

Table G2.A2 Cardiorespiratory Health

CVD — Men

First Author	Year	Age	N	Activity	Outcome	Relative Risk	P for trend	Study Type
Haapanen (1)	1996	35-63	1,072	TPA	CVD mortality Finnish men	<i>AEE kcal/week >2100 = reference</i> 1500.1-2100 1.59 (0.56-4.49)	NA	PCS
Mensink (2)	1996	23-69	7,689	LTPA	CVD mortality	<i>LTPA MET-hours/week low = reference</i> Moderate 0.54 (0.25-1.15) High 0.66 (0.33-1.34)	NA	PCS
Wannamethee(3)	1998	40-59	7,735	TPA	CVD mortality	<i>Recent PA inactive = reference</i> L vs. I 0.50 (0.27-0.90) M vs. I 0.21 (0.07-0.68) MV or V 0.70 (0.39-1.23)	NA	PCS
Wannamethee (3)	1998	40-59	7,735	TPA	CVD mortality	<i>Δ in act. in. to occ reference.</i> L to I 1.79 (1.03-3.13) I/O to L 0.56 (0.27-1.18) >L x 2 0.73 (0.41-1.30)	NA	PCS
Engstrom (4)	1999	55	652	LTPA	CVD mortality PA and BP interaction	<i>Activity index no vigorous activity = reference</i> Normoten Vigorous 0.72 (0.39-1.35) Hyperten Vigorous 0.33 (0.11-0.94)	NA	PCS
Yu (5)	2003	49-64	1,975	LTPA	CVD mortality	<i>TLTPA kcal/day T1 = ref</i> T2 vs. T1 0.81 (0.51-1.27) T3 vs. T1 0.64 (0.40-1.04)	P = 0.07	PCS
Yu (5)	2003	49-64	1,975	LTPA	CVD mortality	<i>L+M LTPA kcal/day T1 = reference</i> T2 vs. T1 1.09 (0.69-1.73) T3 vs. T1 1.01 (0.62-1.63)	P = 0.96	PCS
Yu (5)	2003	49-64	1,975	LTPA	CVD mortality	<i>Heavy LTPA kcal/day T1 = reference</i> T2 vs. T1 0.86 (0.57-1.32) T3 vs. T1 0.38 (0.21-0.67)	–	PCS

Table G2.A2 Cardiorespiratory Health (continued)

CVD — Men (continued)

First Author	Year	Age	N	Activity	Outcome	Relative Risk	P for trend	Study Type
Barengo (6)	2004	30-59	15,853	TPA	CVD mortality Both LTPA and OA associated with lower CVD	<i>LTPA index low = reference</i> Moderate 0.91 (0.52-1.00) High 0.83 (0.69-0.99)	NA	PCS
Barengo (6)	2004	30-59	15,853	TPA	CVD mortality Both LTPA and OA associated with lower CVD	<i>Occupat index low = reference</i> Moderate 0.75 (0.64-0.87) High 0.77 (0.69-0.87)	NA	PCS
Barengo (6)	2004	30-59	15,853	TPA	CVD mortality Both LTPA and OA associated with lower CVD	<i>Walk/Cycle to work <15 minutes = reference</i> 15-29 minutes 1.08 (0.95-1.23) ≥30 minutes 1.05 (0.93-1.19)	NA	PCS
Hu (7)	2004	25-74	8,928	TPA	CVD incidence Finnish men and women	<i>TPA index low = reference</i> Moderate 0.72 (0.57-0.91) High 0.68 (0.52-0.88)	P = 0.007	PCS
Lam(8)	2004	≥35	17,696	LTPA	CHD mortality	<i>MVP <1/month = reference</i> 4-12 x month 0.65 (0.56-0.75) ≥16 x month 0.67 (0.60-0.76)	NA	CC
Calling (9)	2006	45-73	10,366	LTPA	CVD mortality	<i>PA index quartile 1 = reference</i> Low BMI Q2-4 0.78 (0.50-1.20) High BMI Q2-4 0.72-0.998)	NA	PCS
Khaw (10)	2006	45-79	9,964	TPA	CVD incidence	<i>Physical activity index inactive = reference</i> Moderate-inactive 0.88 (0.77-1.00) Moderate-active 0.79 (0.88-0.91) Active 0.74 (0.64-0.86)	P < 0.001	PCS

