

WEB MATERIAL

Age- and Sex-Specific Criterion Validity of the Health Survey for England Physical Activity and Sedentary Behaviour Assessment Questionnaire Against Accelerometry

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Web Table 1. Characteristics of Participants With Complete Accelerometer and Questionnaire Data, Stratified by Age and Body Mass Index, Health Survey for England, 2008^a

	Age Group						<i>P</i> Value ^a
	16–44 years (<i>n</i> = 760)		45–64 years (<i>n</i> = 821)		65+ years (<i>n</i> = 594)		
	%	Mean (SD)	%	Mean (SD)	%	Mean (SD)	
Male sex	45.0		45.0		47.3		0.622
Current smoker	28.7		18.9		9.4		<0.001
Manual occupation	33.6		38.4		45.3		<0.001
Long-standing illness	31.2		50.2		69.4		<0.001
Very physically active at work ^b	22.1		19.9		18.5		0.563
Body mass index, kg/m ²		26.2 (5.1)		28.4 (5.1)		28.0 (4.8)	<0.001
Accelerometer wear time (minutes/day) ^c		830.3 (72.5)		852.7 (71.0)		817.9 (73.9)	<0.001
	Body Mass Index (kg/m ²)						<i>P</i> Value ^a
	18.5–24.9 (<i>n</i> = 628)		25.0–29.9 (<i>n</i> = 805)		≥30 (<i>n</i> = 529)		
	%	Mean (SD)	%	Mean (SD)	%	Mean (SD)	
Male sex	38.1		52.4		45.8		<0.001
Current smoker	25.0		18.1		15.7		<0.001
Manual occupation	34.2		38.3		44.7		0.002
Long-standing illness	40.0		46.8		57.1		<0.001
Very physically active at work ^b	20.5		21.9		19.1		0.650
Body mass index, kg/m ²		22.6 (1.7)		27.3 (1.4)		34.2 (3.9)	<0.001
Accelerometer wear time (minutes/day) ^c		832.7 (71.8)		840.5 (73.3)		835.4 (74.4)	0.127

Abbreviation: SD, standard deviation.

^a *P* values calculated from the χ^2 test (categorical variables) and analysis of variance (continuous variables) for comparison between age/ body mass index groups.

^b Participants aged 16–74 who worked in last four weeks (age group: 16–44, *n* = 606; 45–64, *n* = 574; 65+, *n* = 65; body mass index: 18.5–24.9 kg/m², *n* = 395; 25.0–29.9 kg/m², *n* = 474; ≥30.0 kg/m², *n* = 272).

^c Average accelerometer wear time per day where nonwear was defined by intervals of at least 60 minutes of zero activity counts with allowance for up to two consecutive minutes of 1–100 cpm.

Web Table 2. Characteristics of Participants Completing a Full Interview and With Complete Accelerometer and Questionnaire Data, Health Survey for England, 2008^a

	Full Interview (<i>n</i> = 15,054)		Analytic Sample (<i>n</i> = 2,175)	
	%	Mean (SD)	%	Mean (SD)
Male sex	44.8		45.6	
Current smoker	21.1		19.7	
Manual occupation	39.8		38.7	
Long-standing illness	45.3		48.8	
Very physically active at work ^b	22.5		20.9	
Age, years		49.0 (18.8)		52.2 (17.8)
Body mass index, kg/m ²		27.2 (5.2)		27.5 (5.1)

Abbreviation: SD, standard deviation.

^a No statistical tests performed due to overlapping samples.

^b Participants aged 16–74 who worked in last four weeks (*n* = 8,574 full interview; *n* = 1,245 analytical sample).

Web Table 3. Outline of the Different Versions of the Physical Activity Questionnaire, Health Survey for England, 1991 to 2008^a

Physical Activity Domain	1991–1994	1997–1998, 2006	1999–2004	2008
<i>Heavy domestic (heavy housework and heavy gardening/manual/building/DIY)</i>				
Frequency ^b	✓	✓	✓	✓
Duration		✓		✓
Intensity				✓
Lower limit for duration (minutes)	None	15	30	10
Perceived level				
<i>Walking</i>				
Frequency ^b	✓	✓ ^c	✓	✓
Duration		✓	✓	✓
Intensity	✓	✓	✓	✓
Lower limit for duration (minutes)	20	15	30	10
Perceived level				
<i>Sports and exercise</i>				
Frequency ^b	✓	✓	✓	✓
Duration	✓	✓	✓	✓
Intensity	✓	✓	✓	✓
Lower limit for duration (minutes)	None	15	15	10
Perceived level				
<i>Occupational activity</i>				
Frequency ^b				✓ ^d
Duration				✓
Intensity				
Lower limit for duration (minutes)				
Perceived level ^e	✓	✓	✓	✓

Abbreviation: DIY, do-it-yourself.

^a Version 1 in 1991–1993; version 2 in 1997–1998 and 2006; version 3 in 1999, 2003, and 2004. The latest version, used in 2008, is a slight alteration of version 2 that contains additional questions on occupational activity.

^b 1991–1994: occasions of participation; 1997–2008: days of participation.

^c A question probing on second walking session on the same day was included.

^d Walking at work; climbing stairs or ladders; lifting, carrying or moving heavy loads.

^e A single question on overall activity levels at work.

