

Pattern measures of sedentary behavior in adults: A literature review.

Additional file 2. Results table

- Table 1 Legend of Table 2 Sedentary behavior pattern measures.
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General	
CI	Confidence Interval
SH	Sedentary Hour
DO	Direct Observation
IQR	interquartile range from the 1st and 3rd quartile
S	Sitting
S+R	Sitting or Reclining
S+L	Sitting or Lying
S+S+L	Sitting or Standing or Lying
S→S	sit-to-stand transition
Data cleaning	
*	Number of times across the entire wear time (≥5 days).
Excessive values were removed, if ...	
Excessive values / artefacts	Either: 1) excessively high counts were removed, or 2) days with excessively high counts (>20 000 cpm) were excluded, or 3) days containing spuriously high values were removed
Non-wear was removed, if ...	
≥10 min zeros	at least 10 min of continuous zeros
≥20 min zeros	at least 20 min of continuous zeros
≥20 min zeros, with gap (2min)	at least 20 min of continuous zeros, with allowance for 1 to 2 min of counts >0 cpm
≥60 min zeros	at least 60 min of continuous zeros
≥60 min zeros, with gap (2min)	at least 60 min of continuous zeros, with allowance for 1 to 2 min of counts >0 cpm
≥60 min zeros, with gap (2min <150 cpm)	at least 60 min of continuous zeros, with allowance for 1 to 2 min of counts 0-150 cpm
≥60 min zeros, with gap (2min <100 cpm)	at least 60 min of continuous zeros, with allowance for 1 to 2 min of counts 0-100 cpm
≥60 min zeros, with gap (2min <50 cpm)	at least 60 min of continuous zeros, with allowance for 1 to 2 min of counts 0-50 cpm
≥60 min <1.0 METs, with gap (2min ≥1.0 METs)	at least 60 consecutive minutes of no activity (i.e., estimated activity intensity < 1.0 METs), with allowance for 2 minutes of activities where intensity rose up to 1.0 METs
≥90 min zeros	at least 90 min of continuous zeros
≥90 min zeros, with gap (2min if ≥30 min before and after)	at least ≥90 consecutive minutes of zero counts to allow for movement of the unworn device, two minutes with movement (counts > 0) were permitted as long as ≥30 minutes of non-movement were observed before and after it.
≥90 min zeros vertical, with gap (2min if ≥30 min before and after)	at least ≥90 consecutive minutes of zero counts on the vertical axis; to allow for movement of the unworn device, two minutes with movement (counts > 0) were permitted as long as ≥30 minutes of non-movement were observed before and after it.
>100 min zeros	at least 101 min of continuous zeros (more than 100 minutes)
≥120 min zeros	at least 120 min of continuous zeros
>120 min zeros	at least 121 min of continuous zeros
≥150 min zeros	at least 150 min of continuous zeros
≥180 min zeros	at least 180 min of continuous zeros
Diary	non-wear was logged in a diary or logbook e.g. self-reported sleeping or removal of the sensor (e.g. during water activities).

Pattern measures of sedentary behavior in adults: A literature review.

Table 2 Sedentary behavior pattern measures.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
	<i>N (Mean ± SD)</i> <i>Men/Women</i> <i>Age(Mean ± SD)</i> <i>Health status</i>	<i>Sensor brand/type</i> <i>Settings (e.g. epoch length; type of filter)</i>	<i>Non-wear</i> <i>Day/night</i> <i>Ouliers</i> <i>Minimum wear time</i>	< 100 cpm MLT L+S L+S+S	Wear-time Total SB Bouts Breaks Law exponent Gini index		
(Barber, Forster, & Birch, 2015)	N = 28 Age: 82.1 ± 9.2 Care home residents	ActiGraph GTX-3 Epoch: 15s Elastic belt to be worn over the right hip.	≥5d ≥10h Waking hours Non-wear (≥120 min zeros)	< 100 cpm	Wear-time	All subjects (hours)	12.78 ± 1.90
					Total SB	(hours) (mean ± SD)	
						All subjects	10.12 ± 2.18
						< 85 yrs	10.22 ± 2.48
						≥ 85 yrs	10.02 ± 1.92
						Men	9.68 ± 2.13
						Women	10.32 ± 2.23
						FAC 0-2	11.27 ± 1.33
						FAC 3-5	9.73 ± 2.30
						BI ≤ 11	10.97 ± 1.53
						BI >11	8.78 ± 2.43
						Outside in last month YES	11.35 ± 1.60
						Outside in last month NO	9.83 ± 2.23
						Fallen in last 6 months YES	8.95 ± 2.30
						Fallen in last 6 months NO	11.12 ± 1.55
						MMSE ≤ 24	11.13 ± 1.48
						MMSE > 24	8.52 ± 2.12
	% of waking time						
	All subjects	79					
	< 85 yrs	75.3 ± 12.2					
	≥ 85 yrs	83.3 ± 13.3					
	Men	76.7 ± 16					
	Women	80.6 ± 11.9					
	FAC 0-2	88.2 ± 6.6					
	FAC 3-5	76.4 ± 13.6					
	BI ≤ 11	84.1 ± 7.8					
	BI >11	71.9 ± 16.5					
	Outside in last month YES	90.2 ± 5.4					

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						Outside in last month NO	77.0 ± 13.2
						Fallen in last 6 months YES	73.5 ± 16.5
						Fallen in last 6 months NO	84.4 ± 6.6
						MMSE ≤ 24	85.4 ± 6.9
						MMSE > 24	69.1 ± 14.3
					Bouts	Number(n): BL: ≥ 60 min	
						All subjects	3.3 ± 1.3
						< 85 yrs	3.5 ± 1.6
						≥ 85 yrs	3.1 ± 1
						Men	2.8 ± 1.5
						Women	3.5 ± 1.2
						FAC 0-2	2.8 ± 3.4
						FAC 3-5	1.3 ± 1.3
						BI ≤ 11	3.6 ± 1.3
						BI >11	2.7 ± 1.3
						Outside in last month YES	2.5 ± 1.1
						Outside in last month NO	3.4 ± 1.4
						Fallen in last 6 months YES	3 ± 1.4
						Fallen in last 6 months NO	3.5 ± 1.2
						MMSE ≤ 24	3.6 ± 1.2
						MMSE > 24	2.3 ± 1.3
						BL (min) (of bouts BL ≥ 60 min)	
						All subjects	167 ± 211
						< 85 yrs	107 ± 45
						≥ 85 yrs	228 ± 287
						Men	248 ± 364
						Women	129 ± 52
						FAC 0-2	345 ± 382
						FAC 3-5	108 ± 36
						BI ≤ 11	195 ± 265
						BI >11	124 ± 63
						Outside in last month YES	396 ± 452
						Outside in last month NO	118 ± 52
						Fallen in last 6 months YES	102 ± 35
						Fallen in last 6 months NO	224 ± 278
						MMSE ≤ 24	213 ± 262

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						MMSE > 24	96.2 ± 38.6
(Barreira, Zderic, Schuna, Hamilton, & Tudor-Locke, 2015)	N = 15 Age = 27.5 ± 2.5yrs	ActiGraph GT3X+	07:00 – 22:00h	<100cpm	→ Breaks	Number (n/day)	74 ± 4.1
		Epoch: 1 min		≥100cpm			
		ActivPAL	07:00 – 22:00h	Sit → Stand	Breaks	Number (n/day)	39 ± 3.1
		Epoch: 1 min					
(Baruth, Sharpe, Hutto, Wilcox, & Warren, 2013)	N = 197 Age: 39.3 ± 7.6 Women	Actigraph GT1M Epoch: 1 min	≥ 4d ≥ 10h/d Waking hours Non-wear (≥60 min zeros)	< 100 cpm	Total SB	Hours (h)	9.07 ± 1.79
						Hours (h) in the morning	2.51 ± 0.74
						Hours (h) in the afternoon	3.75 ± 0.59
						Hours (h) in the evening	2.55 ± 0.95
						% of wear time (%)	64.1 ± 8.7
						% of morning	61.8 ± 10.7
						% of afternoon	63.9 ± 9.5
						% of evening	65.8 ± 10.0
						Bouts	Number per SB hour (n/SH)
						BL: ≥1 min	10.5 ± 2.8
						BL: ≥10 min	1.6 ± 0.2
						BL: ≥30 min	0.3 ± 0.1
						BL: ≥60 min	0.1 ± 0.04
						BL (min)	
						BL: ≥1 min	6.4 ± 1.7
BL: ≥10 min	21.4 ± 3.5						
BL: ≥30 min	46.3 ± 7.1						
BL: ≥60 min	79.9 ± 17.9						
	Number (n) in the morning	11.5 ± 3.8					
	Number (n) in the afternoon	10.9 ± 3.1					
	Number (n) in the evening	10.2 ± 3.4					
Breaks	Number (n)	90.9 ± 16.0					
	Intensity (cpm)	484.3 ± 75.2					
	Duration (min)	3.3 ± 0.8					
(Bellettiere e.a., 2015)	N = 307 Age = 83.6 ± 6.4	ActiGraph GT3X+	≥10h/day 4 days	<100cpm	Wear-time	(hours)	13.5 ± 1.3
					Total SB	(hours)	

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
		30Hz, low freq. extension. Epoch: 1 minute Only vertical axis	Non-wear (≥90 min zeros vertical; with gap (2min if ≥30 min before and after))			All subjects	9.73 ± 1.27
					Bouts	Number (n) All subjects; BL ≥1min	70.6 ± 13.7
						% of total SB (%)	
						All subjects	
						BL: >1 min	100.0
						BL: ≥5 min	86.0
						BL: ≥10 min	74.1
						BL: ≥20 min	57.5
						BL: ≥30 min	45.5
						BL: ≥40 min	35.9
						BL: ≥50 min	28.3
						BL: ≥60 min	21.2
						BL: ≥90 min	7.5
						BL: ≥120 min	3.1
						Men	
						BL: >1 min	100.0
						BL: ≥5 min	88.6
						BL: ≥10 min	78.1
						BL: ≥20 min	62.5
						BL: ≥30 min	50.1
						BL: ≥40 min	39.9
						BL: ≥50 min	31.7
						BL: ≥60 min	23.8
						BL: ≥90 min	8.1
						BL: ≥120 min	3.3
						Women	
						BL: >1 min	100.0
						BL: ≥5 min	84.9
						BL: ≥10 min	72.5
						BL: ≥20 min	55.4
						BL: ≥30 min	43.6
						BL: ≥40 min	34.2
						BL: ≥50 min	26.9
						BL: ≥60 min	20.0
						BL: ≥90 min	7.3