Table G2.A2 Cardiorespiratory Health (continued)

CVD — Men (continued)

First Author	Year	Age	N	Activity	Outcome	Relative Risk	P for trend	Study Type
Raum (11)	2007	50-74	4,204	TPA	CHD incidence Light = walking, bike, hiking Heavy = sports or heavy labor	<i>Light PA 0-7 hours/week = reference</i> 0 hour/week 1.02 (0.68-1.53) 7-19 hours/week 0.92 (0.64-1.33) 20-39 hours/week 1.02 (0.68-1.54) ≥40 hours/week 1.06 (0.65-1.71)	NA	PCS
Raum (11)	2007	50-74	4,204	TPA	CHD incidence Light = walking, bike, hiking Heavy = sports or heavy labor	<i>Heavy PA 0-7 hours/week = reference</i> 0 hour/week 2.08 (1.19-3.65) 7-19 hours/week 1.45 (0.91-2.31) 20-39 hours/week 1.37 (0.85-2.22) ≥40 hours/week 1.85 (1.19-2.87)	NA	PCS

CVD — Women

First Author	Year	Age	N	Activity	Outcome	Relative Risk	P for trend	Study Type
Mensink (2)	1996	23-69	7,747	LTPA	CVD mortality	<i>LTPA MET-hours/week reference = low</i> Moderate 1.24 (0.43-4.57) High 0.86 (0.28-2.62)	NA	PCS
Kushi (12)	1997	55-69	40,417	LTPA	CVD Mortality Iowa Women's Health Study	<i>Moderate PA rare/never = reference</i> 1-4 x month 0.86 (0.61-1.21) 2-4 x week 0.74 (0.52-1.05) ≥4x week 0.53 (0.34-0.82)	P < 0.003	PCS
Kushi (12)	1997	55-69	40,417	LTPA	CVD Mortality Iowa Women's Health Study	<i>Vigorous PA rare/never = reference</i> 1-4 x month 0.85 (0.50-1.44) 2-4 x week 0.59 (0.28-1.25) ≥4 x week 0.20 (0.03-1.41)	P = 0.09	PCS
Kushi (12)	1997	55-69	40,417	LTPA	CVD Mortality Iowa Women's Health Study	<i>Physical activity index low = reference</i> Medium 0.86 (0.63-1.17) High 0.55 (0.38-0.81)	P = 0.002	PCS

Table G2.A2 Cardiorespiratory Health (continued)

CVD — Women (continued)