Web Table 4. Absolute Differences in Median Minutes/Day Derived From the Physical Activity and Sedentary Behaviour Assessment Questionnaire (PASBAQ) and Accelerometer Data Stratified by Age – Physical Activity and Sedentary Behavior Variables, Health Survey for England, 2008

PASBAQ Variable	Median (IQR)	Accelerometer Variable	Median (IQR)	Difference ^a	P Value ^b
<i>16–44 years (n = 760)</i>					
Total physical activity	66.1 (141.9)	Total physical activity ^c	264.3 (109.1)	–198.2	<0.001
VPA	4.3 (51.4)	VPA ^d	0.0 (1.5)	4.3	<0.001
MVPA ^e	21.4 (45.8)	MVPA ^d	30.9 (29.0)	–9.5	<0.001
MVPA ^e	21.4 (45.8)	MVPA ^d _{10-min bouts}	7.6 (17.4)	13.9	<0.001
MVPA ^f	18.8 (44.2)	MVPA ^d	30.9 (29.0)	–12.2	<0.001
MVPA ^f	18.8 (44.2)	MVPA ^d _{10-min bouts}	7.6 (17.4)	11.2	<0.001
Heavy domestic	0.7 (3.7)	LRMPA ^d	71.5 (44.4)	–70.8	<0.001
Total sedentary	406.1 (226.4)	<50 cpm	438.4 (138.4)	–32.3	<0.001
Total sedentary	406.1 (226.4)	<100 cpm	493.6 (132.2)	–87.6	<0.001
Total sedentary	406.1 (226.4)	<200 cpm	558.9 (126.0)	–152.8	<0.001
<i>45–64 years (n = 821)</i>					
Total physical activity	72.9 (173.2)	Total physical activity ^c	262.0 (113.6)	–189.1	<0.001
VPA	0.0 (4.3)	VPA ^d	0.0 (0.1)	0.0	<0.001
MVPA ^e	9.2 (33.9)	MVPA ^d	23.9 (29.0)	–14.6	<0.001
MVPA ^e	9.2 (33.9)	MVPA ^d _{10-min bouts}	4.6 (13.7)	4.6	<0.001
MVPA ^f	6.4 (34.3)	MVPA ^d	23.9 (29.0)	–17.4	<0.001
MVPA ^f	6.4 (34.3)	MVPA ^d _{10-min bouts}	4.6 (13.7)	1.9	<0.001
Heavy domestic	1.2 (4.9)	LRMPA ^d	72.0 (50.6)	–70.8	<0.001
Total sedentary	387.1 (207.9)	<50 cpm	460.6 (120.4)	–73.4	<0.001
Total sedentary	387.1 (207.9)	<100 cpm	514.4 (122.4)	–127.3	<0.001
Total sedentary	387.1 (207.9)	<200 cpm	582.1 (114.0)	–195.0	<0.001
<i>65+ years (n = 594)</i>					
Total physical activity	51.2 (140.7)	Total physical activity ^c	198.2 (117.6)	–147.1	<0.001
VPA	0.0 (0.0)	VPA ^d	0.0 (0.0)	0.0	<0.001
MVPA ^e	2.4 (16.7)	MVPA ^d	8.6 (18.4)	–6.2	<0.001
MVPA ^e	2.4 (16.7)	MVPA ^d _{10-min bouts}	0.0 (5.9)	2.4	<0.001
MVPA ^f	0.0 (10.7)	MVPA ^d	8.6 (18.4)	–8.6	<0.001

(Table continues)

MVPA ^f	0.0 (10.7)	MVPA ^d _{10-min bouts}	0.0 (5.9)	0.0	0.059
Heavy domestic	0.6 (2.8)	LRMPA ^d	40.8 (43.7)	-40.2	<0.001
Total sedentary	360.0 (167.1)	<50 cpm	501.5 (102.1)	-141.5	<0.001
Total sedentary	360.0 (167.1)	<100 cpm	551.7 (105.1)	-191.7	<0.001
Total sedentary	360.0 (167.1)	<200 cpm	614.6 (106.6)	-254.6	<0.001

Abbreviations: cpm, counts per minute; IQR, interquartile range; LRMPA, lower-range moderate-intensity physical activity; MVPA, moderate-to-vigorous physical activity; PA, physical activity; VPA, vigorous physical activity.

^a Difference between PASBAQ and accelerometer-assessed median estimates.

^b *P* value for the difference between PASBAQ and accelerometer estimates according to the Wilcoxon signed-rank test.

^c Average daily time spent ≥ 200 cpm.

^d Accelerometer cutoff points to quantify time in intensity band: VPA, $\geq 5,999$ cpm; MVPA, $\geq 2,020$ cpm; LRMPA 760–2,019 cpm.

^e MVPA calculations include heavy domestic activity.

^f MVPA calculations exclude heavy domestic activity

Web Table 5. Absolute Differences in Median Minutes/Day Derived From the Physical Activity and Sedentary Behaviour Assessment Questionnaire (PASBAQ) and Accelerometer Data Stratified by Body Mass Index – Physical Activity and Sedentary Behavior Variables, Health Survey for England, 2008

