

WEB MATERIAL

Validity and Relative Validity of Alternative Methods of Assessing Physical Activity in Epidemiologic Studies: Findings From the Men's Lifestyle Validation Study

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Table of Contents

Web Appendix		3
Web Table 1.	Specific Activities and Sedentary Behaviors Included on the Physical Activity Questionnaire (PAQ) with Assigned Metabolic Equivalent Task Values.	5
Web Table 2.	Participant Characteristics Overall and By Cohort in the Men's Lifestyle Validation Study, United States, 2011–2013.	6
Web Table 3.	Means and Standard Deviations for Physical Activity and Body Composition Variables Overall and By Subgroup of Age and Body Mass Index in the Men's Lifestyle Validation Study, 2011–2013.	7
Web Table 4.	Spearman Correlation Coefficients Comparing the Physical Activity Questionnaire and Multiple Activities Completed Over Time in 24 Hours to Doubly Labeled Water-Determined Total Daily Energy Expenditure and Physical Activity Energy Expenditure in Men's Lifestyle Validation Study, 2011–2013.	10
Web Table 5.	Spearman Correlation Coefficients Comparing the Physical Activity Questionnaire and Multiple Activities Completed Over Time in 24 Hours to Doubly Labeled Water-Determined Physical Activity Level According to Age Group in Men's Lifestyle Validation Study, 2011–2013.	12
Web Table 6.	Spearman Correlation Coefficients Comparing the Physical Activity Questionnaire and Multiple Activities Completed Over Time in 24 Hours to Doubly Labeled Water-Determined Physical Activity Level According to Body Mass Index Group in Men's Lifestyle Validation Study, 2011–2013.	13
Web Table 7.	Spearman Correlation Coefficients Comparing Each Individual Activities Completed Over Time in 24 Hours to Doubly Labeled Water-Determined Physical Activity Level in Men's Lifestyle Validation Study, 2011–2013.	15
Web Table 8.	Spearman Correlation Coefficients Comparing Each Individual Activities Completed Over Time in 24 Hours to the Corresponding Accelerometer-Determined Activity in the Men's Lifestyle Validation Study, 2011–2013.	16
Web Table 9.	Spearman Correlation Coefficients Comparing the Physical Activity Questionnaire, Multiple Activities Completed Over 24-Hours, and Accelerometer to Body Fat Percent Measured by Dual Energy X-ray Absorptiometry in the Men's Lifestyle Validation Study, United States, 2011–2013.	17
Web Table 10.	Spearman Correlation Coefficients Comparing Each Individual Activities Completed Over 24-Hours and Accelerometer Measure to Resting Pulse Rate and Percent Body Fat as Measured by Doubly Labeled Water and Dual Energy X-ray Absorptiometry in the Men's Lifestyle Validation Study, 2011–2013.	18
Web Table 11.	Validity Coefficients ^a Showing Correlations with True Physical Activity for Physical Activity Estimated by the Second PAQ or the Average of Multiple ACT24s with Accelerometer as the Reference Method and DLW-determined Physical Activity	19

Energy Expenditure as the Biomarker in the Men's Lifestyle Validation Study, 2011–2013.

Web Table 12.

Validity Coefficients^a Showing Correlations with True Physical Activity for Physical Activity Estimated by the Second PAQ or the Average of Multiple ACT24s with Accelerometer as the Reference Method and DLW-determined Physical Activity Energy Expenditure Adjusted for Body Weight as the Biomarker in the Men's Lifestyle Validation Study, 2011–2013.

20

WEB APPENDIX

Methods

Accelerometer

At two time points, participants were asked to wear the accelerometer on the hip for 7 days during waking hours, except bathing or swimming, and maintain a wear time diary. For accelerometers, the epoch was set to 1 second and the low-frequency extension was enabled. The low-frequency extension widens the bandpass filter of the raw acceleration signal after a proprietary low pass anti-aliasing filter is applied.(1) This filter increases the sensitivity of the device in the low-frequency range.(2) Accelerometer data was screened for wear time using standard methods.(3, 4) Non-wear time was defined as ≥ 60 consecutive minutes with zero accelerometer counts, allowing up to two minutes with limited movement (< 200 counts per minute, the threshold for sedentary time using triaxial counts). (5) Daily wear time was calculated by subtracting non-wear time from 24 hours. Participants' wear time diaries were used to identify days of wear. Participants' accelerometer data were included if, for each week of wear, they had at least 4 days with ≥ 10 hours of wear per day. Time spent in each activity category, defined by intensity, was obtained by summing minutes of each day when the count satisfied the corresponding intensity criterion. Bouts of sedentary time were defined as 15 or more consecutive minutes at the relevant threshold. Additional details have been described previously.(6)

Deattenuated correlations

Spearman correlation coefficients were deattenuated as detailed previously.(7) Measures from each assessment method are transformed into ranks on the probit scale. The method is used to correct the correlation between two methods for within person variation in one or both variables to estimate the correlation that would be seen with a large number (infinite) number of replicates. The deattenuation can be applied where some but not all individuals have at least two repeated measurements and the number of replicates vary.

Method of triads

When calculating log-transformed physical activity variables, a small number (0.001) was added to zero values. We used the method of triads to estimate the correlation of each assessment method with the latent, true physical activity level.(8) In this analysis, we assumed that the errors of the three assessment methods are uncorrelated. We made this assumption because the different assessment methods, for example the PAQ, accelerometer, and DLW, are based on different types of information. The PAQ and ACT24 are based on self-report while accelerometer-measured activity is device-based, and DLW-PAL is obtained from a urine-based laboratory assay. In addition, we ensured by design that the different methods were administered at different times over the one-year period to avoid spuriously high correlations. We further assumed positive linear correlations between the assessment methods and the true physical activity levels.(9) We obtained confidence intervals for validity coefficients using a method previously described.(10) Any estimated validity coefficients that were > 1 , referred to as Heywood cases, were identified and noted in the tables. If Heywood cases occurred in a confidence interval bound, the bound was set to 1.00.

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Web Table 1. Specific Activities and Sedentary Behaviors Included on the Physical Activity Questionnaire with Assigned Metabolic Equivalent Task Values.

PAQ Item	MET Value
Walking to work or for exercise (including golf)	
Easy (<2 mph)	2.8
Normal (2-2.9 mph)	3
Brisk (3-3.9 mph)	4.3
Very brisk (≥ 4 mph)	7
Jogging (slower than 10 minutes/mile)	7
Running (10 minutes/mile or faster)	11
Bicycling (including stationary machine)	
Low	4
Medium	7
High	10
Swimming	
Low	5
Medium	7
High	10
Tennis	
Low	5
Medium	7
High	8
Squash or racquetball	9
Weightlifting (include machines such as LifeFitness)	5.5
Arms	
Legs	
Moderate outdoor work (e.g., yardwork, gardening)	4.5
Heaving outdoor work (e.g., digging, chopping)	5.5
Lower intensity exercise (yoga, stretching, toning)	3
Other aerobic exercise (exercise classes, etc.)	6
Stair climbing	8.5
Standing or walking around work	1.8
Standing or walking around home	1.8
Sitting at work or commuting	1.3
Sitting at home while watching TV/VCR/DVD	1.3
Other sitting at home (e.g. desk, eating, computer)	1.3

MET: metabolic equivalent task; PAQ: physical activity questionnaire.

Assigned MET values adapted from the Compendium of Physical Activities, 2011. Response options for all activities except stair climbing include 13 categories ranging from “None” to “40+ Hrs.” in units of hours per week during the past year. Daily stair climbing response options include 6 categories (no flights, 1-2, 3-4, 5-9, 10-14, ≥ 15 flights). Daily flights converted to hours per week assuming 8 seconds per flight climbed.

Web Table 2. Participant Characteristics Overall and By Cohort in the Men’s Lifestyle Validation Study, United States, 2011–2013.

