

Supplementary material

Cardiorespiratory Fitness, Muscular Strength and Obesity in Adolescence and Later Chronic Disability Due to Cardiovascular Disease: a Cohort Study of One Million Men

Hanna Henriksson, Pontus Henriksson, Per Tynelius, Mattias Ekstedt, Daniel Berglind, Idoia

Labayen, Jonatan R Ruiz, Carl Lavie, Francisco B Ortega

Corresponding author: Hanna Henriksson, Department of Medical and Health Sciences, Linköping University, Linköping, Sweden. E-mail: hanna.henriksson@liu.se, Telephone. +46730263858

Table S1. Cases and ICD codes of disability pension due to cardiovascular diseases.

Disease classification	n	ICD 10	ICD 9	ICD 8
Cerebrovascular diseases	1222	I60-I69	430-438	430-438
Ischemic heart diseases	346	I20-I25	410-414	410-414
Heart failure	147	I50	428	

Table S2. Associations of cardiorespiratory fitness with disability due to cerebrovascular disease and ischemic heart disease which are additionally adjusted for smoking and risky alcohol consumption. Results are from a sub-sample of adolescents with smoking and alcohol consumption data at conscription¹ (n = 34 966). Data are presented as hazard ratios with 95% confidence intervals.

DP cause	Fitness level²	Basic adjustment³	Basic adjustment +strength	Basic adjustment +strength +smoking +alcohol
Cerebrovascular disease	Unfit	0.62 (0.46, 0.84)	0.63 (0.47, 0.86)	0.66 (0.49, 0.89)
	Fit	Reference	Reference	Reference
Ischemic heart disease	Unfit	0.56 (0.37, 0.83)	0.59 (0.39, 0.89)	0.67 (0.45, 1.01)
	Fit	Reference	Reference	Reference

¹ These sensitivity analyses were performed in a subset of adolescents who performed conscription between 1969 and 1973 since data regarding smoking and risky alcohol consumption only were collected during these years. These adolescents had complete data of cardiorespiratory fitness, BMI, basic confounders as well as data on smoking (no smoking, 1-5, 6-10, 11-20, > 20 cigarettes per day) and risky alcohol consumption (yes vs. no) as described in previous papers from the Swedish Military Service Conscription Registry (e.g Rabiee R et al. Journal of epidemiology and community health 2015; 69(3): 266-71).

² Please note that cardiorespiratory fitness were available as stanine (STANDARD NINE) scores as described previously (e.g. Rabiee R et al. Journal of epidemiology and community health 2015; 69(3): 266-71). Using the stanine score, we categorized the adolescents as unfit (stanine scores 1-4, 20.2 % of adolescents) and fit (stanine scores 5-9, 79.8 % of adolescents) since we had too few observation to divide the sample into quintiles.

³ Basic adjusted models included conscription year, conscription center, age at conscription, childhood socioeconomic position and BMI as covariates.

Table S3. Robustness to unmeasured confounding (calculated as E-values) for associations of cardiorespiratory fitness with later disability pension due to cardiovascular diseases¹.

Disability pension cause	For Effect Estimate²	For CI Limit³
Cerebrovascular diseases	6.60	4.85
Ischemic heart diseases	17.67	6.35
Heart failure	7.15	2.21

CI, confidence interval

¹ E-values were calculated as described by VanderWeele and Ding (Ann Intern Med. 2017;167:268-274).

² The E-value for the Effect Estimate refers to the minimum strength of the relationship (on the risk scale) that an unmeasured confounder needs to have with both cardiorespiratory fitness and the disability outcome to fully explain away the observed relationship

³ The E-value for the 95 % confidence interval limit closest to the null shows the minimum strength of the relationship (on the risk scale) that an unmeasured confounder needs to have with both cardiorespiratory fitness and the disability outcome to make the confidence interval of the observed relationship to also include 1 (i.e. the null value).