First Author	Year	Age	N	Activity	Outcome	Relative Risk	P for trend	Study Type
Weller (13)	1998	>30	6,620	TPA	CVD Mortality	<i>LTPA kcal/kg/day reference = Q1</i> Q2 vs. Q1 0.79 (0.46-1.37) Q3 vs. Q1 1.08 (0.72-1.64) Q4 vs. Q1 0.80 (0.50-1.26)	NA	PCS
Weller (13)	1998	>30	6,620	TPA	CVD Mortality	<i>Non-LTPA kcal/kg/day reference = Q1</i> Q2 vs. Q1 0.85 (0.56-1.28) Q3 vs. Q1 0.61 (0.39-0.96) Q4 vs. Q1 0.49 (0.28-0.86)	NA	PCS
Weller (13)	1998	>30	6,620	TPA	CVD Mortality	<i>Sitting >1/2 time = reference</i> 1/2 time 0.73 (0.49-1.08) <1/2 time 0.37 (0.24-0.56)	NA	PCS
Weller (13)	1998	>30	6,620	TPA	CVD Mortality	<i>Walking <1/2 time = reference</i> 1/2 time 0.74 (0.49-1.12) >1/2 time 0.81 (0.50-1.32)	NA	PCS
Sesso (14)	1999	45.5	1,564	LTPA	CVD incidence	<i>LTPA kcal/week <500 reference</i> 500-999 0.99 (0.69-1.41) ≥1000 0.88 (0.62-1.25)	P = 0.45	PCS
Sesso (14)	1999	45.5	1,564	LTPA	CVD incidence	<i>Blocks walked <4/day = reference</i> 4-9/day 0.84 (0.59-1.19) ≥10/day 0.67 (0.45-1.01)	P = 0.84	PCS
Sesso (14)	1999	45.5	1,564	LTPA	CVD incidence	<i>Sports played none = reference</i> 1-999 kcal/week 1.23 (0.74-2.03) ≥1000 kcal/week 1.32 (0.74-2.37)	P = 0.33	PCS
Rockhill (15)	2001	30-55	80,348	LTPA	CVD incidence	<i>LTPA hours/week <1 = reference</i> 1.0-1.9 0.80 (0.68-0.96) 2.0-3.9 0.74 (0.62-0.88) 4.0-6.9 0.62 (0.50-0.77) ≥7.0 0.69 (0.49-0.97)	–	PCS

Table G2.A2 Cardiorespiratory Health (continued)

CVD — Women (continued)

First Author	Year	Age	N	Activity	Outcome	Relative Risk	P for trend	Study Type
Manson (16)	2002	50-79	73,743	LTPA	CVD incidence Women's Health Initiative	<i>Total MET-hours/week</i> <2.5 = reference 2.5-7.2 0.89 (0.75-1.04) 7.3-13.4 0.81 (0.68-0.97) 13.5-23.3 0.78 (0.66-0.93) ≥23.4 0.72 (0.59-0.87)	P <0.001	PCS
Manson (16)	2002	50-79	73,743	LTPA	CVD incidence Women's Health Initiative	<i>Walking MET-hours/week</i> 0 = reference 0.1-2.5 0.91 (0.78-1.07) 2.6-5.0 0.82 (0.69-0.97) 5.1-10.0 0.75 (0.63-0.89) >10.0 0.68 (0.56-0.82)	P <0.001	PCS
Manson (16)	2002	50-79	73,743	LTPA	CVD incidence Women's Health Initiative	<i>Vigorous ex minute/week</i> 0 = reference 1-60 0.91 (0.73-1.12) 61-100 0.81 (0.63-1.06) 101-150 0.85 (0.64-1.13) >150 0.76 (0.58-1.00)	P = 0.01	PCS
Gregg (17)	2003	≥65	9,518	TPA	CVD Mortality	<i>kcal/week</i> reference <163 Q1 Q2 163-503 0.65 (0.53-0.79) Q3 504-1045 0.70 (0.57-0.80) Q4 1046-1906 0.60 (0.48-0.75) Q5 ≥1907 0.58 (0.46-0.74)	NA	PCS
Gregg (17)	2003	≥65	9,518	Walk	CVD Mortality	<i>kcal/week</i> reference <70 Q1 Q2 70-186 0.88 (0.73-1.06) Q3 187-419 0.66 (0.53-0.82) Q4 420-897 0.66 (0.55-0.84) Q5 >897 0.61 (0.49-0.78)	NA	PCS
Gregg (17)	2003	≥65	9,518	Δ PA	CVD Mortality	<i>Reference = stayed sedentary</i> Sedentary to active 0.64 (0.42-0.97) Active to sedentary 1.07 (0.81-1.42) Stayed active 0.62 (0.44-0.88)	NA	PCS

Table G2.A2 Cardiorespiratory Health (continued)

CVD — Women (continued)