Variable	Overall (N=609)	HPFS Subset (N=437)	Harvard Pilgrim Subset (N=172)
Age, mean (SD), years	68.1 (7.6)	71.6 (4.2)	59.3 (7.4)
Height, mean (SD), m	1.8 (0.1)	1.8 (0.1)	1.8 (0.1)
Weight, mean (SD), kg	81.7 (12.3)	81 (12.1)	83.6 (12.7)
Weight change, mean (SD), kg ^c	-0.04 (2.67)	-0.1 (2.5)	0.1 (3)
BMI, mean (SD), kg/m ²	26.1 (3.7)	26 (3.6)	26.5 (3.8)
Current smoker, % ^d	1.2	1.2	1.2
African American, %	2.3	1.1	5.2
Harvard Pilgrim, %	28.2	-	-
Second PAQ			
Total activity, mean (SD), MET-hr/day	10.4 (6.6)	10.7 (6.4)	9.7 (7.1)
MVPA, mean (SD), MET-hr/day	7.4 (5.5)	7.6 (5.4)	6.7 (5.6)
Sedentary, mean (SD), hr/day	4.6 (2.9)	4.2 (2.6)	5.6 (3.2)
First DLW			
PAL, mean (SD)	1.7 (0.2)	1.7 (0.2)	1.8 (0.3)

DXA: dual energy X-ray absorptiometry; DLW: doubly labeled water; BMI: body mass index; PAQ: physical activity questionnaire; MVPA: moderate to vigorous physical activity; MET: metabolic equivalent of task; PAL: physical activity level.

^aDXA was conducted in a subset of participants residing in the Boston area (n=197).

^bA subgroup (n=100) of participants in group 1 completed a second DLW measurement at approximately 9, 12, or 15 months.

^cWeight change calculated as difference in reported weight between administration of first and second PAQ; missing, n=1.

^dCurrent smoking was missing in 5 men.

Web Table 3. Means and Standard Deviations for Physical Activity and Body Composition Variables Overall and By Subgroup of Age and Body Mass Index in the Men's Lifestyle Validation Study (MLVS), 2011–2013.

Variable and Measurement No.	MLVS Cohort		Age Group				BMI Group			
	All		Age <70 yr		Age ≥70 yr		BMI <25 kg/m ²		BMI ≥25 kg/m ²	
	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)
PAL										
DLW no. 1	609	1.7 (0.2)	352	1.8 (0.2)	257	1.7 (0.2)	258	1.8 (0.2)	351	1.7 (0.2)
DLW no. 2	100	1.8 (0.3)	81	1.8 (0.3)	19	1.7 (0.2)	43	1.8 (0.3)	57	1.8 (0.2)
TDEE, kcal/day										
DLW no. 1	609	2766.6 (429.1)	352	2868.7 (435)	257	2626.9 (379.3)	258	2672.6 (408.1)	351	2835.7 (431.6)
DLW no. 2	100	2957 (481.7)	81	3009.1 (499.7)	19	2734.7 (319)	43	2847.9 (536.9)	57	3039.3 (421.9)
PAEE, kcal/day										
DLW no. 1	609	901.5 (335.3)	352	964.1 (342.5)	257	815.7 (305.6)	258	901 (333)	351	901.9 (337.5)
DLW no. 2	100	1035.6 (388.3)	81	1068.5 (412)	19	895.1 (221.1)	43	1019.4 (440.1)	57	1047.7 (347.7)
Total percent fat, %										
DLW no. 1	609	27.9 (6.6)	352	27.1 (6.3)	257	29.1 (6.8)	258	24.3 (5.5)	351	30.6 (6.1)
DLW no. 2	100	26.8 (6.1)	81	25.8 (6)	19	31 (5)	43	22.9 (4.8)	57	29.7 (5.4)
DXA no. 1	197	23.2 (5.2)	171	22.7 (5.1)	26	26.5 (4.6)	76	19.6 (3.8)	121	25.5 (4.6)
DXA no. 2	99	23.1 (4.9)	82	22.4 (4.7)	17	26.1 (4.9)	42	19.7 (3.5)	57	25.5 (4.3)
Total physical activity ^a										
PAQ (1), MET-hr/day	609	10.6 (11.2)	352	10.6 (9.4)	257	10.6 (13.4)	258	11 (10.3)	351	10.3 (11.8)
PAQ (2), MET-hr/day	609	10.4 (6.6)	352	10.4 (6.5)	257	10.5 (6.7)	258	11.1 (6.6)	351	10 (6.6)
PAQ (Avg), MET-hr/day	609	10.5 (7.6)	352	10.5 (7)	257	10.6 (8.4)	258	11 (7.5)	351	10.2 (7.7)
ACT24 (1), MET-hr/day	540	18.8 (11.6)	313	19.3 (12.3)	227	18.2 (10.5)	225	19.7 (11.8)	315	18.2 (11.5)
ACT24 (2), MET-hr/day	524	16.5 (9.8)	300	17 (10.4)	224	15.8 (9)	219	16.7 (9.6)	305	16.3 (10)
ACT24 (3), MET-hr/day	528	15.3 (9.9)	300	15.4 (9.9)	228	15.2 (9.8)	219	15.5 (9.6)	309	15.2 (10.1)
ACT24 (4), MET-hr/day	540	16.2 (9.9)	308	16.6 (10.7)	232	15.8 (8.9)	232	17.2 (9.8)	308	15.5 (10)
ACT24 (Avg), MET-hr/day	609	17.0 (7.9)	352	17.3 (8.3)	257	16.5 (7.4)	258	17.7 (8.3)	351	16.4 (7.7)
Accelerometer (1), TAC/day	609	596,032 (193,831)	352	625,997 (189,005)	257	554,991 (193,195)	258	637,203 (191,489)	351	565,770 (190,191)
Accelerometer (2), TAC/day	516	574,118 (186,905)	297	599,444 (186,078)	219	539,770 (182,902)	225	611,868 (185,490)	291	544,929 (183,031)
Accelerometer (Avg), TAC/day	609	587,021 (181,709)	352	615,693 (179,737)	257	547,750 (177,331)	258	629,995 (181,592)	351	555,433 (175,448)
MVPA										
PAQ (1), MET-hr/day	609	7.4 (9.3)	352	7.3 (8.7)	257	7.6 (10.1)	258	8.1 (10)	351	6.9 (8.8)
PAQ (2), MET-hr/day	609	7.4 (5.5)	352	7.1 (5.3)	257	7.8 (5.8)	258	8.2 (5.7)	351	6.8 (5.3)
PAQ (Avg), MET-hr/day	609	7.4 (6.4)	352	7.2 (6.2)	257	7.7 (6.7)	258	8.1 (7)	351	6.9 (5.9)
PAQ (1), hr/day	609	1.4 (1.0)	352	1.3 (0.9)	257	1.5 (1.2)	258	1.4 (1)	351	1.3 (1)
PAQ (2), hr/day	609	1.4 (1.1)	352	1.3 (1)	257	1.6 (1.1)	258	1.5 (1.1)	351	1.4 (1.1)
PAQ (Avg), hr/day	609	1.4 (0.9)	352	1.3 (0.9)	257	1.5 (1)	258	1.5 (0.9)	351	1.3 (0.9)
ACT24 (1), MET-hr/day	540	12.6 (11.7)	313	12.7 (12.6)	227	12.5 (10.3)	225	12.9 (11.6)	315	12.4 (11.7)
ACT24 (2), MET-hr/day	524	10.3 (10.1)	300	10.4 (10.8)	224	10.2 (9.2)	219	9.9 (9.3)	305	10.6 (10.6)
ACT24 (3), MET-hr/day	528	9.5 (9.9)	300	9.4 (9.8)	228	9.5 (9.9)	219	9.5 (9.5)	309	9.4 (10.1)
ACT24 (4), MET-hr/day	540	10.0 (9.9)	308	10.2 (10.6)	232	9.7 (8.8)	232	10.8 (9.5)	308	9.4 (10.1)
ACT24 (Avg), MET-hr/day	609	10.7 (7.7)	352	10.8 (8)	257	10.6 (7.3)	258	11.1 (7.9)	351	10.4 (7.6)
ACT24 (1), hr/day	540	2.7 (2.4)	313	2.6 (2.5)	227	2.7 (2.2)	225	2.7 (2.3)	315	2.7 (2.5)
ACT24 (2), hr/day	524	2.2 (2.1)	300	2.2 (2.2)	224	2.3 (2)	219	2.1 (2)	305	2.3 (2.2)
ACT24 (3), hr/day	528	2.1 (2.0)	300	2.1 (2.1)	228	2 (2)	219	2 (1.9)	309	2.1 (2.1)
ACT24 (4), hr/day	540	2.2 (2.1)	308	2.2 (2.3)	232	2.1 (1.9)	232	2.3 (2)	308	2.1 (2.2)
ACT24 (Avg), hr/day	609	2.3 (1.6)	352	2.3 (1.7)	257	2.3 (1.5)	258	2.3 (1.6)	351	2.3 (1.6)
Accelerometer (1), hr/day ^b	609	0.85 (0.51)	352	0.94 (0.49)	257	0.72 (0.5)	258	0.93 (0.53)	351	0.79 (0.48)
Accelerometer (2), hr/day ^b	516	0.79 (0.48)	297	0.87 (0.48)	219	0.68 (0.45)	225	0.86 (0.49)	291	0.74 (0.46)
Accelerometer (Avg), hr/day ^b	609	0.83 (0.47)	352	0.92 (0.47)	257	0.7 (0.45)	258	0.91 (0.49)	351	0.76 (0.45)
Vigorous activity										
PAQ (1), MET-hr/day	609	2.6 (3.6)	352	2.9 (3.9)	257	2.1 (3.2)	258	3.1 (4.1)	351	2.1 (3.1)
PAQ (2), MET-hr/day	609	2.7 (3.5)	352	2.9 (3.6)	257	2.4 (3.5)	258	3.3 (4)	351	2.2 (3.1)
PAQ (Avg), MET-hr/day	609	2.6 (3.3)	352	2.9 (3.5)	257	2.2 (3.1)	258	3.2 (3.8)	351	2.1 (2.9)