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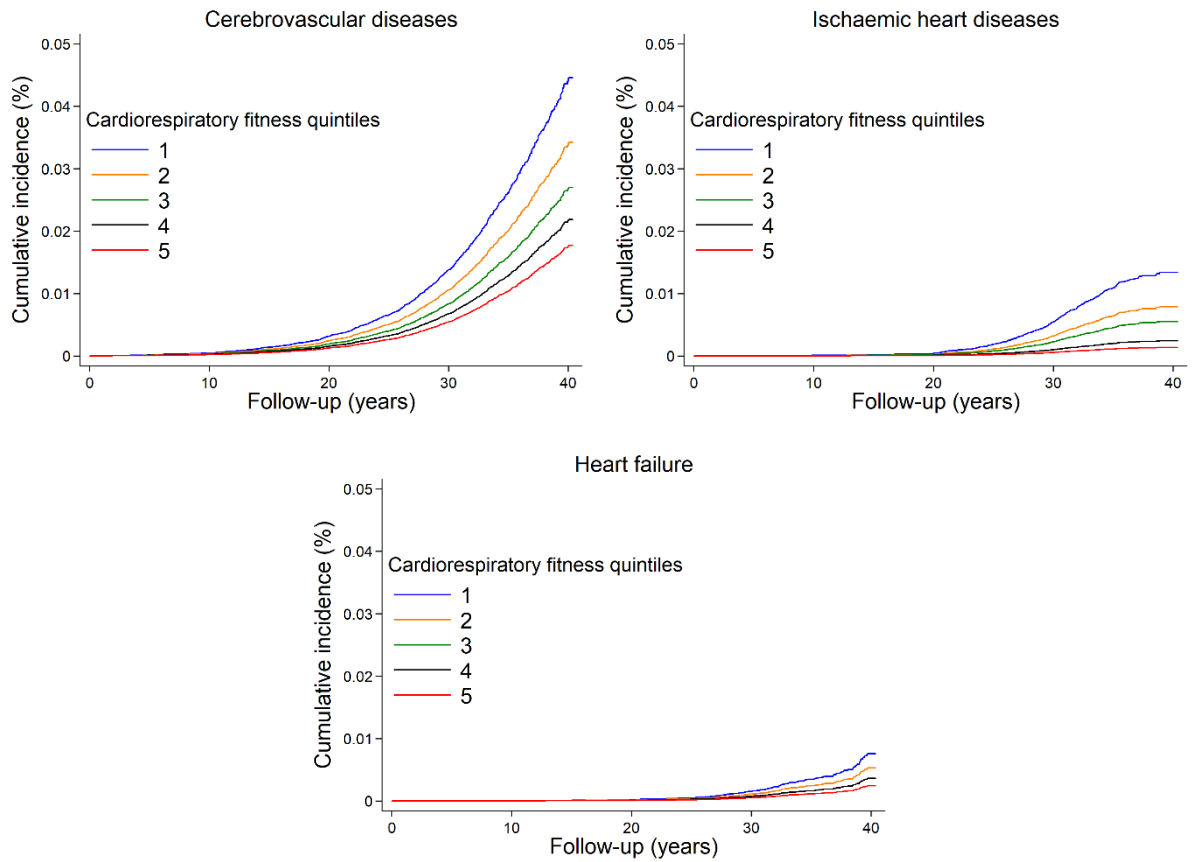


Figure S1. Cumulative incidences (%) of disability pension due to cardiovascular diseases by cardiorespiratory fitness category estimated with adjusted Cox regression models at the population averages of the covariates. Models were adjusted for age, center, year of conscription, childhood socioeconomic position, BMI and muscular strength at conscription