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						BL: ≥120 min	3.0
						65-79yrs	
						BL: >1 min	100.0
						BL: ≥5 min	85.5
						BL: ≥10 min	73.1
						BL: ≥20 min	55.6
						BL: ≥30 min	43.6
						BL: ≥40 min	33.7
						BL: ≥50 min	26.8
						BL: ≥60 min	19.8
						BL: ≥90 min	6.9
						BL: ≥120 min	2.6
						80-89yrs	
						BL: >1 min	100.0
						BL: ≥5 min	86.0
						BL: ≥10 min	74.0
						BL: ≥20 min	57.3
						BL: ≥30 min	45.1
						BL: ≥40 min	35.4
						BL: ≥50 min	27.7
						BL: ≥60 min	20.5
						BL: ≥90 min	7.5
						BL: ≥120 min	3.0
						90+yrs	
						BL: >1 min	100.0
						BL: ≥5 min	86.5
						BL: ≥10 min	75.4
						BL: ≥20 min	60.3
						BL: ≥30 min	48.8
						BL: ≥40 min	39.4
						BL: ≥50 min	31.7
						BL: ≥60 min	24.4
						BL: ≥90 min	8.6
						BL: ≥120 min	4.0
						BL (min) (median (se))	
						All subjects	2.9 (0.1)

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)	
						Fragmentation of sedentary bouts (F _{sed}) = bouts per SB hour (n/SH)		
						MS patients	0.26 ± 0.07	
						Control group	0.30 ± 0.06	
						Gini index (G)		
						MS patients	0.50 ± 0.05	
						Control group	0.47 ± 0.05	
(Boerema, Essink, Tönis, van Velsen, & Hermens, 2015)	N = 27 Age = 37.9 ± 13.5 Office workers	Promove 3D 40Hz Epoch: 1 min. IMA	Waking hours 5d	≤ 1.660 m·s ⁻²	Wear-time	Hours (h)	13.3 ± 2.55	
					Total SB	% of wear-time	85.66	
					SB Bouts	BL (mean)	17.34	
						BL (median)	5.09	
						% of total SB (%)		
						BL: 54.78 min (W _{50%})	50.0	
	Gini index	0.67						
(Carson e.a., 2014)	N = 4935 Age: 45.9 ± 15.1	Actical Worn on right hip on an elasticized belt. Epoch: 1min	≥ 4d (incl. Sat. or Sun.) ≥ 10h/d Waking hours Non-wear (≥60 min zeros, with gap (2min <100 cpm))	<100 cpm	Wear-time	Hours (h)	14.73 ± 1.49	
					Total SB	Hours (h)	10.76 ± 2.03	
					Bouts	Duration (min); BL: ≥20 min	331.6 ± 126.5	
					Breaks	Number (n)	83.2 ± 18.3	
(Cavanaugh, Kochi, & Stergiou, 2010)	N = 157 Age: 80.1 ± 5.8 community-dwelling older adults: 1) high (≥10,000 steps/d) 2) moderate (5,000-10,000 steps/day) 3) inactive (<5,000)	StepWatch Attached to the ankle using Velcro closures. During data processing, stride counts are doubled to reflect steps accumulated by both legs. Epoch: 1 min	14d 24h/d (Except when bathing, showering or swimming and to refrain from aerobic exercise other than walking or jogging)	0 steps	Total SB	% of wear time (%)		
						Highly active elderly	72.2±2.1	
						Moderately active elderly	79.2±1.6	
						Inactive elderly	86.9±1.0	
					Sequence activity-rest periods	of Detrended Fluctuation Analysis (DFA) scaling component (α)		
							Highly active elderly	0.88±0.11
							Moderately active elderly	0.82±0.08
						Inactive elderly	0.72±0.07	
						Entropy Rate (ER)		
						Highly active elderly	3.94±0.39	
	Moderately active elderly	3.61±0.55						
	Inactive elderly	2.89±0.57						
	N=75	ActiGraph GT3X	24h/day → Waking hours	≤100cpm	Wear-time	Hours (h) (median)	14.15	

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
(Chapman, Fraser, Brown, & Burton, 2015)	Age= 42yrs Adults with mental illness	Right hip Vertical axis Epoch: 1 min	7 days → ≥ 4d with 90% of waking hours Non-wear (≥60 min zeros + diary)		Total SB	% of wear-time (median) (IQR)	65 (58 – 72)
					Bouts	% of Total SB (IQR) BL ≥20 min	34 (25 – 42)
					Breaks	Number (n) (median) (IQR) Break Length (min) (median) (IQR)	87 (77 – 102) 3.3 (2.7 – 3.9)
(S. F. . Chastin e.a., 2010)	N = 34 Age: 55.4 ± 9.5 Groups: 1) Parkinson (PD) 2) Control	ActivPAL Sf = 10 Hz;	7d 24h/d	S+L	Total SB	% of wear time (24h) (%) PD Control	76.7 ± 10.6 71.5 ± 9.4
					Bouts	% of Total SB (%) PD: BL: < 3.5h Control: BL < 2h	60 60
						Distribution of bout lengths (α) PD Control	1.32 ± 0.05 1.49 ± 0.07
						Gini index (G) PD Control	0.84 ± 0.06 0.75 ± 0.05
(S.F.M. Chastin & Granat, 2010)	N = 126 Age: 49.7 Groups: 1) Healthy active (Ha); 2) Healthy sedentary (Hs); 3) Chronic low back pain (BLP); 4) Chronic fatigue syndrome (CFS).	ActivPAL	24h/d	S+L	Total SB	% of wear time (24h) (min, max)	75% (41%, 92%)
					Bouts	Duration (min) (median) Ha Hs LBP CFS	17.3 20.7 23.8 24.9
						% of Total SB (%) Ha: BL: >17.3 min Hs: BL: >20.7 min LBP: BL: >23.8 min CFS: BL: >24.9 min	71.5 76.1 92.7 95.4
						Distribution of bout lengths (α) Ha Hs LBP CFS	2.27 1.95 1.80 1.76

Pattern measures of sedentary behavior in adults: A literature review.

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						Gini index (G)		
						Ha	0.35	
						Hs	0.40	
						LBP	0.74	
						CFS	0.77	
(S. F. M. . Chastin, Mandrichenko, Helbostadt, & Skelton, 2014)	N = 2635 Age: 47 (median)	Actigraph 7164 Epoch: 1 min	≥ 5d (incl. Sat. or Sun.) ≥ 10h/d Waking hours Non-wear (≥60 min zeros, were with gap (2min <50 cpm)) Excessive values	< 100 cpm	Total SB	% of wear time		
						Men 22-29	52.4 ± 13.8	
						Men 30-39	54.0 ± 13.4	
						Men 40-49	53.3 ± 12.3	
						Men 50-59	58.2 ± 11.9	
						Men 60-69	60.6 ± 11.1	
						Men 70-79	68.3 ± 10.5	
						Men 80+	72.5 ± 11.0	
						Women 22-29	56.6 ± 9.3	
						Women 30-39	55.6 ± 10.5	
						Women 40-49	55.0 ± 10.5	
						Women 50-59	57.9 ± 9.9	
						Women 60-69	60.4 ± 11.7	
						Women 70-79	65.0 ± 11.9	
						Women 80+	71.1 ± 10.4	
						Bouts	Number (n)	
						Men 22-29	92.5 ± 19.8	
						Men 30-39	94.3 ± 18.5	
						Men 40-49	96.6 ± 17.4	
						Men 50-59	94.3 ± 19.3	
Men 60-69	88.3 ± 19.2							
Men 70-79	80.9 ± 17.4							
Men 80+	77.5 ± 19.5							
Women 22-29	98.4 ± 15.6							
Women 30-39	99.9 ± 16.3							
Women 40-49	99.5 ± 16.2							
Women 50-59	97.9 ± 16.7							
Women 60-69	91.9 ± 17.3							
Women 70-79	89.5 ± 18.2							
Women 80+	84.4 ± 19.3							
	Bout Length (min)							

Pattern measures of sedentary behavior in adults: A literature review.

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						Men 22-29	4.89 ± 1.76
						Men 30-39	5.15 ± 2.02
						Men 40-49	4.89 ± 1.47
						Men 50-59	5.69 ± 2.02
						Men 60-69	6.15 ± 2.04
						Men 70-79	7.24 ± 2.63
						Men 80+	9.07 ± 4.37
						Women 22-29	4.80 ± 1.14
						Women 30-39	4.82 ± 1.48
						Women 40-49	4.83 ± 1.30
						Women 50-59	5.23 ± 1.50
						Women 60-69	5.82 ± 2.14
						Women 70-79	6.79 ± 3.50
						Women 80+	7.58 ± 2.71
(Sebastien F. M. Chastin e.a., 2015)	N=53 Age = 73.7 ± 8.8 Older adults	ActiGraph GT1M Epoch: 1 min	≥10h/d ≥3d PRE-intervention ≥3d POST-intervention Only baseline period	<100 cpm	Total SB	% of wear-time	68.0 ± 10.1
					Bouts	Number (n)	35.5 ± 7.2
						BL (min) (median)	5.12 ± 1.03
						% of Total SB	
						BL: 19.8 ± 6.4 (W _{50%})	50.0
						α (slope of the frequency distribution of bout duration)	1.93 ± 0.15
						Fragmentation of sedentary bouts (F _{sed}) = bouts per SB hour (n/SH)	10.7 ± 2.4
					Breaks	Break Length ('period') (min) (log-mean)	14.4 ± 2.6
N=36 Age = 43.0 ± 10.3 Office workers Groups: - Intervention - Control	ActiGraph GT3X+ Epoch: 1 min	≥10h/d ≥3d PRE-intervention ≥3d POST-intervention Only baseline period	< 100 cpm	Total SB	% of wear-time	63.9 ± 9.4	
				Bouts	Number (n)	26.6 ± 11.8	
					BL (min) (median)	8.22 ± 9.1	
					% of Total SB		
					BL: 27.1 ± 18.5 (W _{50%})	50.0	
					α (slope of the frequency distribution of bout duration)	1.39 ± 0.14	

Pattern measures of sedentary behavior in adults: A literature review.