Web Table 3. Means and Standard Deviations for Physical Activity and Body Composition Variables Overall and By Subgroup of Age and Body Mass Index in the Men's Lifestyle Validation Study (MLVS), 2011–2013.

Variable and Measurement No.	MLVS Cohort		Age Group				BMI Group			
	All		Age <70 yr		Age ≥70 yr		BMI <25 kg/m ²		BMI ≥25 kg/m ²	
	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)
PAQ (1), hr/day	609	0.3 (0.4)	352	0.4 (0.5)	257	0.3 (0.4)	258	0.4 (0.5)	351	0.3 (0.4)
PAQ (2), hr/day	609	0.3 (0.4)	352	0.3 (0.4)	257	0.3 (0.4)	258	0.4 (0.5)	351	0.3 (0.4)
PAQ (Avg), hr/day	609	0.3 (0.4)	352	0.4 (0.4)	257	0.3 (0.4)	258	0.4 (0.4)	351	0.3 (0.4)
ACT24 (1), MET-hr/day	540	4.2 (8.9)	313	4.9 (10.1)	227	3.4 (6.9)	225	5 (9.2)	315	3.7 (8.7)
ACT24 (2), MET-hr/day	524	3.2 (7.0)	300	3.7 (7.4)	224	2.6 (6.4)	219	3.4 (6.1)	305	3.1 (7.6)
ACT24 (3), MET-hr/day	528	2.6 (6.7)	300	2.5 (6.6)	228	2.9 (6.9)	219	3 (6.8)	309	2.4 (6.7)
ACT24 (4), MET-hr/day	540	2.6 (6.1)	308	2.8 (6.7)	232	2.4 (5.1)	232	3.5 (6.8)	308	2 (5.4)
ACT24 (Avg), MET-hr/day	609	3.3 (5.2)	352	3.5 (5.3)	257	3 (5.2)	258	3.9 (5.6)	351	2.8 (4.9)
ACT24 (1), hr/day	540	0.6 (1.3)	313	0.7 (1.5)	227	0.5 (1)	225	0.7 (1.4)	315	0.5 (1.3)
ACT24 (2), hr/day	524	0.5 (1.0)	300	0.5 (1.1)	224	0.4 (1)	219	0.5 (0.9)	305	0.5 (1.1)
ACT24 (3), hr/day	528	0.4 (0.9)	300	0.3 (0.9)	228	0.4 (1)	219	0.4 (1)	309	0.3 (0.9)
ACT24 (4), hr/day	540	0.4 (0.9)	308	0.4 (1)	232	0.4 (0.8)	232	0.5 (1)	308	0.3 (0.8)
ACT24 (Avg), hr/day	609	0.5 (0.8)	352	0.5 (0.8)	257	0.4 (0.8)	258	0.6 (0.8)	351	0.4 (0.7)
Accelerometer (1), hr/day ^b	609	0.07 (0.14)	352	0.09 (0.16)	257	0.05 (0.12)	258	0.08 (0.13)	351	0.06 (0.15)
Accelerometer (2), hr/day ^b	516	0.07 (0.13)	297	0.09 (0.15)	219	0.04 (0.09)	225	0.08 (0.14)	291	0.06 (0.12)
Accelerometer (Avg), hr/day ^b	609	0.07 (0.13)	352	0.09 (0.14)	257	0.04 (0.1)	258	0.09 (0.13)	351	0.06 (0.12)
<i>Moderate activity</i>										
PAQ (1), MET-hr/day	609	4.5 (4.2)	352	4.1 (3.6)	257	5.1 (4.9)	258	4.5 (3.9)	351	4.5 (4.4)
PAQ (2), MET-hr/day	609	4.7 (4.2)	352	4.2 (3.8)	257	5.4 (4.6)	258	4.9 (4.2)	351	4.6 (4.2)
PAQ (Avg), MET-hr/day	609	4.6 (3.7)	352	4.2 (3.4)	257	5.3 (4.1)	258	4.7 (3.6)	351	4.6 (3.8)
PAQ (1), hr/day	609	1.0 (0.9)	352	0.9 (0.8)	257	1.2 (1.1)	258	1 (0.9)	351	1 (1)
PAQ (2), hr/day	609	1.1 (0.9)	352	1 (0.9)	257	1.3 (1)	258	1.1 (0.9)	351	1.1 (1)
PAQ (Avg), hr/day	609	1.1 (0.8)	352	1 (0.8)	257	1.2 (0.9)	258	1.1 (0.8)	351	1.1 (0.9)
ACT24 (1), MET-hr/day	540	8.4 (8.2)	313	7.8 (8.4)	227	9.1 (8)	225	7.9 (7.5)	315	8.6 (8.7)
ACT24 (2), MET-hr/day	524	7.1 (7.9)	300	6.8 (8)	224	7.6 (7.7)	219	6.5 (7.2)	305	7.5 (8.3)
ACT24 (3), MET-hr/day	528	6.8 (7.9)	300	6.9 (7.9)	228	6.7 (7.9)	219	6.5 (7.2)	309	7 (8.3)
ACT24 (4), MET-hr/day	540	7.3 (8.0)	308	7.4 (8.6)	232	7.3 (7.1)	232	7.2 (7.4)	308	7.4 (8.5)
ACT24 (Avg), MET-hr/day	609	7.4 (5.6)	352	7.3 (5.8)	257	7.6 (5.5)	258	7.2 (5.7)	351	7.6 (5.6)
ACT24 (1), hr/day	540	2.1 (2.1)	313	1.9 (2.1)	227	2.2 (2)	225	2 (1.9)	315	2.1 (2.2)
ACT24 (2), hr/day	524	1.8 (1.9)	300	1.7 (2)	224	1.9 (1.9)	219	1.6 (1.8)	305	1.9 (2)
ACT24 (3), hr/day	528	1.7 (1.9)	300	1.7 (2)	228	1.6 (1.8)	219	1.6 (1.7)	309	1.7 (2)
ACT24 (4), hr/day	540	1.8 (1.9)	308	1.8 (2.1)	232	1.8 (1.7)	232	1.8 (1.8)	308	1.8 (2.1)
ACT24 (Avg), hr/day	609	1.8 (1.4)	352	1.8 (1.4)	257	1.9 (1.3)	258	1.8 (1.4)	351	1.9 (1.4)
Accelerometer (1), hr/day ^b	609	0.78 (0.46)	352	0.85 (0.44)	257	0.67 (0.47)	258	0.85 (0.49)	351	0.72 (0.43)
Accelerometer (2), hr/day ^b	516	0.72 (0.44)	297	0.78 (0.44)	219	0.64 (0.42)	225	0.78 (0.44)	291	0.69 (0.43)
Accelerometer (Avg), hr/day ^b	609	0.76 (0.43)	352	0.83 (0.42)	257	0.66 (0.42)	258	0.82 (0.44)	351	0.71 (0.41)
<i>Sedentary time</i>										
PAQ (1), hr/day	609	4.8 (3.0)	352	5.4 (3.2)	257	4.1 (2.5)	258	4.9 (3)	351	4.8 (3)
PAQ (2), hr/day	609	4.6 (2.9)	352	5 (2.9)	257	4.1 (2.7)	258	4.7 (2.7)	351	4.6 (3)
PAQ (Avg), hr/day	609	4.7 (2.6)	352	5.2 (2.7)	257	4.1 (2.3)	258	4.8 (2.5)	351	4.7 (2.6)
ACT24 (1), hr/day	540	8.9 (3.4)	313	9 (3.6)	227	8.6 (3.2)	225	8.6 (3.4)	315	9 (3.4)
ACT24 (2), hr/day	524	9.0 (3.2)	300	9.1 (3.4)	224	8.9 (2.9)	219	8.9 (3.3)	305	9.1 (3.2)
ACT24 (3), hr/day	528	9.1 (3.2)	300	9.4 (3.4)	228	8.7 (2.9)	219	9.1 (3.4)	309	9.1 (3.1)
ACT24 (4), hr/day	540	8.8 (3.3)	308	9 (3.6)	232	8.6 (3)	232	8.5 (3.4)	308	9.1 (3.2)
ACT24 (Avg), hr/day	609	8.9 (2.6)	352	9.1 (2.8)	257	8.7 (2.2)	258	8.6 (2.7)	351	9.1 (2.5)
<i>Including every minute</i>										
Accelerometer (1), hr/day	609	8.5 (1.5)	352	8.5 (1.5)	257	8.4 (1.4)	258	8.2 (1.5)	351	8.6 (1.5)
Accelerometer (2), hr/day	516	8.6 (1.5)	297	8.7 (1.5)	219	8.5 (1.5)	225	8.4 (1.5)	291	8.8 (1.5)
Accelerometer (Avg), hr/day	609	8.5 (1.4)	352	8.6 (1.5)	257	8.4 (1.4)	258	8.3 (1.4)	351	8.7 (1.4)
<i>Including bouts ≥15 min</i>										
Accelerometer (1), hr/day	609	4.5 (1.6)	352	4.4 (1.6)	257	4.7 (1.6)	258	4.2 (1.5)	351	4.8 (1.7)

