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The contribution of overweight, obesity, and lack of physical activity to exit from paid employment: a meta-analysis [1]

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[1] Appendices A–C

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Appendix A1: Search strategy Pubmed

	PubMed (up to Dec 31, 2012)
#1 PHYSICAL ACTIVITY "physical activity" [All Fields] OR "physical activities" [All Fields] OR "physical fitness" [All Fields] OR exercise [All Fields] OR sport [All Fields] OR fitness [All Fields] OR lifestyle [All Fields] OR "health behaviour" [All Fields] OR "health behavior" [All Fields] OR "physical inactivity" [All Fields]	468 717
#2 OBESITY overweight [All Fields] OR "over weight" [All Fields] OR "body weight" [MeSH] OR "body weight" [All Fields] OR "waist circumference" [All Fields] OR "skinfold thickness" [All Fields] OR "fat percentage" [All Fields] OR "waist-hip ratio" [All Fields] OR "hip circumference" OR obesity [All Fields] OR "obese" [All Fields] OR "body mass index" [All Fields] OR bmi [All Fields] OR weight [All fields]	1 140 831
(#1 OR #2)	1 521 639
#3 EARLY RETIREMENT early-retirement [All Fields]	677
#4 UNEMPLOYMENT unemployment [All Fields] OR "unemployed" [All Fields]	12 233
#5 DISABILITY PENSION disability pension[All Fields] OR work-disability [All Fields] OR "disability retirement" [All Fields] OR work ability [All Fields]	2 668
(#3 OR #4 OR #5)	15 276
(#1 OR #2) AND (#3 OR #4 OR #5)	1932
#6 LONGITUDINAL DESIGN ("cohort studies"[MeSH Terms] OR "cohort studies"[All Fields] OR "cohort study"[All Fields]) OR ("longitudinal studies"[MeSH Terms] OR "longitudinal studies"[All Fields] OR "longitudinal study"[All Fields] OR longitudinally [All Fields]) OR ("prospective studies"[MeSH Terms] OR "prospective studies"[All Fields]) OR "prospective study"[All Fields]) OR (prognosis [MeSH:NoExp]) OR ("follow-up studies"[MeSH Terms] OR "follow-up studies"[All Fields] OR "follow up study"[All Fields] OR "follow-up"[All Fields])OR ("retrospective studies"[MeSH Terms] OR "retrospective studies"[All Fields] OR "retrospective study"[All Fields]) NOT ((randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized[tiab] OR placebo[ti] OR clinical trials as topic [MeSH:noexp] OR trial[ti]))	1 589 995
(#1 OR #2) AND (#3 OR #4 OR #5) AND #6	571
Filter on Language	533

Appendix A2: Search strategy Embase

	Embase (up to Dec 31, 2012)
#1 PHYSICAL ACTIVITY ('physical activity'/de OR 'physical activity':de,ti,ab OR 'physical activities'/de OR 'physical fitness'/de OR 'exercise':de,ti,ab OR 'exercise'/de OR 'sport'/de OR 'sport':de,ti,ab OR 'fitness'/de OR 'fitness':de,ti,ab OR 'lifestyle'/de OR 'lifestyle':de,ti,ab OR 'health behavior':de,ti,ab OR 'health behaviour':de,ti,ab OR 'physical inactivity'/de OR 'physical inactivity':de,ti,ab)	559 636
#2 OBESITY 'overweight'/exp OR 'overweight' OR 'body weight'/de OR 'body weight':de,ti,ab OR 'waist circumference'/de OR 'skinfold thickness'/de OR 'waist hip ratio'/exp OR 'hip circumference'/exp OR 'waist hip ratio' OR 'obesity'/exp OR 'obese' OR 'body mass'/exp OR 'body mass index' OR 'bmi' OR 'weight'	1 373 732
(#1 OR #2)	1 818 084
#3 EARLY RETIREMENT 'early-retirement'	920
#4 UNEMPLOYMENT 'Unemployment'/exp OR 'unemployment':ti,ab,de OR 'unemployed'	15 331
#5 DISABILITY PENSION 'Disability pension' OR 'work disability'/exp OR 'work disability' OR 'disability retirement' OR 'work ability':ti,ab	5 608
(#3 OR #4 OR #5)	21 329
(#1 OR #2) AND (#3 OR #4 OR #5)	2 496
#6 DESIGN 'cohort analysis'/exp OR 'cohort analysis':ti,ab OR 'cohort studies':ti,ab,de OR 'cohort study':ti,ab,de OR 'longitudinal'/syn OR 'longitudinally':ti,ab,de OR 'prospective study'/exp OR 'prospective study':ti,ab OR 'prospective studies':ti,ab,de OR 'prognosis' OR 'follow up'/exp OR 'follow up':ti,ab OR 'restrospective study'/exp OR 'retrospective study':ti,ab OR 'retrospective studies':ti,ab,de NOT ('randomized controlled trial'/exp OR 'controlled clinical trial'/exp OR 'randomized':ti,ab OR 'placebo':ti,ab OR 'clinical trial (topic)'/exp OR 'trial':ti)	1 719 140
(#1 OR #2) AND (#3 OR #4 OR #5) AND #6	598
Filter on Language	543

