnoses – secondary ICD10 Underlying (primary) cause of death: ICD10 Contributory (secondary) cause of death: ICD10	E10, E10.0, E10.1, E10.2, E10.3, E10.4, E10.5, E10.6, E10.7, E10.8, E10.9, E11, E11.0, E11.1, E11.2, E11.3, E11.4, E11.5, E11.6, E11.7, E11.8, E11.9, E12, E12.1, E12.8, E12.9,	Insulin-dependent diabetes mellitus, Insulin-dependent diabetes mellitus with coma, Insulin-dependent diabetes mellitus with ketoacidosis, Insulin-dependent diabetes mellitus with renal complications, Insulin-dependent diabetes mellitus with ophthalmic complications, Insulin-dependent diabetes mellitus with neurological complications, Insulin-dependent diabetes mellitus with peripheral circulatory complications, Insulin-dependent diabetes mellitus with other specified complications, Insulin-dependent diabetes mellitus with multiple complications, Insulin-dependent diabetes mellitus with unspecified complications, Insulin-dependent diabetes mellitus without complications, Non-insulin-dependent diabetes mellitus, Non-insulin-dependent diabetes mellitus - with coma, Non-insulin-dependent diabetes mellitus - with ketoacidosis, Non-insulin-dependent diabetes mellitus - with renal complications, Non-insulin-dependent diabetes mellitus - with ophthalmic complications, Non-insulin-dependent diabetes mellitus - with neurological complications, Non-insulin-dependent diabetes mellitus - with peripheral

Phenotype	Data fields	Field names	Data codes	Data code definitions
			E13, E13.1, E13.2, E13.3, E13.5, E13.6, E13.7, E13.8, E13.9, E14, E14.0, E14.1, E14.2, E14.3, E14.4, E14.5, E14.6, E14.7, E14.8, E14.9	circulatory complications, Non-insulin-dependent diabetes mellitus - with other specified complications, Non-insulin-dependent diabetes mellitus - with multiple complications, Non-insulin-dependent diabetes mellitus - with unspecified complications, Non-insulin-dependent diabetes mellitus - without complications, Malnutrition-related diabetes mellitus, Malnutrition-related diabetes mellitus with ketoacidosis, Malnutrition-related diabetes mellitus with unspecified complications, Malnutrition-related diabetes mellitus without complications, Other specified diabetes mellitus, Other specified diabetes mellitus with ketoacidosis, Other specified diabetes mellitus with renal complications, Other specified diabetes mellitus with ophthalmic complications, Other specified diabetes mellitus with peripheral circulatory complications, Other specified diabetes mellitus with other specified complications, Other specified diabetes mellitus with multiple complications, Other specified diabetes mellitus with unspecified complications, Other specified diabetes mellitus without complications, Unspecified diabetes mellitus, Unspecified diabetes mellitus with coma, Unspecified diabetes mellitus with ketoacidosis, Unspecified diabetes mellitus with renal complications, Unspecified diabetes mellitus with ophthalmic complications, Unspecified diabetes mellitus with neurological complications, Unspecified diabetes mellitus with peripheral circulatory complications, Unspecified diabetes mellitus with other specified complications, Unspecified diabetes mellitus with multiple complications, Unspecified diabetes mellitus with unspecified complications, Unspecified diabetes mellitus without complications
Diabetes	41203 41205	Diagnosis - main ICD9 Diagnoses - secondary ICD9	2500, 25000, 25001, 25009, 2501, 25011, 25019, 2503, 2504, 2505, 25099	Diabetes mellitus without mention of complication, Diabetes mellitus without mention of complication (adult-onset type), Diabetes mellitus without mention of complication (juvenile type), Diabetes mellitus without mention of compl. (adult/juvenile unspec.), Diabetes with ketoacidosis, Diabetes with ketoacidosis (juvenile type), Diabetes with ketoacidosis (adult/juvenile unspec.), Diabetes with renal manifestations, Diabetes with ophthalmic manifestations, Diabetes with neurological manifestations, Diabetes with unspecified complications (unspecified onset)
Heart Failure	20002	Non-cancer illness code, self-reported	1076, 1079	Heart failure/pulmonary oedema, Cardiomyopathy
Heart Failure	41202 41204 40001 40002	Diagnoses - main ICD10 Diagnoses – secondary ICD10 Underlying (primary) cause of death: ICD10 Contributory (secondary) cause of death: ICD10	I11.0, I13.0, I13.2, I25.5, I42.0, I42.5, I42.8, I42.9, I50, I50.0, I50.1, I50.9	Hypertensive heart disease with (congestive) heart failure, Hypertensive heart and renal disease with (congestive) heart failure, Hypertensive heart and renal disease with both (congestive) heart failure and renal failure, Hypertensive heart disease with (congestive) heart failure, Hypertensive heart and renal disease with (congestive) heart failure, Hypertensive heart and renal disease with both (congestive) heart failure and renal failure, Ischaemic cardiomyopathy, Dilated cardiomyopathy, Other restrictive cardiomyopathy, Other cardiomyopathies, Cardiomyopathy, unspecified, Heart failure, Congestive heart failure, Left ventricular failure, Heart failure, unspecified
Musculoskeletal injury	20002	Non-cancer illness code, self-reported	1266,1267,1294, 1295,1297,1311, 1312,1406,1532, 1533,1534,1536, 1537,1538,1540, 1541,1545,1618,	Head injury, Spinal injury, Back problem, Joint disorder, Muscle/soft tissue problem, Spine arthritis/spondylitis, Prolapsed disc/slipped disc, Muscle or soft tissue injuries, Disc problem, Disc degeneration, Back pain, Spinal stenosis, Joint pain, Arthritis (NOS), Plantar fasciitis, Carpal tunnel syndrome, Neck problem/injury, Soft tissue inflammation, Tendonitis / tendinitis / tenosynovitis, Bursitis, Synovitis, Epicondylitis, Tennis elbow / lateral epicondylitis, Housemaid's knee (prepatellar bursitis), Fracture skull / head,

Phenotype	Data fields	Field names	Data codes	Data code definitions
			1619,1620,1621,1622,1623,1624,1626,1627,1628,1629,1630,1631,1632,1633,1634,1635,1636,1637,1638,1639,1640,1644,1645,1646,1647,1648,1649,1650,1651,1652,1653,1654,1655,1656	Fracture jaw, Fracture nose, Fracture face / orbit / eye socket, Fracture neck / cervical fracture, Fracture clavicle / collar bone, Fracture shoulder / scapula, Fracture upper arm / humerus / elbow, Fracture forearm / wrist, Fracture radius, Fracture ulna, Fracture wrist / Colles fracture, Fracture hand, Fracture finger, Fracture thumb, Fracture rib, Fracture sternum, Fracture vertebra / crush fracture / vertebral collapse, Fracture pelvis, Fracture neck of femur / hip, Fracture shaft of femur, Fracture patella / knee, Fracture lower leg / ankle, Fracture tibia, Fracture fibula, Fracture foot, Fracture metatarsal, Fracture toe
Musculoskeletal injury	41202 41204 40001 40002	Diagnoses - main ICD10 Diagnoses – secondary ICD10 Underlying (primary) cause of death: ICD10 Contributory (secondary) cause of death: ICD10	Phecodes* 800, 801, 802, 803, 804, 805, 807, 809, 816, 817, 818, 819, 823, 830, 835, 836, 840, 841, 842, 905, 722, 724, 733.8, 740, 741, 742, 742.2,	Fracture of lower limb, Fracture of ankle and foot, Fracture of pelvis, Fracture of upper limb, Fracture of hand or wrist, Fracture of vertebral column without mention of spinal cord injury, Fracture of ribs, Fracture of unspecified bones, Cerebral laceration and contusion, Concussion, Intracranial hemorrhage (injury), Skull and face fracture and other intercranial injury, Torus fracture, Dislocation, Internal derangement of knee, Traumatic arthropathy, Sprains and strains, Sprains and strains of back and neck, Other sprains and strains, Late effects of musculoskeletal and connective tissue injuries, Intervertebral disc disorders, Other and unspecified disorders of back, Malunion and nonunion of fracture, Chondromalacia, Osteoarthritis, Symptoms and disorders of the joints, Derangement of joint, non-traumatic, Stress fracture, Pain in joint
Musculoskeletal injury	41203 41205	Diagnosis - main ICD9 Diagnoses - secondary ICD9	Phecodes* 800, 801, 802, 803, 804, 805, 807, 809, 816, 817, 818, 819, 823, 830, 835, 836, 840, 841, 842, 905, 722, 724, 733.8, 740, 741, 742, 742.2,	Fracture of lower limb, Fracture of ankle and foot, Fracture of pelvis, Fracture of upper limb, Fracture of hand or wrist, Fracture of vertebral column without mention of spinal cord injury, Fracture of ribs, Fracture of unspecified bones, Cerebral laceration and contusion, Concussion, Intracranial hemorrhage (injury), Skull and face fracture and other intercranial injury, Torus fracture, Dislocation, Internal derangement of knee, Traumatic arthropathy, Sprains and strains, Sprains and strains of back and neck, Other sprains and strains, Late effects of musculoskeletal and connective tissue injuries, Intervertebral disc disorders, Other and unspecified disorders of back, Malunion and nonunion of fracture, Chondromalacia, Osteoarthritis, Symptoms and disorders of the joints, Derangement of joint, non-traumatic, Stress fracture, Pain in joint
Myocardial infarction	20002	Non-cancer illness code, self-reported	1075	Heart attack/myocardial infarction
Myocardial infarction	41202 41204 40001 40002	Diagnoses - main ICD10 Diagnoses – secondary ICD10 Underlying (primary) cause of death: ICD10 Contributory (secondary) cause of death: ICD10	I21, I21.0, I21.1, I21.2, I21.3, I21.4, I21.9, I22, I22.0, I22.1, I22.8, I22.9, I23, I23.0, I23.1, I23.2, I23.3, I23.4, I23.5,	Acute myocardial infarction, Acute transmural myocardial infarction of anterior wall, Acute transmural myocardial infarction of inferior wall, Acute transmural myocardial infarction of other sites, Acute transmural myocardial infarction of unspecified site, Acute subendocardial myocardial infarction, Acute myocardial infarction, unspecified, Subsequent myocardial infarction, Subsequent myocardial infarction of anterior wall, Subsequent myocardial infarction of inferior wall, Subsequent myocardial infarction of other sites, Subsequent myocardial infarction of unspecified site, Certain current complications following acute myocardial infarction, Hemopericardium as current complication following acute myocardial infarction, Atrial septal defect as current

