

Supplemental Online Content

dos Santos M, Ferrari G, Lee DH, et al. Association of the “weekend warrior” and other leisure-time physical activity patterns with all-cause and cause-specific mortality: a nationwide cohort study. *JAMA Intern Med*. Published online July 5, 2022. doi:10.1001/jamainternmed.2022.2488

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This supplemental material has been provided by the authors to give readers additional information about their work.

eTable 1. The number and proportion of missing data in NHIS, 1997-2013

	No.	%
Education level	1,685	0.50
Marital status	846	0.17
BMI	10,753	2.98
Smoking status	880	0.24
Alcohol intake	3,799	1.07
Serious psychological distress	3,235	0.92
Number of chronic conditions	737	0.19
Self-rated health	121	0.03
Mobility	2,879	0.74

eTable 2. Sensitivity analysis adjusted for total volume of PA: Associations Between Regularly Active Physical Activity Pattern and All-Cause and Cause-Specific Mortality by Frequency, Duration, and Intensity of activities

Dimensions of Physical Activity	All-cause Mortality	CVD mortality	Cancer mortality
	HR (95% CI)^a	HR (95% CI)^a	HR (95% CI)^a
Physical Activity Pattern			
Inactive	1.00 [Reference]	1.00 [Reference]	1.00 [Reference]
Regularly active	0.85 (0.82 to 0.88)	0.76 (0.69 to 0.84)	0.88 (0.82 to 0.94)
Frequency (times/week)			
3-4 times/week	0.81 (0.75 to 0.86)	0.80 (0.67 to 0.96)	0.83 (0.73 to 0.93)
5+ times/week	0.86 (0.82 to 0.90)	0.74 (0.67 to 0.83)	0.90 (0.82 to 0.97)
Duration (min/each time)			
≤20	1.01 (0.85 to 1.21)	0.85 (0.55 to 1.29)	1.10 (0.83 to 1.46)
>20 to ≤30	0.91 (0.85 to 0.98)	0.74 (0.62 to 0.89)	0.97 (0.85 to 1.10)
>30 to ≤60	0.84 (0.79 to 0.88)	0.76 (0.67 to 0.87)	0.86 (0.79 to 0.95)
>60	0.80 (0.75 to 0.85)	0.74 (0.64 to 0.86)	0.81 (0.73 to 0.91)
Intensity (% VPA/MVPA)			
0%	0.90 (0.86 to 0.95)	0.74 (0.64 to 0.84)	0.92 (0.83 to 1.03)
1%-25%	0.79 (0.69 to 0.89)	0.86 (0.65 to 1.14)	0.74 (0.59 to 0.93)
26%-50%	0.92 (0.84 to 1.02)	0.87 (0.68 to 1.11)	1.00 (0.85 to 1.17)
51%-75%	0.79 (0.73 to 0.85)	0.72 (0.60 to 0.85)	0.75 (0.66 to 0.85)
76%-99%	0.79 (0.73 to 0.86)	0.62 (0.48 to 0.79)	0.89 (0.77 to 1.03)
100%	0.82 (0.75 to 0.89)	0.90 (0.75 to 1.07)	0.92 (0.80 to 1.07)

Abbreviations: CI, confidence interval; CVD, cardiovascular disease; HR, hazard ratio
a, adjusted for age, sex, race/ethnicity, education, income, marital status, smoking, alcohol intake, self-rated health, psychological distress, number of diseases/comorbidities, mobility and total volume of PA.

eTable 3. Sensitivity analysis adjusted for BMI: Associations Between Regularly Active Physical Activity Pattern and All-Cause and Cause-Specific Mortality by Frequency, Duration and Intensity of activities