Appendix A3: Search strategy Web of Science

	Web of Science (up to Dec 31, 2012)
#1 PHYSICAL ACTIVITY TS=((physical activity) OR (physical activities) OR (physical fitness) OR exercise OR sport OR fitness OR lifestyle OR (health behaviour) OR (health behavior) OR (physical inactivity)) AND Document Types=(Article)	373 562
#2 OBESITY TS=(overweight OR (over weight) OR (body weight) OR (waist circumference) OR (skinfold thickness) OR (fat percentage) OR (waist-hip ratio) OR (hip circumference) OR obesity OR obese OR (body mass index) OR (bmi) OR (weight)) AND Document Types=(Article)	765 846
(#1 OR #2)	1 080 413
#3 EARLY RETIREMENT (TS=early-retirement) AND Document Types=(Article)	845
#4 UNEMPLOYMENT (TS=((unemployment) OR (unemployed))) AND Document Types=(Article)	21 652
#5 DISABILITY PENSION (TS=((disability-pension) OR work-disability OR (disability-retirement) OR (work-ability))) AND Document Types=(Article)	2 266
(#3 OR #4 OR #5)	24 378
(#1 OR #2) AND (#3 OR #4 OR #5)	1 978
#6 LONGITUDINAL DESIGN (TS=((cohort studies) OR (cohort study) OR (longitudinal studies) OR (longitudinal study) OR longitudinally OR (prospective studies) OR (prospective study) OR (prognosis) OR (follow-up studies) OR (follow up study) OR (follow-up) OR (retrospective studies) OR (retrospective study) NOT ((randomized controlled trial) OR (controlled clinical trial) OR (randomized) OR placebo OR (clinical trials as topic) OR (trial)))) AND Document Types=(Article)	978 774
(#1 OR #2) AND (#3 OR #4 OR #5) AND #6	624
Filter on Language	594

Appendix B: Overview of included studies and quality assessment. [0=does not meet criterion or insufficient information in article, 1= meets criterion; SES=socioeconomic status]

Author (year)	Determinant			Outcome			Q1 Insight in subject flow*	Q2 >30% response	Q3 Adjusted for confounders			Q4 < loss to 30% follow-up
	Obesity	Overweight	Lack of PA	Dis-ability pension	Unemployment	Early retirement			Any	SES	Lifestyle	
Ahola et al, 2011 (31)	objective		subjective	self-report			1	1	1	1	1	1
Biering-Sorensen et al, 1999 (22)		objective	self-report	register			1	1	1	0	1	1
Canivet et al, 2012 (32)	objective			register			0	1	1	1	1	1
Claessen et al, 2009 (23)	objective	objective		register			1	1	1	0	1	1
Friis et al, 2007 (40)	self-report	self-report	self-report			register	0	1	1	1	1	1
Friis et al, 2008 (24)	self-report	self-report	self-report	register			0	1	1	1	1	1
Gravseth et al, 2008 (25)	objective	objective		register			1	1	1	1	0	1
Hagen et al, 2002 (13)	objective	objective	self-report	register			1	1	1	1	0	1
Harko-nmaki et al, 2007 (33)	self-report			self-report			1	0	1	1	1	1
Houston et al, 2008 (41)	objective	objective				self-report	1	0	1	1	1	0