PASBAQ Variable	Median (IQR)	Accelerometer Variable	Median (IQR)	Difference ^a	P Value ^b
<i>BMI 18.5–24.9 kg/m² (n = 628)</i>					
Total physical activity	66.4 (145.1)	Total physical activity ^c	256.8 (117.4)	–190.4	<0.001
VPA	0.0 (34.3)	VPA ^d	0.0 (1.0)	0.0	<0.001
MVPA ^e	14.7 (43.6)	MVPA ^d	27.0 (30.6)	–12.3	<0.001
MVPA ^e	14.7 (43.6)	MVPA ^d _{10-min bouts}	7.0 (18.6)	7.7	<0.001
MVPA ^f	11.0 (42.9)	MVPA ^d	27.0 (30.6)	–16.0	<0.001
MVPA ^f	11.0 (42.9)	MVPA ^d _{10-min bouts}	7.0 (18.6)	4.0	<0.001
Heavy domestic	0.6 (3.1)	LRMPA ^d	65.5 (45.9)	–64.9	<0.001
Total sedentary	375.0 (214.3)	<50 cpm	449.3 (128.8)	–74.3	<0.001
Total sedentary	375.0 (214.3)	<100 cpm	506.0 (126.8)	–131.0	<0.001
Total sedentary	375.0 (214.3)	<200 cpm	574.4 (125.1)	–199.4	<0.001
<i>BMI 25.0–29.9 kg/m² (n = 805)</i>					
Total physical activity	73.6 (171.4)	Total physical activity ^c	255.9 (111.6)	–182.3	<0.001
VPA	0.0 (17.1)	VPA ^d	0.0 (0.2)	0.0	<0.001
MVPA ^e	13.2 (39.0)	MVPA ^d	23.7 (30.1)	–10.5	<0.001
MVPA ^e	13.2 (39.0)	MVPA ^d _{10-min bouts}	4.7 (14.0)	8.5	<0.001
MVPA ^f	8.6 (38.6)	MVPA ^d	23.7 (30.1)	–15.1	<0.001
MVPA ^f	8.6 (38.6)	MVPA ^d _{10-min bouts}	4.7 (14.0)	3.9	<0.001
Heavy domestic	1.2 (5.5)	LRMPA ^d	68.4 (47.3)	–67.2	<0.001
Total sedentary	385.7 (210.0)	<50 cpm	460.6 (121.5)	–74.9	<0.001
Total sedentary	385.7 (210.0)	<100 cpm	512.8 (125.7)	–127.1	<0.001
Total sedentary	385.7 (210.0)	<200 cpm	580.1 (120.4)	–194.4	<0.001
<i>BMI ≥30.0 kg/m² (n = 529)</i>					
Total physical activity	51.4 (145.0)	Total physical activity ^c	231.4 (110.0)	–180.0	<0.001
VPA	0.0 (0.0)	VPA ^d	0.0 (0.0)	0.0	<0.001
MVPA ^e	4.9 (17.6)	MVPA ^d	15.3 (23.4)	–10.4	<0.001
MVPA ^e	4.9 (17.6)	MVPA ^d _{10-min bouts}	1.7 (8.3)	3.2	<0.001
MVPA ^f	0.0 (15.7)	MVPA ^d	15.3 (23.4)	–15.3	<0.001
MVPA ^f	0.0 (15.7)	MVPA ^d _{10-min bouts}	1.7 (8.3)	–1.7	<0.001

(Table continues)

Heavy domestic	0.7 (3.2)	LRMPA ^d	59.2 (52.1)	-58.5	<0.001
Total sedentary	402.9 (201.4)	<50 cpm	485.3 (121.4)	-82.5	<0.001
Total sedentary	402.9 (201.4)	<100 cpm	536.6 (118.0)	-133.7	<0.001
Total sedentary	402.9 (201.4)	<200 cpm	601.2 (115.0)	-198.3	<0.001

Abbreviations: cpm, counts per minute; IQR, interquartile range; LRMPA, lower-range moderate-intensity physical activity; MVPA, moderate-to-vigorous physical activity; PA, physical activity; VPA, vigorous physical activity.

^a Difference between PASBAQ and accelerometer-assessed median estimates.

^b *P* value for the difference between PASBAQ and accelerometer estimates according to the Wilcoxon signed-rank test.

^c Average daily time spent ≥ 200 cpm.

^d Accelerometer cutoff points to quantify time in intensity band: VPA, $\geq 5,999$ cpm; MVPA, $\geq 2,020$ cpm; LRMPA, 760–2,019 cpm.

^e MVPA calculations include heavy domestic activity.

^f MVPA calculations exclude heavy domestic activity.

Web Table 6. Rank-Order Correlations (Spearman ρ) for the Physical Activity and Sedentary Behaviour Assessment Questionnaire (PASBAQ) With Accelerometer Data Stratified by Age – Physical Activity Variables, Health Survey for England, 2008

Accelerometer, by PASBAQ	16–44 years (<i>n</i> = 760)		45–64 years (<i>n</i> = 821)		65+ years (<i>n</i> = 594)		<i>P</i> Value ^c	<i>P</i> Value ^d	<i>P</i> Value ^e
	ρ^a	95% CI ^b	ρ^a	95% CI ^b	ρ^a	95% CI ^b			
Total activity (minutes with ≥ 200 counts)									
Total activity (minutes/day)	0.13	0.05, 0.20	0.21	0.14, 0.28	0.40	0.32, 0.48	0.103	<0.001	<0.001
Sports of any intensity (minutes/day)	-0.03	-0.10, 0.05	0.02	-0.04, 0.08	0.19	0.12, 0.26	0.322	0.001	<0.001
Total activity (average counts/minute)									
Total activity (minutes/day)	0.15	0.08, 0.23	0.26	0.19, 0.32	0.46	0.38, 0.53	0.023	<0.001	<0.001
Total activity (MET-minutes/day)	0.21	0.15, 0.28	0.29	0.23, 0.36	0.53	0.47, 0.59	0.091	<0.001	<0.001
VPA ^f									
VPA	0.37	0.31, 0.43	0.20	0.12, 0.29	0.15	0.04, 0.26	<0.001	0.337	<0.001
MVPA ^f									
MVPA ^g	0.26	0.19, 0.33	0.34	0.26, 0.42	0.47	0.40, 0.55	0.082	0.004	<0.001
MVPA ^h	0.29	0.22, 0.35	0.27	0.21, 0.34	0.39	0.32, 0.47	0.667	0.012	0.039
MVPA sports	0.18	0.11, 0.24	0.12	0.06, 0.19	0.21	0.14, 0.28	0.223	0.085	0.569
Fairly brisk/fast walking	0.25	0.17, 0.32	0.24	0.18, 0.30	0.36	0.29, 0.43	0.834	0.014	0.027
MVPA ^f _{10-min bouts}									
MVPA ^g	0.30	0.23, 0.37	0.37	0.30, 0.45	0.34	0.24, 0.44	0.119	0.522	0.418
MVPA ^f _{10-min bouts}									
MVPA ^h	0.33	0.27, 0.38	0.31	0.24, 0.38	0.33	0.26, 0.41	0.660	0.682	>0.999
LRMPA ^f									
Heavy domestic	0.14	0.07, 0.22	0.24	0.17, 0.32	0.41	0.33, 0.50	0.039	<0.001	<0.001

Abbreviations: CI, confidence interval; LRMPA, lower-range moderate-intensity physical activity; METs, metabolic equivalents; MVPA, moderate-to-vigorous physical activity; VPA, vigorous physical activity.

^a Spearman's rank correlation.

^b 95% CIs for Spearman's ρ computed using bootstrapping procedure.