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						Fragmentation of sedentary bouts (F _{sed}) = bouts per SB hour (n/SH)	5.72 ± 3.79
					Breaks	Break Length ('period') (min) (log-mean)	5.11 ± 4.1
		ActivPAL	≥10h/d ≥3d PRE-intervention ≥3d POST-intervention	S	Total SB	% of wear-time	69.4 ± 9.1
			Only baseline period		Bouts	Number (n)	33.0 ± 10.4
						BL (min) (median)	6.86 ± 3.0
						% of Total SB BL: 21.9 ± 7.7 (W _{50%})	50.0
						α (slope of the frequency distribution of bout duration)	1.37 ± 0.03
						Fragmentation of sedentary bouts (F _{sed}) = bouts per SB hour (n/SH)	6.0 ± 2.7
					Breaks	Break Length ('period') (min) (log-mean)	4.92 ± 1.7
(Chen e.a., 2016)	N = 1634 Age = 73.3 ± 6.0 Older adults Groups: - disability in IADL - no disability in IADL	Active stylePro HJA-350IT Epoch: 1 minute On either side of waist	≥10h/d (waking hours) ≥4d Non-wear (≥60 min <1.0 METs, with gap (2min ≥1.0 METs))	≤ 1.5 METs	Wear-time	Hours (h) All subjects Disability in IADL YES Disability in IADL NO	14.0 ± 1.8 13.8 ± 1.9 14.0 ± 1.8
					Total SB	Hours (h) All subjects Disability in IADL YES Disability in IADL NO	7.72 ± 2.1 8.73 ± 2.34 7.63 ± 2.04
					Breaks	Number (n) All subjects Disability in IADL YES Disability in IADL NO	59.0 ± 13.2 54.5 ± 13.2 59.4 ± 13.1
(Claridge e.a., 2015)	N = 42 Age = 33.5 ± 12 Adults with Cerebral Palsy (CP)	ActiGraph GT3X Epoch: 3 sec	≥5h/d (waking hours) ≥4d Non-wear (diary)	<100 cpm	Wear-time	Hours (h) All subjects CP-GMFCS level I CP-GMFCS level II CP-GMFCS level III	10.50 ± 2.1 12.08 ± 2.2 12.38 ± 2.1 10.14 ± 1.8

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						CP-GMFCS level IV	11.16 ± 2.1
						CP-GMFCS level V	11.67 ± 2.1
	Groups: - CP-GMFCS level I - CP-GMFCS level II - CP-GMFCS level III - CP-GMFCS level IV - CP-GMFCS level V				Total SB	Hours (h)	
						All subjects	10.50 ± 2.0
						CP-GMFCS level I	9.82 ± 1.09
						CP-GMFCS level II	10.97 ± 0.45
						CP-GMFCS level III	9.49 ± 0.33
						CP-GMFCS level IV	10.90 ± 0.19
						CP-GMFCS level V	11.51 ± 0.09
					Breaks	Number (n)	
						All subjects	n.a.
						CP-GMFCS level I	24.4
						CP-GMFCS level II	16.0
						CP-GMFCS level III	7.6
						CP-GMFCS level IV	3.3
						CP-GMFCS level V	2.4
						Break-rate (n/SH)	
						All subjects	n.a.
						CP-GMFCS level I	2.63 ± 1.99
						CP-GMFCS level II	1.46 ± 0.62
						CP-GMFCS level III	0.82 ± 0.43
						CP-GMFCS level IV	0.31 ± 0.18
						CP-GMFCS level V	0.20 ± 0.095
(Cooper e.a., 2012)	N = 528 Age: 59.8 ± 10.0 Type 2 diabetes	Actigraph GT1M Epoch: 1 min	≥ 3d; Waking hours > 10h/d Non wear (≥20 min zeros)	< 100 cpm	Total SB	(hours)	
						All subjects	8.1 ± 1.3
						Men	8.0 ± 1.2
						Women	8.1 ± 1.3
					Breaks	Number (n)	
						All subjects	82.9 ± 13.3
						Men	87.3 ± 15.7
						Women	85.2 ± 14.5
						Number (n/SH)	
						All subjects	10.7 ± 2.3
	N = 217	ActiGraph GT1M	≥10h/d; waking hours	<100 cpm	Wear-time	Hours (h)	

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)	
(Davis e.a., 2014)	Age = 78.1 ± 5.8 Older adults	Epoch: 10 sec → 1min	≥5d Non-wear (>100 min zeros)			All subjects	14.1 ± 1.4	
						Men	14.7 ± 1.5	
							Women	14.2 ± 1.2
						Total SB	% of wear-time (%)	
							All subjects	71.3 ± 0.10
							Men	72.0 ± 0.10
							Women	70.7 ± 0.10
						Breaks	Number (n)	
							All subjects	72.8 ± 16.2
							Men	n.a.
							Women	n.a.
							Break-rate (n/wear-time(h))	
							All subjects	5.0 ± 1.0
						Men	4.8 ± 1.0	
						Women	5.2 ± 1.1	
(Diaz e.a., 2016)	N = 8096 Age ≥ 45y	Actical Secured to a nylon belt; on right hip Epoch = 1 min	≥10h/d ≥4d Non-wear (≥150 min zeros)	<50 cpm		Wear-time	Hours (h)	14.4 ± 2.0
						Total SB	Hours (h)	11.2 ± 2.1
						Bouts	BL (min) (mean)	11.4 ± 8.1
							BL (min) (median)	9.7 ± 2.3
							Number (n)	
							All subjects	
							BL: >1 min	68.3 ± 20.0
							BL: ≥5 min	28.0 ± 5.9
							BL: ≥10 min	16.9 ± 3.4
							BL: ≥20 min	8.8 ± 2.3
							BL: ≥30 min	5.5 ± 1.9
							BL: ≥40 min	3.8 ± 1.6
							BL: ≥50 min	2.6 ± 1.3
							BL: ≥60 min	1.9 ± 1.1
							BL: ≥90 min	0.8 ± 0.7
							Age: 45-54 yr	
							BL: >1 min	77.5 ± 17.3
							BL: ≥5 min	28.7 ± 5.8
							BL: ≥10 min	16.2 ± 3.9
						BL: ≥20 min	7.7 ± 2.6	

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						BL: ≥30 min	4.4 ± 1.9
						BL: ≥40 min	2.8 ± 1.5
						BL: ≥50 min	1.9 ± 1.1
						BL: ≥60 min	1.3 ± 0.9
						BL: ≥90 min	0.5 ± 0.5
						Age: 55-64 yr	
						BL: >1 min	74.0 ± 18.7
						BL: ≥5 min	28.8 ± 5.5
						BL: ≥10 min	16.7 ± 3.4
						BL: ≥20 min	8.3 ± 2.4
						BL: ≥30 min	5.0 ± 1.8
						BL: ≥40 min	3.3 ± 1.4
						BL: ≥50 min	2.2 ± 1.2
						BL: ≥60 min	1.6 ± 1.0
						BL: ≥90 min	0.6 ± 0.6
						Age: 65-74 yr	
						BL: >1 min	69.5 ± 18.7
						BL: ≥5 min	28.3 ± 5.5
						BL: ≥10 min	16.9 ± 3.3
						BL: ≥20 min	8.8 ± 2.2
						BL: ≥30 min	5.4 ± 1.8
						BL: ≥40 min	3.7 1.5
						BL: ≥50 min	2.6 ± 1.3
						BL: ≥60 min	1.8 ± 1.1
						BL: ≥90 min	0.7 ± 0.6
						Age: ≥75yr	
						BL: >1 min	59.9 ± 20.5
						BL: ≥5 min	26.9 6.6
						BL: ≥10 min	17.0 ± 3.5
						BL: ≥20 min	9.5 ± 2.1
						BL: ≥30 min	6.3 ± 1.7
						BL: ≥40 min	4.5 ± 1.5
						BL: ≥50 min	3.3 ± 1.4
						BL: ≥60 min	2.4 ± 1.2
						BL: ≥90 min	1.1 ± 0.8
						% of Total SB	
						All subjects	

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						BL: >1 min	100
						BL: ≥5 min	88.2 ± 5.7
						BL: ≥10 min	76.7 ± 9.7
						BL: ≥20 min	60.0 ± 13.9
						BL: ≥30 min	48.0 ± 15.5
						BL: ≥40 min	39.1 ± 16.0
						BL: ≥50 min	31.8 ± 15.9
						BL: ≥60 min	26.0 ± 15.4
						BL: ≥90 min	14.2 ± 12.9
						Age: 45-54 yr	
						BL: >1 min	100
						BL: ≥5 min	84.6 ± 6.2
						BL: ≥10 min	70.6 ± 10.2
						BL: ≥20 min	51.5 ± 13.0
						BL: ≥30 min	38.9 ± 13.8
						BL: ≥40 min	30.2 ± 13.3
						BL: ≥50 min	24.0 ± 12.5
						BL: ≥60 min	18.9 ± 11.4
						BL: ≥90 min	9.9 ± 8.4
						Age: 55-64 yr	
						BL: >1 min	100
						BL: ≥5 min	86.4 ± 5.8
						BL: ≥10 min	73.6 ± 9.6
						BL: ≥20 min	55.6 ± 13.0
						BL: ≥30 min	43.2 ± 14.0
						BL: ≥40 min	34.2 ± 13.8
						BL: ≥50 min	27.2 ± 13.3
						BL: ≥60 min	21.8 ± 12.5
						BL: ≥90 min	11.4 ± 10.0
						Age: 65-74 yr	
						BL: >1 min	100
						BL: ≥5 min	87.8 ± 5.4
						BL: ≥10 min	76.2 ± 9.2
						BL: ≥20 min	59.1 ± 13.0
						BL: ≥30 min	46.9 ± 14.4
						BL: ≥40 min	37.8 ± 14.7
						BL: ≥50 min	30.5 ± 14.5

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						BL: ≥60 min	24.6 ± 13.9
						BL: ≥90 min	12.9 ± 11.4
						Age: ≥75yr	
						BL: >1 min	100
						BL: ≥5 min	90.8 ± 4.8
						BL: ≥10 min	81.2 ± 8.7
						BL: ≥20 min	66.6 ± 13.3
						BL: ≥30 min	55.5 ± 15.8
						BL: ≥40 min	46.7 ± 17.1
						BL: ≥50 min	39.2 ± 17.6
						BL: ≥60 min	32.8 ± 17.6
						BL: ≥90 min	19.2 ± 16.1
						Female	
						BL: ≥30 min	46.7 ± 15.6
						BL: ≥60 min	25.1 ± 15.2
						BL: ≥90 min	13.9 ± 12.8
						Male	
						BL: ≥30 min	49.7 ± 15.3
						BL: ≥60 min	27.0 ± 15.4
						BL: ≥90 min	14.5 ± 13.0
						BMI: underweight	
						BL: ≥30 min	43.9 ± 15.7
						BL: ≥60 min	22.7 ± 13.6
						BL: ≥90 min	12.5 ± 11.8
						BMI: normal weight	
						BL: ≥30 min	45.1 ± 15.8
						BL: ≥60 min	23.7 ± 15.1
						BL: ≥90 min	12.6 ± 12.6
						BMI: overweight	
						BL: ≥30 min	47.7 ± 14.9
						BL: ≥60 min	25.5 ± 14.6
						BL: ≥90 min	13.8 ± 12.3
						BMI: obese	
						BL: ≥30 min	50.7 ± 15.6
						BL: ≥60 min	28.2 ± 16.0
						BL: ≥90 min	15.8 ± 13.6
					Breaks	Number (n)	

