Supplementary table 1. Definitions for all site-specific cancers according to ICD diagnosis.

Type of cancer	ICD-8	ICD-9	ICD-10
Prostate	185	185	C61
Bronchi and lung	162	162	C34
Colon	153	153	C18
Rectum	154	154	C19 & C20
Malignant skin	172-173	172-173	C43-C44
Non-Hodgkin's lymphoma	200	200	C82-C86
Renal	189	189	C64
Head-Neck	140-149	140-149	C00-C14 C30-C32
Central nervous system	191-192	191-192, 194D & 194E	C70- C72, C75.1- C75.3
Pancreas	157	157	C25
Bladder	188	188	C67
Esophagus	150	150	C15
Stomach	151	151	C16
Liver, bile ducts and gallbladder	155-156	155-156. Not 155C	C22-C24. Not C22.9.
Myeloma	203	203	C90
Thyroid gland	193	193	C73
Hodgkin's lymphoma	201	201	C81
Leukemia	204-207	204-208	C91-C95

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Supplementary table 2. Absolute numbers for outcomes, in total and by level of fitness at conscription.

Outcome	Low (N=368,971)	Moderate (N=523,970)	High (N=343,648)	Total (N=1,236,589)
	N (%)	N (%)	N (%)	N (%)
Any cancer	28,430 (7.8 %)	30,485 (5.9 %)	25,202 (7.4 %)	84,117 (6.9 %)
Malignant skin	8,547 (2.3 %)	10,303 (2.0 %)	9,440 (2.8 %)	28,290 (2.3 %)
Bronchi and lung	1,181 (0.3 %)	857 (0.2 %)	529 (0.2 %)	2,567 (0.2 %)
Head & Neck	1,359 (0.4 %)	1,242 (0.2 %)	943 (0.3 %)	3,544 (0.3 %)
Central nervous system	942 (0.3 %)	1,046 (0.2 %)	852 (0.3 %)	2,840 (0.2 %)
Thyroid gland	262 (0.1 %)	327 (0.1 %)	233 (0.1 %)	822 (0.1 %)
GASTROINTESTINAL CANCERS				
Esophagus	436 (0.1 %)	333 (0.1 %)	240 (0.1 %)	1,009 (0.1 %)
Stomach	503 (0.1 %)	458 (0.1 %)	331 (0.1 %)	1,292 (0.1 %)
Liver, bile ducts and gallbladder	703 (0.2 %)	557 (0.1 %)	333 (0.1 %)	1,593 (0.1 %)
Pancreas	693 (0.2 %)	661 (0.1 %)	505 (0.2 %)	1,859 (0.2 %)
Colon	1,610 (0.4 %)	1,598 (0.3 %)	1,093 (0.3 %)	4,301 (0.4 %)
Rectum	1,128 (0.3 %)	1,152 (0.2 %)	857 (0.3 %)	3,137 (0.3 %)
UROLOGICAL CANCERS				
Prostate	6,766 (1.9 %)	6,745 (1.3 %)	6,168 (1.8 %)	19,679 (1.6 %)
Bladder	1,164 (0.3 %)	1,071 (0.2 %)	835 (0.2 %)	3,070 (0.3 %)
Kidney	874 (0.2 %)	834 (0.2 %)	586 (0.2 %)	2.294 (0.2 %)
HEMATOLOGICAL CANCERS				
Myeloma	378 (0.1 %)	441 (0.1 %)	394 (0.1 %)	1,213 (0.1 %)
Non-Hodgkin's lymphoma	1,050 (0.3 %)	1,228 (0.2 %)	972 (0.3 %)	3,250 (0.3 %)
Hodgkin's lymphoma	324 (0.1 %)	407 (0.1 %)	307 (0.1 %)	1,038 (0.1 %)
Leukemia	881 (0.2 %)	1,007 (0.2 %)	842 (0.3 %)	2,730 (0.2 %)

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Supplementary table 3. CRF at conscription and incidence of cancer (n=1,005,911), muscle strength included as covariate.