^c *P* value for the difference between Spearman's ρ for age groups 16–44 and 45–64 years calculated using the Fisher's *z* test.

^d *P* value for the difference between Spearman's ρ for age groups 45–64 and 65+ years calculated using the Fisher's *z* test.

^e *P* value for the difference between Spearman's ρ for age groups 16–44 and 65+ years calculated using the Fisher's *z* test.

^f Accelerometer cutoff points to quantify time in intensity band: VPA, $\geq 5,999$ counts/minute; MVPA, $\geq 2,020$ counts/minute; LRMPA, 760–2,019.

^g MVPA calculations include heavy domestic activity.

^h MVPA calculations exclude heavy domestic activity.

Web Table 7. Rank-Order Correlations (Spearman ρ) for the Physical Activity and Sedentary Behaviour Assessment Questionnaire (PASBAQ) With Accelerometer Data Stratified by Body Mass Index – Physical Activity Variables, Health Survey for England, 2008

Accelerometer, by PASBAQ	BMI 18.5–24.9 kg/m ² (n = 628)		25.0–29.9 kg/m ² (n = 805)		≥30.0 kg/m ² (n = 529)		P Value ^c	P Value ^d	P Value ^e
	ρ^a	95% CI ^b	ρ^a	95% CI ^b	ρ^a	95% CI ^b			
Total activity (minutes with ≥200 counts)									
Total activity (minutes/day)	0.21	0.13, 0.28	0.20	0.13, 0.27	0.27	0.19, 0.36	0.842	0.187	0.280
Sports of any intensity (minutes/day)	0.11	0.04, 0.18	0.07	-0.01, 0.14	0.07	-0.01, 0.15	0.447	>0.999	0.497
Total activity (average counts/minute)									
Total activity (minutes/day)	0.25	0.18, 0.31	0.22	0.16, 0.28	0.33	0.25, 0.40	0.549	0.034	0.139
Total activity (MET-minutes/day)	0.31	0.24, 0.38	0.29	0.22, 0.36	0.38	0.29, 0.46	0.682	0.070	0.180
VPA ^f									
VPA	0.39	0.31, 0.46	0.34	0.26, 0.43	0.22	0.12, 0.33	0.280	0.020	0.002
MVPA ^f									
MVPA ^g	0.34	0.25, 0.42	0.36	0.28, 0.43	0.42	0.33, 0.52	0.667	0.208	0.114
MVPA ^h	0.32	0.25, 0.38	0.36	0.30, 0.43	0.35	0.28, 0.43	0.395	0.842	0.569
MVPA sports	0.22	0.15, 0.29	0.26	0.20, 0.32	0.19	0.12, 0.27	0.424	0.190	0.596
Fairly brisk/fast walking	0.27	0.18, 0.35	0.28	0.20, 0.35	0.31	0.24, 0.39	0.842	0.555	0.459
MVPA ^f _{10-min bouts}									
MVPA ^g	0.36	0.28, 0.44	0.34	0.26, 0.42	0.34	0.25, 0.43	0.667	>0.999	0.697
MVPA ^f _{10-min bouts}									
MVPA ^h	0.33	0.26, 0.41	0.35	0.28, 0.41	0.32	0.24, 0.39	0.675	0.549	0.849
LRMPA ^f									
Heavy domestic	0.23	0.14, 0.32	0.23	0.14, 0.31	0.22	0.13, 0.32	>0.999	0.849	0.857

Abbreviations: CI, confidence interval; LRMPA, lower-range moderate-intensity physical activity; METs, metabolic equivalents; MVPA, moderate-to-vigorous physical activity; VPA, vigorous physical activity.

^a Spearman's rank correlation.

^b 95% CIs for Spearman's ρ computed using bootstrapping procedure.

^c P value for the difference between Spearman's ρ for 18.5–24.9 vs. 25.0–29.9 kg/m² calculated using the Fisher's z test.

^d P value for the difference between Spearman's ρ for 25.0–29.9 vs. ≥30.0 kg/m² calculated using the Fisher's z test.

^e P value for the difference between Spearman's ρ for 18.5–24.9 vs. ≥30.0 kg/m² calculated using the Fisher's z test.

^f Accelerometer cutoff points to quantify time in intensity band: VPA, ≥5,999 counts/minute; MVPA, ≥2,020 counts/minute; LRMPA, 760–2,019.

^g MVPA calculations include heavy domestic activity.

^h MVPA calculations exclude heavy domestic activity.

Web Table 8. Rank-Order Correlations (Spearman ρ) for the Physical Activity and Sedentary Behaviour Assessment Questionnaire (PASBAQ) With Accelerometer Data Stratified by Age – Sedentary Behavior Variables, Health Survey for England, 2008