Dimensions of Physical Activity	All-cause Mortality	CVD mortality	Cancer mortality
	HR (95% CI) ^a	HR (95% CI) ^a	HR (95% CI) ^a
Physical Activity Pattern			
Inactive	1.00 [Reference]	1.00 [Reference]	1.00 [Reference]
Regularly active	0.85 (0.82 to 0.88)	0.77 (0.71 to 0.84)	0.89 (0.83 to 0.95)
Frequency (times/week)			
3-4 times/week	0.81 (0.76 to 0.86)	0.81 (0.68 to 0.97)	0.83 (0.73 to 0.94)
5+ times/week	0.86 (0.83 to 0.90)	0.76 (0.70 to 0.83)	0.90 (0.84 to 0.97)
Duration of sessions (in minutes)			
≤20	1.02 (0.86 to 1.21)	0.85 (0.56 to 1.30)	1.11 (0.83 to 1.47)
>20 to ≤30	0.91 (0.85 to 0.98)	0.75 (0.62 to 0.90)	0.98 (0.86 to 1.12)
>30 to ≤60	0.84 (0.80 to 0.89)	0.77 (0.68 to 0.87)	0.88 (0.80 to 0.96)
>60	0.83 (0.79 to 0.87)	0.77 (0.69 to 0.87)	0.85 (0.77 to 0.93)
Intensity (% VPA/MVPA)			
0%	0.91 (0.86 to 0.95)	0.74 (0.65 to 0.85)	0.93 (0.84 to 1.03)
1%-25%	0.80 (0.71 to 0.91)	0.89 (0.68 to 1.16)	0.76 (0.61 to 0.94)
26%-50%	0.94 (0.85 to 1.03)	0.89 (0.71 to 1.13)	1.01 (0.87 to 1.19)
51%-75%	0.80 (0.75 to 0.85)	0.73 (0.62 to 0.87)	0.76 (0.68 to 0.86)
76%-99%	0.81 (0.75 to 0.87)	0.64 (0.51 to 0.80)	0.91 (0.78 to 1.05)
100%	0.85 (0.74 to 0.98)	0.92 (0.77 to 1.09)	0.94 (0.82 to 1.08)

Abbreviations: CI, confidence interval; CVD, cardiovascular disease; HR, hazard ratio; NA, not applicable/able to calculate

a, adjusted for age, sex, race/ethnicity, education, income, marital status, smoking, BMI, alcohol intake, self-rated health, psychological distress, number of diseases/comorbidities and mobility.

eTable 4. Sensitivity analysis excluding participants with ≥ 780 min/week of physical activity: Associations Between Weekend Warriors Physical Activity Pattern and Mortality, with Regularly Active as the Reference Category

Dimensions of Physical Activity	All-cause Mortality	CVD mortality	Cancer mortality
	HR (95% CI)^a	HR (95% CI)^a	HR (95% CI)^a
Physical Activity Pattern			
Regularly active	1.00 [Reference]	1.00 [Reference]	1.00 [Reference]
Weekend Warrior	1.08 (0.97 to 1.20)	1.14 (0.85 to 1.53)	1.06 (0.85 to 1.30)
Frequency (times/week)			
1 time/week	1.01 (0.82 to 1.24)	1.40 (0.87 to 2.26)	0.73 (0.46 to 1.16)
2 times/week	1.11 (0.98 to 1.26)	0.98 (0.71 to 1.35)	1.23 (0.97 to 1.55)
Intensity (% VPA/MVPA)			
0%	1.15 (0.98 to 1.34)	1.19 (0.80 to 1.78)	1.27 (0.95 to 1.71)
1%-25%	0.74 (0.39 to 1.41)	0.55 (0.08 to 3.95)	0.97 (0.33 to 2.89)
26%-50%	1.04 (0.65 to 1.66)	NA	1.10 (0.41 to 2.93)
51%-75%	0.87 (0.56 to 1.33)	0.69 (0.25 to 1.87)	0.64 (0.31 to 1.32)
76%-99%	0.99 (0.66 to 1.48)	1.68 (0.82 to 3.45)	0.79 (0.32 to 1.94)
100%	1.11 (0.94 to 1.31)	1.14 (0.70 to 1.86)	1.03 (0.73 to 1.46)

Abbreviations: CI, confidence interval; CVD, cardiovascular disease; HR, hazard ratio; NA, not applicable/able to calculate

a, adjusted for age, sex, race/ethnicity, education, income, marital status, smoking, alcohol intake, self-rated health, psychological distress, number of diseases/comorbidities, mobility and total volume of PA.