Web Table 3. Means and Standard Deviations for Physical Activity and Body Composition Variables Overall and By Subgroup of Age and Body Mass Index in the Men's Lifestyle Validation Study (MLVS), 2011–2013.

Variable and Measurement No.	MLVS Cohort		Age Group				BMI Group			
	All		Age <70 yr		Age ≥70 yr		BMI <25 kg/m ²		BMI ≥25 kg/m ²	
	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)
Accelerometer (2), hr/day	516	4.7 (1.6)	297	4.5 (1.6)	219	4.8 (1.6)	225	4.4 (1.6)	291	4.9 (1.6)
Accelerometer (Avg), hr/day	609	4.6 (1.5)	352	4.5 (1.6)	257	4.8 (1.5)	258	4.3 (1.5)	351	4.8 (1.5)
RPR, beats/min ^c										
RPR (1)	464	63.7 (8.6)	279	63.9 (8.7)	185	63.3 (8.4)	216	62.4 (8.1)	248	64.7 (8.8)
RPR (2)	469	63.0 (7.9)	283	63.2 (8.0)	186	62.8 (7.8)	222	61.5 (7.3)	247	64.3 (8.2)
RPR (3)	407	63.3 (8.3)	241	63.8 (8.5)	166	62.4 (7.9)	197	62.4 (8.1)	210	64.1 (8.4)
RPR (4)	468	63.6 (8.5)	284	63.8 (8.7)	184	63.2 (8.1)	216	62.1 (8.1)	252	64.8 (8.6)
RPR (Avg)	479	63.4 (7.2)	291	63.7 (7.5)	188	63.0 (6.9)	223	62.1 (6.9)	256	64.6 (7.4)

TDEE: total daily energy expenditure; PAEE: physical activity energy expenditure; RPR: resting pulse rate.

^aTotal activity determined by PAQ and ACT24 is based on active MET-hrs/day (i.e., not including sedentary behavior).

^bMVPA, vigorous, and moderate activity were calculated including every minute.

^cMen who reported taking anti-hypertensive medications at baseline were excluded.

Web Table 4. Spearman Correlation Coefficients Comparing the Physical Activity Questionnaire and Multiple Activities Completed Over Time in 24 Hours to Doubly Labeled Water-Determined Total Daily Energy Expenditure and Physical Activity Energy Expenditure in Men’s Lifestyle Validation Study, 2011–2013 (N=609^a).

Variable and Measurement No.	DLW-determined TDEE			DLW-determined PAEE ^b		
	Age-Adjusted	Deattenuated Age-Adjusted	95% CI	Age-Adjusted	Deattenuated Age-Adjusted	95% CI
Total activity, MET-hr/day						
PAQ (1)	0.25	0.29	(0.20, 0.37)	0.33	0.39	(0.31, 0.47)
PAQ (2)	0.25	0.28	(0.19, 0.36)	0.34	0.40	(0.32, 0.48)
PAQ (Avg)	0.27	0.31	(0.23, 0.38)	0.37	0.44	(0.36, 0.51)
ACT24 (2)	0.21	0.24	(0.15, 0.33)	0.27	0.32	(0.23, 0.40)
ACT24 (Avg)	0.29	0.33	(0.25, 0.40)	0.35	0.42	(0.33, 0.49)
MVPA, MET-hr/day						
PAQ (1)	0.28	0.31	(0.23, 0.39)	0.36	0.43	(0.35, 0.51)
PAQ (2)	0.26	0.30	(0.21, 0.37)	0.37	0.43	(0.35, 0.51)
PAQ (Avg)	0.29	0.33	(0.25, 0.40)	0.39	0.47	(0.38, 0.54)
ACT24 (2)	0.24	0.27	(0.18, 0.36)	0.28	0.33	(0.24, 0.41)
ACT24 (Avg)	0.32	0.35	(0.27, 0.43)	0.37	0.42	(0.34, 0.50)
Vigorous, MET-hr/day						
PAQ (1)	0.19	0.21	(0.12, 0.30)	0.30	0.35	(0.27, 0.43)
PAQ (2)	0.18	0.20	(0.11, 0.29)	0.29	0.34	(0.25, 0.42)
PAQ (Avg)	0.19	0.22	(0.13, 0.30)	0.30	0.36	(0.28, 0.44)
ACT24 (2)	0.13	0.14	(0.06, 0.23)	0.17	0.19	(0.10, 0.29)
ACT24 (Avg)	0.22	0.25	(0.16, 0.33)	0.28	0.32	(0.24, 0.40)
Moderate, MET-hr/day						
PAQ (1)	0.16	0.17	(0.09, 0.26)	0.19	0.22	(0.13, 0.31)
PAQ (2)	0.16	0.18	(0.10, 0.27)	0.22	0.26	(0.17, 0.35)
PAQ (Avg)	0.18	0.20	(0.11, 0.29)	0.23	0.27	(0.18, 0.36)
ACT24 (2)	0.17	0.19	(0.11, 0.28)	0.18	0.22	(0.12, 0.31)
ACT24 (Avg)	0.22	0.24	(0.16, 0.33)	0.25	0.29	(0.20, 0.37)
Sedentary, hr/day						
PAQ (1)	-0.09	-0.10	(-0.18, -0.02)	-0.11	-0.13	(-0.21, -0.04)
PAQ (2)	-0.09	-0.10	(-0.18, -0.02)	-0.13	-0.15	(-0.24, -0.06)
PAQ (Avg)	-0.10	-0.11	(-0.20, -0.03)	-0.14	-0.16	(-0.25, -0.07)
ACT24 (2)	-0.10	-0.11	(-0.20, -0.02)	-0.14	-0.17	(-0.26, -0.07)
ACT24 (Avg)	-0.14	-0.16	(-0.25, -0.08)	-0.19	-0.22	(-0.31, -0.13)