Continued

Author (year)	Determinant			Outcome			Q1 Insight in subject flow*	Q2 >30% response	Q3 Adjusted for confounders			Q4 < loss to 30% follow -up
	Obesity	Over-weight	Lack of PA	Dis-ability pension	Unem-ployment	Early retire-ment			Any	SES	Life-style	
Jusot et al, 2008 (38)	self-report	self-report			self-report		0	1	1	1	0	0
Krause et al, 1997 (34)			self-report	self-report			0	1	1	0	0	1
Krokstad et al, 2002 (35)			self-report	register			0	1	1	1	1	1
Lahti et al, 2012 (36)			self-report	register			0	1	1	1	1	1
Laitinen et al, 2002 (14)	self-report	self-report			register		1	1	1	1	1	1
Liira et al, 1999 (19)			self-report		self-report		0	1	1	0	0	1
Lund et al, 2001 (21)	self-report	self-report		self-report			1	1	1	1	1	1
Lund et al, 2010 (26)	self-report	self-report		register			1	1	1	0	0	1
Manninen et al, 1997 (15)	self-report	self-report		register			0	1	1	0	1	1
Mansson et al, 1996 (27)	objective			register			0	1	1	0	1	1
Neovius et al, 2008 (20)	objective	objective		register			1	1	1	1	0	1
Rissanen et al, 1990 (28)	objective	objective		register			0	0	1	1	1	1
Robroek et al, 2012 (18)	self-report	self-report	self-report	self-report	self-report	self-report	1	1	1	1	1	1
Roos et al, 2012 (29)	self-report	self-report		register			1	0	1	0	0	1
Ropponen et al, 2011 (16)	self-report	self-report	self-report	register			0	0	1	1	1	1
Suominen et al, 2005 (37)			self-report	register			0	1	0	0	0	1
Visscher et al, 2004 (30)	objective	objective		register			1	1	1	1	1	1
Virtanen et al, 2012 (39)		self-report			self-report		0	0	1	1	0	1

Appendix C1: Included studies presenting the association between overweight, obesity and/or lack of physical activity and disability pension. [BL=baseline; BMI=body mass index; F=female; FU=follow-up; HR=hazard ratio; M=male; OR=odds ratio; PA=physical activity; RR=relative risk.]

Author year Country	Population (N) Employees/ general population Mean age at BL (range) Gender	Follow-up (FU) period (maximum or mean) BL year	Determinant definition	Outcome definition (disability pension)	Determinant prevalence (baseline) (N/%)	Outcome prevalence	Association estimate adjustment
			Overweight/ Obesity				
Canivet et al, 2012 (32) Sweden	N=6540 Employees ? (45–65 years) 49% male (N=3181) 51% female (N=3359)	13-year FU BL: 1992–94	BMI (kg/m^2), Objective 2 categories: <30.0 / ≥30.0	Register-based	F ≥30.0: N=351 (10.4%) M ≥30.0: N=344 (10.8%)	F: N=664 (19.8%) M: N=460 (14.5%)	HR adjusted for age BMI≥30.0: F: 1.6 (1.3–2.0) M: 1.7 (1.3–2.2)
Claessen et al, 2009 (23) Germany	N=16875 Employees (construct-ion) 41.9 (25–59 years) 100% male	10.8-year FU BL: 1986–92	BMI (kg/m^2), Objective 7 categories: <20.0 20.0–22.4 22.5–24.9 25.0–27.4 27.5–29.9 30.0–34.9 ≥35.0	Register-based	25.0–27.4: N=4871 27.5–29.9: N=3260 30.0–34.9: N=2221 ≥35.0: N=343	N=3064	HR adjusted for age/ nationality/ smoke/alcohol: <20: n/a 20.0–22.4: reference 22.5–24.9: n/a 25.0–27.4: 0.79 (0.69–0.92) 27.5–29.9: 0.89 (0.76–1.03) 30.0–34.9: 0.92 (0.78–1.07) ≥35: 1.56 (1.25–1.96)
Gravseth et al, 2008 (25) Norway	N=302330 General population (military service conscript) 18/19 years 100% male	36-year FU BL: 1967–76	BMI (kg/m^2), Objective 4 categories: <18.5 18.5–24.9 25–29.9 ≥30.0	Register-based	≥30: N=7403	N=3651 (1.2%)	HR adjusted for age, birth order, birth weight, childhood disease benefit, maternal marital status, maternal and paternal disability, parental education, intellectual performance, mental function conscript, height conscript, education: <18.5: n/a 18.5–24.9: reference 25.0–29.9: 1.0 (0.9–1.1) ≥30: 1.4 (1.2–1.7)
Harkonmäki et al, 2007 (33) Finland	N=8817 General population ? (40–54 years) 42% male (N=3668) 58% female (N=5149)	5-year FU BL: 1998	BMI (kg/m^2), Self-report 2 categories: <30.0 ≥30.0	Self-report	≥30.0: N=1078 (12.3%)	N=318 (3.6%)	OR adjusted for age, gender, childhood adversities, smoking, alcohol, depression, SES, medication: ≥30.0: 1.58 (1.18–2.12)
Lund et al, 2001 (21) Denmark	N=2618 Employees (waste collectors, municipal workers) 44.3 years (?) at follow-up 100% male	2.5-year FU BL: 1994	BMI (kg/m^2), Self-report 4 categories: <20.0 20.0–24.9 25.0–29.9 ≥30.0	Self-report Disability pension and long-term sick leave (>2 months)	25.0–29.9: N=936 ≥30.0: N=293	N=67 (2.6%)	OR adjusted for age, occupational group, health, skill discretion, smoking: <20.0: n/a 20.0–24.9: reference 25.0–29.9: 1.11 (0.60–2.04) ≥30.0: 1.83 (0.87–3.85)
							Continued