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						All subjects	68.8 ± 20.0
						Age: 45-54	78.0 ± 17.3
						Age: 55-64	74.6 ± 18.7
						Age: 65-74	70.1 ± 18.7
						Age: ≥75	60.4 ± 20.6
						Female	70.6 ± 20.5
						Male	66.7 ± 19.3
						BMI: underweight	76.5 ± 22.0
						BMI: normal weight	73.5 ± 20.6
						BMI: overweight	69.4 ± 18.9
						BMI: obese	64.5 ± 19.9
						Breakrate (n/SH)	
						All subjects	6.4 ± 2.4
						Age: 45-54	8.0 ± 2.5
						Age: 55-64	7.2 ± 2.3
						Age: 65-74	6.6 ± 2.2
						Age: ≥75	5.3 ± 2.1
						Female	6.6 ± 2.4
						Male	6.2 ± 2.3
						BMI: underweight	6.9 ± 2.6
						BMI: normal weight	6.9 ± 2.5
						BMI: overweight	6.5 ± 2.3
						BMI: obese	6.0 ± 2.3
						Duration (min)	
						All subjects	2.8 ± 0.8
						Age: 45-54	3.4 ± 0.9
						Age: 55-64	3.0 ± 0.8
						Age: 65-74	2.8 ± 0.8
						Age: ≥75	2.3 ± 0.6
						Female	2.6 ± 0.7
						Male	2.9 ± 0.9
						BMI: underweight	2.6 ± 0.8
						BMI: normal weight	2.8 ± 0.8
						BMI: overweight	2.8 ± 0.8
						BMI: obese	2.7 ± 0.8
	N = 439	ActiGraph 7164	≥3d during waking hours	<100 cpm	Wear-time	Hours (h)	

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
(Ezeugwu, Klaren, A Hubbard, Manns, & Motl, 2015)	Age = 47.3 ± 10.0 yrs Adults with MS: - mobility disability absent (PDDS≤2) - mobility disability present (PDDS≥3)	Epoch = 1 minute On belt around the waist, on the non-dominant hip	≥10h/d wear-time Non-wear (≥60 min zeros)			MS, mobility disability absent	14.01 ± 0.11
						MS, mobility disability present	13.79 ± 0.14
					Total SB	Hours (h)	
						MS, mobility disability absent	8.41 ± 0.08
						MS, mobility disability present	8.89 ± 0.09
						Bouts (≥2min)	BL (min)
					MS, mobility disability absent		23.8 ± 1.1
						MS, mobility disability present	24.2 ± 1.3
						Number(n); BL >30 min	MS, mobility disability absent
					MS, mobility disability present		5.1 ± 0.1
Breaks (≥2min)	Number (n)						
	MS, mobility disability absent	13.7 ± 0.2					
	MS, mobility disability present	14.7 ± 0.2					
	Duration (min)	MS, mobility disability absent	12.8 ± 0.1				
MS, mobility disability present		11.6 ± 0.1					
(Falconer, Page, Andrews, & Cooper, 2015)	N = 519 Age = 59.9 ± 9.9 Adults with type 2 Diabetes	ActiGraph GT1M Epoch = 1 min Waist-worn belt	≥3d during waking hours ≥10h/d wear-time Non-wear (≥60 min zeros)	<100 cpm	Wear-time	Hours(h)	14.02 ± 1.22
					Total SB	Hours(h)	9.06 ± 1.39
					Bouts	% of Total SB	
						BL: ≥30 min	54
					BL: <30 min	46	
(Fanning e.a., 2016)	N = 221 Age = 70.7 ± 4.7 Low active older adults - Intervention - Controls	ActiGraph GT1M or GT3X Epoch = 1 min On non-dominant hip	≥3d during waking hours ≥10h/d wear-time	<100 cpm	Total SB	Hours(h)	
						Intervention; month 0	9.94 ± 1.61
						Intervention; month 6	9.89 ± 1.21
						Intervention; month 12	9.97 ± 1.41
						Control; month 0	9.77 ± 1.38
						Control; month 6	9.69 ± 1.27
						Control; month 12	9.76 ± 1.23
						Breaks	Number(n)
					Intervention; month 0		78.31 ± 16.11
						Intervention; month 6	79.48 ± 15.12
Intervention; month 12	77.99 ± 16.43						

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)	
						Control; month 0	80.10 ± 15.95	
						Control; month 6	78.61 ± 15.51	
						Control; month 12	75.42 ± 17.07	
(García-Hermoso, Notario-Pacheco, e.a., 2015)	N = 1365 Age = 20-80 yrs	ActiGraph GT3X Vector magnitude Elastic belt; right side of waist	≥4d (≥ 1 weekend-day) ≥10h/d wear-time Non-wear (≥60 min zeros, with gap (2min <100 cpm))	<100 cpm	Wear-time	Hours(h)		
						All subjects	15,52 ± 3.65	
						Men	15,69 ± 3.85	
						Women	15,41 ± 3.51	
						Total SB	Hours(h)	
						All subjects	9,67 ± 2.93	
						Men	10,03 ± 3.11	
						Women	9,45 ± 2.79	
						Bouts	% of Total SB (%)	
						All subjects	77,0	
						Men	75,5	
						Women	77,9	
						Breaks	Number (n)	
						All subjects	74.4 ± 14.3	
Men	77.3 ± 13.3							
Women	72.9 ± 15.7							
						Breakrate (n/SH)		
						All subjects	3.4 ± 1.5	
						Men	4.4 ± 1.1	
						Women	2.9 ± 1.2	
(García-Hermoso, Martínez-Vizcaino, e.a., 2015)	N = 263 Age = 55.8 ± 12.2	ActiGraph GT3X Vector magnitude Elastic band; right side of waist Epoch = 1 min	≥4d (≥ 1 weekend-day) ≥10h/d wear-time Non-wear (≥10 min zeros)	<100 cpm	Total SB	Hours(h)		
						All subjects	8.46 ± 2.01	
						Men	9.15 ± 1.98	
						Women	8.03 ± 1.92	
						Bouts	Number (n)	
						BL ≥10min; All subjects	14.4 ± 4.8	
						BL ≥10min; Men	14.2 ± 3.9	
						BL ≥10min; Women	14.5 ± 5.3	
						% of Total SB (%)		
						BL ≥10min; All subjects	76.8 ± 29.9	
BL ≥10min; Men	70.6 ± 26.5							

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)				
						BL ≥10min; Women	81.3 ± 32.4				
(Gardiner, Eakin, Healy, & Owen, 2011)	N = 59 Age: 74.3 ± 9.3 Older adults Intervention on breaking up SB time	Actigraph GT1M	6+6d ≥10h/d	< 100 cpm	Total SB	% of wear time (%)					
						PRE	71.1 ± 8.9				
					POST (mean (95% CI))	67.9 (66.9, 69.0)					
					Breaks	Number (n)					
PRE	87.8 ± 14.0										
						POST (mean (95% CI))	91.8 (89.3, 94.4)				
(Gennuso, Gangnon, Thraen-Borowski, & Colbert, 2014)	N = 5076 Age = 43.8 ± 19.5 Groups: - Subjects <8h/d SB - Subjects ≥8h/d SB	ActiGraph AM-7164 Elastic belt, over right hip Epoch = 1 min	≥1d Waking hours ≥10h/d wear-time Non-wear (≥60 min zeros, with gap (2min <100 cpm))	≥100 cpm	Total SB	Hours(h)					
						All subjects (mean ± SD)	8.2 ± 2.3				
						<8 h/d SB (median, 25% - 75%)	6.6 (5.6 – 7.3)				
										≥8 h/d SB (median, 25% - 75%)	9.4 (8.7 – 10.6)
					Breaks	Number (n)					
						All subjects (mean ± SD)	90 ± 19				
<8 h/d SB (median, 25% - 75%)	89 (78 – 100)										
					≥8 h/d SB (median, 25% - 75%)	91 (77 – 104)					
(Gupta e.a., 2016)	N = 692 Age = 45.1 ± 9.9 Blue-collar workers Time split: - Whole day - Work - Non-work	ActiGraph GT3X+ Placed on the right thigh (like the ActivPAL)	4d; 24h/d ≥10h/d wear-time during waking hours.	If inclination of the thigh is above 45° (Custom classification program)	Wear-time	Hours(h)					
						Whole day	15.93 ± 1.45				
						Work	7.60 ± 1.29				
										Non-work	8.79 ± 1.60
					Total SB	Hours(h)					
						Whole day	7.83 ± 2.13				
						Work	2.45 ± 1.75				
										Non-work	5.49 ± 1.46
					Bouts	Hours(h)					
						Whole day					
						BL >30min	3.17 ± 1.67				
						BL 6-30min	3.60 ± 1.28				
						BL ≤5min	1.06 ± 0.58				
						Work					
BL >30min	2.45 ± 1.75										
BL 6-30min	0.50 ± 0.94										
					BL ≤5min	1.40 ± 1.09					
					Non-work						
					BL >30min	5.49 ± 1.46					

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)	
						BL 6-30min	2.65 ± 1.40	
						BL ≤5min	2.30 ± 0.80	
(Hallman, Mathiassen, Gupta, Korshoj, & Holtermann, 2015)	N = 191 Age = 45 ± 9.5 Blue collar workers	2x Actigraph GT3X Placed on the thigh and trunk (like the ActivPAL)	4d; 24h/d Waking hours ≥4h/day of working time and >75% of average reported working time ≥4h/day of leisure time and >75% of average reported leisure time Non-wear (≥90 min zeros + diary) Excessive values	Acti4 software classification of sitting	Wear-time	Work (h)	8.4 ± 2.5	
						Leisure (h)	8.9 ± 2.7	
					Total SB	Work (h)	3.12 ± 1.5	
						Leisure (h)	5.93 ± 1.9	
					Bouts	% of wear-time during either Work or Leisure (%)		
						Males; BL >30min	8.2 ± 10.2	
	Females; BL >30min	5.6 ± 7.7						
		Non-work						
		Males; BL >30min	34.8 ± 15.1					
		Females; BL >30min	28.2 ± 14.9					
(G. N. Healy e.a., 2008)	N = 168 Age = 53.4 ± 11.8 Adults	Actigraph 7164 Epoch: 1 min	≥ 5d (incl. 1 weekend day) ≥ 10h/d Waking hours Non-wear (≥20 min zeros + dairy)	< 100 cpm	Total SB	(hours) = sum over ≥5 days	56.7 ± 12.1 *	
						% of wear-time (%)	57	
					Breaks	Number (n) = sum over ≥5 days	601 ± 155*	
						Intensity (cpm) = sum over ≥5 days	514 ± 94 *	
		Duration (min) = sum over ≥5 days	4.50 ± 1.05 *					
(G. N. . b Healy, Matthews, Dunstan, Winkler, & Owen, 2011)	N = 4757 Age = 46.5 ± 14.2 Adults	Actigraph 7164 Epoch: 1 min	≥ 10h/d Non-wear (≥60 min zeros, with gap (2min <50 cpm)) Excessive values	< 100 cpm	Wear-time	Hours (h)	14.6 ± 1.45	
					Total SB	(hours)	8.44 ± 1.45	
					Breaks	Number (n)	92.5 ± 15.6	
Duration (min)	4.12 ± 1.26							
(Helgadóttir, Forsell, & Ekblom, 2015)	N = 165 Age = 43.42 ± 11.42 Groups: - Depressive disorders - Concurrent disorders - Anxiety disorders	ActiGraph GT3X+ On the right hip Epoch = 1 min	≥4d; waking hours ≥10h/d Non-wear (≥60 min zeros, with gap (2min)) If excessive values, whole day excluded from analysis.	<100cpm	Wear-time	Hours(h)	14.14	
					Total SB	Hours(h)		
						All subjects	9.11 ± 1.62	
						Depressive disorders	9.66 ± 1.62	
						Concurrent disorders	9.02 ± 1.59	
						Anxiety disorder	9.20 ± 1.77	
						Men	9.43 ± 1.70	
						Women	8.95 ± 1.56	
Bouts	Total time of BL ≥ 20min (h)							