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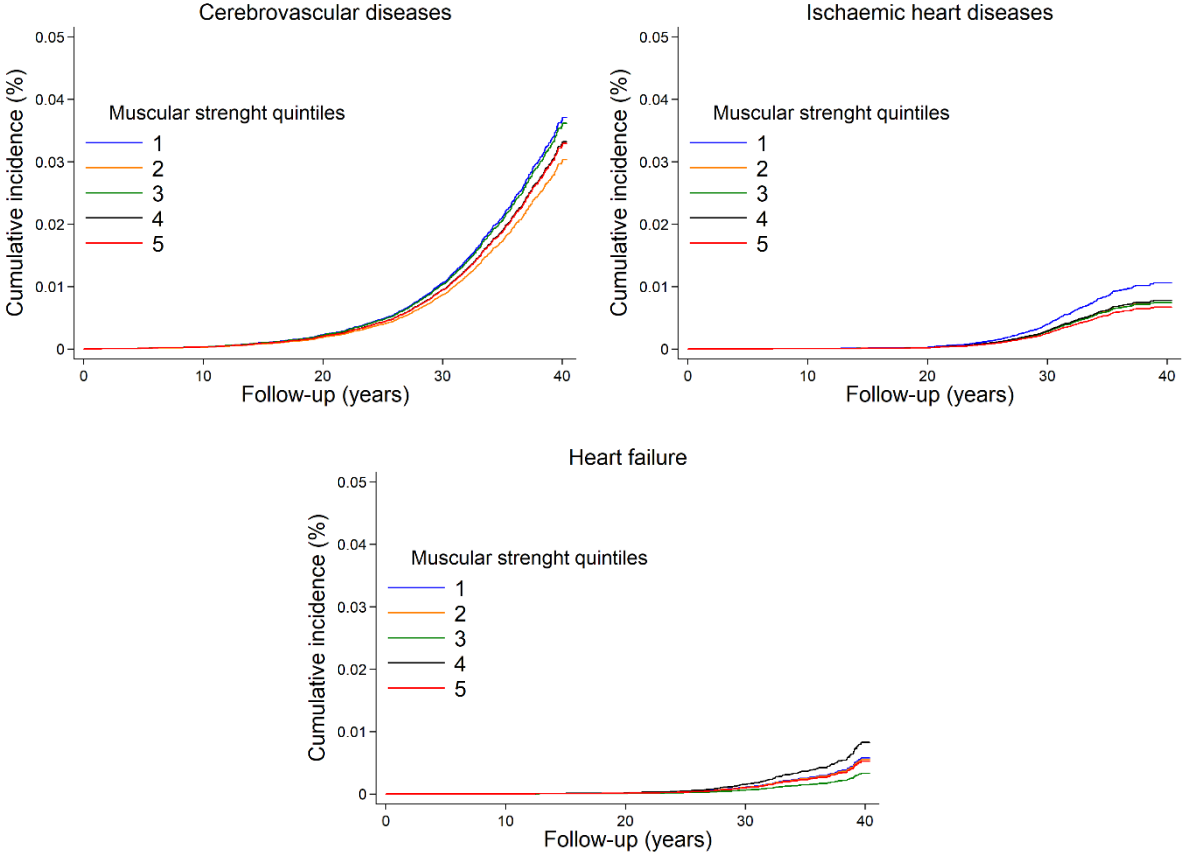


Figure S2. Cumulative incidences (%) of disability pension due to cardiovascular diseases by muscular strength category estimated with adjusted Cox regression models at the population averages of the covariates. Models were adjusted for age, center, year of conscription, childhood socioeconomic position, BMI and cardiorespiratory fitness at conscription

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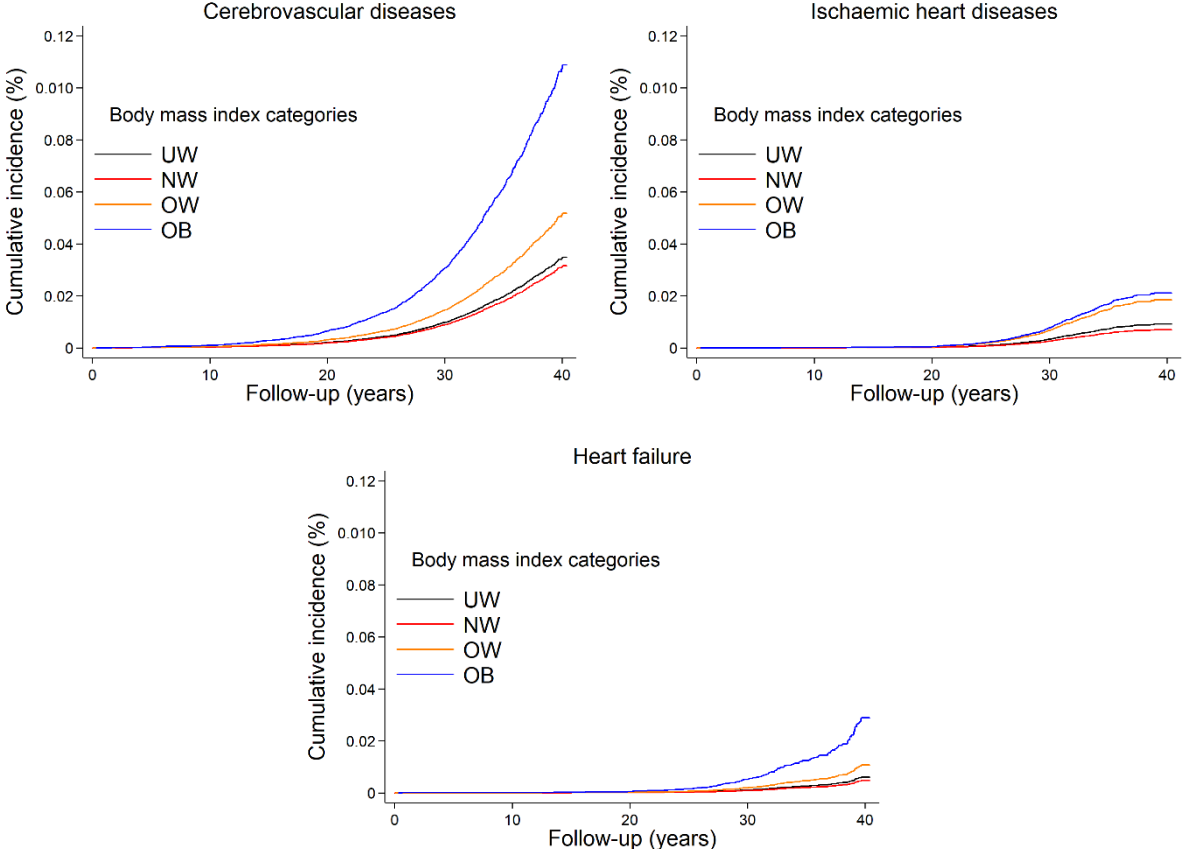