DLW: doubly labeled water; PAL: physical activity level; CI: confidence interval; PAQ: physical activity questionnaire; ACT24: Activities Completed Over Time in 24 Hours; PAQ (Avg) indicates average of first and second questionnaires; ACT24 (Avg) indicates average of up to four 24-hour recalls.

^an=524 men for second ACT24 recall.

^bPAEE was estimated from TDEE by subtracting resting metabolic rate and the thermic effect of food. Resting metabolic rate was predicted based on age, sex, height, and weight as described by Mifflin et al. (11).

Web Table 5. Spearman Correlation Coefficients Comparing the Physical Activity Questionnaire and Multiple Activities Completed Over Time in 24 Hours to Doubly Labeled Water-Determined Physical Activity Level According to Age Group in Men's Lifestyle Validation Study, 2011–2013 (N=609).

Variable and Measurement No.	DLW-determined PAL ^a		
	Age-Adjusted	Deattenuated Age-Adjusted	95% CI
Total activity			
Age < 70 yr			
PAQ (1)	0.40	0.47	(0.37, 0.57)
PAQ (2)	0.45	0.53	(0.42, 0.62)
PAQ (Avg)	0.46	0.55	(0.43, 0.64)
ACT24 (2)	0.26	0.30	(0.18, 0.42)
ACT24 (Avg)	0.34	0.41	(0.30, 0.51)
Age ≥ 70 yr			
PAQ (1)	0.37	0.33	(0.21, 0.44)
PAQ (2)	0.29	0.31	(0.18, 0.42)
PAQ (Avg)	0.37	0.35	(0.22, 0.45)
ACT24 (2)	0.32	0.35	(0.22, 0.47)
ACT24 (Avg)	0.39	0.42	(0.31, 0.53)
MVPA			
Age < 70 yr			
PAQ (1)	0.42	0.50	(0.38, 0.59)
PAQ (2)	0.47	0.56	(0.45, 0.65)
PAQ (Avg)	0.48	0.57	(0.46, 0.66)
ACT24 (2)	0.28	0.32	(0.19, 0.43)
ACT24 (Avg)	0.34	0.40	(0.29, 0.50)
Age ≥ 70 yr			
PAQ (1)	0.35	0.38	(0.27, 0.49)
PAQ (2)	0.31	0.34	(0.21, 0.45)
PAQ (Avg)	0.36	0.39	(0.27, 0.49)
ACT24 (2)	0.30	0.32	(0.19, 0.44)
ACT24 (Avg)	0.40	0.44	(0.32, 0.54)
Vigorous			
Age < 70 yr			
PAQ (1)	0.40	0.47	(0.36, 0.56)
PAQ (2)	0.38	0.45	(0.35, 0.55)
PAQ (Avg)	0.41	0.49	(0.37, 0.58)
ACT24 (2)	0.23	0.26	(0.13, 0.37)
ACT24 (Avg)	0.30	0.36	(0.24, 0.46)
Age ≥ 70 yr			
PAQ (1)	0.29	0.30	(0.18, 0.42)
PAQ (2)	0.28	0.30	(0.18, 0.41)
PAQ (Avg)	0.29	0.31	(0.18, 0.42)
ACT24 (2)	0.18	0.19	(0.06, 0.33)
ACT24 (Avg)	0.31	0.33	(0.20, 0.44)
Moderate			
Age < 70 yr			
PAQ (1)	0.17	0.19	(0.07, 0.31)
PAQ (2)	0.27	0.32	(0.20, 0.42)
PAQ (Avg)	0.25	0.28	(0.16, 0.39)
ACT24 (2)	0.13	0.15	(0.03, 0.28)
ACT24 (Avg)	0.21	0.25	(0.12, 0.36)
Age ≥ 70 yr			
PAQ (1)	0.25	0.26	(0.13, 0.37)
PAQ (2)	0.19	0.21	(0.09, 0.33)
PAQ (Avg)	0.24	0.26	(0.13, 0.37)
ACT24 (2)	0.21	0.23	(0.10, 0.36)

Web Table 5. Spearman Correlation Coefficients Comparing the Physical Activity Questionnaire and Multiple Activities Completed Over Time in 24 Hours to Doubly Labeled Water-Determined Physical Activity Level According to Age Group in Men's Lifestyle Validation Study, 2011–2013 (N=609).

Variable and Measurement No.	DLW-determined PAL ^a		
	Age-Adjusted	Deattenuated Age-Adjusted	95% CI
ACT24 (Avg)	0.27	0.29	(0.16, 0.40)
Sedentary			
Age < 70 yr			
PAQ (1)	-0.11	-0.13	(-0.24, -0.01)
PAQ (2)	-0.16	-0.19	(-0.30, -0.07)
PAQ (Avg)	-0.15	-0.18	(-0.29, -0.06)
ACT24 (2)	-0.12	-0.14	(-0.27, -0.02)
ACT24 (Avg)	-0.16	-0.19	(-0.31, -0.08)
Age ≥ 70 yr			
PAQ (1)	-0.11	-0.12	(-0.25, 0.00)
PAQ (2)	-0.11	-0.12	(-0.25, 0.01)
PAQ (Avg)	-0.13	-0.15	(-0.27, -0.02)
ACT24 (2)	-0.21	-0.22	(-0.35, -0.09)
ACT24 (Avg)	-0.27	-0.29	(-0.40, -0.16)

DLW: doubly labeled water; PAL: physical activity level; CI: confidence interval; PAQ: physical activity questionnaire; ACT24: Activities Completed Over Time in 24 Hours; PAQ (Avg) indicates average of first and second questionnaires; ACT24 (Avg) indicates average of up to four 24-hour recalls.

^aPAL was estimated from DLW-total daily energy expenditure (kcal/day) divided by the resting metabolic rate. Resting metabolic rate was predicted based on age, sex, height, and weight as described by Mifflin et al.(11)

Web Table 6. Spearman Correlation Coefficients Comparing the Physical Activity Questionnaire and Multiple Activities Completed Over Time in 24 Hours to Doubly Labeled Water-Determined Physical Activity Level According to Body Mass Index Group in Men's Lifestyle Validation Study, 2011–2013 (N=609).