First Author	Year	Age	N	Activity	Outcome	Relative Risk	P for trend	Study Type
Barengo (6)	2004	30-59	16,824	TPA	CVD mortality Both LTPA and OA associated with lower CVD	<i>LTPA index low = reference</i> Moderate 0.83 (0.71-0.96) High 0.89 (0.68-1.18)	NA	PCS
Barengo (6)	2004	30-59	16,824	TPA	CVD mortality Both LTPA and OA associated with lower CVD	<i>Occupat index low = reference</i> Moderate 0.73 (0.60-0.88) High 0.77 (0.65-0.91)	NA	PCS
Barengo (6)	2004	30-59	16,824	TPA	CVD mortality Both LTPA and OA associated with lower CVD	<i>Walk/Cycle to work <15 minutes = reference</i> 15-29 minutes 0.78 (0.62-0.97) ≥30 minutes 0.97 (0.82-1.15)	NA	PCS
Hu (7)	2004	25-74	9,964	TPA	CVD incidence Finnish men and women	<i>TPA index low = reference</i> Moderate 0.73 (0.55-0.97) High 0.64 (0.45-0.89)	P = 0.02	PCS
Lam (8)	2004	≥35	19,437	LTPA	CVD mortality Hong Kong chinese population	<i>MVP <1/month = reference</i> 4-12 x month 0.89 (0.78-1.03) ≥16 x month 0.71 (0.63-0.80)	NA	CC
Calling (9)	2006	45-73	16,606	LTPA	CVD mortality	<i>PA index quartile 1 = reference</i> Low BMI quartile 2-4 0.46 (0.26-0.83) High BMI quartile 2-4 0.78 (0.51-1.19)	NA	PCS
Khaw (10)	2006	45-79	12,207	TPA	CVD incidence Norfolk men and women	<i>Physical activity index inactive = reference</i> Moderate-inactive 0.98 (0.85-1.12) Moderate-active 0.94 (0.80-1.11) Active 0.69 (0.56-0.86)	P < 0.001	PCS

Table G2.A2 Cardiorespiratory Health (continued)

CVD — Women (continued)

First Author	Year	Age	N	Activity	Outcome	Relative Risk	P for trend	Study Type
Matthews (18)	2006	40-70	67,143	TPA	CVD Mortality	<i>Total active MET-hours/day <9.9 = reference</i> 10-13.6 0.94 (0.66-1.33) 13.7-18.0 0.75 (0.52-1.08) ≥18.1 0.66 (0.46-0.95)	P = 0.01	PCS
Matthews (18)	2006	40-70	67,143	TPA	CVD Mortality	<i>Adult ex MET-hours/day 0 = reference</i> 0.1-3.4 0.91 (0.70-1.19) 3.5-7.0 0.68 (0.39-1.18) ≥7.1 0.23 (0.03-1.64)	P = 0.04	PCS
Matthews (18)	2006	40-70	67,143	TPA	CVD Mortality	<i>Non-ex active Met-hours/day ≤9.9 = reference</i> 10.0-13.6 0.87 (0.63-1.22) 13.7-18.0 0.70 (0.49-1.01) ≥18.1 0.73 (0.50-1.06)	P = 0.06	PCS
Matthews (18)	2006	40-70	67,143	TPA	CVD Mortality	<i>Walking MET-hours/day ≤3.4 = reference</i> 3.5-7.0 1.09 (0.79-1.51) 7.1-10.0 1.14 (0.79-1.66) ≥10.1 0.92 (0.60-1.40)	P = 0.72	PCS
Raum (11)	2007	50-74	5,126	TPA	CVD incidence Primarily work activity Light = walking, bike, hiking Heavy = sports or heavy labor	<i>Light PA 0-7 hours/week = reference</i> 0 hour/week 1.59 (0.77-3.25) 7-19 hours/week 1.14 (0.61-2.13) 20-39 hours/week 1.02 (0.68-1.54) ≥40 hours/week 1.57 (0.85-1.89)	NA	PCS
Raum (11)	2007	50-74	5,126	TPA	CVD incidence Primarily work activity Light = walking, bike, hiking Heavy = sports or heavy labor	<i>Heavy PA 0-7 hours/week = reference</i> 0 hour/week 1.28 (0.70-2.35) 7-19 hours/week 1.83 (0.98-3.40) 20-39 hours/week 1.34 (0.66-2.71) ≥40 hours/week 1.49 (0.72-3.10)	NA	PCS