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						All subjects	3.84 ± 1.8
						Depressive disorders	4.19 ± 1.8
						Concurrent disorders	3.77 ± 1.7
						Anxiety disorder	4.00 ± 2.2
						Men	4.37 ± 1.8
						Women	3.59 ± 1.8
						Number of bouts of BL ≥ 20min (n)	
						All subjects	6.41 ± 2.53
						Depressive disorders	7.03 ± 2.73
						Concurrent disorders	6.26 ± 2.34
						Anxiety disorder	6.76 ± 3.29
						Men	7.13 ± 2.39
						Women	6.06 ± 2.53
(Jefferis e.a., 2015)	N = 1403 Age = 78.4 ± 4.6 Older men.	ActiGraph GT3X Only vertical axis Over the hip Epoch = 1 min	≥3d; waking hours ≥10h/d Non-wear (≥90 min zeros; with gap (2min if ≥30 min before and after))	<100cpm	Total SB	Hours (h (95% CI))	
						All subjects	10.3 (10.2-10.4)
						Age: 70 – 74	10.0 (9.9-10.2)
						Age: 75 – 79	10.2 (10.1-10.3)
						Age: ≥80	10.7 (10.6-10.8)
						BMI: <25	10.2 (10.1-10.4)
						BMI: 25 – 29	10.2 (10.1-10.3)
						BMI: ≥30	10.6 (10.5-10.7)
						Smoking: yes	10.3 (10.2-10.3)
						Smoking: no	10.8 (10.5-11.2)
						Depression: no	10.2 (10.2-10.3)
						Depression: yes	10.6 (10.4-10.7)
						Chronic conditions: non	10.4 (10.3-10.5)
						Chronic conditions: 1 – 2	10.5 (10.3-10.7)
						Chronic conditions: ≥3	10.9 (10.6-11.1)
						% of wear time (% (95% CI))	
						All subjects	72.4 (72.0-72.8)
						Age: 70 – 74	69.7 (68.9-70.5)
						Age: 75 – 79	71.2 (70.5-72.0)
						Age: ≥80	76.0 (75.3-76.7)
						BMI: <25	74.5 (70.6-72.3)
						BMI: 25 – 29	74.7 (71.1-72.3)
						BMI: ≥30	75.7 (74.8-76.5)

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						Smoking: yes	72.3 (71.9-72.7)
						Smoking: no	74.9 (72.4-77.4)
						Depression: no	71.3 (70.8-71.8)
						Depression: yes	76.4 (75.4-77.3)
						Chronic conditions: non	73.0 (72.3-73.7)
						Chronic conditions: 1 – 2	74.4 (73.1-75.6)
						Chronic conditions: ≥3	78.3 (76.5-80.1)
					Bouts	Number (n (95% CI))	
						All subjects	71.9 (71.2-72.6)
						Age: 70 – 74	73.4 (72.2-74.6)
						Age: 75 – 79	72.7 (71.6-73.8)
						Age: ≥80	69.6 (68.3-70.9)
						BMI: <25	74.5 (73.2-75.8)
						BMI: 25 – 29	72.7 (71.7-73.7)
						BMI: ≥30	65.7 (64.1-67.3)
						Smoking: yes	71.7 (71.0-72.4)
						Smoking: no	77.6 (73.3-82.0)
						Depression: no	73.1 (72.3-73.9)
						Depression: yes	67.4 (65.8-68.9)
						Chronic conditions: non	71.3 (70.1-72.5)
						Chronic conditions: 1 – 2	69.4 (67.4-71.4)
						Chronic conditions: ≥3	66.6 (63.3-70.0)
						Number (n)	
						All subjects	
						BL: >1 min	71.6 ± 15.7
						BL: ≥5 min	27.5 ± 4.6
						BL: ≥10 min	16.5 ± 2.7
						BL: ≥20 min	8.5 ± 1.9
						BL: ≥30 min	5.1 ± 1.6
						BL: ≥40 min	3.3 ± 1.3
						BL: ≥50 min	2.1 ± 1.1
						BL: ≥60 min	1.4 ± 0.9
						BL: ≥70 min	0.9 ± 0.7
						BL: ≥80 min	0.6 ± 0.6
						BL: ≥90 min	0.4 ± 0.4
						BL: ≥100 min	0.3 ± 0.4

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						BL: ≥110 min	0.2 ± 0.3
						BL: ≥120 min	0.1 ± 0.2
						% of Total SB (%)	
						All subjects	
						BL: >1 min	100
						BL: ≥5 min	86.5 ± 5.0
						BL: ≥10 min	74.5 ± 8.4
						BL: ≥20 min	56.5 ± 11.8
						BL: ≥30 min	43.2 ± 13.2
						BL: ≥40 min	33.1 13.2
						BL: ≥50 min	25.1 12.7
						BL: ≥60 min	18.8 ± 11.7
						BL: ≥70 min	14.1 ± 10.7
						BL: ≥80 min	10.5 ± 9.6
						BL: ≥90 min	7.7 ± 8.5
						BL: ≥100 min	5.8 7.5
						BL: ≥110 min	4.4 ± 6.6
						BL: ≥120 min	3.3 ± 6.1
						BL (min; median (IQR))	3.2 (1.1-9.9)
					Breaks	Number/sedentary hour (n/SH (95% CI)	
						All subjects	7.2 (7.1-7.3)
						Age: 70 – 74	7.6 (7.4-7.8)
						Age: 75 – 79	7.4 (7.2-7.6)
						Age: ≥80	6.7 (6.5-6.9)
						BMI: <25	7.5 (7.3-7.7)
						BMI: 25 – 29	7.4 (7.2-7.5)
						BMI: ≥30	6.4 (6.2-6.6)
						Smoking: yes	7.2 (7.1-7.3)
						Smoking: no	7.5 (6.9-8.2)
						Depression: no	7.4 (7.3-7.5)
						Depression: yes	6.6 (6.4-6.8)
						Chronic conditions: non	7.1 (6.9-7.3)
						Chronic conditions: 1 – 2	6.9 (6.6-7.2)
						Chronic conditions: ≥3	6.3 (5.9-6.8)

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
(Jefferis e.a., 2016)	N = 1078 Age = 78.5 ± 4.7 Older men.	ActiGraph GT3X Only vertical axis On a belt, over right hip Epoch = 1 min	≥3d; waking hours ≥10h/d Non-wear (≥90 min zeros; with gap (2min if ≥30 min before and after))	<100cpm	Wear-time	Hours(h)	14.27 ± 1.12
					Total SB	Hours (h)	10.20 ± 1.38
					Bouts	% of Total SB (%)	
						BL: 01-15min	37
						BL: 16-30min	21
						BL: 31-60min	24
						BL: ≥61min	18
(Judice, Silva, & Sardinha, 2015)	N = 351 Age = 74.6 ± 7.0	ActiGraph GT1M Right hip, near the iliac crest Epoch = 1 min	≥3d (incl. 1 weekend day) waking hours ≥10h/d Non-wear (≥60 min zeros + water activities)	<100 cpm	Wear-time	Hours (h)	
						All subjects	13.3
						Male	13.46
						Female	13.23
					Total SB	Hours (h)	
						All subjects	9.60 ± 1.95
						Male	9.87 ± 1.80
						Female	9.46 ± 2.02
					Bouts	Number(n)	
						All subjects	
						BL: 5-10min	156.0 ± 27.0
						BL: 11-20min	40.0 ± 14.0
						BL: 21-30min	16.0 ± 7.5
						BL: 31-60min	6.0 ± 3.9
						BL: >60min	1.3 ± 1.2
						Male	
						BL: 5-10min	156.5 ± 23.8
	BL: 11-20min	44.0 ± 13.7					
	BL: 21-30min	18.1 ± 7.0					
	BL: 31-60min	7.0 ± 3.8					
	BL: >60min	1.6 ± 1.2					
	Female						
	BL: 5-10min	156.2 ± 28.7					
	BL: 11-20min	38.2 ± 14.6					
	BL: 21-30min	14.8 ± 7.5					
	BL: 31-60min	5.4 ± 3.8					
	BL: >60min	1.2 ± 1.2					

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
(Júdice, Santos, Hamilton, Sardinha, & Silva, 2015)	N = 7 Age = 49.7 ± 12.6 Overweight/Obese adult with computer based work. Crossover-RCT: - Control - Intervention	ActivPAL On right thigh. Epoch = 1min ActiGraph GT3X On the right hip, near iliac crest. Only vertical axis Filter: AG-norm Epoch = 1min Actiheart (HR+Acc.) On an adapted polarband placed on the chest. Epoch = 1min	1w+1w; waking hours ≥10h/day wear-time	ActivPAL: S+R Actigraph: <100 cpm Actiheart: <1.5METs	Total SB	Hours(h)	
						Control	
						ActivPAL	8.58 ± 2.4
						ActiGraph GT3x	10.7 ± 1.6
						Actiheart	5.93 ± 2.1
						Intervention	
						ActivPAL	5.27 ± 2.9
						ActiGraph GT3x	10.6 ± 2.3
						Actiheart	5.7 ± 2.6
						Breaks	Number (n)
Control							
ActivPAL	46.6 ± 16.7						
ActiGraph GT3x	128.0 ± 43.6						
Actiheart	258 ± 79.8						
Intervention							
ActivPAL	53.7 ± 15.2						
ActiGraph GT3x	136 ± 34.5						
Actiheart	305 ± 79.2						
(Kim, Barry, & Kang, 2015)	N = 11 Age = 30.67 ± 7.24	ActivPAL Mid-anterior position on right thigh ActiGraph GT3X On waist over right hip Epoch = 1s – 1 min	Non-wear based on images (lifelogging)	ActivPAL: S+R Actigraph: <50 cpm <100 cpm <150 cpm Sojourn (vertical axis) Sojourn (three axis) Inclinometer on 1s, 10s, 60s.	Wear-time Total SB	Hours(h)	6.11 ± 0.36
						Hours(h (95% CI)))	
						ActivPAL	3.95 (2.90, 4.99)
						GT3X-Soj1x	3.75 (2.81, 4.69)
						GT3X-Soj3x	3.94 (2.88, 4.99)
						GT3X-Incli-1s	3.19 (2.31, 4.07)
						GT3X-<8cnts/10s	4.38 (3.63, 5.13)
						GT3X-Incli-10s	3.17 (2.30, 4.05)
						GT3X-<50cpm	3.89 (3.04, 4.74)
						GT3X-<100cpm	4.24 (3.46, 5.03)
						GT3X-<150cpm	4.42 (3.65, 5.18)
						GT3X-Incli-60s	3.16 (2.26, 4.05)
						Bouts	Number(n (95% CI)))
						ActivPAL	18.2 (12.7, 23.6)
						GT3X-Soj1x	23.8 (18.9, 28.8)
						GT3X-Soj3x	13.7 (10.2, 17.2)
						GT3X-Incli-1s	55.1 (35.6, 74.6)