Variable and Measurement No.	DLW-determined PAL ^a		
	Age-Adjusted	Deattenuated Age-Adjusted	95% CI
Total activity			
BMI < 25 kg/m ²			
PAQ (1)	0.38	0.44	(0.31, 0.55)
PAQ (2)	0.43	0.43	(0.30, 0.55)
PAQ (Avg)	0.43	0.47	(0.34, 0.58)
ACT24 (2)	0.20	0.24	(0.09, 0.37)
ACT24 (Avg)	0.36	0.43	(0.30, 0.55)
BMI ≥ 25 kg/m ²			
PAQ (1)	0.33	0.38	(0.27, 0.48)
PAQ (2)	0.36	0.42	(0.31, 0.52)
PAQ (Avg)	0.38	0.44	(0.34, 0.54)
ACT24 (2)	0.34	0.38	(0.27, 0.49)
ACT24 (Avg)	0.35	0.40	(0.29, 0.50)
MVPA			
BMI < 25 kg/m ²			
PAQ (1)	0.44	0.51	(0.37, 0.62)
PAQ (2)	0.46	0.48	(0.36, 0.60)
PAQ (Avg)	0.49	0.53	(0.40, 0.64)
ACT24 (2)	0.22	0.27	(0.11, 0.40)
ACT24 (Avg)	0.38	0.45	(0.32, 0.57)
BMI ≥ 25 kg/m ²			
PAQ (1)	0.34	0.40	(0.29, 0.50)
PAQ (2)	0.38	0.44	(0.33, 0.54)
PAQ (Avg)	0.39	0.45	(0.34, 0.55)
ACT24 (2)	0.33	0.37	(0.25, 0.47)
ACT24 (Avg)	0.36	0.40	(0.28, 0.50)
Vigorous			
BMI < 25 kg/m ²			
PAQ (1)	0.46	0.51	(0.38, 0.62)
PAQ (2)	0.43	0.51	(0.37, 0.62)
PAQ (Avg)	0.47	0.54	(0.41, 0.65)
ACT24 (2)	0.20	0.24	(0.09, 0.37)
ACT24 (Avg)	0.36	0.43	(0.30, 0.55)
BMI ≥ 25 kg/m ²			
PAQ (1)	0.26	0.30	(0.19, 0.41)
PAQ (2)	0.24	0.28	(0.17, 0.39)
PAQ (Avg)	0.25	0.30	(0.18, 0.40)
ACT24 (2)	0.16	0.18	(0.07, 0.30)
ACT24 (Avg)	0.23	0.26	(0.14, 0.37)
Moderate			
BMI < 25 kg/m ²			
PAQ (1)	0.15	0.18	(0.04, 0.32)
PAQ (2)	0.13	0.16	(0.02, 0.29)
PAQ (Avg)	0.15	0.18	(0.05, 0.32)
ACT24 (2)	0.12	0.14	(-0.01, 0.29)
ACT24 (Avg)	0.20	0.24	(0.11, 0.37)
BMI ≥ 25 kg/m ²			
PAQ (1)	0.21	0.24	(0.12, 0.35)
PAQ (2)	0.30	0.35	(0.23, 0.45)
PAQ (Avg)	0.29	0.33	(0.21, 0.43)
ACT24 (2)	0.21	0.24	(0.12, 0.36)

Web Table 6. Spearman Correlation Coefficients Comparing the Physical Activity Questionnaire and Multiple Activities Completed Over Time in 24 Hours to Doubly Labeled Water-Determined Physical Activity Level According to Body Mass Index Group in Men's Lifestyle Validation Study, 2011–2013 (N=609).

Variable and Measurement No.	DLW-determined PAL ^a		
	Age-Adjusted	Deattenuated Age-Adjusted	95% CI
ACT24 (Avg)	0.27	0.30	(0.18, 0.40)
Sedentary			
BMI < 25 kg/m ²			
PAQ (1)	-0.11	-0.13	(-0.27, 0.01)
PAQ (2)	-0.19	-0.23	(-0.37, -0.09)
PAQ (Avg)	-0.16	-0.19	(-0.33, -0.06)
ACT24 (2)	-0.07	-0.09	(-0.24, 0.07)
ACT24 (Avg)	-0.17	-0.19	(-0.32, -0.05)
BMI ≥ 25 kg/m ²			
PAQ (1)	-0.11	-0.13	(-0.24, -0.01)
PAQ (2)	-0.11	-0.12	(-0.24, -0.01)
PAQ (Avg)	-0.13	-0.15	(-0.26, -0.03)
ACT24 (2)	-0.20	-0.22	(-0.34, -0.11)
ACT24 (Avg)	-0.21	-0.24	(-0.35, -0.12)

DLW: doubly labeled water; PAL: physical activity level; CI: confidence interval; PAQ: physical activity questionnaire; ACT24: Activities Completed Over Time in 24 Hours; PAQ (Avg) indicates average of first and second questionnaires; ACT24 (Avg) indicates average of up to four 24-hour recalls.

^aPAL was estimated from DLW-total daily energy expenditure (kcal/day) divided by the resting metabolic rate. Resting metabolic rate was predicted based on age, sex, height, and weight as described by Mifflin et al. (11).

Web Table 7. Spearman Correlation Coefficients Comparing Each Individual Activities Completed Over Time in 24 Hours to Doubly Labeled Water-Determined Physical Activity Level in Men’s Lifestyle Validation Study, 2011–2013.

Variable and Measurement No.	DLW-determined PAL ^a		
	Age-Adjusted	Deattenuated Age-Adjusted	95% CI
Total activity, MET-hr/day			
ACT24 (1)	0.28	0.33	(0.24, 0.41)
ACT24 (2)	0.29	0.33	(0.24, 0.41)
ACT24 (3)	0.29	0.34	(0.25, 0.43)
ACT24 (4)	0.30	0.35	(0.26, 0.44)
MVPA, MET-hr/day			
ACT24 (1)	0.26	0.31	(0.21, 0.39)
ACT24 (2)	0.28	0.33	(0.23, 0.41)
ACT24 (3)	0.26	0.29	(0.20, 0.38)
ACT24 (4)	0.30	0.35	(0.25, 0.43)
Vigorous, MET-hr/day			
ACT24 (1)	0.25	0.30	(0.20, 0.38)
ACT24 (2)	0.18	0.21	(0.11, 0.31)
ACT24 (3)	0.14	0.16	(0.07, 0.25)
ACT24 (4)	0.20	0.23	(0.13, 0.32)
Moderate, MET-hr/day			
ACT24 (1)	0.10	0.11	(0.02, 0.20)
ACT24 (2)	0.17	0.20	(0.11, 0.29)
ACT24 (3)	0.17	0.20	(0.11, 0.30)
ACT24 (4)	0.20	0.23	(0.13, 0.32)
Sedentary, hr/day			
ACT24 (1)	-0.14	-0.17	(-0.26, -0.08)
ACT24 (2)	-0.15	-0.17	(-0.27, -0.08)
ACT24 (3)	-0.16	-0.19	(-0.28, -0.10)
ACT24 (4)	-0.19	-0.23	(-0.32, -0.13)

DLW: doubly labeled water; PAL: physical activity level; CI: confidence interval; PAQ: physical activity questionnaire; ACT24: Activities Completed Over Time in 24 Hours.

^aPAL was estimated from DLW-total daily energy expenditure (kcal/day) divided by the resting metabolic rate. Resting metabolic rate was predicted based on age, sex, height, and weight as described by Mifflin et al. (11).

Web Table 8. Spearman Correlation Coefficients Comparing Each Individual Activities Completed Over Time in 24 Hours to the Corresponding Accelerometer-Determined Activity in the Men’s Lifestyle Validation Study, 2011–2013.

Variable and Measurement No.	Accelerometer ^a		
	Adjusted ^b	Deattenuated Adjusted ^b	95% CI
Total activity, MET-hr/day			
ACT24 (1)	0.29	0.32	(0.24, 0.39)
ACT24 (2)	0.34	0.37	(0.29, 0.44)
ACT24 (3)	0.29	0.32	(0.24, 0.39)
ACT24 (4)	0.31	0.34	(0.26, 0.42)
MVPA, MET-hr/day			
ACT24 (1)	0.20	0.22	(0.13, 0.30)
ACT24 (2)	0.29	0.32	(0.23, 0.39)
ACT24 (3)	0.23	0.25	(0.16, 0.34)
ACT24 (4)	0.27	0.29	(0.20, 0.37)
Vigorous, MET-hr/day			
ACT24 (1)	0.14	0.16	(0.07, 0.25)
ACT24 (2)	0.06	0.08	(-0.02, 0.16)
ACT24 (3)	0.07	0.08	(-0.02, 0.17)
ACT24 (4)	0.05	0.05	(-0.04, 0.14)
Moderate, MET-hr/day			
ACT24 (1)	0.13	0.15	(0.06, 0.24)
ACT24 (2)	0.25	0.27	(0.18, 0.35)
ACT24 (3)	0.20	0.22	(0.13, 0.31)
ACT24 (4)	0.24	0.26	(0.17, 0.35)
Sedentary, hr/day			
ACT24 (1)	0.28	0.30	(0.22, 0.38)
ACT24 (2)	0.26	0.28	(0.20, 0.37)
ACT24 (3)	0.23	0.24	(0.15, 0.33)
ACT24 (4)	0.24	0.26	(0.18, 0.35)

PAQ: physical activity questionnaire; ACT24: Activities Completed Over Time in 24 Hours; CI: confidence interval.