PASBAQ, by Accelerometer Cutoff Point For Sedentary Behavior ^a	16–44 years (<i>n</i> = 760)		45–64 years (<i>n</i> = 821)		65+ years (<i>n</i> = 594)		<i>P</i> Value ^d	<i>P</i> Value ^e	<i>P</i> Value ^f
	ρ^b	95% CI ^c	ρ^b	95% CI ^c	ρ^b	95% CI ^c			
Total sedentary ^g									
<50 cpm	0.34	0.28, 0.41	0.31	0.24, 0.37	0.32	0.25, 0.40	0.503	0.834	0.682
<100 cpm	0.33	0.27, 0.40	0.30	0.24, 0.36	0.31	0.23, 0.39	0.509	0.842	0.682
<200 cpm	0.30	0.24, 0.37	0.28	0.22, 0.35	0.29	0.21, 0.37	0.667	0.842	0.842
Total sedentary ^h									
<50 cpm	0.10	0.03, 0.18	0.21	0.13, 0.29	0.34	0.26, 0.41	0.025	0.009	<0.001
<100 cpm	0.08	0.00, 0.15	0.18	0.11, 0.25	0.32	0.24, 0.40	0.043	0.006	<0.001
<200 cpm	0.04	-0.03, 0.10	0.15	0.07, 0.23	0.29	0.21, 0.38	0.028	0.006	<0.001
TV viewing									
<50 cpm	-0.01	-0.09, 0.06	0.11	0.03, 0.18	0.27	0.19, 0.35	0.017	0.002	<0.001
<100 cpm	-0.04	-0.10, 0.02	0.08	0.02, 0.14	0.25	0.17, 0.33	0.017	0.001	<0.001
<200 cpm	-0.07	-0.14, 0.01	0.06	-0.02, 0.13	0.23	0.16, 0.31	0.010	0.001	<0.001
Non-TV sitting									
<50 cpm	0.16	0.08, 0.23	0.17	0.09, 0.24	0.15	0.06, 0.24	0.842	0.704	0.849
<100 cpm	0.15	0.08, 0.21	0.15	0.08, 0.22	0.14	0.06, 0.23	>0.999	0.849	0.849
<200 cpm	0.12	0.05, 0.19	0.14	0.07, 0.20	0.13	0.04, 0.22	0.689	0.849	0.849
Occupational sitting/standing ⁱ									
<50 cpm	0.23	0.14, 0.31	0.19	0.11, 0.27	0.23	0.02, 0.45	0.497	0.772	>0.999
<100 cpm	0.24	0.16, 0.32	0.19	0.10, 0.28	0.27	0.02, 0.53	0.395	0.555	0.826
<200 cpm	0.23	0.15, 0.31	0.18	0.10, 0.26	0.31	0.07, 0.55	0.395	0.337	0.549

Abbreviations: CI, confidence interval; cpm, counts per minute.

^a Accelerometer-based sedentary time calculated using three different thresholds (<50, <100 and <200 cpm).

^b Spearman's rank correlation.

^c 95% CIs for Spearman's ρ computed using bootstrapping procedure.

^d *P* value for the difference between Spearman's ρ for age groups 16–44 and 45–64 years calculated using the Fisher's *z* test.

^e *P* value for the difference between Spearman's ρ for age groups 45–64 and 65+ years calculated using the Fisher's *z* test.

^f *P* value for the difference between Spearman's ρ for age groups 16–44 and 65+ years calculated using the Fisher's *z* test.

^g Total includes occupational sitting/standing.

^h Total excludes occupational sitting/standing.

ⁱ Time spent sitting/standing while at work. Participants aged 16–74 who reported working in the last four weeks with information on sedentary time (*n* = 550 for ages 16–44 years; *n* = 509 for ages 45–64 years; *n* = 56 for ages 65+ years).

Web Table 9. Rank-Order Correlations (Spearman ρ) for the Physical Activity and Sedentary Behaviour Assessment Questionnaire (PASBAQ) With Accelerometer Data Stratified by Body Mass Index – Sedentary Behavior Variables, Health Survey for England, 2008

PASBAQ, by Accelerometer Cutoff Point For Sedentary Behavior ^a	BMI 18.5–24.9 kg/m ² (n = 628)		25.0–29.9 kg/m ² (n = 805)		≥30 kg/m ² (n = 529)		P Value ^d	P Value ^e	P Value ^f
	ρ^b	95% CI ^c	ρ^b	95% CI ^c	ρ^b	95% CI ^c			
Total sedentary ^g									
<50 cpm	0.34	0.27, 0.41	0.28	0.22, 0.34	0.27	0.19, 0.36	0.215	0.849	0.190
<100 cpm	0.33	0.25, 0.41	0.28	0.21, 0.34	0.27	0.19, 0.36	0.303	0.849	0.267
<200 cpm	0.30	0.22, 0.37	0.25	0.19, 0.31	0.26	0.19, 0.33	0.313	0.849	0.465
Total sedentary ^h									
<50 cpm	0.24	0.16, 0.32	0.26	0.20, 0.32	0.24	0.16, 0.32	0.689	0.704	>0.999
<100 cpm	0.22	0.15, 0.29	0.23	0.15, 0.31	0.22	0.14, 0.29	0.842	0.849	>0.999
<200 cpm	0.19	0.12, 0.26	0.20	0.14, 0.26	0.19	0.11, 0.27	0.849	0.849	>0.999
TV viewing									
<50 cpm	0.08	0.00, 0.16	0.20	0.13, 0.26	0.15	0.06, 0.24	0.021	0.358	0.230
<100 cpm	0.06	-0.02, 0.14	0.17	0.11, 0.23	0.13	0.04, 0.22	0.037	0.465	0.234
<200 cpm	0.04	-0.05, 0.13	0.15	0.08, 0.22	0.11	0.04, 0.19	0.038	0.465	0.234
Non-TV sitting									
<50 cpm	0.23	0.15, 0.31	0.17	0.11, 0.23	0.16	0.08, 0.23	0.242	0.857	0.219
<100 cpm	0.22	0.15, 0.29	0.15	0.09, 0.22	0.15	0.06, 0.23	0.174	>0.999	0.219
<200 cpm	0.20	0.13, 0.28	0.13	0.06, 0.21	0.13	0.05, 0.22	0.177	>0.999	0.223
Occupational sitting/standing ⁱ									
<50 cpm	0.21	0.11, 0.31	0.18	0.08, 0.28	0.23	0.11, 0.35	0.667	0.516	0.803
<100 cpm	0.21	0.11, 0.31	0.19	0.11, 0.27	0.25	0.13, 0.36	0.772	0.435	0.617
<200 cpm	0.19	0.07, 0.31	0.19	0.10, 0.27	0.25	0.12, 0.37	>0.999	0.435	0.453

Abbreviations: CI, confidence interval; cpm, counts per minute.

^a Accelerometer-based sedentary time calculated using three different thresholds (<50, <100 and <200 cpm).

^b Spearman's rank correlation.

^c 95% CIs for Spearman's ρ computed using bootstrapping procedure.

^d P value for the difference between Spearman's ρ for 18.5–24.9 vs. 25.0–29.9 kg/m² calculated using the Fisher's z test.

^e P value for the difference between Spearman's ρ for 25.0–29.9 vs. ≥30.0 kg/m² calculated using the Fisher's z test.