Author year Country	Population N Employees/ general population Mean age at BL (range) Gender	Follow-up (FU) period (maximum or mean) BL year	Determinant definition	Outcome definition (disability pension)	Determinant prevalence (baseline) (N/%)	Outcome prevalence	Association estimate adjustment
Lund et al, 2010 (26) Norway/ Denmark	N=8287 Employees ? (18–59 years) 51% male (N=4203) 49% female (N=4084)	15-year FU BL: '90/'95/'00	BMI (kg/m^2), Self-report 4 categories: <18.5 18.5–24.9 25.0–29.9 ≥30.0	Register-based	Risk time 25.0–29.9 F: 9738.40 M: 21 230.87 ≥30.0: F: 2446.77 M: 4123.42	F: N=262 (6.4%) M: N=184 (4.4%)	HR adjusted for age, work environment and general health: <18.5: n/a 18.5–24.9: reference 25.0–29.9: F: 1.11 (0.82–1.50) M: 0.67 (0.49–0.93) ≥30.0 F: 1.25 (0.79–1.97) M: 0.84 (0.52–1.37)
Manninen et al, 1997 (15) Finland	N=8655 Employees (farmers) ? (18–64 years) 52% male (N=4537) 48% female (N=4118)	10 year FU BL: 1979–80	BMI (kg/m^2), Self-report continuous	Register-based	n/a	N=1004 (11.6%)	RR adjusted for gender, age, smoking, psychological distress: 1.08 (1.01–1.15)
Månsson et al, 1996 (27) Sweden	N=5926 General population 48.1 (47–49 years) 100% male	≥11-year FU BL: 1974–78	BMI (kg/m^2), Objective 4 categories: <18.5 18.5–24.9 25–29.9 ≥30	Register-based	25-29.9: N=2237 (37.7%) ≥30: N=433 (7.3%)	N=849 (14.3%)	RR adjusted for smoking: <18.5: n/a 18.5–24.9: reference 25–29.9: 1.3 (1.1–1.6) ≥30: 2.8 (2.2–3.5)
Neovius et al, 2008 (20) Sweden	N=1191027 General population (military service conscript) ? (17-20 years) 100% male	38-year FU BL: 1969–94	BMI (kg/m^2), Objective 5 categories: <18.5 18.5–24.9 25.0–29.9 30.0–34.9 ≥35	Register-based	25.0–29.9: N=101 332 (8.5%) 30.0–34.9: N=15 974 (1.3%) ≥35: N=3117 (0.3%)	N=60 024	HR adjusted for year of conscript testing, SEP, municipality, age at testing, testing center, and year of testing, muscular strength: <18.5: n/a 18.5–24.9: reference 25.0–29.9: 1.36 (1.32–1.40) 30.0–34.9: 1.87 (1.76–1.99) ≥35: 3.04 (2.72–3.40)
Rissanen et al, 1990 (28) Finland	N=31 129 Employees ? (25–64 years) 61% male (N=19 076) 39% female (N=12 053)	10 year FU BL: 1966–72	BMI (kg/m^2), Objective 6 categories: <22.5 22.5–24.9 25.0–27.4 27.5–29.9 30.0–32.4 ≥32.5	Register-based	25.0–27.4: F: N=2584 M: N=5359 27.5–29.9: F: N=1683 M: N=2839 30.0–32.4: F: N=995 M: N=1065 ≥32.5: F: N=778 M: N=419	N=4706	RR adjusted for age, geographical region, smoking, and occupation: <22.5: reference 22.5–24.9: n/a 25.0–27.4: F: 1.5 (1.3–1.7) M: 1.1 (1.0–1.2) 27.5–29.9: F: 1.5 (1.3–1.8) M: 1.2 (1.1–1.4) 30.0–32.4: F: 1.9 (1.6–2.3) M: 1.4 (1.2–1.6) ≥32.5: F: 2.1 (1.7–2.3) M: 1.8 (1.4–2.2)
							Continued