^aMeasures based on the triaxial vector magnitude. Total activity is based on total activity counts (TAC) per day; accelerometer measures of MVPA, vigorous, and moderate activity include ≥ 1 minute bouts; sedentary time is based on ≥ 15 minute bouts.

^bValues from PAQ and ACT24 were adjusted for age (yr); values from accelerometer were adjusted for age (yr) and accelerometer wear time (hr/day).

Web Table 9. Spearman Correlation Coefficients Comparing the Physical Activity Questionnaire, Multiple Activities Completed Over 24-Hours, and Accelerometer to Body Fat Percent Measured by Dual Energy X-ray Absorptiometry in the Men's Lifestyle Validation Study, United States, 2011–2013.

Variable and Measurement No.	DXA-Body Fat Percent (N=197) ^a		
	Age-Adjusted ^a	Deattenuated Adjusted ^b	95% CI
DLW-PAL (1)	-0.47	-0.47	-0.57, -0.36)
Total activity			
PAQ (1)	-0.32	-0.32	-0.43, -0.19
PAQ (2)	-0.36	-0.37	-0.48, -0.24
PAQ (Avg)	-0.36	-0.37	-0.48, -0.24
ACT24 (2)	-0.18	-0.18	-0.32, -0.04
ACT24 (Avg)	-0.21	-0.20	-0.33, -0.07
Accelerometer (Avg)	-0.35	-0.36	-0.47, -0.23
MVPA			
PAQ (1)	-0.32	-0.32	-0.43, -0.19
PAQ (2)	-0.42	-0.42	-0.53, -0.31
PAQ (Avg)	-0.39	-0.39	-0.50, -0.27
ACT24 (2)	-0.16	-0.16	-0.31, -0.02
ACT24 (Avg)	-0.21	-0.22	-0.35, -0.09
Accelerometer (Avg)	-0.29	-0.30	-0.41, -0.17
Vigorous			
PAQ (1)	-0.37	-0.38	-0.49, -0.25
PAQ (2)	-0.35	-0.36	-0.47, -0.23
PAQ (Avg)	-0.37	-0.37	-0.48, -0.25
ACT24 (2)	-0.11	-0.10	-0.24, 0.05
ACT24 (Avg)	-0.23	-0.23	-0.36, -0.10
Accelerometer (Avg)	-0.29	-0.29	-0.41, -0.16
Moderate			
PAQ (1)	-0.05	-0.05	-0.18, 0.09
PAQ (2)	-0.25	-0.26	-0.38, -0.12
PAQ (Avg)	-0.16	-0.16	-0.30, -0.03
ACT24 (2)	-0.05	-0.05	-0.19, 0.10
ACT24 (Avg)	-0.08	-0.08	-0.21, 0.06
Accelerometer (Avg)	-0.25	-0.26	-0.37, -0.12
Sedentary time			
PAQ (1)	-0.02	-0.02	-0.16, 0.11
PAQ (2)	-0.01	-0.01	-0.14, 0.12
PAQ (Avg)	-0.04	-0.04	-0.17, 0.10
ACT24 (2)	-0.01	-0.01	-0.16, 0.13
ACT24 (Avg)	0.00	0.00	-0.13, 0.13
Accelerometer (Avg)	0.32	0.32	0.19, 0.43

DXA: dual energy X-ray absorptiometry; CI: confidence interval; PAQ: physical activity questionnaire; ACT24: Activities Completed Over Time in 24-Hours; PAQ (Avg) indicates average of first and second questionnaires; ACT24 (Avg) indicates average of up to four 24-hour recalls; Accelerometer (Avg) indicates average of up to two measures.

^aFor ACT24 (2), n=169 in DXA analysis.

^bAccelerometer measures additionally adjusted for wear time (hr/day).

Web Table 10. Spearman Correlation Coefficients Comparing Each Individual Activities Completed Over 24-Hours and Accelerometer Measure to Resting Pulse Rate and Percent Body Fat as Measured by Doubly Labeled Water and Dual Energy X-ray Absorptiometry in the Men’s Lifestyle Validation Study, 2011–2013

Variable and Measurement No.	RPR (N=479)			DLW-Percent body fat (N=609)			DXA-Percent body fat (N=197)		
	Adjusted ^a	Deattenuated Adjusted ^a	95% CI	Adjusted ^a	Deattenuated Adjusted ^a	95% CI	Adjusted ^a	Deattenuated Adjusted ^a	95% CI
Total activity									
ACT24 (1)	-0.12	-0.13	(-0.22, -0.03)	-0.19	-0.20	(-0.28, -0.11)	-0.23	-0.23	(-0.37, -0.10)
ACT24 (2)	-0.11	-0.11	(-0.21, -0.02)	-0.16	-0.17	(-0.25, -0.09)	-0.18	-0.18	(-0.32, -0.04)
ACT24 (3)	-0.04	-0.04	(-0.13, 0.06)	-0.17	-0.17	(-0.26, -0.09)	-0.11	-0.11	(-0.26, 0.04)
ACT24 (4)	-0.21	-0.17	(-0.27, -0.08)	-0.14	-0.14	(-0.23, -0.06)	-0.14	-0.15	(-0.29, 0.00)
Accelerometer (1)	-0.18	-0.19	(-0.28, -0.10)	-0.32	-0.34	(-0.40, -0.27)	-0.35	-0.35	(-0.46, -0.23)
Accelerometer (2)	-0.20	-0.19	(-0.29, -0.10)	-0.31	-0.32	(-0.39, -0.24)	-0.31	-0.31	(-0.43, -0.17)
MVPA									
ACT24 (1)	-0.14	-0.14	(-0.24, -0.05)	-0.19	-0.19	(-0.28, -0.11)	-0.20	-0.21	(-0.34, -0.07)
ACT24 (2)	-0.09	-0.09	(-0.19, 0.00)	-0.13	-0.14	(-0.22, -0.05)	-0.16	-0.16	(-0.31, -0.02)
ACT24 (3)	-0.05	-0.03	(-0.12, 0.07)	-0.15	-0.16	(-0.24, -0.08)	-0.13	-0.13	(-0.27, 0.02)
ACT24 (4)	-0.66	-0.22	(-0.32, -0.12)	-0.15	-0.16	(-0.24, -0.08)	-0.15	-0.15	(-0.29, -0.01)
Accelerometer (1)	-0.18	-0.19	(-0.28, -0.10)	-0.27	-0.28	(-0.36, -0.21)	-0.30	-0.30	(-0.42, -0.17)
Accelerometer (2)	-0.20	-0.20	(-0.29, -0.11)	-0.24	-0.25	(-0.34, -0.17)	-0.24	-0.25	(-0.37, -0.11)
Vigorous									
ACT24 (1)	-0.10	-0.11	(-0.20, -0.01)	-0.26	-0.25	(-0.34, -0.17)	-0.30	-0.29	(-0.41, -0.16)
ACT24 (2)	-0.05	-0.05	(-0.15, 0.05)	-0.11	-0.11	(-0.19, -0.03)	-0.11	-0.10	(-0.24, 0.05)
ACT24 (3)	-0.17	-0.15	(-0.24, -0.05)	-0.11	-0.11	(-0.20, -0.03)	-0.10	-0.10	(-0.24, 0.05)
ACT24 (4)	-0.18	-0.19	(-0.28, -0.10)	-0.14	-0.15	(-0.23, -0.06)	-0.17	-0.17	(-0.31, -0.03)
Accelerometer (1)	-0.21	-0.23	(-0.31, -0.13)	-0.27	-0.28	(-0.36, -0.21)	-0.31	-0.32	(-0.43, -0.19)
Accelerometer (2)	-0.63	-0.23	(-0.32, -0.13)	-0.23	-0.25	(-0.33, -0.16)	-0.21	-0.22	(-0.35, -0.08)
Moderate									
ACT24 (1)	-0.06	-0.06	(-0.15, 0.04)	-0.05	-0.06	(-0.14, 0.03)	-0.04	-0.04	(-0.17, 0.11)
ACT24 (2)	0.01	0.02	(-0.08, 0.11)	-0.03	-0.03	(-0.11, 0.05)	-0.05	-0.05	(-0.19, 0.10)
ACT24 (3)	0.03	0.04	(-0.06, 0.13)	-0.11	-0.11	(-0.20, -0.03)	-0.13	-0.13	(-0.27, 0.02)
ACT24 (4)	-0.18	-0.15	(-0.24, -0.06)	-0.08	-0.09	(-0.17, 0.00)	-0.04	-0.04	(-0.19, 0.10)
Accelerometer (1)	-0.14	-0.15	(-0.24, -0.06)	-0.24	-0.25	(-0.33, -0.17)	-0.26	-0.26	(-0.37, -0.12)
Accelerometer (2)	-0.16	-0.16	(-0.25, -0.06)	-0.21	-0.22	(-0.31, -0.14)	-0.20	-0.20	(-0.34, -0.06)
Sedentary time									
ACT24 (1)	0.02	0.04	(-0.06, 0.13)	0.07	0.07	(-0.01, 0.16)	0.07	0.07	(-0.08, 0.21)
ACT24 (2)	0.04	0.04	(-0.06, 0.13)	0.06	0.07	(-0.02, 0.15)	-0.01	-0.01	(-0.16, 0.13)
ACT24 (3)	0.00	0.00	(-0.10, 0.10)	0.07	0.07	(-0.02, 0.15)	-0.06	-0.06	(-0.20, 0.09)
ACT24 (4)	0.11	0.12	(0.02, 0.21)	0.10	0.10	(0.02, 0.19)	0.03	0.03	(-0.11, 0.17)
Accelerometer (1)	0.13	0.10	(0.01, 0.19)	0.29	0.31	(0.23, 0.37)	0.31	0.31	(0.18, 0.42)
Accelerometer (2)	0.07	0.07	(-0.03, 0.16)	0.28	0.30	(0.22, 0.37)	0.25	0.25	(0.11, 0.38)