Figure S3. Cumulative incidences (%) of disability pension due to cardiovascular diseases by body mass index categories estimated with adjusted Cox regression models at the population averages of the covariates. UW, underweight; NW, normal weight; OW, overweight; OB, obesity. Models were adjusted for age, center, year of conscription, childhood socioeconomic position, cardiorespiratory fitness and muscular strength at conscription

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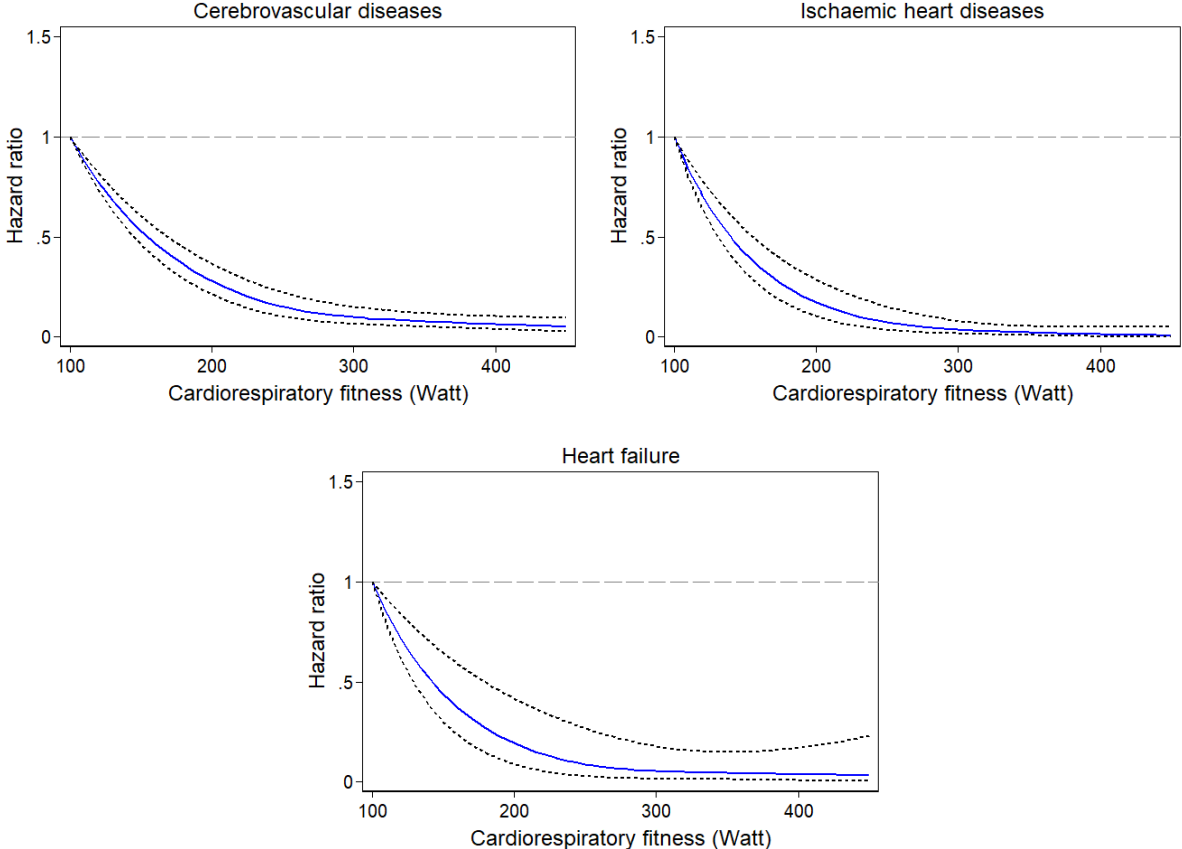