Author year Country	Population N Employees/ general population Mean age at BL (range) Gender	Follow-up (FU) period (maximum or mean) BL year	Determinant definition	Outcome definition (disability pension)	Determinant prevalence (baseline) (N/%)	Outcome prevalence	Association estimate adjustment
Roos et al, 2012 (29) Finland	N=6542 Employees 49.5 (45–60 year) 22% male (N=1141) 78% female (N=5131)	7.8-year FU BL: 2000–02	BMI (kg/m^2), Self-report 5 categories: <20.0 20.0–24.9 25–29.9 30–34.9 ≥35	Register-based	25–29.9: F: N=1638 (32%) M: N=643 (46%) 30–34.9 F: N=570 (11%) M: N=165 (12%) ≥35 F: N=177 (3%) M: N=52 (4%)	n/a	HR adjusted for age, diagnosed diseases, physical and mental functioning, working conditions: 20.0–24.9: reference 25.0–29.9: F: 1.02 (0.82–1.27) M: 1.45 (0.92–2.30) 30.0–34.9: F: 1.33 (1.02–1.74) M: 0.95 (0.49–1.84) ≥35: F: 1.73 (1.20–2.49) M: 1.19 (0.51–2.78)
Visscher et al, 2004 (30) Netherlands/ Finland	N=17 235 General population ? (20-64 year) 30% men (N=2437) 70% women (N=5565)	15-year FU BL: 1973–77	BMI (kg/m^2), Objective 4 categories: <18.5 18.5–24.9 25–29.9 ≥30	Register-based	25–29.9: M: N=3467 (38.9%) F: N=2426 (29.1%) ≥30: M: N=192 (7.4%) F: N=976 (15.6%)	F: N=859 M: N=262	RR adjusted for age, education, geographic region, alcohol use: <18.5: n/a 18.5–24.9: reference 25–29.9: F: 1.4 (1.2–1.6) M: 1.1 (1.0–1.3) ≥30: F: 1.6 (1.4–2.0) M: 1.7 (1.5–2.0)
			Overweight/ obesity, lack of physical activity				
Ahola et al, 2011 (31) Finland	N=3164 Employees ? (30–58 years) 49% male (N=1560) 51% female (N>=1604)	7.5-year FU BL: 2000–01	BMI (kg/m^2), Objective 2 categories: <30 ≥30 PA, self-report frequency of PA causing at least shortness of breath and sweating for ≥30 minutes 2 categories: weekly / less frequent	Register-based	BMI: ≥30: N=567 PA (less frequent): N=746	N=208	OR adjusted for age, gender, mental disorder, physical illness, education, occupational grade, work hours, physical strain, job strain, job insecurity, PA, BMI, smoking: ≥30: 1.18 (0.81–1.72) PA (less frequent): 1.20 (0.84–1.70)
Biering-Sorensen et al, 1999 (22) Denmark	N=892 General population ? (30–60 years) 50% male (N=442) 50% female (N=450)	15-year FU BL: 1977–78	BMI (kg/m^2), Objective 3 categories: ≤20 20–27 >27 PA, Self-report PA in leisure time 2 categories: never / ever	Register-based	n/a	N=84	OR adjusted for age, dyspnea, suffering from colic nervousness, hospitalization, surgery, general health risk, general health, peak flow, isometric endurance test of back muscles, pain during the test, distance from home to work, sick leave, physical condition compared to those of same age, smoking, PA, BMI ≤20: n/a 20–27: reference >27: 2.44 (1.48–4.00) PA (never): 2.23 (1.43–3.50)
							Continued