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						GT3X-<8cnts/10s	137.0 (109.1, 164.9)
						GT3X-Incli-10s	53.0 (34.5, 71.7)
						GT3X-<50cpm	32.0 (24.8, 39.2)
						GT3X-<100cpm	27.8 (22.1, 33.5)
						GT3X-<150cpm	24.9 (19.0, 30.8)
						GT3X-Incli-60s	22.5 (14.9, 30.0)
						BL (min (95% CI))	
						ActivPAL	16.7 (8.9, 22.4)
						GT3X-Soj1x	10.1 (6.6, 13.5)
						GT3X-Soj3x	18.7 (12.7, 24.6)
						GT3X-Incli-1s	4.3 (2.8, 5.8)
						GT3X-<8cnts/10s	2.2 (1.4, 2.9)
						GT3X-Incli-10s	4.4 (2.9, 5.9)
						GT3X-<50cpm	8.5 (5.0, 12.1)
						GT3X-<100cpm	10.4 (6.5, 14.4)
						GT3X-<150cpm	12.5 (7.4, 17.6)
						GT3X-Incli-60s	9.8 (7.0, 12.5)
(Kim, Welk, Braun, & Kang, 2015)	N = 5917	ActiGraph 7164 Right hip Epoch = 1 min	≥4d; Waking hours ≥10h/d wear time Non-wear (≥60 min zeros, with gap (2min <100cpm))	<100 cpm <i>All estimates were adjusted for accelerometer wear time.</i>	Total SB	Hours(h (SE)) Total BL: 1 min BL: 2-4 min BL: 5-9 min BL: 10-14 min BL: 15-19 min BL: 20-24 min BL: 25-29 min BL: ≥30 min	8.05 (0.03) 0.57 (0.00) 1.42 (0.01) 1.57 (0.01) 1.04 (0.01) 0.74 (0.00) 0.56 (0.00) 0.43 (0.00) 1.73 (0.02)
					Bouts	Number(n (SE)) All BL: 1 min BL: 2-4 min BL: 5-9 min BL: 10-14 min BL: 15-19 min BL: 20-24 min BL: 25-29 min	93.02 (0.31) 34.25 (0.17) 31.53 (0.16) 14.41 (0.05) 5.34 (0.03) 2.65 (0.02) 1.53 (0.01) 0.96 (0.01)

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)				
						BL: ≥30 min	2.35 (0.03)				
(Leask, Harvey, Skelton, & Chastin, 2015)	N = 33 Age = 65-82 (median = 73.3) Community dwelling older adults	ActivPAL	≥1d; waking hours	S+R	Total SB	% of wear-time (% (range))	59.2 (28.3 – 94)				
					Bouts	Number (n(range)) BL≥2min	30 (11 – 35)				
(Lord e.a., 2011)	N=56 Age: 78.9 ± 4.9 Older adults	ActivPAL sf = 10 Hz;	7d 24h/d	S+L	Total SB	(hours)	12.46 ± 1.94				
					Bouts	Gini index (G)	0.836 ± 0.04				
				S→S	Bouts	Temporal diversity (D _{1sed})	15.2 ± 5.3				
					Breaks	Number per day	39.0 ± 10.7				
(Lyden, Keadle, Staudenmayer, & Freedson, 2014)	N = 13 Age: 24.8 ± 5.2	Actigraph GT3X (1D and 3D) Epoch: 1 second	3d 10h/d	Soj-1x model	Total SB	(hours) (mean (95% CI))	6.27 (5.70, 6.85)				
					Breaks	Number (n) (mean (95% CI)) Breakrate (n/SH) (mean (95% CI))	39.3 (35.3, 43.3) 6.6 (5.5, 7.7)				
				Soj-3x model	Total SB	(hours) (mean (95% CI))	5.80 (5.28, 6.33)				
					Breaks	Number (n) (mean (95% CI)) Breakrate (n/SH) (mean (95% CI))	29.4 (23.3, 35.5) -1.3 (-12.7, 10.1)				
				≤ 100 cpm	Total SB	(hours) (mean (95% CI))	6.52 (6.06, 6.98)				
					Breaks	Number (n) (mean (95% CI)) Breakrate (n/SH) (mean (95% CI))	54.4 (51.5, 72.9) 11.2 (8.7, 13.8)				
				≤ 50 cpm	Total SB	(hours) (mean (95% CI))	5.95 (5.43, 6.46)				
					Breaks	Number (n) (mean (95% CI)) Breakrate (n/SH) (mean (95% CI))	62.2 (51.5, 72.9) 11.2 (8.7, 13.8)				
				8 counts per 10 sec	Total SB	(hours) (mean (95% CI))	6.40 (5.91, 6.89)				
					Breaks	Number (n) (mean (95% CI)) Breakrate (n/SH) (mean (95% CI))	56.9 (45.3, 68.4) 9.5 (7.2, 11.8)				
				(Lynch e.a., 2016)	N = 185 Age = 64.2 ± 10.3	ActiGraph GT3X+ Elastic belt over right hip. Epoch: 1 min	Waking hours ≥10h/d Non-wear (≥60 min zeros, with gap (2min <50 cpm))	<100 cpm	Wear-time	Hours(h)	14.41
									Total SB	Hours(h)	8.77 ± 1.55
Bouts	Number (n) BL: ≥ 20 min	6.1									

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
	Colon cancer survivors		Excessive values			BL: ≥ 30 min	3.2
						% of Total SB (%)	
						BL: ≥ 20 min	42.6 ± 1.92
						BL: ≥ 30 min	29.3 ± 1.74
(Maddocks & Wilcock, 2012)	N = 85 Age: 66 ± 9	ActivPAL	4d (incl. Sat. and Sun.) 24h/d	S+L	Total SB	Hours (h) of 24h	
						All subjects	17.9 ± 2.1
						Physical status 0	17.7 ± 2.2
	Patients with Thoracic cancer					Physical status 1	19.7 ± 1.7
	Physical status 0-2					Physical status 2	21.0 ± 1.7
				S→S	Breaks	Number (n)	
						All subjects	45 ± 17
						Physical status 0	49 ± 8
						Physical status 1	47 ± 18
						Physical status 2	39 ± 19
(Manns, Ezeugwu, Armijo-Olivo, Vallance, & Healy, 2015)	N = 2017 Age = 70.7 ± 7.6	ActiGraph 7164 Over right hip Epoch = 1 min	Waking hours ≥10h/d Non-wear (≥60 min zeros, with gap (2min <50 cpm)) Excessive values	<100 cpm	Wear time	Hours (h (95% CI))	
						- m-disability present	14.37 (14.06, 14.68)
						- m-disability absent	14.48 (14.21, 14.76)
	Community dwelling older adults				Total SB	Hours (h (95% CI))	
	- mobility disability present					- m-disability present	9.92 (9.60, 10.24)
	- mobility disability absent					- m-disability absent	9.18 (8.8, 9.47)
					Bouts	BL (min)	
						- m-disability present	
						(mean (95% CI))	7.3 (7.0, 7.7)
						(median (IQR))	6.6 (5.2 – 8.7)
						- m-disability absent	
						(mean (95% CI))	6.4 (6.1, 6.8)
						(median (IQR))	6.1 (5.0 – 7.6)
					Breaks	Duration (min (95% CI))	
						- m-disability present	
						(mean (95% CI))	3.0 (2.8, 3.2)
						(median (IQR))	3.2(2.6 – 3.8)
						- m-disability absent	
						(mean (95% CI))	3.7 (3.5, 3.8)
						(median (IQR))	3.7 (3.1 – 4.5)

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						Number (n (95% CI))	
						- m-disability present	87.6 (85.1, 90.1)
						- m-disability absent	89.6 (87.3, 91.9)
(Ortlieb e.a., 2014)	N = 168 Age: 65 – 89	Actigraph GT3X; Epoch: 1 min 1D: vertical axis only	≥4d ≥10h/d Non-wear (≥20 min zeros, with gap (2min))	≤ 100 cpm	Total SB	(hours)	
	Groups - total PA/day: 1) 'rare' (<25%) 2) 'average' (≥25- <75%) 3) 'frequent' (≥75%)					All subjects	8.4 ± 1.48
						% of wear time (median (5%, 95%))	
						All	65 (50, 82)
						Rare	74 (66, 85)
						Average	65 (54, 74)
						Frequent	59 (41, 67)
					Bouts	BL (min) (mean (5%, 95%))	
						All	7.08 (4.78, 11.81)
						Rare	8.64 (6.13, 12.58)
						Average	6.91 (4.80, 9.97)
						Frequent	6.31 (4.18, 8.58)
						BL (min) (median (5%, 95%))	
						All	3.00 (2.00, 4.50)
						Rare	3.00 (2.00, 5.00)
						Average	3.00 (2.00, 4.00)
						Frequent	2.00 (2.00, 3.00)
						% of total SB (%)	
						All BL: >3 min	89 (84, 92)
						Rare BL: >3 min	90 (86, 92)
						Average BL: >3 min	88 (84, 92)
						Frequent BL: >2 min	88 (81, 91)
						Gini index (G (5%, 95%))	
						All	0.63 (0.57, 0.68)
						Rare	0.65 (0.60, 0.68)
						Average	0.63 (0.58, 0.68)
						Frequent	0.62 (0.57, 0.67)
(Paraschiv-Ionescu, Buchser, Rutschmann, & Aminian, 2008)	N=30 Groups: 1) Healthy subjects	Three inertial sensors (each with two accelerometers and one gyroscope) fixed	5d 8h/d No epoch length reported.	S+L	Sequence of activity-rest periods	Detrended Fluctuation Analysis (DFA) scaling component (α)	
						Healthy subjects	0.856±0.09
						Chronic Pain patients	0.756±0.09