eTable 5. Sensitivity analysis excluding participants with ≥ 600 min/week of physical activity: Associations Between Weekend Warriors Physical Activity Pattern and Mortality, with Regularly Active as the Reference Category

Dimensions of Physical Activity	All-cause Mortality	CVD mortality	Cancer mortality
	HR (95% CI) ^a	HR (95% CI) ^a	HR (95% CI) ^a
Physical Activity Pattern			
Regularly active	1.00 [Reference]	1.00 [Reference]	1.00 [Reference]
Weekend Warrior	1.09 (0.98 to 1.22)	1.14 (0.84 to 1.54)	1.07 (0.87 to 1.33)
Frequency (times/week)			
1 times/week	1.02 (0.83 to 1.25)	1.43 (0.89 to 2.30)	0.72 (0.45 to 1.16)
2 times/week	1.13 (0.99 to 1.28)	0.95 (0.68 to 1.33)	1.27 (1.00 to 1.61)
Intensity (% VPA/MVPA)			
0%	1.15 (0.98 to 1.35)	1.21 (0.81 to 1.80)	1.31 (0.97 to 1.77)
1%-25%	0.76 (0.40 to 1.44)	0.55 (0.08 to 4.00)	1.01 (0.34 to 2.99)
26%-50%	1.06 (0.66 to 1.69)	NA	1.12 (0.42 to 2.97)
51%-75%	0.90 (0.59 to 1.38)	0.71 (0.26 to 1.94)	0.66 (0.32 to 1.37)
76%-99%	0.99 (0.65 to 1.52)	1.75 (0.85 to 3.58)	0.84 (0.34 to 2.05)
100%	1.13 (0.96 to 1.34)	1.08 (0.65 to 1.82)	1.03 (0.73 to 1.47)

Abbreviations: CI, confidence interval; CVD, cardiovascular disease; HR, hazard ratio; NA, not applicable/able to calculate

a, adjusted for age, sex, race/ethnicity, education, income, marital status, smoking, alcohol intake, self-rated health, psychological distress, number of diseases/comorbidities, mobility and total volume of PA.

eTable 6. Sensitivity analysis excluding the first 5 years of follow-up: Associations Between Weekend Warriors Physical Activity Pattern and Mortality, with Regularly Active as the Reference Category

Dimensions of Physical Activity	All-cause Mortality	CVD mortality	Cancer mortality
	HR (95% CI)^a	HR (95% CI)^a	HR (95% CI)^a
Physical Activity Pattern			
Regularly active	1.00 [Reference]	1.00 [Reference]	1.00 [Reference]
Weekend Warrior	1.12 (0.99 to 1.26)	1.19 (0.86 to 1.64)	1.11 (0.88 to 1.38)
Frequency (times/week)			
1 times/week	1.14 (0.91 to 1.43)	1.66 (0.98 to 2.80)	0.82 (0.49 to 1.36)
2 times/week	1.10 (0.96 to 1.26)	0.96 (0.69 to 1.34)	1.25 (0.97 to 1.60)
Intensity (% VPA/MVPA)			
0%	1.16 (0.98 to 1.38)	1.28 (0.84 to 1.95)	1.31 (0.96 to 1.77)
1%-25%	0.79 (0.40 to 1.56)	0.76 (0.10 to 5.51)	0.76 (0.21 to 2.69)
26%-50%	1.08 (0.65 to 1.78)	NA	0.96 (0.33 to 2.81)
51%-75%	0.79 (0.51 to 1.21)	0.68 (0.22 to 2.18)	0.85 (0.41 to 1.76)
76%-99%	0.81 (0.49 to 1.35)	1.49 (0.66 to 3.39)	0.71 (0.23 to 2.20)
100%	1.22 (1.02 to 1.46)	1.25 (0.73 to 2.12)	1.12 (0.78 to 1.62)

Abbreviations: CI, confidence interval; CVD, cardiovascular disease; HR, hazard ratio; NA, not applicable/able to calculate

a, adjusted for age, sex, race/ethnicity, education, income, marital status, smoking, alcohol intake, self-rated health, psychological distress, number of diseases/comorbidities, mobility and total volume of PA.