

## Does increasing physical activity reduce the excess risk of work disability among overweight individuals? <sup>1</sup>

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1. *Supplementary material*
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**Supplementary Table S1.** Association between overweight, physical activity and work disability in HeSSup and FPS cohorts. HR=hazard ratio; CI=confidence interval.

	Long-term sickness absence				Disability pension			
HeSSup	Cases (%)	HR (95% CI)	HR <sup>a</sup> (95% CI)	HR <sup>b</sup> (95% CI)	Cases (%)	HR (95% CI)	HR <sup>a</sup> (95% CI)	HR <sup>b</sup> (95% CI)
Normal weight	895 (12)	1	1	1	283 (4)	1	1	1
Overweight	770 (17)	1.61 (1.46-1.77)	1.33 (1.20-1.47)	1.32 (1.19-1.46)	332 (7)	2.17 (1.85-2.54)	1.48 (1.25-1.74)	1.45 (1.23-1.71)
Physically active	1255 (13)	1	1	n/a	438 (5)	1	1	n/a
Physically inactive	410 (16)	1.31 (1.18-1.47)	1.11 (0.99-1.24)	n/a	177 (7)	1.62 (1.36-1.93)	1.22 (1.02-1.46)	n/a
MET hours per week <sup>c</sup>	1665 (14)	0.96 (0.4-0.98)	0.99 (0.97-1.01)	n/a	615 (5)	0.91 (0.88-0.94)	0.97 (0.93-1.00)	n/a
FPS								
Normal weight	2033 (13)	1	1	1	852 (5)	1	1	1
Overweight	2295 (19)	1.65 (1.55-1.75)	1.43 (1.34-1.52)	1.39 (1.30-1.48)	1071 (9)	1.82 (1.22-1.99)	1.43 (1.30-1.57)	1.36 (1.24-1.49)
Physically active	3207 (14)	1	1	n/a	1341 (6)	1	1	
Physically inactive	1121 (21)	1.60 (1.49-1.71)	1.38 (1.29-1.48)	n/a	582 (11)	1.98 (1.80-2.18)	1.58 (1.43-1.75)	n/a
MET hours per week <sup>‡</sup>	4328 (16)	0.93 (0.92-0.94)	0.96 (0.95-0.98)	n/a	1923 (7)	0.87 (0.85-0.89)	0.92 (0.90-0.95)	n/a

<sup>a</sup> Adjusted for sex, age, socioeconomic status, smoking, and alcohol consumption

<sup>b</sup> Adjusted as Model a, and for physical activity.

<sup>c</sup> Metabolic task hours per week. HR per 10-unit increase. n/a = not applicable

**Supplementary Table S2.** Counterfactual mediation analysis on association between overweight and long-term ( $\geq 90$  days) sickness absence, with physical inactivity as a mediator.

FPS	HR <sup>a</sup>	95% CI	P for interaction	Proportion mediated (%)
Exposure-mediator interaction not allowed				
Controlled direct effect	1.38	1.30-1.47		
Natural direct effect	1.38	1.30-1.47		
Natural indirect	1.03	1.02-1.04		
Total effect	1.43	1.34-1.52		10%
Exposure-mediator interaction allowed			0.48	
Controlled direct effect	1.40	1.31-1.51		
Natural direct effect	1.39	1.30-1.48		
Natural indirect	1.03	1.02-1.04		
Total effect	1.43	1.34-1.54		9%
HeSSup				
Exposure-mediator interaction not allowed				
Controlled direct effect	1.32	1.19-1.46		
Natural direct effect	1.32	1.19-1.46		
Natural indirect	1.01	1.00-1.02		
Total effect	1.33	1.20-1.47		2%
Exposure-mediator interaction allowed			0.03	
Controlled direct effect	1.25	1.12-1.41		
Natural direct effect	1.30	1.17-1.44		
Natural indirect	1.01	1.00-1.03		
Total effect	1.32	1.19-1.46		6%

\*Adjusted for sex, age, and occupational position (FPS) or education (HeSSup), smoking, and alcohol consumption.

**Supplementary Table S3.** Counterfactual mediation analysis on association between overweight and disability pension, with physical inactivity as a mediator.

FPS	HR*	95% CI	P for interaction	Proportion mediated (%)
Exposure-mediator interaction not allowed				
Controlled direct effect	1.36	1.24-1.49		
Natural direct effect	1.36	1.24-1.49		
Natural indirect	1.05	1.03-1.06		
Total effect	1.42	1.30-1.56		15%
Exposure-mediator interaction allowed			0.10	
Controlled direct effect	1.42	1.27-1.59		
Natural direct effect	1.38	1.25-1.51		
Natural indirect	1.04	1.02-1.06		
Total effect	1.43	1.30-1.57		13%
HeSSup				
Exposure-mediator interaction not allowed				
Controlled direct effect	1.45	1.23-1.71		
Natural direct effect	1.45	1.23-1.71		
Natural indirect	1.01	1.00-1.03		
Total effect	1.47	1.25-1.73		4%
Exposure-mediator interaction allowed			0.12	
Controlled direct effect	1.36	1.12-1.64		
Natural direct effect	1.42	1.20-1.69		
Natural indirect	1.02	1.00-1.05		
Total effect	1.46	1.24-1.72		7%

\*Adjusted for sex, age, and occupational position (FPS) or education (HeSSup), smoking, and alcohol use.