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
	2) Chronic Pain patients (CP)	<i>on the chest, the thigh and the shank.</i> 40 Hz				Fano factor scaling component (α_F)	
						Healthy subjects	0.350±0.085
						Chronic Pain patients	0.178±0.100
						Probability of words representing: long activity - short rest	
						P ₁₁₁ (word: "111")	
						Healthy subjects	0.060±0.02
						Chronic Pain patients	0.043±0.01
						P ₁₁₀ (word: "110")	
						Healthy subjects	0.063±0.01
						Chronic Pain patients	0.052±0.01
						P ₀₁₁ (word: "011")	
						Healthy subjects	0.065±0.01
						Chronic Pain patients	0.053±0.01
						P ₁₁₁₁₁₁ (word: "111", "111")	
						Healthy subjects	0.540±0.08
						Chronic Pain patients	0.400±0.06
(Paraschiv-Ionescu, Perruchoud, Buchser, & Aminian, 2009)	N = 32 Age: 67 ± 13 Groups: 1) Healthy subjects 2) Chronic Pain patients (CP)	ASUR (Autonomous Sensing Unit Recorder) 2D, 40 Hz	5d 8h/d	S+L	Total SB	% of wear time	
						Healthy subjects	49±11
						Chronic Pain patients	63±13
					Bouts	Burstiness parameter (B)	
						Healthy subjects	0.40±0.10
						Chronic Pain patients	0.33±0.12
						Memory parameter (M)	
						Healthy subjects	0.08±0.07
						Chronic Pain patients	0.11±0.10
					Breaks	Burstiness parameter (B)	
						Healthy subjects	0.37±0.05
						Chronic Pain patients	0.32±0.12
						Memory parameter (M)	
						Healthy subjects	0.20±0.13
						Chronic Pain patients	0.09±0.07

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)	
					Sequence of activity-rest periods	Complementary cumulative probability distribution (CCPD) 1. Scaling factor ($\tau_{\Delta}^{pos}, \tau_{\Delta}^{neg}$)	Healthy subjects: 296±133, 413±208 Chronic Pain patients: 614±340, 297±158	
						2. Characteristic shape parameter ($\beta_{\Delta}^{pos}, \beta_{\Delta}^{neg}$)	Healthy subjects: 0.66±0.15, 0.63±0.15 Chronic Pain patients: 0.71±0.16, 0.77±0.19	
						Fano factor scaling component (α_F)	Healthy subjects: 0.34±0.08 Chronic Pain patients: 0.19±0.11	
					Structural complexity	Permutation entropy (PE)	Healthy subjects: 0.28±0.09 Chronic Pain patients: 0.16±0.07	
(Parry & Straker, 2013)	N = 50 Age: 36.4 ± 8.6 Office workers	Actical Attached to an elastic belt, worn over the right hip. Epoch: 1 min	≥4d (≥3 work, ≥1 non-work) ≥ 8,34 h/d Non-wear (>120 min zeros)	< 91 cpm	Wear-time	Hours (h)		
						Workdays – all day	14.9 ± 1.09	
						Workdays – work hours	8.9 ± 0.77	
						Non-workdays	13.7 ± 1.43	
						Total SB	Hours(h)	
						Workdays – all day	11.3 ± 0.98	
					Non-Workdays	9.30 ± 1.47		
						% of wear time (%)		
					Workdays – all day	75.9		
					Non-Workdays	69.7		
					Bouts	% of wear time; BL: >30 min		
					Workdays – all day	34.1 ± 11.6		
Workdays – work hours	40.8 ± 16.6							
Workdays – non-work hours	22.8 ± 10.9							
Non-workdays	26.9 ± 11.1							
Breaks	Number (n/SH)							
Workdays – all day	6.0 ± 1.4							
Workdays – work hours	5.1 ± 1.7							

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						Workdays – non-work hours	7.9 ± 2.1
						Non-workdays	9.2 ± 9.8
(Parry, Straker, Gilson, & Smith, 2013)	N = 62 Age: 41.4 ± 10.9 Office workers Intervention	Actigraph GT3X Epoch: 1 min 7 days. 60sec epoch. Elastic belt to be worn over the right hip.	≥4+4d (≥3 work, ≥1 non-work) ≥ 8,34 h/d Waking hours Non-wear (≥120 min zeros)	< 100 cpm	Wear-time	Hours (h)	
						Workdays – all day	15.37 ± 1.40
						Workdays – work hours	8.36 ± 1.09
					Total SB	% of wear time	
						PRE	72.85 ± 7.06
						Workdays – all day	78.29 ± 8.41
						Workdays – work hours	
						POST	71.25 ± 7.27
						Workdays – all day	76.6 ± 8.6
					Bouts	% of wear time; BL: >30	
						PRE	
						Workdays – all day	24.37 ± 12.73
						Workdays – work hours	28.98 ± 19.34
						POST	
						Workdays – all day	22.29 ± 13.16
Breaks	Break rate (n/SH)						
	PRE						
	Workdays – all day	7.81 ± 2.45					
	Workdays – work hours	6.95 ± 3.20					
	POST						
	Workdays – all day	8.45 ± 2.86					
(Pettapiece-Phillips e.a., 2016)	N = 50 Age = 37.2 (18 – 62) Women - Control - BRCA1 mutation	ActiGraph GT3X Elasticized belt Epoch = 1 sec	7d; waking hours ≥10h/d Non-wear (≥10 min zeros)	ActiLife 6.8.2	ver. Total SB	Hours(h)	
						All subjects	8.6 ± 1.5
						Bouts	BL – longest bout (in 7days) (min)
(Prince, Blanchard, Grace, & Reid, 2015)	N = 263 Age = 63.6 9.3	ActiGraph GT3X Right hip Vector Magnitude Epoch = 1 min	≥4d; waking hours ≥10h/d Non-wear (≥60 min zeros, with gap (2min <150 cpm))	≤150 cpm	Wear-time	Hours(h)	
						All subjects	14.14 ± 1.30
						Men	14.21 ± 1.28
						Women	13.93 ± 1.32

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
	Cardiac rehabilitation graduates				Total SB	Hours(h) All subjects Men Women	8.0 ± 1.6 8.2 ± 1.5 7.2 ± 1.5
					Bouts	Number (n); BL: ≥10 min All subjects Men Women	14.1 ± 3.8 14.7 ± 3.6 12.3 ± 3.7
(Prioreschi, Makda, Tikly, & McVeigh, 2015)	N = 29 Age = 52.7 ± 11 Rheumatoid Arthritis, women. - normal bone mass - low bone mass	Actical Velcro belt on hip of dominant leg. Epoch = 1 min	≥4d; waking hours ≥10h/d Non-wear (≥60 min zeros)	≤100cpm	Wear-time	Hours(h) normal bone mass low bone mass	17 ± 3 16 ± 3
					Total SB	% of wear-time (%) normal bone mass low bone mass	65 ± 11 74 ± 10
					Bouts	Number (n); BL: ≥60 min normal bone mass low bone mass	7 ± 3 8 ± 3
					Breaks	Number (n) normal bone mass low bone mass	72 ± 21 53 ± 18
(N. Reid e.a., 2013)	N = 31 Age: 84.2 (range 61.4-95.8) Older adults In residential care	ActivPAL3™ Epoch: 15 seconds	7d 24h/d Waking hours ≥80% or ≥10h of waking time Non-wear (diary)	S+L	Waking hours Total SB	Hours(h) (hours) (mean (CI 95%)) % of waking hours	14.6 ± 2.0 12.4 (11.3, 13.3) 85
					Bouts	% of Total SB (%) Duration: ≥30 min Duration: ≥60 min Bout duration at 10% total SB (min) Bout duration at 50% total SB (min) Bout duration at 90% total SB (min)	73 44 11 53 142
(R. E. R. . Reid, Carver, Andersen, Court, &	N = 71 Age = 50.27 ± 9.38	ActivPAL™3 Adhesive patch on mid-thigh Epoch = 15sec	≥4d ≥22h/d; Sleep time was not analysed	Sitting Break = Transition	Total SB Breaks	Hours (h) Number(n)	9.74 ± 2.29 48.20 ± 15.40

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
Andersen, 2015)	Adults, post bariatric surgery			from sitting to standing			
(L. B. . c Sardinha, Santos, Silva, Baptista, & Owen, 2015)	N = 215 Age = 73.3 ± 5.9 Non-institutionalized older adults	ActiGraph GT1M Right hip, near iliac crest Epoch: 15sec → 1 min	≥3d, incl. 1 weekend day ≥10h/d Non-wear (≥60 min zeros)	<100 cpm	Wear-time	Hours(h)	13.38 ± 1.58
					Total SB	Hours(h)	8.55 ± 1.89
					Breaks	Number(n)	78.9 ± 16.0
(L. B. Sardinha e.a., 2015)	N = 371 Age = 74.7 ± 6.9 Non-institutionalized older adults - Low risk for physical dependence - High risk for physical dependence	ActiGraph GT1M Right hip, near iliac crest Epoch: 15sec → 1 min	≥3d, incl. 1 weekend day ≥10h/d Non-wear (≥60 min zeros)	<100 cpm	Wear-time	Hours(h)	
						All subjects	13.72 ± 1.54
						Low risk for physical dependence	13.87 ± 1.57
						High risk for physical dependence	13.30 ± 1.34
					Total SB	Hours(h)	
						All subjects	9.00 ± 2.16
						Low risk for physical dependence	8.76 ± 2.09
						High risk for physical dependence	9.70 ± 2.21
					Breaks	Number(n)	
						All subjects	74.9 ± 20.0
	Low risk for physical dependence	78.0 ± 17.6					
	High risk for physical dependence	65.9 ± 23.6					
	Number per SB hour (n/SH)						
	All subjects	9.0 ± 3.6					
	Low risk for physical dependence	9.5 ± 3.3					
	High risk for physical dependence	7.5 ± 3.9					
(Sartini e.a., 2015)	N = 1455 Age = 78.5 ± 4.6 Older men	ActiGraph GT3X Only vertical axis On elasticated belt over right hip Epoch = 1 min	≥3d; waking hours ≥10h/d Non-wear (≥90 min zeros, with gap (2min if ≥30 min before and after)) Only hours with ≥45 valid wear minutes were included. Means were adjusted for various factors	<100cpm	Wear-time	Hours(h, range)	14.22 (14.17,14.28)
					Total SB	% of wear-time (%)	72.6 (72.1, 73.0)
					Bouts	% of bouts at period of the day (%)	
					≥60 min	Evenings (7 p, - 10.59 pm)	49
						8-9 pm	13.6
						9-10 pm	14.0
	N = 442		≥ 6d (incl. Sat. and Sun.)	MET ≤ 1.8	Total SB	(hours)	