Author year Country	Population N Employees/ general population Mean age at BL (range) Gender	Follow-up (FU) period (maximum or mean) BL year	Determinant definition	Outcome definition (disability pension)	Determinant prevalence (baseline) (N/%)	Outcome prevalence	Association estimate adjustment
Friis et al, 2008 (24) Denmark	N=12028 Employees (nurses) ? (44–66 years) 100% women	9-year FU BL: 1993	BMI (kg/m^2), Self-report 3 categories: <25 25–29.9 ≥30 PA, self-report Leisure time PA 2 categories: Little PA & sedentary / physically active	Register-based	BMI: 25–29.9: N=2599 ≥30: N=599 PA (little): N=3239	N=691	HR adjusted for health, work schedule, work area, work pressure, influence at work, physical demands, PA, BMI, marital status, spouses SES, income: <25: reference 25–29.9: 1.12 (0.92–1.35) ≥30: 1.63 (1.20–2.22) PA (active): 1.50 (1.23–1.83)
Hagen et al, 2002 (13) Norway	N=25271 Employees ? (25–59 years) 60% male 40% female	10-year FU BL: 1984–86	BMI (kg/m^2), Objective 4 categories: <24.1 24.1–26.3 26.4–28.6 ≥28.6 PA, self-report Frequency/ intensity/ duration of exercise 4 categories: 0–50% 51–75% 76–90% 91–100%	Register-based Disability pension due to back diseases	BMI: 24.1–26.3: N=7705 26.4–28.6: N=4572 ≥28.6: N=3063 PA: 51–75%: N=6512 76–90%: N=5212 91–100%: N=2333	N=715	OR adjusted for age, gender, physical work, smoking, perceived health, diabetes, angina pectoris, worn out: <24.1: reference 24.1–26.3: 1.0 (0.8–1.3) 26.4–28.6: 1.3 (1.0–1.6) ≥28.6: 1.6 (1.2–2.0) OR adjusted for age, gender, smoking, alcohol, BMI: PA 0–50%: reference 51–75%: 1.4 (1.1–1.7) 76–90%: 1.2 (0.9–1.6) 91–100%: 1.9 (1.4–2.4)
Robroek et al, 2012 (18) Netherlands/ Europe	N=4923 Employees ? (50-country-specific retirement age) 56% male (N=2782) 44% female (N=2141)	4-year FU BL: 2004	BMI (kg/m^2), Self-report 3 categories: <25 25–29.9 ≥30 PA, self-report regular participation in moderate and vigorous activities 2 categories: <1×/week ≥1×/week	Self-report Exited the labour force because of recognised health problems.	BMI: 25–29.9: N=2084 (42%) ≥30: N=722 (15%) PA: <1×/week: N=274 (6%)	N=103 (2%)	HR adjusted for age, gender, education, cohabitation status, self-perceived health, BMI/PA, alcohol, job control, job rewards: <25: reference 25–29.9: 0.80 (0.51–1.28) ≥30: 1.29 (0.78–2.15) PA <1×/week: 3.05 (1.68–5.55)
Ropponen et al, 2011 (16) Sweden/ Finland	N=24043 General population (twins) ? (17-? years) 51% male (N=?) 49% female (N=?)	30-year FU BL: 1975	BMI (kg/m^2), Self-report Continuous PA, Self-report Frequency, duration, and intensity 3 categories: sedentary conditional continuous (MET)	Register-based Disability pension due to osteo-arthritis, or musculo-skeletal disorders (MSD)	n/a	DP (MSD): 1819 / 24 043 (7.4%) DP (OA): 677 / 24 043 (2.8%)	HR adjusted for education, social class, chronic disease, musculoskeletal pain, use of analgesics, smoking, alcohol BMI: F: 1.03 (1.01–1.05) M: 1.06 (1.03–1.08) PA unadjusted F: 1.00 (0.97–1.04) M: 0.99 (0.97–1.02)
							Continued

Author year Country	Population N Employees/ general population Mean age at BL (range) Gender	Follow-up (FU) period (maximum or mean) BL year	Determinant definition	Outcome definition (disability pension)	Determinant prevalence (baseline) (N/%)	Outcome prevalence	Association estimate adjustment
			Lack of PA				
Krause et al, 1997 (34) USA/Finland	N=968 General population ? (42–60 years) 100% male	4-year FU BL: 1984–89	PA, Self-report Total duration 4 categories: Quartiles (1st: shortest duration)	Self-report Disability retired	n/a	N=67 (14.5%)	OR age-adjusted: 1st quartile: reference 2nd quartile: 1.02 (0.51–2.06) 3rd quartile: 0.74 (0.35–1.57) 4th quartile: 1.01 (0.50–2.03)
Krokstad et al, 2002 (35) Norway	N=62 369 General population ? (20–66 years) 52% male (N=32 194) 48% female (N=30 175)	10-year FU BL: 1984–86	PA, Self-report Leisure time PA 2 categories: <1×/week ≥1×/week	Register-based	n/a	n/a	HR adjusted for age, education, health, employment status, occupational risk factors, psychosocial risk factors, perceived health, lifestyle factors: 50–66 years <1×/week F: 1.18 (1.03–1.35) M: 1.12 (1.01–1.24)
Lahti et al, 2012 (36) Finland	N=6275 Employees (40–60 years) 22% male (N=1355) 78% female (N=4920)	6.8-year FU BL: 2000–2002	PA, Self-report Leisure time PA 4 categories based on MET hours/week: inactive / active moderate / active vigorous / conditioning	Register-based	Inactive: F: N=1180 M: N=350 Moderate: F: N=2208 M: N=395 Vigorous: F: N=998 M: N=364 Conditioning: F: N=534 M: N=246	N=435 (6.9)	HR adjusted for age, occupational social class, smoking, alcohol, BMI, physical and mental strenuousness of work, physical health functioning, mental health functioning, sickness absence: Inactive: reference Moderate: F: 0.97 (0.76–1.23) M:0.56 (0.34–0.92) Vigorous: F: 0.43 (0.29–0.64) M: 0.59 (0.34–1.01) Conditioning: F: 0.41 (0.24–0.70) M: 0.20 (0.08–0.52)
Suominen et al, 2005 (37) Finland	N=2196 Employees ? (15-64 years) 48% male (N=926) 52% female (N=996)	10-year FU BL: 1989	PA, Self-report 4 categories: 0×/month 1×/month 2-3×/month >3×/month	Register-based Including individual early retirement pension (for those aged ≥55 years)	0: N=1005 1×/month: N=443 2-3×/month: N=142	N=107	HR unadjusted: 0×/month: reference 1×/month: 2.24 (1.41–3.55) 2–3×/month: 1.93 (0.98–3.74) >4×/month: 1.29 (0.77–2.17)