Phenotype	Data fields	Field names	Data codes	Data code definitions
			I23.6, I23.8, I24.1, I25.2	complication following acute myocardial infarction, Ventricular septal defect as current complication following acute myocardial infarction, Rupture of cardiac wall without hemopericardium as current complication following acute myocardial infarction, Rupture of chordae tendinae as current complication following acute myocardial infarction, Rupture of papillary muscle as current complication following acute myocardial infarction, Thrombosis of atrium, auricular appendage, and ventricle as current complication following acute myocardial infarction, Other current complications following acute myocardial infarction, Dressler's Syndrome, Old myocardial infarction
Myocardial infarction	41203 41205	Diagnosis - main ICD9 Diagnoses - secondary ICD9	410, 410.0, 410.1, 410.2, 410.3, 410.4, 410.5, 410.6, 410.7, 410.8, 410.9, 411, 411.0, 411.1, 411.8, 412, 412.9, 429.79	Myocardial infarction, Acute myocardial infarction of other anterior wall, episode of care unspecified, Acute myocardial infarction of inferolateral wall, episode of care unspecified, Acute myocardial infarction of inferoposterior wall, episode of care unspecified, Acute myocardial infarction of other inferior wall, episode of care unspecified, Acute myocardial infarction of other lateral wall, episode of care unspecified, True posterior wall infarction, episode of care unspecified, Subendocardial infarction, episode of care unspecified, Acute myocardial infarction of other specified sites, episode of care unspecified, Acute myocardial infarction of unspecified site, episode of care unspecified, Postmyocardial infarction syndrome, Intermediate coronary syndrome, Other acute and subacute complications of ischemic heart disease, Old myocardial infarction, Ill-defined descriptions and complications of heart disease, other
Stroke	20002	Non-cancer illness code, self-reported	1081, 1086, 1491, 1583	Stroke, subarachnoid hemorrhage, brain hemorrhage, ischemic stroke
Stroke	41203 41205	Diagnosis - main ICD9 Diagnoses - secondary ICD9	430.0, 430.1, 430.9, 431.0, 431.1, 431.9, 434.0, 434.1, 434.9, 436.0, 436.1, 436.9	Subarachnoid hemorrhage, intracerebral hemorrhage, occlusion of cerebral arteries, cerebral thrombosis, cerebral embolism, cerebral artery occlusion, unspecified, acute, but ill-defined, cerebrovascular disease
Stroke	41202 41204 40001 40002	Diagnoses - main ICD10 Diagnoses – secondary ICD10 Underlying (primary) cause of death: ICD10 Contributory (secondary) cause of death: ICD10	I60, I60.0, I60.1, I60.2, I60.3, I60.4, I60.5, I60.6, I60.7, I60.8, I60.9, I61, I61.0, I61.1, I61.2, I61.3, I61.4, I61.5, I61.6, I61.8, I61.9, I63, I63.0, I63.1, I63.2, I63.3, I63.4, I63.5, I63.6, I63.8, I63.9, I64, I64.0, I64.1, I64.9	Subarachnoid hemorrhage, subarachnoid hemorrhage from carotid siphon and bifurcation, subarachnoid hemorrhage from middle cerebral artery, subarachnoid hemorrhage from anterior communicating artery, subarachnoid hemorrhage from posterior communicating artery, subarachnoid hemorrhage from basilar artery, subarachnoid hemorrhage from vertebral artery, subarachnoid hemorrhage from other intracranial arteries, subarachnoid hemorrhage from intracranial artery, unspecified, other subarachnoid hemorrhage, subarachnoid hemorrhage, unspecified, intracerebral hemorrhage, intracerebral hemorrhage in hemisphere, subcortical, intracerebral hemorrhage in hemisphere, cortical, intracerebral hemorrhage in hemisphere, unspecified, intracerebral hemorrhage in brain stem, intracerebral hemorrhage in cerebellum, intracerebral hemorrhage, intraventricular, intracerebral hemorrhage multiple localized, other intracerebral hemorrhage, intracerebral hemorrhage, unspecified, cerebral infarction, cerebral infarction due to thrombosis of precerebral arteries, cerebral infarction due to embolism of precerebral arteries, cerebral infarction due to unspecified occlusion or stenosis of precerebral arteries, cerebral infarction due to embolism of cerebral arteries, cerebral infarction due to unspecified occlusion or stenosis of cerebral

Phenotype	Data fields	Field names	Data codes	Data code definitions
				arteries, cerebral infarction due to cerebral venous thrombosis, nonpyogenic, other cerebral infarction, cerebral infarction, unspecified, stroke, not specified as hemorrhagic or infarction
*Listed Phecode ⁴ definitions comprise 26,897 unique ICD-9 and ICD-10 codes. Mapping from Phecodes to ICD codes can be found at (https://phewascatalog.org/phecodes).				

eTable 2. Covariate definitions

Covariate	UK Biobank Field ID(s)	UK Biobank Field Name(s)	Instance(s)	Coding	Notes
<i>Primary model</i>					
Age	21022	Age	0	Continuous age in years	Age calculated at end of accelerometer wear
Sex	31	Sex	0	1) Male 2) Female	
Ethnic background*	21000	Ethnic background	0	1) White 2) Black 3) Asian 4) Other	Response 5 (<i>Chinese</i>) included under category Asian. Responses 2 (<i>Mixed</i>) and 6 (<i>Other ethnic group</i>) combined into category Other given low frequency
Tobacco use*	20116	Smoking status	0, 1 [†]	1) Current 2) Previous 3) Never	
Townsend deprivation index	22189	Townsend deprivation index at recruitment	0	Continuous scale	
Alcohol use*	1558, 1568, 1578, 1588, 1598, 1608, 4407, 4418, 4429, 4440, 4451, 4462, 5364	Alcohol intake frequency, average weekly red wine intake, average weekly champagne plus white wine intake, average weekly beer plus cider intake, average weekly spirits intake, average weekly fortified wine intake, average weekly intake of other alcoholic drinks, average monthly red wine intake, average monthly champagne plus white wine intake, average monthly beer plus cider intake, average monthly spirits intake, average monthly fortified wine intake, average monthly intake of other alcoholic drinks	0, 1 [†]	Continuous alcohol consumption in g/week	Responses to alcohol intake frequency and quantity questionnaires were converted to alcohol intake in grams/week (see Halford et al. ⁵) In 10.8% of individuals reporting alcohol intake frequency without specifying a number of drinks, the median number of drinks observed at the specified frequency was assumed.
Diet quality*	1289, 1299, 1309, 1319, 1369, 1379, 1389, 1349, 1478		0, 1 [†]	1) Healthy 2) Intermediate 3) Unhealthy	Diet quality categorized as follows (see Bhattacharya et al. ⁶): - Unhealthy: a) below-median intake of fruits and vegetables and b) above-median intake of red meat or processed meat or above-median frequency of adding salt to their diet - Healthy: a) above-median intake or fruits and vegetables and b) below-

Covariate	UK Biobank Field ID(s)	UK Biobank Field Name(s)	Instance(s)	Coding	Notes
					<p>median intake of red meat or processed meat and below-median frequency of adding salt to their diet</p> <ul style="list-style-type: none"> - Intermediate: not classified as healthy or unhealthy
Educational attainment*	845, 6138	Age completed full time education, qualifications	0, 1†	Continuous educational attainment in years	<p>Degree/qualification status and reported age completed full time education were converted to years of educational attainment as follows (see Okbay et al.⁷):</p> <ul style="list-style-type: none"> - College or university degree: 20 - Advanced Subsidiary/Advanced Levels or equivalent: 13 - Ordinary Levels/General Certificate of Secondary Education or equivalent: 10 - Certificate of Secondary Education or equivalent: 10 - National Vocational Qualification or Higher National Diploma or Higher National Certificate or equivalent: Age completed full time education – 5 - Other professional qualification: 15 - None of the above: 7
Self-reported health*	2178	Overall health rating	0, 1†	<p>1) Excellent 2) Good 3) Fair 4) Poor</p>	
Employment status*	6142	Current employment status	0, 1†	<p>1) Paid employment/Self-employed 2) Retired or unemployed</p>	<i>In paid employment or self-employed</i> coded as Paid employment/Self-employed, all other answers coded as Retired or unemployed
<i>Additional covariates included in secondary model</i>					
Body mass index	21001	Body mass index	0, 1†	Continuous in kg/m ²	
Systolic blood pressure	4080, 93	Systolic blood pressure	0, 1†	Continuous in mmHg	
Diastolic blood pressure	4079, 94	Diastolic blood pressure	0, 1†	Continuous in mmHg	
Anti-hypertensive medication use*	6153, 6177	Medication for cholesterol, blood pressure, or diabetes	0, 1†	Yes, no	Positive response to <i>blood pressure medication</i> use coded as Yes

Covariate	UK Biobank Field ID(s)	UK Biobank Field Name(s)	Instance(s)	Coding	Notes
Diabetes	2443, 20002, 2986, 6177, 6153, 40001, 40002, 41202, 41203, 41204, 41205,	Diabetes diagnosed by doctor, Non-cancer illness code, self-reported, Started insulin use within one year diagnosis of diabetes, Medication for cholesterol, blood pressure, or diabetes, Underlying (primary) cause of death: ICD10, Contributing (secondary) cause of death: ICD10, Diagnoses – main ICD10, Diagnoses – main ICD9, Diagnoses – secondary ICD10, Diagnoses – secondary ICD9	0, 1† and hospital data	Yes, no	Please see eTable 1 for specific diagnoses codes used to define diabetes

*Responses *Do not know* and *Prefer not to answer* considered non-informative (i.e., missing)

†Instance 0 = baseline assessment (3/2006-10/2010), Instance 1 = first follow-up assessment (12/2009-6/2013). Priority was given to Instance 1 data when available given closer temporal proximity before accelerometry

eTable 3. Sample characteristics stratified at the median activity threshold of ≥ 230.4 minutes of MVPA per week (sample median)