Figure S4. Hazard ratios with 95% CIs for disability pension due to cardiovascular diseases by cardiorespiratory fitness (100 Watt as reference). Restricted cubic spline models estimated with Cox proportional hazards regression adjusted for age, center, year of conscription, childhood socioeconomic position, BMI and muscular strength at conscription.

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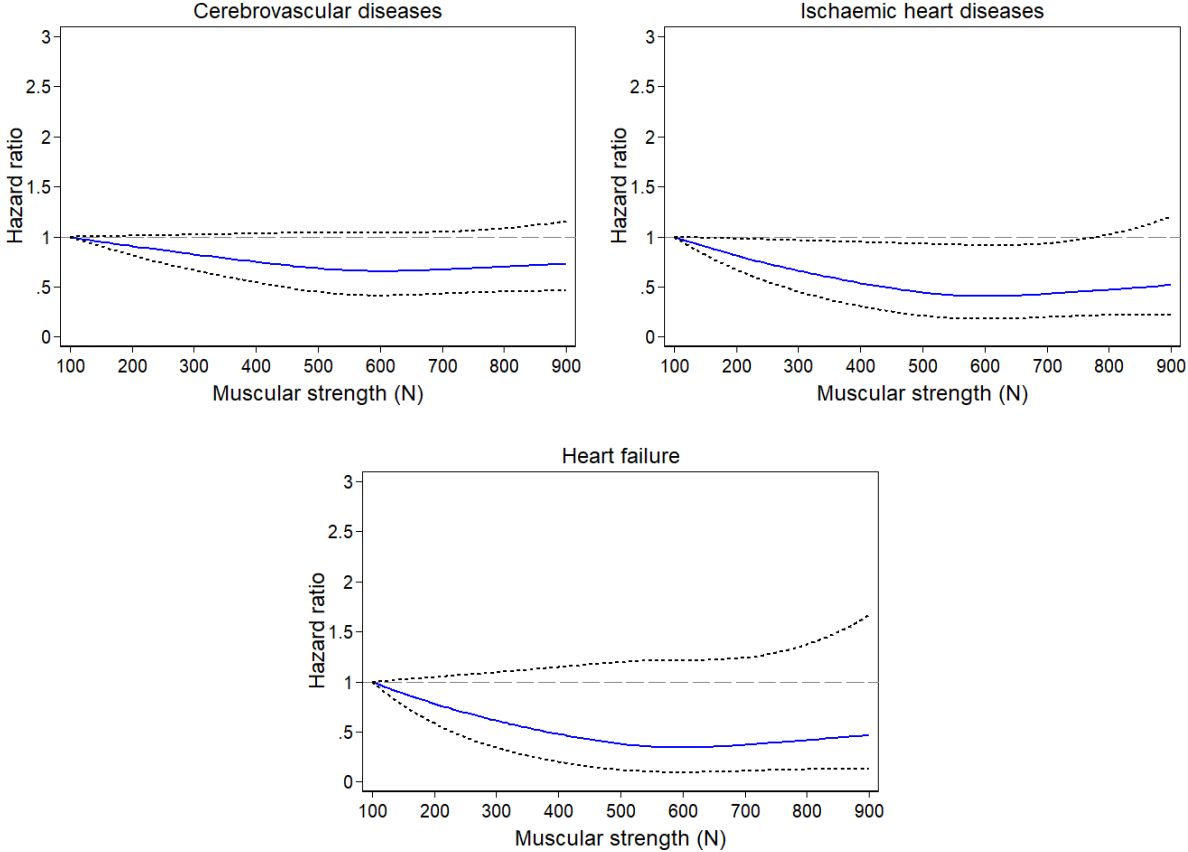


Figure S5. Hazard ratios with 95% CIs for disability pension due to cardiovascular diseases by muscular strength (100 N as reference). Restricted cubic spline models estimated with Cox proportional hazards regression adjusted for age, center, year of conscription, childhood socioeconomic position, BMI and cardiorespiratory fitness at conscription.