| Cancer site | n cases | Cardiorespiratory fitness (ref = low) | | |
| | | Moderate | High | |
		HR (95% CI)	HR (95% CI)	P
Any cancer site	62,748	1.01 (0.99-1.03)	1.04 (1.02-1.07)	<0.001
Malignant skin	22,405	1.12 (1.08-1.15)	1.29 (1.24-1.34)	<0.001
Bronchi and lung	1,596	0.82 (0.73-0.92)	0.58 (0.51-0.67)	<0.001
Head & Neck	2,666	0.84 (0.77-0.92)	0.78 (0.70-0.86)	<0.001
Central nervous system	1,926	0.94 (0.84-1.05)	1.01 (0.90-1.14)	0.75
Thyroid gland	643	1.05 (0.86-1.27)	1.06 (0.86-1.31)	0.71
GASTROINTESTINAL CANCERS				
Esophagus	680	0.75 (0.63-0.90)	0.59 (0.48-0.72)	<0.001
Stomach	880	0.86 (0.73-1.01)	0.75 (0.63-0.90)	<0.001
Pancreas	1,257	0.92 (0.81-1.06)	0.89 (0.77-1.19)	0.001
Liver, bile ducts and gallbladder	1,090	0.81 (0.71-0.94)	0.59 (0.50-0.69)	<0.001
Colon	3,143	0.94 (0.87-1.03)	0.84 (0.76-0.92)	<0.001
Rectum	2,281	1.03 (0.93-1.14)	0.96 (0.86-1.07)	0.09
UROLOGICAL CANCERS				
Prostate	14,021	1.03 (0.98-1.07)	1.04 (1.00-1.09)	0.001
Kidney	1,724	0.91 (0.82-1.02)	0.80 (0.70-0.91)	<0.001
Bladder	2,217	0.92 (0.84-1.02)	0.89 (0.80-0.99)	0.01
HEMATOLOGICAL CANCERS				
Leukemia	1,910	1.05 (0.94-1.17)	1.11 (0.98-1.25)	0.46
Myeloma	895	1.15 (0.98-1.36)	1.21 (1.01-1.44)	0.03
Hodgkin's lymphoma	794	0.91 (0.77-1.08)	0.99 (0.82-1.19)	0.39
Non-Hodgkin's lymphoma	2,471	1.05 (0.95-1.16)	1.09 (0.98-1.21)	0.06

Covariates included in analysis: CRF, muscle strength, site of conscription, year of conscription, parental education, age at conscription, and BMI. CRF=cardiorespiratory fitness. HR=Hazard ratio

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Supplementary table 4. Interaction analyses between CRF and BMI for the association with site-specific cancer, as well as hazard ratios for the association between CRF and site-specific cancer, stratified by BMI (N=1,078,000).

Cancer site	Interaction with BMI	Underweight/normal weight	Overweight/obesity
	P	HR (95% CI)	HR (95% CI)
Malignant skin, low CRF	0.33	Ref	0.85 (0.78-0.92)
Moderate/high CRF		1.2 (1.17-1.24)	1.07 (1.01-1.14)
Bronchi and lung, low CRF	0.08	Ref	0.96 (0.71-1.29)
Moderate/high CRF		0.67 (0.60-0.74)	0.88 (0.72-1.08)
Head & Neck, low CRF	0.64	Ref	1.19 (0.97-1.46)
Moderate/high CRF		0.85 (0.79-0.93)	0.95 (0.81-1.12)
Central nervous system, low CRF	0.73	Ref	1.07 (0.85-1.35)
Moderate/high CRF		0.98 (0.88-1.08)	1.00 (0.82-1.21)
Thyroid gland, low CRF	0.23	Ref	0.99 (0.66-1.48)
Moderate/high CRF		0.99 (0.83-1.18)	1.32 (0.97-1.81)
GASTROINTESTINAL CANCERS			
Esophagus, low CRF	0.86	Ref	2.19 (1.55-3.09)
Moderate/high CRF		0.71 (0.60-0.83)	1.49 (1.14-1.95)
Stomach, low CRF	0.46	Ref	2.18 (1.62-2.94)
Moderate/high CRF		0.86 (0.74-1.00)	1.63 (1.28-2.07)
Pancreas, low CRF	0.37	Ref	1.37 (1.01-1.88)
Moderate/high CRF		0.88 (0.78-1.00)	1.43 (1.16-1.77)
Liver, bile ducts and gallbladder, low CRF	0.25	Ref	1.77 (1.34-1.32)
Moderate/high CRF		0.76 (0.66-0.86)	1.08 (0.85-1.37)
Colon, low CRF	0.35	Ref	1.40 (1.17-1.67)
Moderate/high CRF		0.90 (0.83-0.97)	1.13 (0.98-1.31)
Rectum, low CRF	0.27	Ref	1.35 (1.07-1.69)
Moderate/high CRF		0.99 (0.91-1.09)	1.14 (0.96-1.36)
UROLOGICAL CANCERS			
Prostate, low CRF	0.74	Ref	0.88 (0.77-1.01)
Moderate/high CRF		1.07 (1.03-1.11)	0.92 (0.85-0.99)
Kidney, low CRF	0.09	Ref	2.00 (1.61-2.49)
Moderate/high CRF		0.91 (0.82-1.01)	1.42 (1.18-1.71)
Bladder, low CRF	0.01	Ref	1.37 (1.08-1.73)
Moderate/high CRF		0.96 (0.88-1.05)	0.88 (0.72-1.07)
HEMATOLOGICAL CANCERS			
Leukemia, low CRF	0.78	Ref	1.35 (1.06-1.71)
Moderate/high CRF		1.09 (0.98-1.21)	1.53 (1.28-1.83)
Myeloma, low CRF	0.21	Ref	1.43 (0.97-2.10)
Moderate/high CRF		1.25 (1.08-1.46)	1.33 (1.00-1.76)
Hodgkin's lymphoma, low CRF	0.11	Ref	1.72 (1.28-2.30)
Moderate/high CRF		1.02 (0.87-1.21)	1.27 (0.95-1.70)
Non-Hodgkin's lymphoma, low CRF	0.007	Ref	1.53 (1.26-1.86)
Moderate/high CRF		1.13 (1.03-1.24)	1.22 (1.02-11.45)