Table G2.A2 Cardiorespiratory Health (continued)

CVD — Men and Women

First Author	Year	Age	N	Activity	Outcome	Relative Risk	P for trend	Study Type
Kaplan (19)	1996	16-94	6,131	LTPA	CVD mortality	Sedentary vs. active 0.85 (0.75-0.97)	NA	PCS
LaCroix (20)	1996	≥65	1,845	LTPA	CVD incidence	<i>Walking <1 hour/week = reference</i> 1-4 hours/week 0.90 (0.69-1.17) >4 hours/week 0.73 (0.55-0.96)	P <0.05	PCS
Fang (21)	2003	25-74	9,790	TPA	CVD mortality NHANES 1	<i>PA Index Most = reference</i> Moderate 1.07 (0.91-1.26) Least 1.29 (1.10-1.51)	NA	PCS
Fang (22)	2005	25-74	14,407	TPA	CVD mortality	<i>PA index least active = reference</i> Normoten moderate 0.76 (0.39-1.49) Normoten most 0.65 (0.24-1.77) Prehyper moderate 0.79 (0.58-1.09) Prehyper most 0.89 (0.61-1.31) Hyper moderate 0.84 (0.73-0.97)	NA	PCS
Wisloff (23)	2006	>20	56,072	LTPA	CVD mortality	<i>No activity = reference</i> 1week, low,>30 0.71 (0.59-0.86) 1week, high,>30 0.61 (0.49-0.75) ≥4week, low,>30 0.85 (0.74-0.99) ≥4week, high,>30 0.70 (0.57-0.86)	NS	PCS

Reference List

1. Haapanen N, Miilunpalo S, Vuori I, Oja P, Pasanen M. Characteristics of leisure time physical activity associated with decreased risk of premature all-cause and cardiovascular disease mortality in middle-aged men. *Am.J.Epidemiol.* 1996 May 1;143(9):870-80.
2. Mensink GB, Deketh M, Mul MD, Schuit AJ, Hoffmeister H. Physical activity and its association with cardiovascular risk factors and mortality. *Epidemiology* 1996 Jul;7(4):391-7.
3. Wannamethee SG, Shaper AG, Walker M. Changes in physical activity, mortality, and incidence of coronary heart disease in older men. *Lancet* 1998 May 30;351(9116):1603-8.