Appendix C2: Included studies presenting the relation between obesity and/or a lack of physical activity and unemployment. [BL=baseline; BMI=body mass index; F=female; FU=follow-up; HR=hazard ratio; M=male; OR=odds ratio; PA=physical activity; RR=relative risk.]

Author year Country	Population N Employees / general population Mean age at BL (range) Gender	Follow-up (FU) period (maximum or mean) BL year	Determinant definition	Outcome definition (unemployment)	Determinant prevalence (baseline) (N/%)	Outcome prevalence	Association estimate adjustment
			Overweight/ Obesity				
Jusot et al, 2008 (38) France	N=5707 Employees (private sector) ? (30–54 years) 58% male (N=3287) 42% female (N=2420)	4-year FU BL: 1992–95	BMI (kg/m^2) self-report 3 categories: <25 25–29.9 ≥30	Self-report Response options: Active / Unemployed / Inactive	25–29.9: F: N=453 (18.7%) M: N=1218 (37.1%) ≥30 F: N=161 (6.7%) M: N=243 (7.4%)	F: N=189 (7.8%) M: N=1826 (55.6%)	OR adjusted for age, education, type of job contract, household composition, children: <25: reference 25–29.9: F: 1.3 (0.9–1.9) M: 0.8 (0.6–1.2) ≥30 F: 2.0 (1.2–3.4) M: 0.5 (0.2–1.0)
Laitinen et al, 2002 (14) Finland	N=9754 (register-based) General population 14 years 49% male (N=4183) 51% female (N=4912)	17-year FU BL: 1980	BMI age 14 (kg/m^2), self-report 3 categories, gender-specific: F: <21.6 21.6-23.7 ≥23.8 M: <21.3 21.4-23.6 ≥23.7	Register-based ≥366 days on unemployment allowance	≥23.8(F), ≥23.7(M): M: N=248 F: N=241	≥ 366 days F: 10% (<21.6) M: 20% (<21.3)	OR adjusted for family SES at age 14, area of residence at age 14, school performance at age 16: <21.6/<21.3: n/a 21.6–23.7: reference ≥23.8: n/a ≥23.7: F: 1.12 (0.74–1.68) M: 1.08 (0.78–1.49)
Virtanen et al, 2012 (39) Sweden/ Finland	N=1083 General population 30 years 52% male 48% female	12-year FU BL: 1981	BMI (kg/m^2), Self-report 2 categories: <25 ≥25	Self-report	n/a	25%?	HR adjusted for gender, parental status, socioeconomic status, unemployment before age 30: ≥25: 0.94 (0.71–1.23)
			Overweight/ obesity and lack of PA				
Robroek et al, 2012 (18) Netherlands/ Europe	N=4923 Employees ? (50-country-specific retirement age) 56% male (N=2782) 44% female (N=2141)	4-year FU BL: 2004	BMI (kg/m^2), Self-report 3 categories: <25 25–29.9 ≥30 PA, self-report regular participation in moderate and vigorous activities 2 categories: <1×/week ≥1×/week	Self-report Exited the labour force because of recognized health problems.	BMI: 25-29.9: N=2084 (42%) ≥30: N=722 (15%) PA: <1×/week: N=274 (6%)	N=218 (4%)	HR adjusted for age, gender, education, cohabitation status, self-perceived health, BMI/ PA, alcohol, job control, job rewards: <25: reference 25–29.9: 1.07 (0.79–1.46) ≥30: 1.36 (0.94–1.99) PA (<1×/week): 1.84 (1.13–3.01)
			Lack of PA				
Liira et al, 1999 (19) Finland	N=781 (construction workers) N=877 (forest workers) Employees (forest workers, construction workers) ? (<50 years) 100% male	5-year FU BL: 1989	PA, Self-report Engaging in leisure-time activities to improve physical fitness 2 categories: <1×/week ≥1×/week	Self-report >24 months unemployed	≥1×/week PA: within group FU >24 months unemployment Construction: 35% Forest: 37%	FU >24 months unempl. Construct-ion: N=195 (25%) Farming: N=67 (8%)	OR age-adjusted: <1×/week Construction: 1.57 (1.11–2.22) Farming: 1.60 (0.91–2.81)