Cox regression models including an interaction term between dichotomized CRF (low vs. moderate/high) and dichotomized BMI category (underweight/normal weight vs. overweight/obesity), with likelihood ratio testing of the interaction. Adjusted for site, year, and age at conscription as well as parental level of education.
CRF=cardiorespiratory fitness. BMI=Body mass index. HR=Hazard ratio

Supplementary Table 5: Cardiorespiratory fitness at conscription and incidence of cancer (n = 1,077,042)

Cancer site	n cases	Cardiorespiratory fitness (ref = low)		p-value for linear trend[a]	P for cognitive ability
		Moderate	High		
		HR (95% CI)	HR (95% CI)		
Any cancer site	64,541	1.01 (0.99-1.03)	1.05 (1.03-1.07)	<0.001	<0.001
Malignant skin	23,045	1.10 (1.07-1.14)	1.25 (1.21-1.30)	<0.001	<0.001
Bronchi and lung	1,634	0.84 (0.75-0.95)	0.63 (0.55-0.72)	<0.001	<0.001
Head & Neck	2,734	0.88 (0.80-0.96)	0.84 (0.76-0.92)	<0.001	0.001
Central nervous system	2,012	0.94 (0.84-1.04)	1.00 (0.89-1.13)	0.85	0.60
Thyroid gland	683	1.01 (0.84-1.21)	1.01 (0.82-1.23)	0.86	0.57
GASTROINTESTINAL CANCERS					
Esophagus	688	0.79 (0.66-0.94)	0.68 (0.56-0.83)	<0.001	<0.001
Stomach	902	0.89 (0.76-1.04)	0.83 (0.69-0.98)	<0.001	0.002
Pancreas	1,278	0.93 (0.82-1.07)	0.92 (0.79-1.06)	0.001	0.003
Liver, bile ducts and gallbladder	1,109	0.86 (0.75-0.99)	0.66 (0.56-0.77)	<0.001	<0.001
Colon	3,220	0.95 (0.87-1.03)	0.83 (0.76-0.91)	<0.001	0.07
Rectum	2,335	1.03 (0.93-1.13)	0.97 (0.87-1.08)	0.09	0.02
UROLOGICAL CANCERS					
Prostate	14,214	1.03 (0.99-1.07)	1.04 (1.00-1.09)	<0.001	<0.001
Kidney	1,752	0.94 (0.74-1.05)	0.84 (0.74-0.95)	<0.001	<0.001
Bladder	2,259	0.94 (0.85-1.04)	0.93 (0.83-1.03)	0.08	0.001
HEMATOLOGICAL CANCERS					
Leukemia	1,987	1.05 (0.94-1.17)	1.14 (1.02-1.29)	0.18	0.99
Myeloma	915	1.15 (0.98-1.35)	1.21 (1.02-1.44)	0.03	0.96
Hodgkin's lymphoma	842	0.95 (0.80-1.12)	1.02 (0.85-1.23)	0.74	0.33
Non-Hodgkin's lymphoma	2,556	1.07 (0.97-1.17)	1.12 (1.01-1.24)	0.03	0.05

Adjusted for year, site, age, body mass index, parental education at conscription, and cognitive ability at conscription where indicated. [a]Linear trends tested utilizing 9-level cardiorespiratory fitness. HR=Hazard ratio

Supplementary table 6. Baseline demographics at conscription for the full target population and the analytic sample.