Baseline Characteristic	Active-WW ^a (n=26,473)	Active-Regular ^a (n=18,944)	Inactive ^a (n=44,156)
<i>Mean (SD), median (quartile 1, quartile 3), or N (%)</i>			
Age	62.2 (7.7)	61.1 (7.9)	63.0 (7.9)
Sex			
Female	12,481 (47.2%)	9,371 (49.5%)	28,617 (64.8%)
Male	13,992 (52.9%)	9,573 (50.5%)	15,539 (35.2%)
Ethnic background ^b			
Asian	209 (0.8%)	222 (1.2%)	594 (1.3%)
Black	145 (0.5%)	144 (0.8%)	440 (1.0%)
Mixed	125 (0.5%)	113 (0.6%)	249 (0.6%)
Other	129 (0.5%)	128 (0.7%)	206 (0.5%)
White	25,865 (97.7%)	18,337 (96.8%)	42,667 (96.6%)
Tobacco use			
Never	15,708 (59.3%)	10,962 (57.9%)	24,739 (56.0%)
Former	9,366 (35.4%)	6,870 (36.3%)	15,965 (36.2%)
Current	1,399 (5.3%)	1,112 (5.9%)	3,452 (7.8%)
Alcohol intake (g/week) ^c	104 (32, 192)	96 (32, 192)	80 (8, 160)
Townsend Deprivation Index ^d	-2.0 (2.7)	-1.3 (3.0)	-1.8 (2.8)
Educational attainment (years)	15.8 (4.6)	16.0 (4.6)	14.6 (4.7)
Employed	16,399 (61.9%)	12,639 (66.7%)	25,259 (57.2%)
Self-reported health			
Good	16,012 (60.5%)	11,327 (59.8%)	26,397 (59.8%)
Excellent	7,073 (26.7%)	5,069 (26.8%)	7,194 (16.3%)
Fair	3,061 (11.6%)	2,278 (12.0%)	8,827 (20.0%)
Poor	327 (1.2%)	270 (1.4%)	1,738 (3.9%)
Diet quality			
Intermediate	24,554 (50.0%)	9,481 (50.0%)	9,110 (50.0%)
Poor	16,811 (34.2%)	5,603 (29.6%)	5,200 (28.5%)
Good	7,726 (15.7%)	3,860 (20.4%)	3,909 (21.5%)
Anti-hypertensive medication use [#]	3,766 (14.2%)	2,465 (13.0%)	9,353 (21.1%)
Body mass index (kg/m ²) [#]	25.9 (3.8)	25.6 (3.9)	27.6 (5.0)
Body mass index > 20 kg/m ²	11,464 (13.3%)	2,371 (12.5%)	11,464 (26.0%)
Systolic blood pressure (mmHg) [#]	136 (18)	135 (18)	137 (18)

Systolic blood pressure > 140 mmHg	10,132 (38.3%)	6,856 (36.2%)	17,968 (40.7%)
Diastolic blood pressure (mmHg) [#]	81 (10)	81 (10)	82 (10)
Diastolic blood pressure > 90 mmHg	4,796 (18.1%)	3,363 (17.8%)	8,660 (19.6%)
Diabetes	535 (2.0%)	382 (2.0%)	2,063 (4.7%)
<p>a- Inactive defined as MVPA below the sample median (230.4 minutes of MVPA/week)</p> <p>b- Represents self-reported "ethnic background." Race classification of "Other" defined as self-report of a race other than Asian, Black, Mixed, or White.</p> <p>c- Can be converted to standard US drinks per week by dividing by 14g</p> <p>d- The Townsend Deprivation Index is a measure of material deprivation standardized by geographic area. Numerically greater values indicate more deprivation. The sample range is -6.2 to 10.1, with values around -2 and -1 indicating somewhat less deprivation compared to average based on geographic location.</p> <p>e- Indicates covariates which may lie on the causal pathway between physical activity and cardiovascular events and are included only in a secondary additionally adjusted model (see eTable 9).</p> <p>SD = standard deviation</p>			

eTable 4. Sample characteristics of individuals in primary analysis sample versus individuals excluded for incomplete accelerometer data

Baseline Characteristic	Primary sample (n=89,573)	Incomplete data (n=3,925)
<i>Mean (SD), median (quartile 1, quartile 3), or N (%)</i>		
Age	62.3 (7.8)	62.7 (7.9)
Sex		
Female	50,469 (56.3%)	2,219 (56.5%)
Male	39,104 (43.7%)	1,706 (43.5%)
Ethnic background ^a		
Asian	1,025 (1.1%)	41 (1.0%)
Black	729 (0.8%)	31 (0.8%)
Mixed	487 (0.5%)	0 (0%)
Other	463 (0.5%)	41 (1.0%)
White	86,869 (97.0%)	3,812 (97.1%)
Smoking status		
Never	51,409 (57.4%)	2,212 (56.4%)
Former	32,201 (36.0%)	1,446 (36.8%)
Current	5,963 (6.7%)	267 (6.8%)
Alcohol intake (g/week) ^b	96 (32, 192)	96 (16, 176)
Townsend Deprivation Index ^c	-1.7 (2.8)	-1.7 (2.8)
Educational attainment (years)	15.3 (4.7)	15.2 (4.7)
Employed	54,297 (60.6%)	2,321 (59.1%)
Self-reported health		
Good	53,736 (60.0%)	2,384 (60.7%)
Excellent	19,336 (21.6%)	810 (20.6%)
Fair	14,166 (15.8%)	620 (15.8%)
Poor	2,335 (2.6%)	111 (2.8%)
Diet quality		
Intermediate	44,894 (50.1%)	1,977 (50.4%)
Poor	28,791 (32.1%)	1,229 (31.3%)
Good	15,888 (17.7%)	719 (18.3%)
Anti-hypertensive medication use ^d	15,584 (17.4%)	755 (19.2%)
Body mass index (kg/m ²) ^d	26.7 (4.5)	26.7 (4.5)
Body mass index > 30 kg/m ²	17,346 (19.4%)	745 (19.0%)
Systolic blood pressure (mmHg) ^d	137 (18)	136 (18)
Systolic blood pressure > 140 mmHg	34,957 (39.1%)	1,486 (37.9%)
Diastolic blood pressure (mmHg) ^d	82 (10)	81 (10)

Diastolic blood pressure > 90 mmHg	16,819 (18.8%)	709 (18.1%)
Diabetes	2,980 (3.3%)	123 (3.1%)
<p>a- Represents self-reported "ethnic background." Race classification of "Other" defined as self-report of a race other than Asian, Black, Mixed, or White.</p> <p>b- Can be converted to standard US drinks per week by dividing by 14g</p> <p>c- The Townsend Deprivation Index is a measure of material deprivation standardized by geographic area. Numerically greater values indicate more deprivation. The sample range is -6.2 to 10.1, with values around -2 and -1 indicating somewhat less deprivation compared to average based on geographic location.</p> <p>d- Indicates covariates which may lie on the causal pathway between physical activity and cardiovascular events and are included only in a secondary additionally adjusted model (see eTable 9).</p> <p>SD = standard deviation</p>		

eTable 5. Associations between physical activity pattern and incident cardiovascular disease across varying MVPA thresholds

Activity Pattern	Atrial fibrillation ^a (n=87,034)			Myocardial infarction ^a (n=87,484)			Heart failure ^a (n=88,871)			Stroke ^a (n=88,308)		
	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c
Activity threshold: 25th percentile (≥115.2 minutes MVPA/week)^d												
Inactive (n=21,614) ^e	1.00 (0.93-1.08)	1.00	1.00	1.00 (0.90-1.11)	1.00	1.00	1.00 (0.91-1.10)	1.00	1.00	1.00 (0.88-1.13)	1.00	1.00
Weekend warrior (n=45,738) ^e	0.79 (0.75-0.84)	1.85	1.67	0.72 (0.66-0.78)	2.12	1.88	0.63 (0.58-0.68)	2.55	2.30	0.76 (0.69-0.84)	1.96	1.67
Regular activity (n=22,221) ^e	0.79 (0.73-0.86)	1.85	1.60	0.64 (0.56-0.72)	2.50	2.12	0.63 (0.55-0.71)	2.55	2.17	0.79 (0.68-0.91)	1.85	1.77
Activity threshold: Guideline-based (≥150 minutes MVPA/week)^d												
Inactive (n=30,228) ^e	1.00 (0.94-1.07)	1.00	1.00	1.00 (0.91-1.10)	1.00	1.00	1.00 (0.92-1.09)	1.00	1.00	1.00 (0.90-1.11)	1.00	1.00
Weekend warrior (n=37,872) ^e	0.78 (0.74-0.83)	1.88	1.70	0.73 (0.67-0.80)	2.08	1.81	0.62 (0.56-0.68)	2.61	2.30	0.79 (0.71-0.88)	1.85	1.53
Regular activity (n=21,473) ^e	0.81 (0.74-0.88)	1.77	1.53	0.65 (0.57-0.74)	2.45	2.04	0.64 (0.56-0.73)	2.50	2.08	0.83 (0.72-0.97)	1.70	1.21
Activity threshold: 50th percentile (≥230.4 minutes MVPA/week)^d												
Inactive (n=44,156) ^e	1.00 (0.95-1.06)	1.00	1.00	1.00 (0.92-1.08)	1.00	1.00	1.00 (0.93-1.08)	1.00	1.00	1.00 (0.90-1.11)	1.00	1.00
Weekend warrior (n=26,473) ^e	0.82 (0.76-0.88)	1.74	1.53	0.77 (0.69-0.86)	1.92	1.60	0.68 (0.61-0.77)	2.30	1.92	0.89 (0.79-1.02)	1.50	1.00
Regular activity (n=18,944) ^e	0.84 (0.76-0.91)	1.67	1.43	0.72 (0.62-0.82)	2.12	1.74	0.68 (0.59-0.79)	2.30	1.85	0.87 (0.74-1.02)	1.56	1.00
Activity threshold: 75th percentile (≥403.2 minutes MVPA/week)^d												
Inactive (n=66,783) ^e	1.00 (0.95-1.05)	1.00	1.00	1.00 (0.93-1.07)	1.00	1.00	1.00 (0.93-1.07)	1.00	1.00	1.00 (0.92-1.09)	1.00	1.00
Weekend warrior (n=11,115) ^e	0.87 (0.78-0.98)	1.56	1.16	0.92 (0.78-1.08)	1.39	1.00	0.81 (0.67-0.96)	1.77	1.25	0.86 (0.70-1.06)	1.60	1.00
Regular activity (n=11,675) ^e	0.82 (0.72-0.92)	1.74	1.39	0.80 (0.67-0.95)	1.81	1.29	0.75 (0.62-0.90)	2.00	1.46	0.74 (0.59-0.92)	2.04	1.39
<p>a- Number of events as follows: atrial fibrillation n=2,642, myocardial infarction n=1,229, heart failure n=1,275, stroke n=840</p> <p>b- Hazard ratios obtained using the floating absolute risks method</p> <p>c- E-values estimate the strength of association with exposure and outcome of potential unmeasured confounders required to nullify the observed effect. E_{point} denotes E-value for the point estimate and E_{null} denotes the E-value for the confidence interval bound closest to the null.</p> <p>d- Inactive defined as weekly MVPA below the specified threshold. All models adjusted for age, sex, race, tobacco use, Townsend Deprivation Index, alcohol use, diet quality, educational attainment, employment status, and self-reported health.</p> <p>e- Subgroup sample sizes reflect the overall sample prior to disease-specific exclusions for prevalent conditions (e.g., prior to removal of prevalent atrial fibrillation for the incident atrial fibrillation analysis).</p>												

eTable 6. Associations between physical activity pattern and incident cardiovascular disease using activity threshold of ≥ 150 minutes of MVPA per week (guideline-based)