4. Engstrom G, Hedblad B, Janzon L. Hypertensive men who exercise regularly have lower rate of cardiovascular mortality. *J.Hypertens.* 1999 Jun;17(6):737-42.
5. Yu S, Yarnell JW, Sweetnam PM, Murray L. What level of physical activity protects against premature cardiovascular death? The Caerphilly study. *Heart* 2003 May;89(5):502-6.
6. Barengo NC, Hu G, Lakka TA, Pekkarinen H, Nissinen A, Tuomilehto J. Low physical activity as a predictor for total and cardiovascular disease mortality in middle-aged men and women in Finland. *Eur.Heart J.* 2004 Dec;25(24):2204-11.
7. Hu G, Tuomilehto J, Silventoinen K, Barengo N, Jousilahti P. Joint effects of physical activity, body mass index, waist circumference and waist-to-hip ratio with the risk of cardiovascular disease among middle-aged Finnish men and women. *Eur.Heart J.* 2004 Dec;25(24):2212-9.
8. Lam TH, Ho SY, Hedley AJ, Mak KH, Leung GM. Leisure time physical activity and mortality in Hong Kong: case-control study of all adult deaths in 1998. *Ann.Epidemiol.* 2004 Jul;14(6):391-8.
9. Calling S, Hedblad B, Engstrom G, Berglund G, Janzon L. Effects of body fatness and physical activity on cardiovascular risk: risk prediction using the bioelectrical impedance method. *Scand.J.Public Health* 2006;34(6):568-75.
10. Khaw KT, Jakes R, Bingham S, Welch A, Luben R, Day N, Wareham N. Work and leisure time physical activity assessed using a simple, pragmatic, validated questionnaire and incident cardiovascular disease and all-cause mortality in men and women: The European Prospective Investigation into Cancer in Norfolk prospective population study. *Int.J.Epidemiol.* 2006 Aug;35(4):1034-43.
11. Raum E, Rothenbacher D, Ziegler H, Brenner H. Heavy physical activity: risk or protective factor for cardiovascular disease? A life course perspective. *Ann.Epidemiol.* 2007 Jun;17(6):417-24.
12. Kushi LH, Fee RM, Folsom AR, Mink PJ, Anderson KE, Sellers TA. Physical activity and mortality in postmenopausal women. *JAMA* 1997 Apr 23;277(16):1287-92.
13. Weller I, Corey P. The impact of excluding non-leisure energy expenditure on the relation between physical activity and mortality in women. *Epidemiology* 1998 Nov;9(6):632-5.
14. Sesso HD, Paffenbarger RS, Ha T, Lee IM. Physical activity and cardiovascular disease risk in middle-aged and older women. *Am.J.Epidemiol.* 1999 Aug 15;150(4):408-16.

15. Rockhill B, Willett WC, Manson JE, Leitzmann MF, Stampfer MJ, Hunter DJ, Colditz GA. Physical activity and mortality: a prospective study among women. *Am.J.Public Health* 2001 Apr;91(4):578-83.
16. Manson JE, Greenland P, LaCroix AZ, Stefanick ML, Mouton CP, Oberman A, Perri MG, Sheps DS, Pettinger MB, Siscovick DS. Walking compared with vigorous exercise for the prevention of cardiovascular events in women. *N.Engl.J.Med.* 2002 Sep 5;347(10):716-25.
17. Gregg EW, Gerzoff RB, Caspersen CJ, Williamson DF, Narayan KM. Relationship of walking to mortality among US adults with diabetes. *Arch.Intern.Med.* 2003 Jun 23;163(12):1440-7.
18. Matthews CE, Jurj AL, Shu XO, Li HL, Yang G, Li Q, Gao YT, Zheng W. Influence of exercise, walking, cycling, and overall nonexercise physical activity on mortality in Chinese women. *Am.J.Epidemiol.* 2007 Jun 15;165(12):1343-50.
19. Kaplan GA, Strawbridge WJ, Cohen RD, Hungerford LR. Natural history of leisure-time physical activity and its correlates: associations with mortality from all causes and cardiovascular disease over 28 years. *Am.J.Epidemiol.* 1996 Oct 15;144(8):793-7.
20. LaCroix AZ, Leveille SG, Hecht JA, Grothaus LC, Wagner EH. Does walking decrease the risk of cardiovascular disease hospitalizations and death in older adults? *J.Am.Geriatr.Soc.* 1996 Feb;44(2):113-20.
21. Fang J, Wylie-Rosett J, Cohen HW, Kaplan RC, Alderman MH. Exercise, body mass index, caloric intake, and cardiovascular mortality. *Am.J.Prev.Med.* 2003 Nov;25(4):283-9.
22. Fang J, Wylie-Rosett J, Alderman MH. Exercise and cardiovascular outcomes by hypertensive status: NHANES I epidemiological follow-up study, 1971-1992. *Am.J.Hypertens.* 2005 Jun;18(6):751-8.
23. Wisloff U, Nilsen TI, Droyvold WB, Morkved S, Slordahl SA, Vatten LJ. A single weekly bout of exercise may reduce cardiovascular mortality: how little pain for cardiac gain? 'The HUNT study, Norway'. *Eur.J.Cardiovasc.Prev.Rehabil.* 2006 Oct;13(5):798-804.