Appendix C3: Included studies presenting the relation between obesity and/or a lack of physical activity and early retirement. [BL=baseline; BMI=body mass index; F=female; FU=follow-up; HR=hazard ratio; M=male; OR=odds ratio; PA=physical activity; RR=relative risk.]

Author year Country	N, Population Employees/ general population Mean age at BL (range) Gender	Follow-up period (maximum or mean) BL year	Determinant definition	Outcome Definition (early retirement)	Determinant prevalence (baseline) (N/%)	Outcome prevalence	Association estimate adjustment
			Overweight/ Obesity				
Houston et al, 2008 (41) USA	N=6483 Employees ? (45–64 years) White F: 50.2 years African American F 50.1 years White M: 50.6 years African American M 49.9 years 49% male (N=3190) 51% female (N=3293)	9-year FU BL: 1987–89	BMI (kg/m^2), Objective 3 categories: <25 25–29.9 ≥30	Self-report retiring early if they were <65 years	25-29.9 White F: 29.5% African-American F: 36.9% White M: 50.6% African-American M: 45.2% ≥30 White F: 19.9% African-American F: 45.5% White M: 22.5% African-American M: 29.5%	White F: 19.3% Afr-Am F: 21.5% White M: 21.6% African-American M: 18.7%	HR adjusted for education, smoke, income, occupation, occupational PA, marital status, field center: <25: reference 25–29.9: White F: 0.85 (0.68–1.06) African-American F: 1.27 (0.86–1.89) White M: 1.23 (1.00–1.52) African-American M: 0.73 (0.45–1.18) ≥30: White F: 0.83 (0.63–1.09) African-American F: 1.26 (0.85–1.89) White M: 1.32 (1.03–1.69) African-American M: 1.21 (0.74–1.98)
			Overweight/ obesity and lack of PA				
Friis et al, 2007 (40) Denmark	N=5538 Employees (nurses) ? (51–59 years) 100% female	9-year FU BL: 1993	BMI (kg/m^2), Self-report 3 categories: <25 25–29.9 ≥30 PA, Self-report Leisure time PA 2 categories: Little PA & sedentary / physically active	Register-based PEW (post-employment wage)	BMI: 25-29.9: N=1283 ≥30: N=292 PA (little): N=4068	N=3710	HR adjusted for health, work schedule, work area, work pressure, influence at work, physical demands, PA, BMI, marital status and spouses SES, income: <25: reference 25–29.9: 1.12 (1.04–1.21) ≥30: 1.06 (0.91–1.24) PA (active): 1.13 (1.04–1.22)
Robroek et al, 2012 (18) Netherlands/ Europe	N=4923 Employees ? (50-country-specific retirement age) 56% male (N=2782) 44% female (N=2141)	4-year FU BL: 2004	BMI (kg/m^2), Self-report 3 categories: <25 25–29.9 ≥30 PA, Self-report regular participation in moderate and vigorous activities 2 categories: <1×/week ≥1×/week	Self-report Exited the labour force because of recognised health problems.	BMI: 25-29.9: N=2084 (42%) ≥30: N=722 (15%) PA: <1×/week N=274 (6%)	N=589 (12%)	HR adjusted for age, gender, education, cohabitation status, self-perceived health, BMI/ PA, alcohol, job control, job rewards: <25: reference 25–29.9: 1.08 (0.90–1.30) ≥30: 1.01 (0.79–1.31) PA (<1×/week): 0.94 (0.65–1.35)

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