DXA: dual energy X-ray absorptiometry; RPR: resting pulse rate; CI: confidence interval; PAQ: physical activity questionnaire; ACT24: Activities Completed Over Time in 24-Hours.

^aDXA, DLW, PAQ, ACT24, and RPR adjusted for age (yr), accelerometer adjusted for age (yr) and wear time (h/day).

Web Table 11. Validity Coefficients^a Showing Correlations with True Physical Activity for Physical Activity Estimated From the Second Physical Activity Questionnaire, Activities Completed Over Time in 24-Hours, Accelerometry, and Doubly Labeled Water-Determined Physical Activity Energy Expenditure in the Men’s Lifestyle Validation Study, 2011–2013.

	N	r _{QR}	r _{QM}	r _{RM}	VC _{QT}	95% CI	VC _{RT}	95% CI	VC _{MT}	95% CI
Q=PAQ (2)										
Total activity	516	0.40	0.38	0.42	0.61	(0.53, 0.70)	0.66	(0.59, 0.75)	0.63	(0.55, 0.73)
MVPA	516	0.37	0.41	0.31	0.70	(0.61, 0.81)	0.52	(0.44, 0.62)	0.59	(0.50, 0.70)
Vigorous	516	0.29	0.33	0.16	0.77	(0.61, 0.98)	0.37	(0.28, 0.48)	0.42	(0.31, 0.57)
Moderate	516	0.34	0.25	0.29	0.54	(0.44, 0.66)	0.63	(0.51, 0.77)	0.46	(0.37, 0.59)
Q=ACT24 (Avg)										
Total activity	516	0.38	0.35	0.42	0.56	(0.47, 0.66)	0.67	(0.59, 0.77)	0.62	(0.53, 0.72)
MVPA	516	0.32	0.36	0.31	0.61	(0.52, 0.72)	0.52	(0.43, 0.63)	0.59	(0.49, 0.70)
Vigorous	516	0.12	0.26	0.16	0.44	(0.30, 0.65)	0.27	(0.17, 0.42)	0.58	(0.40, 0.84)
Moderate	516	0.27	0.25	0.29	0.49	(0.39, 0.62)	0.56	(0.44, 0.70)	0.52	(0.41, 0.66)

VC: Validity coefficient; MVPA: moderate to vigorous physical activity; DLW: doubly labeled water; PAEE: physical activity energy expenditure.

r: Correlation between the PAQ (2) or average ACT24 and the accelerometer (r_{QR}), the PAQ (2) or average ACT24 and DLW-PAEE (r_{QM}), or the accelerometer and DLW-PAEE (r_{RM}).

^aQ=Second PAQ adjusted for age or the average of up to four ACT24 recalls adjusted for age; R=Accelerometer-determined activity adjusted for age and wear time; M=DLW-determined PAEE adjusted for age; T= true physical activity. This analysis was restricted to men with two accelerometer measures.

Web Table 12. Validity Coefficients^a Showing Correlations with True Physical Activity for Physical Activity Estimated From the Second Physical Activity Questionnaire, Activities Completed Over Time in 24-Hours, Accelerometry, and Body Size-Adjusted Doubly Labeled Water-Determined Physical Activity Energy Expenditure in the Men’s Lifestyle Validation Study, 2011–2013.

	N	r _{QR}	r _{QM}	r _{RM}	VC _{QT}	95% CI	VC _{RT}	95% CI	VC _{MT}	95% CI
Q=PAQ (2)										
Total activity	516	0.40	0.38	0.41	0.61	0.53, 0.7	0.66	(0.58, 0.75)	0.62	(0.53, 0.71)
MVPA	516	0.37	0.40	0.30	0.71	0.61, 0.82	0.52	(0.44, 0.62)	0.57	(0.48, 0.69)
Vigorous	516	0.29	0.32	0.15	0.78	0.61, 0.99	0.37	(0.28, 0.49)	0.41	(0.30, 0.56)
Moderate	516	0.34	0.24	0.28	0.54	0.44, 0.67	0.62	(0.51, 0.77)	0.45	(0.36, 0.58)
Q=ACT24 (Avg)										
Total activity	516	0.38	0.34	0.41	0.56	0.48, 0.67	0.67	(0.58, 0.76)	0.61	(0.52, 0.71)
MVPA	516	0.32	0.36	0.30	0.62	0.52, 0.73	0.52	(0.42, 0.63)	0.58	(0.48, 0.70)
Vigorous	516	0.12	0.25	0.15	0.45	0.30, 0.66	0.27	(0.17, 0.42)	0.56	(0.39, 0.82)
Moderate	516	0.27	0.25	0.28	0.49	0.39, 0.62	0.55	(0.44, 0.70)	0.51	(0.40, 0.65)

VC: Validity coefficient; MVPA: moderate to vigorous physical activity; DLW: doubly labeled water; PAEE: physical activity energy expenditure; r: Correlation between the PAQ (2) or average ACT24 and the accelerometer (r_{QR}), the PAQ (2) or average ACT24 and DLW-PAEE (r_{QM}), or the accelerometer and DLW-PAEE (r_{RM}).

^aQ=Second PAQ adjusted for age or the average of up to four ACT24 recalls adjusted for age; R=Accelerometer-determined activity adjusted for age and wear time; M=DLW-determined PAEE adjusted for age and weight; T= true physical activity. This analysis was restricted to men with two accelerometer measures.