**Supplementary Table S4.** Counterfactual mediation analysis on association between overweight and work disability, with physical inactivity as a mediator (dichotomy). Those with incident bronchial asthma, myocardial infarction, angina pectoris, cerebrovascular diseases, arthritis, sciatica, migraine, depression, or diabetes between the two measurement points were omitted (n=34813). HR=hazard ratio; CI=confidence interval.

		HR <sup>a</sup>	95% CI	I <sup>2</sup>	P
<b>&gt;90 days sickness absence</b>	Controlled direct effect				
	FPS	1.53	1.37-1.71		
	HeSSup	1.42	1.20-1.69		
	Pooled	1.50	1.36-1.64	0%	0.47
	Natural direct effect				
	FPS	1.50	1.36-1.65		
	HeSSup	1.43	1.20-1.69		
	Pooled	1.48	1.36-1.61	0%	0.63
	Natural indirect effect				
	FPS	1.04	1.01-1.08		
	HeSSup	1.01	0.95-1.06		
	Pooled	1.03	1.00-1.06	0%	0.37
	Total effect				
	FPS	1.56	1.43-1.71		
	HeSSup	1.44	1.23-1.68		
	Pooled	1.53	1.42-1.65	0%	0.38
<b>Disability pension</b>	Controlled direct effect				
	FPS	1.72	1.46-2.02		
	HeSSup	1.53	1.10-2.12		
	Pooled	1.68	1.45-1.94	0%	0.53
	Natural direct effect				
	FPS	1.63	1.42-1.86		
	HeSSup	1.53	1.17-2.00		
	Pooled	1.61	1.43-1.82	0%	0.68
	Natural indirect effect				
	FPS	1.04	0.99-1.10		
	HeSSup	1.03	0.94-1.12		
	Pooled	1.04	0.99-1.09	0%	0.85
	Total effect				
	FPS	1.70	1.50-1.92		
	HeSSup	1.57	1.23-2.01		
	Pooled	1.67	1.50-1.87	0%	0.57

<sup>a</sup> Adjusted for age, sex, socioeconomic status, alcohol use and smoking.

**Supplementary Table S5.** Hazard ratio for the association between physical activity at T2 and work disability among participants who were physically inactive at T1 and with overweight at T1 and T2. Physical inactivity is measured as dichotomy. Those with incident bronchial asthma, myocardial infarction, angina pectoris, cerebrovascular diseases, arthritis, sciatica, migraine, depression, or diabetes between the two measurement points were omitted (n=3097). HR=hazard ratio; CI=confidence interval.

		HR <sup>a</sup>	95% CI	I <sup>2</sup>	P
<b>&gt;90 days sickness absence</b>	FPS	0.80	0.67-0.96		
	HeSSup	0.94	0.68-1.31		
	Pooled	0.83	0.71-0.97	0%	0.40
<b>Disability pension</b>	FPS	0.66	0.50-0.86		
	HeSSup	0.92	0.56-1.51		
	Pooled	0.71	0.56-0.90	25%	0.25

<sup>a</sup> Adjusted for age, sex, socioeconomic status, alcohol use and smoking.

**Supplementary Table S6.** Hazard ratio for the association between physical activity at T2 and work disability. Included are participants who were physically inactive at T1 and with BMI  $\geq 25$  with no more than 5% change in BMI between T1 and T2. Physical activity at T2 is measured as dichotomy. HR=hazard ratio; CI=confidence interval.

<b>PERSISTENT OVERWEIGHT (BMI <math>\geq 25</math>, change <math>\pm 5\%</math>)</b>	<b>events/ cases</b>	<b>HR<sup>a</sup></b>	<b>95% CI</b>	<b>I<sup>2</sup></b>	<b>P</b>
<b>&gt;90 days sickness absence</b>	FPS 328/1554	0.78	0.63-0.98		
	HeSSup 85/517	0.62	0.39-0.96		
	Pooled	0.75	0.61-0.91	0%	0.37
<b>Disability pension</b>	FPS 164/1554	0.75	0.55-1.03		
	HeSSup 36/517	0.63	0.31-1.28		
	Pooled	0.73	0.55-0.97	0%	0.65

<sup>a</sup> Adjusted for age, sex, socioeconomic status, alcohol use and smoking.

**Supplementary Table S7.** Hazard ratio for the association between physical activity at T2 and work disability. Included are participants who were physically inactive at T1 and with BMI  $\geq 30$  at both times. Physical activity at T2 is measured as dichotomy. HR=hazard ratio; CI=confidence interval.

<b>PERSISTENT OBESITY (BMI <math>\geq 30</math>)</b>	<b>events/ cases</b>	<b>HR<sup>a</sup></b>	<b>95% CI</b>	<b>I<sup>2</sup></b>	<b>P</b>
<b>&gt;90 days sickness absence</b>					
FPS	213/817	0.87	0.65-1.17		
HeSSup	57/302	1.08	0.63-1.84		
Pooled		0.91	0.71-1.18	0%	0.49
<b>Disability pension</b>					
FPS	112/817	0.74	0.49-1.13		
HeSSup	29/302	0.95	0.44-2.06		
Pooled		0.78	0.54-1.13	0%	0.57

<sup>a</sup> Adjusted for age, sex, socioeconomic status, alcohol use and smoking.