Activity Pattern	Atrial fibrillation ^a (n=87,034)			Myocardial infarction ^a (n=87,484)			Heart failure ^a (n=88,871)			Stroke ^a (n=88,308)		
	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c
Weekend warrior defined as $\geq 50\%$ MVPA over 1-2 days^d												
Inactive (n=30,228) ^e	1.00 (0.94-1.07)	1.00	1.00	1.00 (0.91-1.10)	1.00	1.00	1.00 (0.92-1.09)	1.00	1.00	1.00 (0.90-1.11)	1.00	1.00
Weekend warrior (n=37,872) ^e	0.78 (0.74-0.83)	1.88	1.70	0.73 (0.67-0.80)	2.08	1.81	0.62 (0.56-0.68)	2.61	2.30	0.79 (0.71-0.88)	1.85	1.53
Regular activity (n=21,473) ^e	0.81 (0.74-0.88)	1.77	1.53	0.65 (0.57-0.74)	2.45	2.04	0.64 (0.56-0.73)	2.50	2.08	0.83 (0.72-0.97)	1.70	1.21
Weekend warrior defined as $\geq 75\%$ MVPA over 1-2 days^d												
Inactive (n=30,228) ^e	1.00 (0.94-1.06)	1.00	1.00	1.00 (0.91-1.10)	1.00	1.00	1.00 (0.92-1.09)	1.00	1.00	1.00 (0.90-1.12)	1.00	1.00
Weekend warrior (n=6,352) ^e	0.77 (0.66-0.89)	1.92	1.50	0.75 (0.61-0.93)	2.00	1.36	0.53 (0.41-0.68)	3.18	2.30	0.70 (0.53-0.91)	2.21	1.43
Regular activity (n=52,993) ^e	0.79 (0.75-0.84)	1.85	1.67	0.70 (0.64-0.75)	2.21	2.00	0.64 (0.59-0.69)	2.50	2.26	0.81 (0.74-0.89)	1.77	1.50
Weekend warrior defined as $\geq 50\%$ MVPA over 1-2 consecutive days^d												
Inactive (n=30,228) ^e	1.00 (0.94-1.06)	1.00	1.00	1.00 (0.91-1.10)	1.00	1.00	1.00 (0.92-1.09)	1.00	1.00	1.00 (0.89-1.12)	1.00	1.00
Weekend warrior (n=25,270) ^e	0.80 (0.75-0.87)	1.81	1.56	0.74 (0.66-0.82)	2.04	1.74	0.62 (0.55-0.70)	2.61	2.21	0.74 (0.56-0.97)	2.04	1.21
Regular activity (n=34,075) ^e	0.78 (0.73-0.84)	1.88	1.67	0.68 (0.61-0.75)	2.30	2.00	0.62 (0.56-0.69)	2.61	2.26	0.80 (0.71-0.90)	1.81	1.46
Weekend warrior defined as $\geq 50\%$ MVPA over 1-2 weekend days^d												
Inactive (n=30,228) ^e	1.00 (0.94-1.07)	1.00	1.00	1.00 (0.91-1.09)	1.00	1.00	1.00 (0.92-1.09)	1.00	1.00	1.00 (0.89-1.12)	1.00	1.00
Weekend warrior (n=7,820) ^e	0.81 (0.70-0.94)	1.77	1.32	0.77 (0.63-0.95)	1.92	1.29	0.67 (0.54-0.85)	2.35	1.63	0.86 (0.66-1.13)	1.60	1.00
Regular activity (n=51,526) ^e	0.79 (0.75-0.83)	1.85	1.70	0.69 (0.64-0.75)	2.26	2.00	0.62 (0.57-0.67)	2.61	2.35	0.80 (0.73-0.88)	1.81	1.53

a- Number of events as follows: atrial fibrillation n=2,642, myocardial infarction n=1,229, heart failure n=1,275, stroke n=840
b- Hazard ratios obtained using the floating absolute risks method
c- E-values estimate the strength of association with exposure and outcome of potential unmeasured confounders required to nullify the observed effect. E_{point} denotes E-value for the point estimate and E_{null} denotes the E-value for the confidence interval bound closest to the null.
d- Inactive defined as weekly MVPA below the specified threshold. All models adjusted for age, sex, race, tobacco use, Townsend Deprivation Index, alcohol use, diet quality, educational attainment, employment status, and self-reported health.
e- Subgroup sample sizes reflect the overall sample prior to disease-specific exclusions for prevalent conditions (e.g., prior to removal of prevalent atrial fibrillation for the incident atrial fibrillation analysis).

eTable 7. Associations between physical activity pattern and incident cardiovascular disease using activity threshold of ≥ 230.4 minutes of MVPA per week (sample median)

Activity Pattern	Atrial fibrillation ^a (n=87,034)			Myocardial infarction ^a (n=87,484)			Heart failure ^a (n=88,871)			Stroke ^a (n=88,308)		
	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c
Weekend warrior defined as $\geq 50\%$ MVPA over 1-2 days^d												
Inactive (n=44,156) ^e	1.00 (0.95-1.06)	1.00	1.00	1.00 (0.92-1.08)	1.00	1.00	1.00 (0.93-1.08)	1.00	1.00	1.00 (0.90-1.11)	1.00	1.00
Weekend warrior (n=26,473) ^e	0.82 (0.76-0.88)	1.74	1.53	0.77 (0.69-0.86)	1.92	1.60	0.68 (0.61-0.77)	2.30	1.92	0.89 (0.79-1.02)	1.50	1.00
Regular activity (n=18,945) ^e	0.84 (0.76-0.91)	1.67	1.43	0.72 (0.62-0.82)	2.12	1.74	0.68 (0.59-0.79)	2.30	1.85	0.87 (0.74-1.02)	1.56	1.00
Weekend warrior defined as $\geq 75\%$ MVPA over 1-2 days^d												
Inactive (n=44,156) ^e	1.00 (0.95-1.06)	1.00	1.00	1.00 (0.92-1.08)	1.00	1.00	1.00 (0.93-1.08)	1.00	1.00	1.00 (0.91-1.10)	1.00	1.00
Weekend warrior (n=3,722) ^e	0.93 (0.78-1.10)	1.36	1.00	0.80 (0.61-1.05)	1.81	1.00	0.66 (0.49-0.89)	2.40	1.50	0.80 (0.56-1.13)	1.81	1.00
Regular activity (n=41,696) ^e	0.81 (0.77-0.86)	1.77	1.60	0.74 (0.68-0.81)	2.04	1.77	0.69 (0.62-0.76)	2.26	1.96	0.89 (0.80-0.99)	1.50	1.11
Weekend warrior defined as $\geq 50\%$ MVPA over 1-2 consecutive days^d												
Inactive (n=44,156) ^e	1.00 (0.95-1.06)	1.00	1.00	1.00 (0.92-1.08)	1.00	1.00	1.00 (0.93-1.08)	1.00	1.00	1.00 (0.90-1.11)	1.00	1.00
Weekend warrior (n=16,918) ^e	0.86 (0.79-0.95)	1.60	1.29	0.79 (0.69-0.91)	1.85	1.43	0.73 (0.63-0.84)	2.08	1.67	0.92 (0.78-1.08)	1.39	1.00
Regular activity (n=28,499) ^e	0.80 (0.74-0.86)	1.81	1.60	0.72 (0.64-0.80)	2.12	1.81	0.66 (0.58-0.74)	2.40	2.04	0.86 (0.71-0.98)	1.96	1.16
Weekend warrior defined as $\geq 50\%$ MVPA over 1-2 weekend days^d												
Inactive (n=44,156) ^e	1.00 (0.95-1.03)	1.00	1.00	1.00 (0.92-1.09)	1.00	1.00	1.00 (0.92-1.08)	1.00	1.00	1.00 (0.90-1.11)	1.00	1.00
Weekend warrior (n=5,421) ^e	0.86 (0.72-1.03)	1.60	1.00	0.88 (0.69-1.13)	1.53	1.00	0.76 (0.57-1.01)	1.96	100	1.05 (0.77-1.42)	1.28	1.00
Regular activity (n=39,997) ^e	0.75 (0.71-0.80)	2.00	1.81	0.73 (0.67-0.80)	2.08	1.81	0.68 (0.62-0.74)	2.30	2.04	0.87 (0.78-0.96)	1.56	1.25

a- Number of events as follows: atrial fibrillation n=2,642, myocardial infarction n=1,229, heart failure n=1,275, stroke n=840
b- Hazard ratios obtained using the floating absolute risks method
c- E-values estimate the strength of association with exposure and outcome of potential unmeasured confounders required to nullify the observed effect. E_{point} denotes E-value for the point estimate and E_{null} denotes the E-value for the confidence interval bound closest to the null.
d- Inactive defined as weekly MVPA below the specified threshold. All models adjusted for age, sex, race, tobacco use, Townsend Deprivation Index, alcohol use, diet quality, educational attainment, employment status, and self-reported health.
e- Subgroup sample sizes reflect the overall sample prior to disease-specific exclusions for prevalent conditions (e.g., prior to removal of prevalent atrial fibrillation for the incident atrial fibrillation analysis).

eTable 8. Associations between physical activity pattern and incident cardiovascular disease with 2-year blanking period after accelerometer