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)	
(Scheers, Philippaerts, & Lefevre, 2012)	Age: 41.4 ± 9.8	SenseWear Pro3 Armband (SWA) Epoch: 1 min Worn over the triceps muscle of the right arm.	≥ 95% of 24h/d (Except during water-based activities)	(incl. sleep)		Men – normal weight	16.82 ± 1.87	
						Women – normal weight	16.48 ± 1.59	
						Men – Overweight	17.37 ± 1.84	
						Women – Overweight	17.52 ± 1.56	
						Men – Obese	17.91 ± 1.60	
						Women – Obese	18.36 ± 2.00	
					Bouts	BL (min)		
						Men – normal weight	13.63 ± 4.49	
						Women – normal weight	13.09 ± 3.03	
						Men – Overweight	14.52 ± 3.56	
						Women – Overweight	15.41 ± 3.68	
						Men – Obese	15.52 ± 3.66	
					Breaks	Number (n)		
						Men – normal weight	77.79 ± 15.17	
						Women – normal weight	77.13 ± 12.21	
Men – Overweight	73.65 ± 12.61							
Women – Overweight	69.98 ± 13.26							
Men – Obese	70.84 ± 10.90							
(Shiroma, Freedson, Trost, & Lee, 2013a)	N = 7247 Women Age = 71.4 ± 5.8	Actigraph GT3X+	≥ 4d ≥ 10h/d Waking hours	< 100 cpm	Wear-time	Hours (h)	14.8 ± 1.2	
						Total SB	Hours (h)	9.7 ± 1.5
							% of wear time (95% CI)	65.5 (65.5, 64.7)
					Breaks		Number (n/SH) (95% CI)	9.0 (9.0, 9.1)
					Bouts	Number (n) (95% CI)	85.9 (85.5, 86.3)	
						Number (n)		
						Duration: >1 min	85.9 ± 16.1	
						Duration: ≥5 min	29.8 ± 4.7	
						Duration: ≥10 min	15.9 ± 3.2	
						Duration: ≥20 min	7.0 ± 2.2	
						Duration: ≥30 min	3.8 ± 1.6	
						Duration: ≥40 min	2.2 ± 1.2	
						Duration: ≥50 min	1.4 ± 0.9	
					Duration: ≥60 min	0.9 ± 0.7		

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						% of Bouts	
						Duration: >1 min	100
						Duration: ≥5 min	35.5 ± 6.7
						Duration: ≥10 min	19.4 ± 5.9
						Duration: ≥20 min	8.7 ± 4.1
						Duration: ≥30 min	4.8 ± 2.9
						Duration: ≥40 min	2.9 ± 2.1
						Duration: ≥50 min	1.8 ± 1.6
						Duration: ≥60 min	1.2 ± 1.2
						% of Total SB (%)	
						Duration: >1 min	100
						Duration: ≥5 min	81.6 ± 6.4
						Duration: ≥10 min	65.5 ± 10.1
						Duration: ≥20 min	44.5 ± 12.5
						Duration: ≥30 min	31.5 ± 12.4
						Duration: ≥40 min	22.7 ± 11.3
						Duration: ≥50 min	16.5 ± 10.0
						Duration: ≥60 min	11.9 ± 8.6
(Shiroma, Freedson, Trost, & Lee, 2013b)	N = 5032 Mean Age = 70.1 Older women	Actigraph GT3X+	≥ 4d ≥ 10h/d Waking hours	< 100 cpm	Wear-time Total SB Bouts	Hours (h (SE)) Hours (h) Number (n) (median (95% CI))	14.3 (+0.02) 9.6 67.5 79.3 (78.7, 79.8) 27.9 (27.7, 28.0) 15.2 (15.1, 15.3) 6.7 (6.7, 6.8) 3.6 (3.6, 3.7)
						% of wear time (median)	
						% of Total SB (%) (median (95% CI))	
						Duration: 1 min	100
						Duration: 5 min	35.6 (33.4, 35.9)
						Duration: 10 min	19.4 (19.2, 19.6)
						Duration: 20 min	8.5 (8.4, 8.6)
						Duration: 30 min	4.6 (4.5, 4.7)
	N = 33	ActivPAL		Sitting	Total SB	% of wear-time (%)	77,0 ± 17.8

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
(Spinney e.a., 2015)	Office workers		Analysis only during office hours	S → S	Breaks	Number per SB hour (n/SH)	4.0 ± 2.8
(Straker e.a., 2014)	N = 24 (3*8) Age: 38.2 ± 8.3 Occupational groups: 1) Seated office workers 2) Standing office workers 3) Teachers	Actical (omnidirectional) On belt over right anterior iliac spine Epoch: 1min	4d	< 91 cpm	Bouts Breaks + Bouts	% of Wear-time (%); BL: >30 min Seated office workers Standing office workers Teachers % of Wear-time (%); BL: 0-5 min Seated office workers Standing office workers Teachers	37.3 25.7 15.7 21.8 26.8 34.6
(Tieges e.a., 2015)	N = 96 Age = 72.2 (64-80) Patients with acute stroke	ActivPAL On unaffected leg	7d Including sleep ≥24h/d	S+L Sleep time was included in the analysis	Total SB Bouts	% of day (24h) Hours of day (24h) (median (IQR)) Overall 1mo after stroke 6mo after stroke 12mo after stroke % of Total SB (%) (BL is median IQR) Overall - BL: 102 min 1mo after stroke - BL: 99 min 6mo after stroke - BL: 102.6 min 12mo after stroke - BL: 102 min Number per SB hour (n/SH) Overall 1mo after stroke 6mo after stroke 12mo after stroke	81 19.5 (18.1 – 21.2) 19.9 (18.4 – 22.1) 19.1 (17.8 – 20.8) 19.3 (17.3 – 20.9) 50 (W ₅₀) 50 (W ₅₀) 50 (W ₅₀) 50 (W ₅₀) 2.30 (1.80 – 2.90) 2.21 (1.70 – 2.88) 2.41 (1.87 – 2.96) 2.48 (1.91 – 2.94)
(Van Cauwenberg, Van Holle, De Bourdeaudhuij, Owen, & Deforche, 2015)	N = 442 Age = 74.2 ± 6.2 Older adults	ActiGraph GT3X+ Epoch = 1 min	≥5d; waking hours ≥10h/d Non-wear (≥90 min zeros)	<100 cpm	Total SB	Hours(h) Overall % of wear-time (%) Morning (7h-12h) Afternoon (12h-17h) Evening (17h-23h)	9.67 ± 1.63 50.33 66.40 68.47

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)	
(van der Berg e.a., 2016)	N = 2497 Age = 60.0 ± 8.1 Adults: - Normal glucose metabolism (NGM) - Impaired glucose metabolism (IGM) - Type 2 Diabetes Mellitus (T2DM) And stratification to number of metabolic syndrome criteria: - 0 criteria - 1-2 criteria - 3-5 criteria	ActivPAL3 On right thigh	8d (24h/d) ≥14h/d of waking time Automated algorithm to identify waking time versus sleep.	S+L	Waking-time	Hours (h)	15.7 ± 0.9	
						All subjects	15.7 ± 0.9	
						NGM	15.8 ± 0.8	
						IGM	15.7 ± 1.0	
					Total SB	Hours (h (95%CI))		
						NGM	9.06 (9.0, 9.1)	
						IGM	9.46 (9.3,9.6)	
						T2DM	10.10 (10.0, 10.2)	
						0 criteria	8.69 (8.5, 8.9)	
						1-2 criteria	9.19 (9.1, 9.3)	
						3-5 criteria	9.96 (9.9, 10.1)	
						Bouts	Number (n (95%CI)); BL: ≥30min	
							NGM	4.55 (4.5, 4.6)
							IGM	4.88 (4.7, 5.0)
							T2DM	5.42 (5.3, 5.5)
							0 criteria	4.24 (4.1, 4.4)
					1-2 criteria		4.64 (4.6, 4.7)	
					3-5 criteria		5.32 (5.2, 5.4)	
					BL (min)			
					NGM		10.54 (10.4, 10.7)	
					IGM		11.15 (10.8, 11.5)	
					Breaks	Number (n (95%CI))		
						NGM	55.69 (55.0, 56.4)	
						IGM	55.00 (53.5, 56.5)	
T2DM	52.78 (51.7, 53.9)							
0 criteria	57.11 (55.7, 58.5)							
1-2 criteria	55.73 (54.9, 56.5)							
3-5 criteria	52.71 (51.8, 53.6)							

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)	
(Van Dommelen e.a., 2016)	N = 205 Age = 45.8 ± 9.6 Adults; stratification based on occupation: - financial service provider – white collar - research institute white collar - construction company – blue collar	ActiGraph On right hip	≥4d, waking hours ≥2 work days (≥3h work) ≥10h/d wear-time Non-wear (≥60 min zeros, with gap (2min <100 cpm)) Analysis of: 1) total wear-time 2) occupational time	<100 cpm	Wear-time	Hours(h)		
						Total time		
						white collar, financial, men	14.9 ± 1.1	
						white collar, financial, women	14.7 ± 1.0	
						white collar, research, men	15.0 ± 0.8	
						white collar, research, women	14.8 ± 0.8	
						blue collar, construction, men	15.4 ± 1.2	
						Occupational time		
						white collar, financial, men	8.5 ± 1.0	
						white collar, financial, women	8.3 ± 1.0	
						white collar, research, men	8.2 ± 1.1	
						white collar, research, women	7.8 ± 1.5	
						blue collar, construction, men	7.7 ± 0.7	
						Total SB	% of Wear-time (%)	
						Total time		
						white collar, financial, men	70.0 ± 5.2	
						white collar, financial, women	67.4 ± 6.9	
						white collar, research, men	65.7 ± 5.3	
						white collar, research, women	63.5 ± 6.9	
						blue collar, construction, men	55.5 ± 9.3	
Occupational time								
white collar, financial, men	78.5 ± 5.6							
white collar, financial, women	79.5 ± 5.9							
white collar, research, men	77.0 ± 7.4							
white collar, research, women	76.3 ± 7.6							
blue collar, construction, men	43.6 ± 16.9							
Bouts	% of Total SB (%) BL: ≥30 min							
Total time								
white collar, financial, men	22.3 ± 8.9							
white collar, financial, women	21.9 ± 11.2							
white collar, research, men	22.2 ± 6.9							
white collar, research, women	19.2 ± 7.6							
blue collar, construction, men	12.2 ± 7.1							
Occupational time								
white collar, financial, men	27.4 ± 16.3							
white collar, financial, women	29.8 ± 17.9							

Pattern measures of sedentary behavior in adults: A literature review.

Study	Population	Sensor & settings	Data cleaning	SB classification	SB pattern measure	Unit	Per subject / day (mean ± SD)
						white collar, research, men	30.0 ± 14.9
						white collar, research, women	28.3 ± 15.1
						blue collar, construction, men	7.2 ± 10.7

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