	Sample with information on parental education (N=1,078,000)	Study sample (N=1,226,478)	Full target population (N=1,811,024
Year for conscription, mean (SD)	1985 (9)	1984 (9)	1987 (10)
Age at conscription, years, mean (SD)	18.3 (0.6)	18.3 (0.7)	18.3 (0.7)
Years of follow-up, mean (SD)	32.2 (9.7)	32.8 (10.3)	30.1 (11)
Height, cm, mean (SD)	179 (7)	179 (7)	179 (7)
Missing, n (%)	0	0	145,576 (8%)
Body Mass Index (BMI), kg/m^2, mean (SD)	21.8 (2.8)	21.7 (2.8)	21.9 (3.1)
Missing	0	0	145,800 (8%)
BMI-category			
Underweight	77,361 (7 %)	92,267 (8 %)	129,584 (8%)
Normal weight	882,598 (82 %)	1,002,221 (82 %)	1,327,781 (80%)
Overweight	101,383 (9 %)	113,253 (9 %)	169,551 (10%)
Obesity	16,658 (2 %)	18,737 (2 %)	38,308 (2%)
Missing	0	0	145,800 (8%)
CRF category			
Low	308,974 (29 %)	365,874 (30 %)	367,544 (30%)
Moderate	468,677 (43 %)	519,652 (42 %)	520,899 (42%)
High	300,349 (28 %)	340,952 (28 %)	341,488 (28%)
Missing	0	0	581,093 (32%)
Muscle strength category			
Low	101,444 (10 %)	120,089 (10 %)	182,617 (12%)
Moderate	582,047 (58 %)	673,495 (58 %)	857,958 (58%)
High	322,420 (32 %)	357,933 (31 %)	451,080 (30%)
Missing	72,089 (7 %)	74,961 (6 %)	319,369 (18%)
Systolic blood pressure, mean (SD)	128 (11)	128 (11)	129 (11)
Missing	3,361 (0.3 %)	3,439 (0.3 %)	226,701 (13%)
Diastolic blood pressure, mean (SD)	67 (10)	67 (10)	68 (10)
Missing	4,298 (0.4 %)	4,414 (0.4 %)	227,988 (13%)
Diabetes mellitus	381 (0.04 %)	453 (0.04 %)	4,605 (0.25%)
Hypertension	1,343 (0.12 %)	1,586 (0.13 %)	2,661 (0.15 %)
Cardiovascular disease	20,769 (1.9 %)	23,901 (2.0 %)	41,417 (2.3%)
Kidney disease	921 (0.09 %)	1,062 (0.09 %)	1,984 (0.11%)
Alcohol abuse	1,510 (0.14 %)	2,300 (0.19 %)	3,517 (0.19%)
Substance abuse	2,258 (0.21 %)	3,329 (0.27 %)	5,756 (0.32%)
Parental education			
Compulsory school	299,188 (28 %)	299,188 (28 %)	397,934 (24%)
High school-≤2 years university	602,461 (56 %)	602,461 (56%)	942,996 (58%)
>2 years university	176,351 (16 %)	176,351 (16 %)	287,345 (18%)
Missing	0	148,478 (12 %)	182,749 (10%)

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Supplementary table 7. Sensitivity analysis in population excluding all individuals with preexisting diabetes, hypertension, cardiovascular disease, kidney disease, alcohol abuse, or substance abuse at baseline (n = 1,052,447)