Activity Pattern	Atrial fibrillation ^a (n=85,902)			Myocardial infarction ^a (n=86,705)			Heart failure ^a (n=88,146)			Stroke ^a (n=87,624)		
	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c
Activity threshold: Guideline-based (≥150 minutes MVPA/week)^d												
Inactive (n=30,228) ^e	1.00 (0.93-1.08)	1.00	1.00	1.00 (0.90-1.11)	1.00	1.00	1.00 (0.91-1.10)	1.00	1.00	1.00 (0.88-1.14)	1.00	1.00
Weekend warrior (n=37,872) ^e	0.77 (0.72-0.83)	1.92	1.70	0.69 (0.63-0.77)	2.26	1.92	0.63 (0.57-0.71)	2.55	2.17	0.85 (0.75-0.96)	1.63	1.25
Regular activity (n=21,473) ^e	0.81 (0.73-0.89)	1.77	1.50	0.61 (0.52-0.71)	2.66	2.17	0.60 (0.51-0.70)	2.72	2.21	0.90 (0.76-1.07)	1.46	1.00
Activity threshold: 50th percentile (≥230.4 minutes MVPA/week)^d												
Inactive (n=44,156) ^e	1.00 (0.94-1.07)	1.00	1.00	1.00 (0.91-1.10)	1.00	1.00	1.00 (0.92-1.09)	1.00	1.00	1.00 (0.89-1.12)	1.00	1.00
Weekend warrior (n=26,473) ^e	0.82 (0.75-0.89)	1.74	1.50	0.70 (0.61-0.80)	2.21	1.81	0.72 (0.63-0.82)	2.12	1.74	0.97 (0.83-1.12)	1.21	1.00
Regular activity (n=18,944) ^e	0.84 (0.75-0.93)	1.67	1.36	0.66 (0.56-0.78)	2.40	1.88	0.64 (0.54-0.76)	2.50	1.96	0.92 (0.76-1.11)	1.39	1.00
<p>a- Number of events as follows: atrial fibrillation n=1,943, myocardial infarction n=807, heart failure n=777, stroke n=548</p> <p>b- Hazard ratios obtained using the floating absolute risks method</p> <p>c- E-values estimate the strength of association with exposure and estimate the potential unmeasured confounders required to nullify the observed effect. E_{point} denotes E-value for the point estimate and E_{null} denotes the E-value for the confidence interval bound closest to the null.</p> <p>d- Inactive defined as weekly MVPA below the specified threshold. All models adjusted for age, sex, race, tobacco use, Townsend Deprivation Index, alcohol use, diet quality, educational attainment, employment status, and self-reported health.</p> <p>e- Subgroup sample sizes reflect the overall sample prior to disease-specific exclusions for prevalent conditions (e.g., prior to removal of prevalent atrial fibrillation for the incident atrial fibrillation analysis).</p>												

eTable 9. Associations between physical activity pattern and incident cardiovascular disease in models additionally adjusted for body mass index, blood pressure, anti-hypertensive use, and diabetes

Activity Pattern	Atrial fibrillation ^a (n=86,814)			Myocardial infarction ^a (n=87,262)			Heart failure ^a (n=88,646)			Stroke ^a (n=88,089)		
	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c
Activity threshold: Guideline-based (≥150 minutes MVPA/week)^d												
Inactive (n=30,102) ^e	1.00 (0.93-1.07)	1.00	1.00	1.00 (0.91-1.10)	1.00	1.00	1.00 (0.91-1.10)	1.00	1.00	1.00 (0.89-1.12)	1.00	1.00
Weekend warrior (n=37,804) ^e	0.86 (0.81-0.92)	1.60	1.39	0.79 (0.72-0.86)	1.85	1.60	0.70 (0.64-0.78)	2.21	1.88	0.81 (0.73-0.91)	1.77	1.43
Regular activity (n=21,438) ^e	0.91 (0.83-0.99)	1.43	1.11	0.71 (0.62-0.81)	2.17	1.77	0.75 (0.66-0.85)	2.00	1.63	0.87 (0.75-1.01)	1.56	1.00
Activity threshold: 50th percentile (≥230.4 minutes MVPA/week)^d												
Inactive (n=44,005) ^e	1.00 (0.94-1.06)	1.00	1.00	1.00 (0.91-1.10)	1.00	1.00	1.00 (0.92-1.09)	1.00	1.00	1.00 (0.90-1.11)	1.00	1.00
Weekend warrior (n=26,428) ^e	0.90 (0.83-0.96)	1.46	1.25	0.82 (0.74-0.92)	1.74	1.39	0.78 (0.69-0.87)	1.88	1.56	0.92 (0.81-1.05)	1.39	1.00
Regular activity (n=18,911) ^e	0.93 (0.85-1.01)	1.36	1.00	0.77 (0.67-0.89)	1.92	1.50	0.80 (0.69-0.92)	1.81	1.39	0.90 (0.77-1.06)	1.46	1.00
<p>a- Number of events as follows: atrial fibrillation n=2,628, myocardial infarction n=1,224, heart failure n=1,261, stroke n=835</p> <p>b- Hazard ratios obtained using the floating absolute risks method</p> <p>c- E-values estimate the strength of association with exposure and estimate the outcome of potential unmeasured confounders required to nullify the observed effect. E_{point} denotes E-value for the point estimate and E_{null} denotes the E-value for the confidence interval bound closest to the null.</p> <p>d- Inactive defined as weekly MVPA below the specified threshold. All models adjusted for age, sex, race, tobacco use, Townsend Deprivation Index, alcohol use, diet quality, educational attainment, employment status, self-reported health, body mass index, systolic blood pressure, diastolic blood pressure, anti-hypertensive use, and diabetes</p> <p>e- Subgroup sample sizes reflect the overall sample prior to disease-specific exclusions for prevalent conditions (e.g., prior to removal of prevalent atrial fibrillation for the incident atrial fibrillation analysis).</p>												

eTable 10. Associations between physical activity pattern and incident cardiovascular disease with individuals with incomplete accelerometer data assumed to be inactive

Activity Pattern	Atrial fibrillation ^a (n=90,853)			Myocardial infarction ^a (n=91,305)			Heart failure ^a (n=92,762)			Stroke ^a (n=92,196)		
	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c	Hazard ratio (95% CI) ^b	E _{point} ^c	E _{null} ^c
Activity threshold: Guideline-based (≥150 minutes MVPA/week)^d												
Inactive (n=34,153) ^e	1.00 (0.94-1.06)	1.00	1.00	1.00 (0.92-1.09)	1.00	1.00	1.00 (0.92-1.09)	1.00	1.00	1.00 (0.90-1.11)	1.00	1.00
Weekend warrior (n=37,872) ^e	0.78 (0.73-0.83)	1.88	1.70	0.75 (0.69-0.82)	2.00	1.74	0.64 (0.58-0.70)	2.50	2.21	0.79 (0.71-0.88)	1.85	1.53
Regular activity (n=21,473) ^e	0.81 (0.74-0.88)	1.77	1.60	0.67 (0.59-0.76)	2.35	1.96	0.66 (0.58-0.75)	2.40	2.00	0.88 (0.72-0.97)	1.53	1.21
Activity threshold: 50th percentile (≥230.4 minutes MVPA/week)^d												
Inactive (n=48,081) ^e	1.00 (0.95-1.06)	1.00	1.00	1.00 (0.93-1.08)	1.00	1.00	1.00 (0.93-1.08)	1.00	1.00	1.00 (0.91-1.10)	1.00	1.00
Weekend warrior (n=26,473) ^e	0.81 (0.75-0.87)	1.77	1.56	0.78 (0.70-0.87)	1.88	1.56	0.69 (0.62-0.78)	2.26	1.88	0.89 (0.78-1.01)	1.50	1.00
Regular activity (n=18,944) ^e	0.83 (0.76-0.91)	1.70	1.43	0.73 (0.63-0.83)	2.08	1.70	0.70 (0.60-0.80)	2.21	1.81	0.86 (0.73-1.02)	1.60	1.00
<p>a- Number of events as follows: atrial fibrillation n=2,780, myocardial infarction n=1,284, heart failure n=1,331, stroke n=882</p> <p>b- Hazard ratios obtained using the floating absolute risks method</p> <p>c- E-values estimate the strength of association with exposure and estimate the strength of association with exposure and outcome of potential unmeasured confounders required to nullify the observed effect. E_{point} denotes E-value for the point estimate and E_{null} denotes the E-value for the confidence interval bound closest to the null.</p> <p>d- Inactive defined as weekly MVPA below the specified threshold. All models adjusted for age, sex, race, tobacco use, Townsend Deprivation Index, alcohol use, diet quality, educational attainment, employment status, and self-reported health.</p> <p>e- Subgroup sample sizes reflect the overall sample prior to disease-specific exclusions for prevalent conditions (e.g., prior to removal of prevalent atrial fibrillation for the incident atrial fibrillation analysis).</p>												