^f P value for the difference between Spearman's ρ for 18.5–24.9 vs. ≥30.0 kg/m² calculated using the Fisher's z test.

^g Total includes occupational sitting/standing.

^h Total excludes occupational sitting/standing.

ⁱ Time spent sitting/standing while at work. Participants aged 16–74 who reported working in the last four weeks with information on sedentary time ($n = 352$ BMI 18.5–24.9 kg/m²; $n = 430$ BMI 25.0–29.9 kg/m²; $n = 241$ BMI ≥ 30.0 kg/m²).

Web Appendix

Adult Physical Activity Questions

ASK ALL AGED 16+

Intro

Now I'd like to ask you some questions about things that you have done that involve physical activity. This may be things that you have done at work, college or in your leisure time.

INTERVIEWER: PRESS 1 AND <ENTER> TO CONTINUE

1..1

Work

First of all, in the last 4 weeks, that is since (*date of interview - 4 weeks*), did you do any paid or unpaid work either as an employee or as self employed?

Please include any voluntary work or part time work you may have done.

- 1 Yes
- 2 No

IF Work = Yes THEN

WrkDays

On how many days did you work in the last 4 weeks?

INTERVIEWER: PLEASE INCLUDE ANY PAID OR UNPAID OVERTIME. INCLUDE ALL JOBS IF MORE THAN ONE. INCLUDE ALL DAYS RESPONDENT WORKED EVEN IF THEY WERE NOT FULL WORKING DAYS.

Range: 0..28

WrkAct2

SHOWCARD I

Looking at showcard I, which of these did you do whilst working? Please include any work you did on weekends.

CODE ALL THAT APPLY

- 1 Sitting down or standing up
- 2 Walking at work (e.g. door to door sales, hospital nurse work)
- 3 Climbing stairs or ladders
- 4 Lifting, carrying or moving heavy loads

IF WorkAct2 = Sit THEN

WrkAct3H

On an average work day in the last four weeks, how much time did you usually spend sitting down or standing up?

INTERVIEWER: IF RESPONDENT WAS ON HOLIDAY OR UNABLE TO WORK ON ANY DAYS IN THE LAST FOUR WEEKS, ASK THEM TO REPORT THE AVERAGE NUMBER OF HOURS ON THOSE DAYS THEY WORKED.

RECORD HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR. RECORD MINUTES AT NEXT QUESTION.

Range: 0..12

WrkAct3M

(On an average work day, how much time did you usually spend sitting down or standing up?)

ENTER NUMBER OF MINUTES. IF AN EXACT HOUR, ENTER 0 FOR MINUTES

:0..59

END IF

IF WorkAct2 = walk

WrkAct4H

On an average work day in the last four weeks, how much time did you usually spend walking at work (e.g. door to door sales, hospital nurse work)?

INTERVIEWER: IF RESPONDENT WAS ON HOLIDAY OR UNABLE TO WORK ON ANY DAYS IN THE LAST FOUR WEEKS, ASK THEM TO REPORT THE AVERAGE NUMBER OF HOURS ON THOSE DAYS THEY WORKED.

RECORD HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR. RECORD MINUTES AT NEXT QUESTION.

: 0..12

WrkAct4M

(On an average work day in the last four weeks, how much time did you usually spend walking at work e.g. door to door sales, hospital nurse work)?

INTERVIEWER: IF RESPONDENT WAS ON HOLIDAY OR UNABLE TO WORK ON ANY DAYS IN THE LAST FOUR WEEKS, ASK THEM TO REPORT THE AVERAGE NUMBER OF HOURS ON THOSE DAYS THEY WORKED.

ENTER NUMBER OF MINUTES. IF AN EXACT HOUR, ENTER 0 FOR MINUTES

: 0..59

END IF

IF WorkAct2 = climb

WrkAct5H

On an average work day in the last four weeks, how much time did you usually spend climbing stairs or ladders?

INTERVIEWER: IF RESPONDENT WAS ON HOLIDAY OR UNABLE TO WORK ON ANY DAYS IN THE LAST FOUR WEEKS, ASK THEM TO REPORT THE AVERAGE NUMBER OF HOURS ON THOSE DAYS THEY WORKED.

RECORD HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR. RECORD MINUTES AT NEXT QUESTION.

: 0..12

WrkAct5M

On an average work day, how much time did you usually climbing stairs or ladders? ENTER NUMBER OF MINUTES. IF AN EXACT HOUR, ENTER 0 FOR MINUTES

: 0..59

END IF

IF WorkAct2 = lift

WrkAct6H

On an average work day in the last four weeks, how much time did you usually spend lifting, carrying or moving heavy loads?

INTERVIEWER: IF RESPONDENT WAS ON HOLIDAY OR UNABLE TO WORK ON ANY DAYS IN THE LAST FOUR WEEKS, ASK THEM TO REPORT THE AVERAGE NUMBER OF HOURS ON THOSE DAYS THEY WORKED.

RECORD HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR. RECORD MINUTES AT NEXT QUESTION.

: 0..12

WrkAct6M

On an average work day, how much time did you lifting, carrying or moving heavy loads?

ENTER NUMBER OF MINUTES. IF AN EXACT HOUR, ENTER 0 FOR MINUTES

: 0..59

END IF

Active

Thinking about your job in general would you say that you are ...READ OUT...

- 1 ...very physically active,
- 2 ...fairly physically active,
- 3 ...not very physically active,
- 4 ...or, not at all physically active in your job?

END IF

ASK ALL AGE 16+

Housewrk

I'd like you to think about all the physical activities you have done in the last few weeks (*when you were not doing your (paid) job*). Have you done any housework in the past four weeks, that is from (*date of interview - 4 weeks*) up to yesterday?

- 1 Yes
- 2 No

IF Housewrk = Yes THEN

HWrkList

SHOW CARD J

Have you done any housework listed on this card?

- 1 Yes
- 2 No

HevyHWrk

SHOW CARD K

Some kinds of housework are heavier than others. This card gives some examples of heavy housework. It does not include everything, these are just examples. Was any of the housework you did in the last four weeks this kind of heavy housework?