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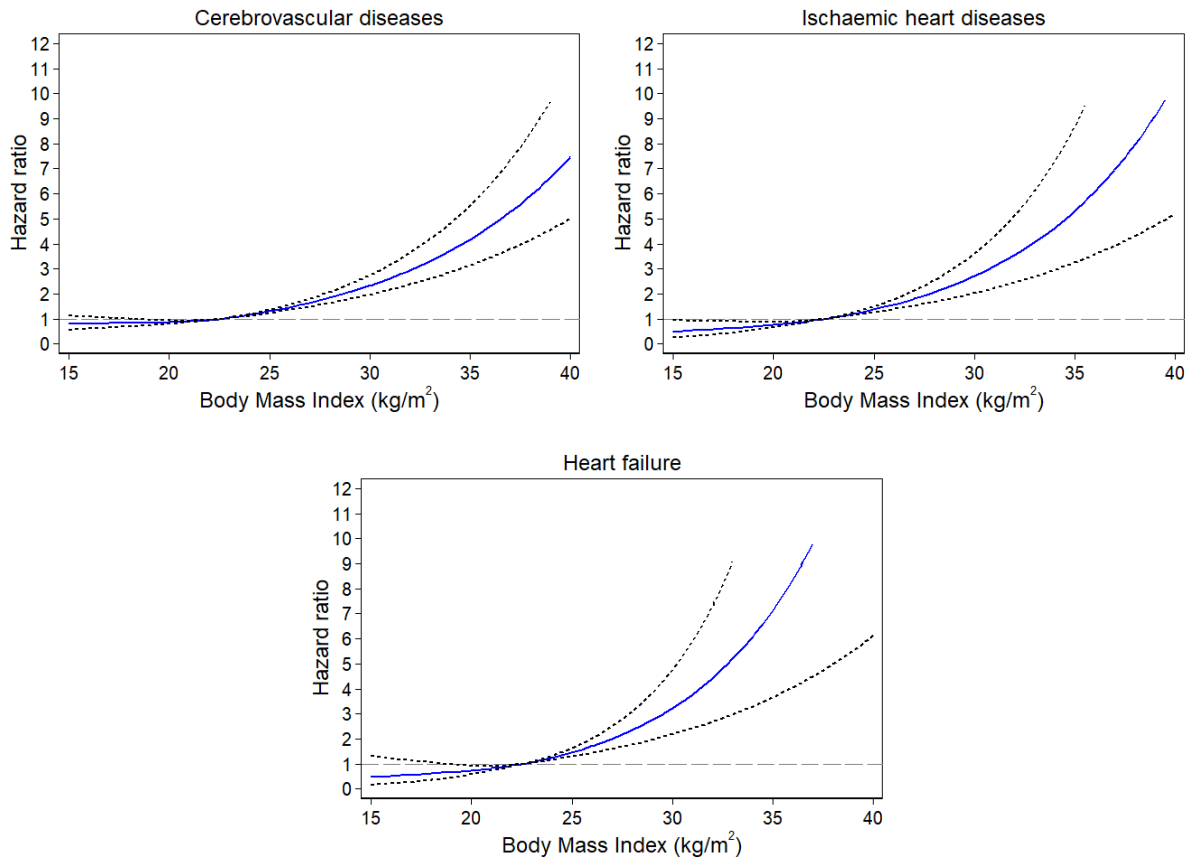


Figure S6. Hazard ratios with 95% CIs for disability pension due to cardiovascular diseases by body mass index (22.5 kg/m² as reference). Restricted cubic spline models estimated with Cox proportional hazards regression adjusted for age, center, year of conscription, childhood socioeconomic position, cardiorespiratory fitness and muscular strength at conscription.