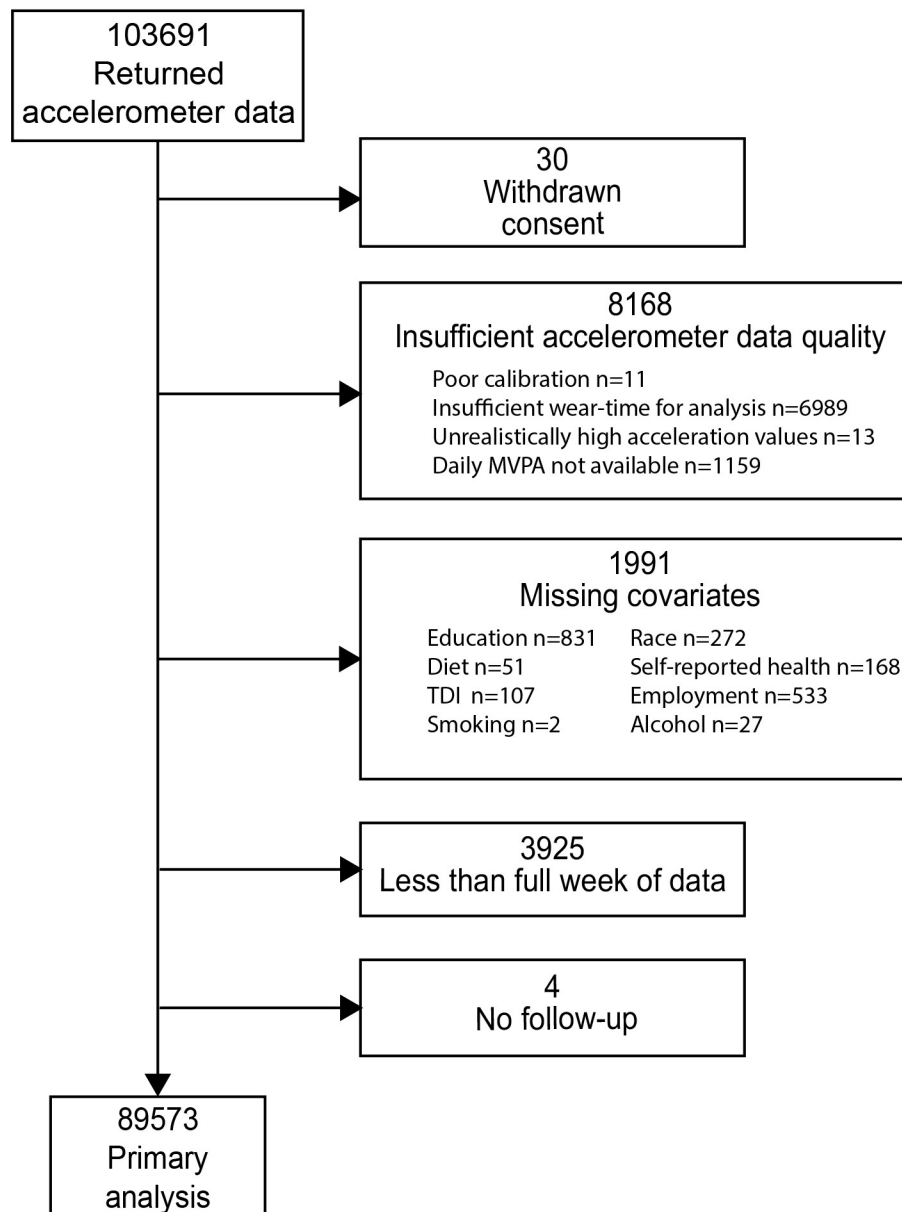
eTable 11. Associations between physical activity pattern and incident cardiovascular disease among individuals with complete wear time (no imputed values)

Activity Pattern ^a	Atrial fibrillation ^b (n=65,076)			Myocardial infarction ^b (n=65,428)			Heart failure ^b (n=66,509)			Stroke ^b (n=66,087)		
	Hazard ratio (95% CI) ^c	E _{point} ^d	E _{null} ^d	Hazard ratio (95% CI) ^c	E _{point} ^d	E _{null} ^d	Hazard ratio (95% CI) ^c	E _{point} ^d	E _{null} ^d	Hazard ratio (95% CI) ^c	E _{point} ^d	E _{null} ^d
Activity threshold: Guideline-based (≥150 minutes MVPA/week)^e												
Inactive (n=22,222) ^f	1.00 (0.93-1.08)	1.00	1.00	1.00 (0.90-1.12)	1.00	1.00	1.00 (0.91-1.10)	1.00	1.00	1.00 (0.88-1.14)	1.00	1.00
Weekend warrior (n=29,381) ^f	0.78 (0.73-0.87)	1.88	1.56	0.76 (0.68-0.84)	1.96	1.67	0.62 (0.55-0.69)	2.61	2.26	0.86 (0.75-0.97)	1.60	1.21
Regular activity (n=15,445) ^f	0.79 (0.72-0.87)	1.85	1.56	0.67 (0.58-0.78)	2.35	1.96	0.61 (0.52-0.72)	2.66	2.12	0.88 (0.74-1.04)	1.53	1.00
Activity threshold: 50th percentile (≥230.4 minutes MVPA/week)^e												
Inactive (n=32,704) ^f	1.00 (0.94-1.07)	1.00	1.00	1.00 (0.92-1.10)	1.00	1.00	1.00 (0.92-1.09)	1.00	1.00	1.00 (0.89-1.12)	1.00	1.00
Weekend warrior (n=20,596) ^f	0.83 (0.76-0.90)	1.70	1.46	0.81 (0.72-0.92)	1.77	1.39	0.68 (0.60-0.78)	2.30	1.88	0.96 (0.83-1.11)	1.25	1.00
Regular activity (n=13,748) ^f	0.84 (0.75-0.93)	1.67	1.36	0.74 (0.64-0.88)	2.04	1.53	0.66 (0.56-0.79)	2.40	1.85	0.91 (0.76-1.10)	1.43	1.00
<p>a- Complete wear time defined as ≥20 hours of true (i.e., non-imputed) wear time on each of the seven days of accelerometer monitoring</p> <p>b- Number of events as follows: atrial fibrillation n=2,041, myocardial infarction n=912, heart failure n=968, stroke n=649</p> <p>c- Hazard ratios obtained using the floating absolute risks method</p> <p>d- E-values estimate the strength of association with exposure and outcome of potential unmeasured confounders required to nullify the observed effect. E_{point} denotes E-value for the point estimate and E_{null} denotes the E-value for the confidence interval bound closest to the null.</p> <p>e- Inactive defined as weekly MVPA below the specified threshold. All models adjusted for age, sex, race, tobacco use, Townsend Deprivation Index, alcohol use, diet quality, educational attainment, employment status, and self-reported health.</p> <p>f- Subgroup sample sizes reflect the overall sample prior to disease-specific exclusions for prevalent conditions (e.g., prior to removal of prevalent atrial fibrillation for the incident atrial fibrillation analysis).</p>												

eTable 12. Associations between physical activity pattern and incident musculoskeletal disease

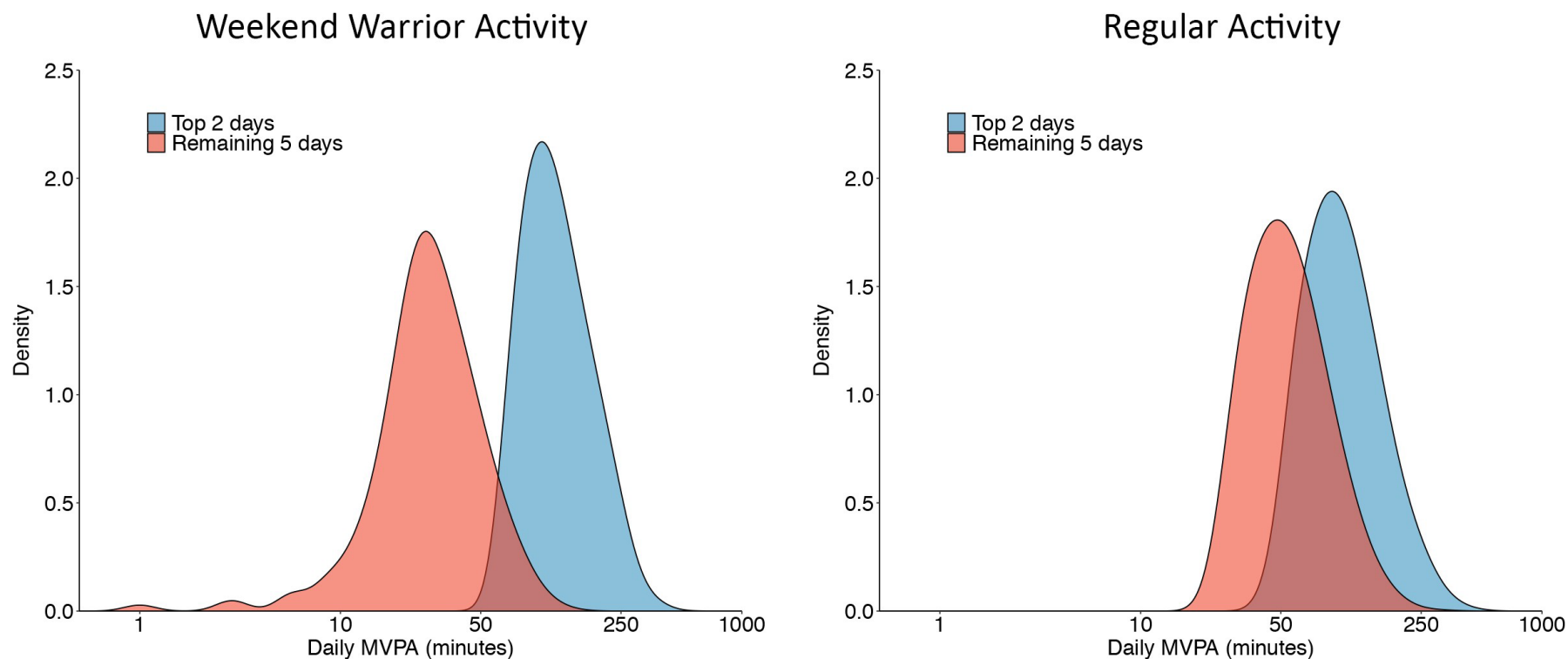
Activity Pattern	Hazard ratio (95% CI) ^a	E _{point} ^c	E _{null} ^c
Activity threshold: Guideline-based (≥150 minutes MVPA/week)			
Inactive (n=21,737) ^e	1.00 (0.96-1.04)	1.00	1.00
Weekend warrior (n=28,846) ^e	0.87 (0.84-0.91)	1.56	1.43
Regular activity (n=16,638) ^e	0.89 (0.85-0.94)	1.50	1.32
Activity threshold: 50th percentile (≥230.4 minutes MVPA/week)			
Inactive (n=32,327) ^e	1.00 (0.96-1.04)	1.00	1.00
Weekend warrior (n=20,214) ^e	0.91 (0.87-0.96)	1.43	1.25
Regular activity (n=14,680) ^e	0.93 (0.88-0.98)	1.36	1.16
<p>a- Hazard ratios obtained using the floating absolute risks method b- Number of incident musculoskeletal events: 6,736 c- E-values estimate the strength of association with exposure and outcome of potential unmeasured confounders required to nullify the observed effect. E_{point} denotes E-value for the point estimate and E_{null} denotes the E-value for the confidence interval bound closest to the null. d- Inactive defined as weekly MVPA below the specified threshold. All models adjusted for age, sex, race, tobacco use, Townsend Deprivation Index, alcohol use, diet quality, educational attainment, employment status, and self-reported health. e- Subgroup sample sizes reflect the analysis sample (i.e., individuals without prevalent musculoskeletal disease at the time of accelerometer wear)</p>			