- 1 Yes
- 2 No

IF HevyHWrk = Yes THEN

HeavyDay

During the past four weeks on how many days have you done this kind of heavy housework?

Range: 1..28

IF HeavyDay IN [1..28] THEN

HrsHHW

On the days you did heavy housework, how long did you usually spend?

RECORD HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR. RECORD MINUTES AT NEXT QUESTION

Range: 0..12

MinHHW

RECORD MINUTES SPENT ON HEAVY HOUSEWORK.

Range: 0..59

END IF

END IF

END IF

ASK ALL AGE 16+

Garden

Have you done any gardening, DIY or building work in the past four weeks, that is since (*date of interview - 4 weeks*)?

- 1 Yes
- 2 No

IF Garden = Yes THEN

GardList

SHOW CARD L

Have you done any gardening, DIY or building work listed on this card?

- 1 Yes
- 2 No

ManWork

SHOW CARD M

Have you done any gardening, DIY or building work from this other card, or any similar heavy manual work?

- 1 Yes
- 2 No

IF ManWork = Yes THEN

ManDays

During the past 4 weeks on how many days have you done this kind of heavy manual gardening or DIY?

Range :1..28

HrsDIY

On the days you did heavy manual gardening or DIY, how long did you usually spend?
ENTER HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR.RECORD MINUTES AT NEXT QUESTION.

Range :0..12

MinDIY

RECORD MINUTES SPENT ON GARDENING OR DIY.

Range :0..59

END IF
END IF

ASK ALL AGE 16+

Wlk5it

I'd like you to think about all the walking you have done in the past four weeks either locally or away from here. Please include any country walks, walking to and from work or college and any other walks that you have done.

In the past four weeks, that is since (*date of interview - 4 weeks*), have you done a continuous walk that lasted at least 5 minutes?

- 1 Yes
- 2 No
- 3 Can't walk at all

IF Wlk5Int = Yes THEN

Wlk10M

In the past four weeks, have you done a continuous walk that lasted at least 10 minutes?
(That is since (*date of interview - 4 weeks*)).

- 1 Yes
- 2 No

IF Wlk10M = Yes THEN

DayWlk

During the past four weeks, on how many days did you do a walk of at least 10 minutes?
(That is since (*date of interview - 4 weeks*)).

Range: 1..28

Day1Wlk

On (*any of those days*) did you do more than one walk lasting at least 10 minutes?

- 1 Yes, more than one walk of 10+ mins (on at least one day)
- 2 No, only one walk of 10+ mins a day

IF (DayWlk in [2..28]) AND (Day1Wlk = Yes) THEN

Day2Wlk

On how many days in the last four weeks did you do more than one walk that lasted at least 10 minutes?

Range: 1..28

END IF

IF Wlk10M = Yes THEN

HrsWlk

How long did you usually spend walking each time you did a walk for 10 minutes or more?

IF VERY DIFFERENT LENGTHS, PROBE FOR MOST REGULAR. ENTER HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR.RECORD MINUTES AT NEXT QUESTION.

Range: 0..12

MinWlk

RECORD MINUTES SPENT WALKING.

Range: 0..59

IF Day1Wlk = 1 and TotTim = 10-14 THEN

WLK30 MIN

On how many days in the last four weeks did you spend 30 minutes or more walking (this could be made up of more than one walk)?

Range 1..28

END IF

END IF

END IF

WalkPace

Which of the following best describes your usual walking pace ...READ OUT...

- 1 ...a slow pace,
- 2 ...a steady average pace,
- 3 ...a fairly brisk pace,
- 4 ...or, a fast pace - at least 4 miles per hour?
- 5 (none of these)

END IF

ASK ALL AGE 16+

ActPhy

SHOW CARD N

Can you tell me if you have done any activities on this card during the last 4 weeks, which is since *(date of interview - 4 weeks)*? Please include teaching, coaching, training and practice sessions.

- 1 Yes
- 2 No

IF ActPhy = Yes THEN

WhtAct

SHOW CARD N

Which have you done in the last four weeks?

PROBE: Any others?

CODE ALL THAT APPLY.

- 1 Swimming
- 2 Cycling
- 3 Workout at a gym/Exercise bike/Weight training
- 4 Aerobics/Keep fit/Gymnastics/ Dance for fitness
- 5 Any other type of dancing
- 6 Running/Jogging
- 7 Football/Rubgy
- 8 Badminton/tennis
- 9 Squash
- 10 Exercises (e.g. press-up, sit-ups).

FOR i = 1 TO 6 DO

Records up to 6 additional sports

OActQ[i]

Have you done any other sport or exercise not listed on the card ?

- 1 Yes
- 2 No

IF (OActQ = Yes) THEN

COthAct

INTERVIEWER: Record brief details of the *(first/second/third/fourth/fifth/sixth)* other sport exercise activity.

Type in the first few letters of the sport to enter coding frame.

Type 'other' if the sport is not listed. Type 'xxx' (for not listed/don't know) if unable to code.

On exiting coding frame press <Enter> to move to next question.

Note: records up to 6 activities.

END IF
END IF
END DO

Note: ActVar is a combination of WhtAct and OactQ. ActVar = 1 to 10 comes from WhtAct = 1 to 10. ActVar = 11-16 comes from OactQ = 11-16.

FOR ActVar = 1 TO 16 DO
IF ((ActVar in [1..10]) AND (ActVar IN WhtAct)) OR ((ActVar in [11..16]) AND (OactQ[ActVar] = Yes)) THEN

DayExc

Can you tell me on how many separate days you did (*name of activity*) for at least 10 minutes a time during the past four weeks, that is since since (*date of interview – 4 weeks*)?

IF ONLY DONE FOR LESS THAN 10 MINUTES ENTER 0.
Range: 0..28

IF DayExc in [1..28] THEN

ExcHrs

How much time did you usually spend doing (*name of activity*) on each day? Only count times you did it for at least 10 minutes.