Cancer site	n cases	Cardiorespiratory fitness (ref = low)		p-value for linear trend[a]
		Moderate	High	
		HR (95% CI)	HR (95% CI)	
Any cancer site	62,692	1.02 (1.00-1.04)	1.06 (1.04-1.08)	<0.001
Malignant skin	22,434	1.13 (1.09-1.16)	1.31 (1.26-1.35)	<0.001
Bronchi and lung	1,578	0.81 (0.72-0.91)	0.58 (0.51-0.67)	<0.001
Head & Neck	2,658	0.86 (0.79-0.95)	0.81 (0.74-0.90)	<0.001
Central nervous system	1,958	0.93 (0.84-1.04)	0.99 (0.88-1.12)	0.95
Thyroid gland	664	1.02 (0.84-1.23)	1.03 (0.84-1.26)	0.97
GASTROINTESTINAL CANCERS				
Esophagus	664	0.76 (0.64-0.91)	0.62 (0.50-0.75)	<0.001
Stomach	862	0.88 (0.75-1.03)	0.80 (0.67-0.95)	<0.001
Pancreas	1,228	0.93 (0.81-1.06)	0.87 (0.76-1.01)	<0.001
Liver, bile ducts and gallbladder	1,012	0.86 (0.74-0.99)	0.63 (0.53-0.74)	<0.001
Colon	3,136	0.94 (0.87-1.02)	0.83 (0.75-0.91)	<0.001
Rectum	2,275	1.02 (0.92-1.12)	0.94 (0.84-1.04)	0.02
UROLOGICAL CANCERS				
Prostate	13,835	1.05 (1.01-1.09)	1.07 (1.03-1.12)	<0.001
Kidney	1,700	0.92 (0.82-1.02)	0.79 (0.70-0.90)	<0.001
Bladder	2,192	0.94 (0.85-1.04)	0.91 (0.82-1.02)	0.04
HEMATOLOGICAL CANCERS				
Leukemia	1,930	1.05 (0.94-1.17)	1.15 (1.02-1.29)	0.11
Myeloma	880	1.16 (0.98-1.37)	1.26 (1.06-1.49)	0.01
Hodgkin's lymphoma	817	0.96 (0.81-1.13)	1.01 (0.84-1.22)	0.68
Non-Hodgkin's lymphoma	2,481	1.06 (0.96-1.17)	1.12 (1.01-1.24)	0.03

Adjusted for year, site, age, body mass index, and parental education at conscription. [a]Linear trends tested utilizing 9-level CRF. CRF=cardiorespiratory fitness. HR=Hazard ratio

Supplementary table 8. Analyses in the full study sample, not adjusted for parental level of education (n = 1,226,478)

Cancer site	n cases	Cardiorespiratory fitness (ref = low)		
		Moderate	High	*p-value for linear trend[a]*
		HR (95% CI)	HR (95% CI)	
Any cancer site	84,117	1.03 (1.01-1.04)	1.06 (1.04-1.08)	<0.001
Malignant skin	28,290	1.14 (1.10-1.17)	1.34 (1.30-1.38)	<0.001
Bronchi and lung	2,567	0.79 (0.72-0.87)	0.58 (0.52-0.64)	<0.001
Head & Neck	3,544	0.88 (0.81-0.95)	0.82 (0.75-0.89)	<0.001
Central nervous system	2,840	0.96 (0.88-1.05)	1.03 (0.94-1.14)	0.24
Thyroid gland	822	1.02 (0.87-1.21)	1.01 (0.84-1.21)	0.85
GASTROINTESTINAL CANCERS				
Esophagus	1,009	0.77 (0.67-0.89)	0.63 (0.54-0.74)	<0.001
Stomach	1,292	0.90 (0.79-1.02)	0.77 (0.67-0.89)	<0.001
Pancreas	1,859	0.97 (0.87-1.08)	0.86 (0.77-0.97)	<0.001
Liver, bile ducts and gallbladder	1,593	0.79 (0.71-0.89)	0.56 (0.49-0.65)	<0.001
Colon	4,301	0.96 (0.90-1.03)	0.81 (0.75-0.88)	<0.001
Rectum	3,137	1.01 (0.93-1.10)	0.91 (0.83-1.00)	0.002
UROLOGICAL CANCERS				
Prostate	19,679	1.07 (1.03-1.11)	1.11 (1.07-1.15)	<0.001
Kidney	2,294	0.91 (0.83-1.00)	0.76 (0.69-0.85)	<0.001
Bladder	3,070	0.94 (0.87-1.03)	0.88 (0.80-0.96)	<0.001
HEMATOLOGICAL CANCERS				
Leukemia	2,730	1.05 (0.96-1.15)	1.11 (1.00-1.22)	0.17
Myeloma	1,213	1.13 (0.98-1.30)	1.21 (1.05-1.40)	0.004
Hodgkin's lymphoma	1,038	1.00 (0.86-1.16)	1.11 (0.94-1.30)	0.48
Non-Hodgkin's lymphoma	3,250	1.06 (0.97-1.15)	1.09 (1.00-1.20)	0.06

Adjusted for year, site, age, and body mass index at conscription. [a]Linear trends tested utilizing 9-level CRF. CRF=cardiorespiratory fitness. HR=Hazard ratio