eFigure 1. Study flow



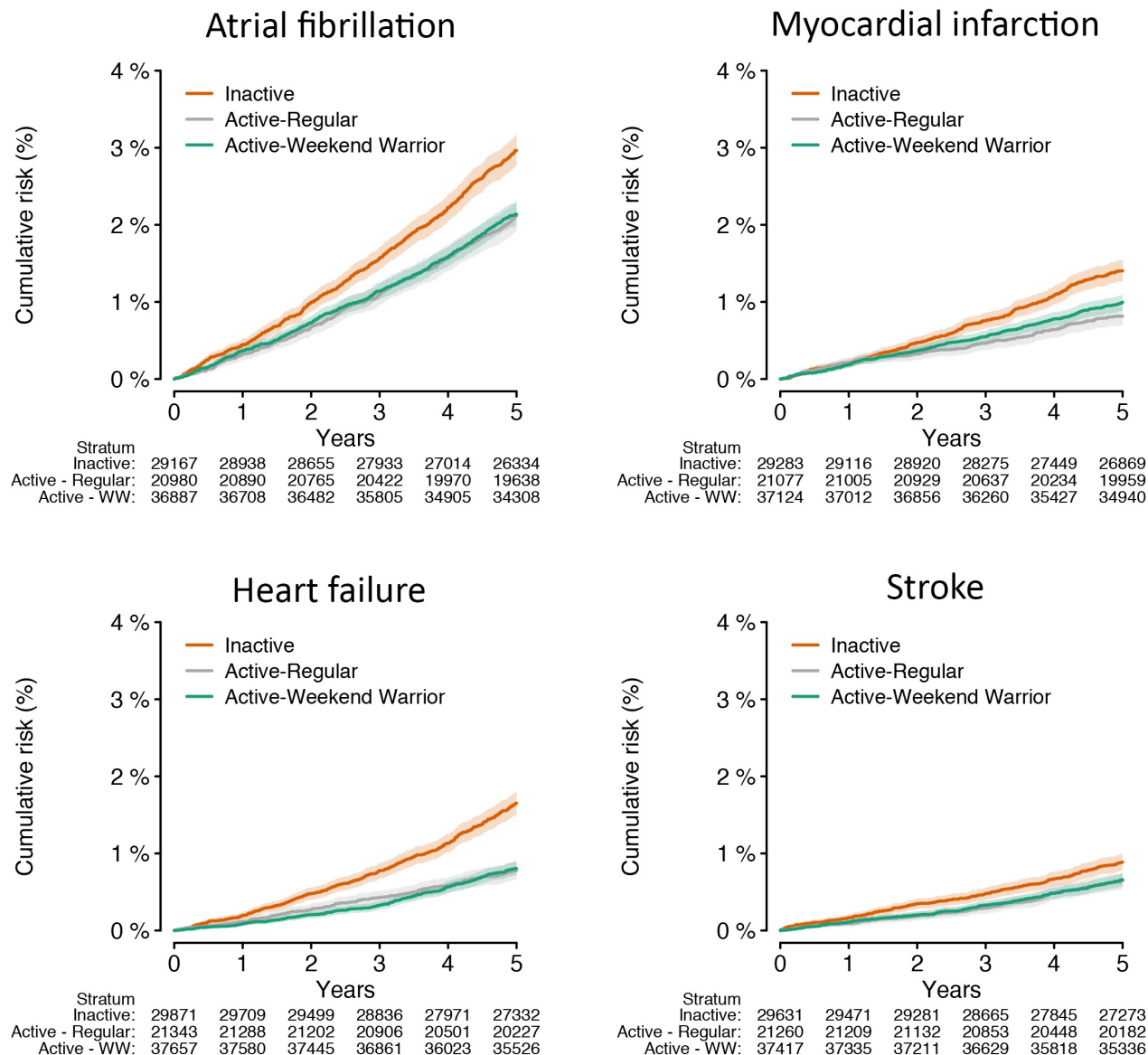
Depicted is an overview of the composition of the primary analysis sample. Of 103,691 individuals submitting accelerometer data, individuals were sequentially excluded for withdrawn consent, insufficient accelerometer data quality, missing covariates, less than a full week of data, and absence of clinical follow-up data (see **eMethods**), resulting in 89,573 individuals in the primary analysis.

eFigure 2. Distribution of moderate-to-vigorous physical activity on top two days versus remaining five days among active individuals based on guideline-based threshold of ≥ 230.4 minutes of MVPA per week (sample median)



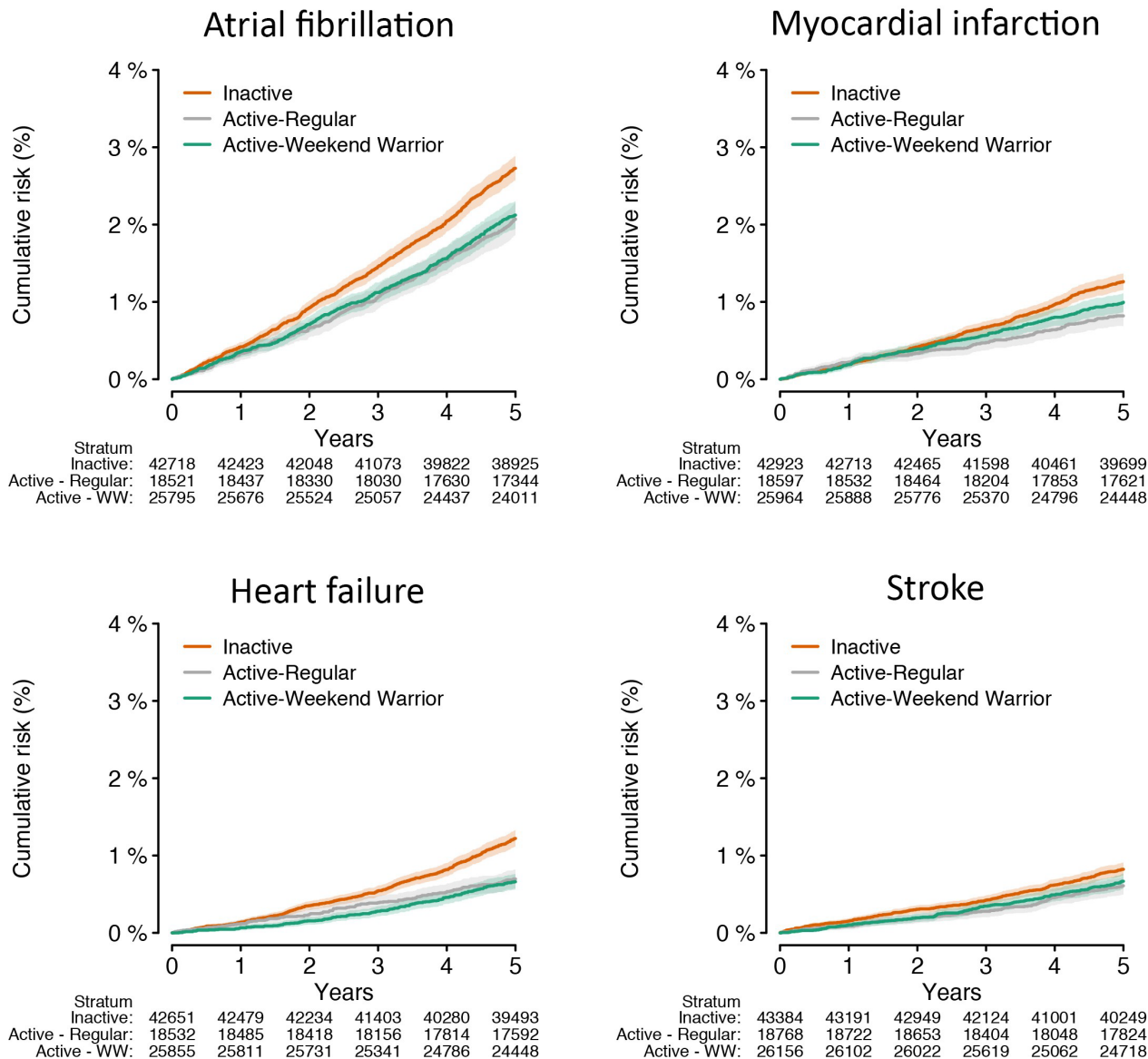
Depicted is the distribution of daily moderate-to-vigorous physical activity (MVPA) on the two most active days of the week (blue), versus the remaining five days (red), among individuals above the sample median (i.e., ≥ 230.4 minutes MVPA over the week, $n=45,417$). Individuals meeting criteria for weekend warrior activity (i.e., $\geq 50\%$ of total MVPA achieved in 1-2 days) are shown in panel A. Active individuals not meeting criteria for weekend warrior activity (“Regular”) are shown in panel B. A total of 144 individuals in the weekend warrior group (0.5%) with a value of zero for the remaining five days were attributed one minute of MVPA to accommodate logarithmic x-axis scale.

eFigure 3. Cumulative risk of incident cardiovascular events stratified by activity pattern using an activity threshold of ≥ 150 minutes of MVPA per week (guideline-based)