RECORD HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR. RECORD MINUTES AT NEXT QUESTION.

Range: 0..12

ExcMin

RECORD MINUTES HERE.

Range: :0..59

ExcSwT

During the past four weeks, was the effort of (*name of activity*) usually enough to make you out of breath or sweaty?

- 1 Yes
- 2 No

END IF

Note: repeated for each activity named in WhtAct.

IF WhtAct = 1, 3 OR 4 THEN

Intro

Now, I'd like to ask you some further questions about some of the things you have done in the last four weeks. This may include some of the things you have just told me about, but we are interested to know what different types of activities people regularly take part in.

END IF

IF WhtAct = 1 THEN

Swim

You said that you did some swimming. What was it that you did mainly; swimming as a family or social activity OR swimming laps or lengths?

CODE ONE ONLY. IF RESPONDENT SAYS BOTH, PROBE FOR THE ACTIVITY THAT THEY DID MOST OFTEN.

- 1 Swimming as a social or family activity
- 2 Swimming laps or lengths

END IF

IF WhtAct = 3 THEN

Workout

SHOW CARD O

You mentioned workout at a gym / exercise bike / weight training. What did you do specifically?

CODE ALL THAT APPLY

- 1 Strength work out at a gym using machines or free weights
- 2 Exercise bike
- 3 Spinning classes
- 4 Stepping machines, rowing machines or cross trainer
- 5 Treadmill running

FOR Workout = 1 to 5, i = 1 to 5 DO

Day2Exc(i)

Can you tell me on how many separate days you did (*name of activity*) for at least 10 minutes a time during the past four weeks, that is since since (*date of interview - 4 weeks*)?

IF ONLY DONE FOR LESS THAN 10 MINUTES ENTER 0.

Range: 0..28

IF Day2Exc(i) in [1..28] THEN

Exc2Hrs(i)

How much time did you usually spend doing (*name of activity*) on each day? Only count times you did it for at least 10 minutes.

RECORD HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR. RECORD MINUTES AT NEXT QUESTION.

Range: 0..12

Exc2Min(i)

RECORD MINUTES HERE.

Range: :0..59

Exc2SwT(i)

During the past four weeks, was the effort of (*name of activity*) usually enough to make you out of breath or sweaty?

- | | |
|---|-----|
| 1 | Yes |
| 2 | No |

END IF

END DO

END IF

IF WhtAct = 4 THEN

KeepFit

SHOW CARD P

You said that you did some Aerobics/Keep fit/Gymnastics/ Dance for fitness. What was that specifically?

CODE ALL THAT APPLY

- | | |
|---|---------------------------|
| 1 | Aerobics/keep fit classes |
| 2 | Fitness dancing |
| 3 | Aqua Aerobics |
| 4 | Gymnastics |

5 circuit training

FOR Keepfit = 1 to 5, i = 1 to 5 DO

Day3Exc(i)

Can you tell me on how many separate days you did (*name of activity*) for at least 10 minutes a time during the past four weeks, that is since (*date of interview - 4 weeks*)?

IF ONLY DONE FOR LESS THAN 10 MINUTES ENTER 0.

Range: 0..28

IF Day3Exc(i) in [1..28] THEN

Exc3Hrs(i)

How much time did you usually spend doing (*name of activity*) on each day? Only count times you did it for at least 10 minutes.

RECORD HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR. RECORD MINUTES AT NEXT QUESTION.

Range: 0..12

Exc3Min(i)

RECORD MINUTES HERE.

Range: :0..59

Exc3Swat(i)

During the past four weeks, was the effort of (*name of activity*) usually enough to make you out of breath or sweaty?

1 Yes

2 No

IntroSit

Now I'd like to ask you some questions about time that you might have spent sitting down. For these questions, I'd like you to think about what you have done in the last four weeks, that is since (*date of interview - 4 weeks*) (*when you were not doing your (paid) job*).

INTERVIEWER: PRESS 1 AND ENTER TO CONTINUE

:1..1

TVWkHr

In the last 4 weeks, how much time did you spend sitting down watching TV (including DVDs and videos) on an average weekday (that is Monday to Friday)?

RECORD HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR. RECORD MINUTES AT NEXT QUESTION.

Range: 0..12

TVWkMin

RECORD MINUTES HERE.

Range: :0..59

WkSit2H

In the last four weeks, how much time did you spend sitting down doing any other activity on an average weekday (that is Monday to Friday)? Please do not include time spent doing these activities while at work.

INTERVIEWER: EXAMPLES OF THESE ACTIVITIES INCLUDE READING, EATING A MEAL/SNACK, STUDYING, DRAWING, USING A COMPUTER, PLAYING VIDEO GAMES. RECORD HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR. RECORD MINUTES AT NEXT QUESTION"

Range: 0..12

WkSit2H

RECORD MINUTES HERE.

Range: :0..59

WESit1H

In the last four weeks, how much time did you spend watching TV (including watching DVDs and videos) on an average weekend day (that is Saturday and Sunday)?

INTERVIEWER: RECORD HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR. RECORD MINUTES AT NEXT QUESTION.

Range: 0..12

WESit1M

RECORD MINUTES HERE.

Range: 0..59

WESit2H

In the last 4 weeks, how much time did you spend sitting down doing any other activity on an average weekend day (that is Saturday and Sunday)? Please do not include time spent doing these activities while at work.

INTERVIEWER: EXAMPLES OF THESE ACTIVITIES INCLUDE READING, STUDYING, DRAWING, USING A COMPUTER, PLAYING VIDEO GAMES.

RECORD HOURS SPENT BELOW. ENTER 0 IF LESS THAN 1 HOUR. RECORD MINUTES AT NEXT QUESTION.

Range: 0..12

WESit2M

RECORD MINUTES HERE.

Range: 0..59

Usual

Compared with the amount of activity that you usually do both at work and in your free time would you say that in the last four weeks you were...READ OUT...

- 1 ...more active than usual,
- 2 less active than usual,
- 3 Or, about the same as usual?

END IF
END DO
END IF