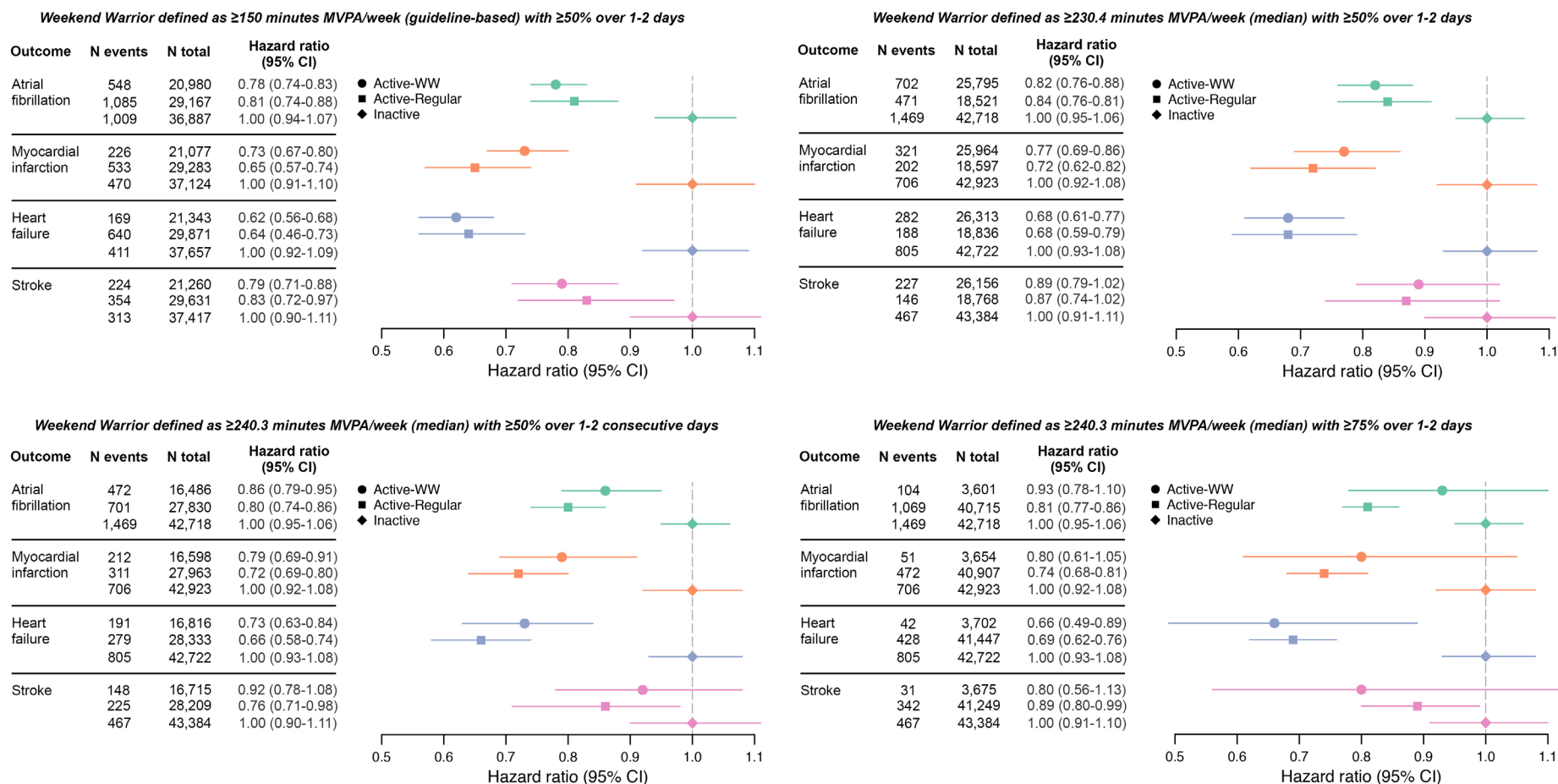
Plots depicting the crude cumulative risk of incident cardiovascular events, stratified by accelerometer-derived activity pattern (Inactive = orange, Active-Weekend Warrior [Active-WW] = green, Active-Regular = gray). Each plot utilizes the guideline-based threshold for activity (≥ 150 minutes MVPA/week). Person-time in each stratum is summarized as follows: Atrial fibrillation Inactive: 6.2 (5.7, 6.8), Active-Weekend Warrior: 6.3 (5.7, 6.8), Active-Regular: 6.3 (5.8, 6.9); Myocardial infarction Inactive: 6.3 (5.7, 6.8), Active-Weekend Warrior: 6.3 (5.8, 6.8), Active-Regular: 6.4 (5.8, 6.9); Heart failure Inactive: 6.3 (5.7, 6.8), Active-Weekend Warrior: 6.2 (5.8, 6.8), Active-Regular: 6.4 (5.8, 6.9); Stroke Inactive: 6.3 (5.7, 6.8), Active-Weekend Warrior: 6.3 (5.8, 6.8), Active-Regular: 6.4 (5.8, 6.9). The number at-risk over time is depicted below each plot. MVPA = moderate-to-vigorous physical activity. Shaded regions depict 95% confidence intervals.

eFigure 4. Cumulative risk of incident cardiovascular events stratified by activity pattern using an activity threshold of ≥ 230.4 minutes of MVPA per week (sample median)



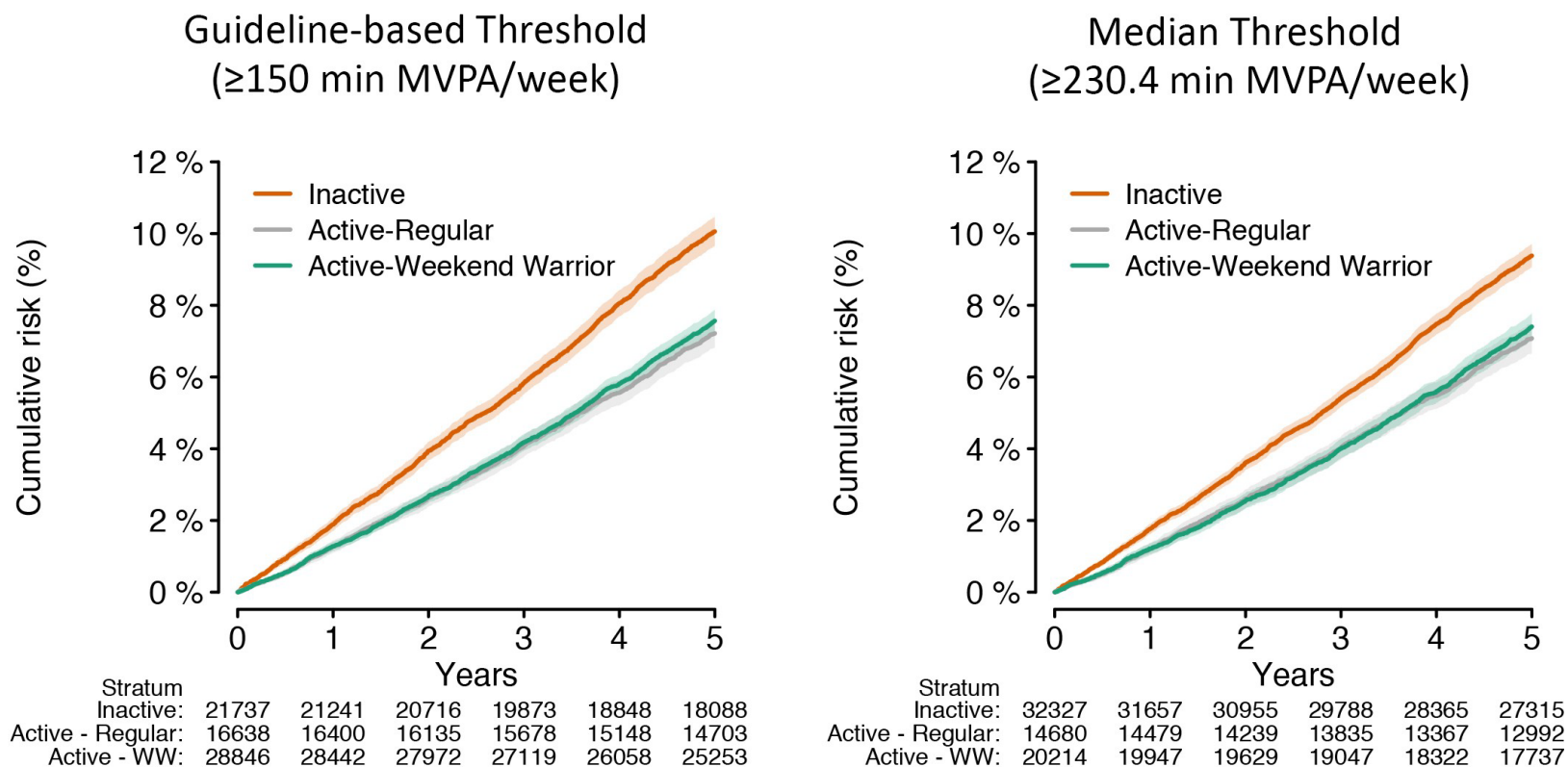
Plots depicting the crude cumulative risk of incident cardiovascular events, stratified by accelerometer-derived activity pattern (Inactive = orange, Active-Weekend Warrior [Active-WW] = green, Active-Regular = gray). Each plot utilizes the median threshold for activity (≥ 230.4 minutes MVPA/week). Person-time in each stratum is summarized as follows: Atrial fibrillation Inactive: 6.3 (5.7, 6.8), Active-Weekend Warrior: 6.3 (5.7, 6.8), Active-Regular: 6.3 (5.8, 6.9); Myocardial infarction Inactive: 6.3 (5.7, 6.8), Active-Weekend Warrior: 6.3 (5.8, 6.8), Active-Regular: 6.4 (5.8, 6.9); Heart failure Inactive: 6.3 (5.7, 6.8), Active-Weekend Warrior: 6.3 (5.8, 6.8), Active-Regular: 6.4 (5.8, 6.9); Stroke Inactive: 6.3 (5.7, 6.8), Active-Weekend Warrior: 6.3 (5.8, 6.8), Active-Regular: 6.4 (5.8, 6.9). The number at-risk over time is depicted below each plot. MVPA = moderate-to-vigorous physical activity. Shaded regions depict 95% confidence intervals.

eFigure 5. Associations between physical activity pattern and incident cardiovascular disease utilizing alternative definitions of weekend warrior activity



Depicted are forest plots depicting multivariable-adjusted associations between activity pattern and incident atrial fibrillation (green), myocardial infarction (orange), heart failure (blue), and stroke (purple). Additional methods of classifying the Active-WW pattern are compared. Three activity groups are compared: Inactive (reference, diamonds), Active-Weekend Warrior (“Active-WW”, circles), and Active-Regular (squares). Each plot depicts a different threshold used to define Inactive (see title above each plot). Bars depict 95% confidence intervals.

eFigure 6. Cumulative risk of incident musculoskeletal conditions stratified by activity pattern



Plots depicting the crude cumulative risk of incident musculoskeletal conditions, stratified by accelerometer-derived activity pattern (Inactive = orange, Active-Weekend Warrior [Active-WW] = green, Active-Regular = gray). The left plot utilizes the guideline-based threshold (≥ 150 minutes MVPA/week⁸⁻¹⁰) while the right plot utilizes the median threshold for activity (≥ 230.4 minutes MVPA/week) while. Person-time in each stratum is summarized as follows: Guideline-based Inactive: 6.1 (5.5, 6.7), Guideline-based Active-Regular: 6.3 (5.6, 6.9), Guideline-based Active-Weekend Warrior: 6.2 (5.6, 6.8), Median Inactive: 6.2 (5.5, 6.8), Median Active-Regular: 6.3 (5.7, 6.9), Median Active-Weekend Warrior: 6.2 (5.6, 6.8). The number at-risk over time is depicted below each plot. MVPA = moderate-to-vigorous physical activity. Shaded regions depict 95% confidence intervals.

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