

## **DESCRIPTION OF OTHER MEASURES**

Participants were asked to report the frequency (how often) and duration (how long) of active transportation (walking or bicycling to get to and from work, school, or errands), household (home or yard), and leisure activity over the 30 days preceding the interview. The questionnaire defined moderate intensity as tasks that caused “light sweating or a slight to moderate increase in breathing or heart rate” and vigorous intensity as tasks that caused “heavy sweating or large increases in breathing or heart rate”, both for at least 10 minutes at a time. Self-reported screen time was calculated from responses to two questions on the average number of hours/day spent watching TV/videos and computer use/games in the past 30 days. For each of the four indicators, the recall period of the past 30 days differed from the accelerometer wear time.

Self-reported sociodemographic measures used in this study included age, race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, other), gender, education (less than high school, high school graduate/GED, greater than high school), household income (0-\$14,999, \$15,000-\$34,999; \$35,000-\$64,999  $\geq$  \$65,000), employment, and marital status. Age above 85 years was top-coded before the data were released to protect confidentiality of the respondents, meaning all individuals above that age were assigned an age of 85 years. Employment was ascertained during the home interview and referred to work in the past week.

Participants self-reported cancer or malignancy, and responses were categorized into three groups (none, non-melanoma skin cancer, any other type of cancer). Participants also self-reported arthritis, alcohol intake (categorized as  $\geq$ 12 drinks/year: yes or no), and smoking. They also answered whether a doctor of health professional ever told them that they had a history of

angina, coronary heart disease, congestive heart failure, myocardial infarction, or stroke.

Cigarette smoking was grouped as current, former (smoked at least 100 cigarettes in the past but not currently smoking), and never. Participants answered a question on assistive devices:

“Because of a health problem, do you have difficulty walking without using any special equipment?” (yes or no). Participants self-identified into one of four categories regarding their usual daily activities: (1) you sit during the day and do not walk about very much; (2) you stand or walk about quite a lot during the day but do not have to carry or lift things very often; (3) you lift or carry light loads or have to climb stairs or hills often; or (4) you do heavy work or carry heavy loads.

Measured height and weight were used to derive BMI, grouped as underweight ( $<18.5 \text{ kg/m}^2$ ), normal weight ( $18.5\text{-}<25 \text{ kg/m}^2$ ), overweight ( $25\text{-}<30 \text{ kg/m}^2$ ), obese class I ( $30\text{-}<35 \text{ kg/m}^2$ ), and obese class II or III ( $\geq 35 \text{ kg/m}^2$ ). Total cholesterol (continuous) and C-reactive protein (CRP) were measured, with the latter categorized as  $<0.3$  or  $\geq 0.3 \text{ mg/dL}$ .<sup>1</sup> Hypertension was defined as hypertensive (systolic blood pressure  $\geq 140 \text{ mm Hg}$ , diastolic blood pressure  $\geq 90 \text{ mm Hg}$ , taking antihypertensive medications, self-reporting physician diagnosed high blood pressure), prehypertension (systolic blood pressure  $120\text{-}139 \text{ mm Hg}$ , diastolic blood pressure  $80\text{-}89 \text{ mm Hg}$ ), or not hypertensive. Diabetes was defined as diabetic (physician diagnosed diabetes, undiagnosed diabetes with fasting glycosylated hemoglobin (HbA1c)  $\geq 6.5\%$ ), prediabetes (HbA1c  $5.7\%$  to  $6.4\%$ ), or not diabetic.<sup>1</sup>

## **ASSESSMENT OF SELECTION BIAS**

In the sample 792 adults did not wear an accelerometer and 353 returned faulty accelerometers; both groups were excluded from all analyses. When exploring potential selection bias, those excluded for any reason in the analysis (n=1,845) were more likely ( $p<0.05$ ) to be older, male, non-Hispanic white, not employed, not married, have less than a high school education, lower household income, normal weight, need special equipment to walk, and report higher levels of sitting throughout a typical day compared to those included (n=4,510). Those excluded were also more often reported a history of any type of cancer, angina, myocardial infarction, coronary heart disease, and congestive heart failure, and were more likely to die during the follow-up period than those included. Those excluded were less likely to report  $\geq 12$  drinks/year and to have a lower C-reactive protein and a lower prevalence of prehypertension/hypertension and prediabetes/diabetes compared to those included. There were no differences by gender, cigarette smoking, or self-reported arthritis.

## **DESCRIPTION OF MODELS**

Four model variations were considered with the latent classes included as categorical exposure measures. First, models were adjusted for potential confounders that were associated with at least one physical activity/sedentary behavior variable and mortality. This included age, gender, race/ethnicity, education, marital status, smoking, employment, needing special equipment to walk, arthritis, cancer, and coronary heart disease (Model 1). Because including employment in some models violated the proportional hazard assumption, it was also included as a cross-product with follow-up time in the models. The following variables did not change any association by more than

10% and were excluded from further consideration: household income, C-reactive protein, total cholesterol, and alcohol intake.

Second, models were further adjusted for average daily accelerometer wear time coded continuously (Model 1A).

Third, models adjusted for potential confounders in Model 1 and other components of physical activity in the continuous form, while accelerometer wear time was dropped (Model 2). The control of the other components of physical activity/sedentary behavior assumed that these measures were acting as either mediators or confounders. The models exploring the MVPA latent classes controlled for light activity and sedentary behavior continuously. The models exploring sedentary behavior latent classes controlled for light activity and MVPA continuously. No additional adjustment occurred for average counts/minute latent classes.

Fourth, models were explored by further adjusting Model 2 for potential mediators including BMI, diabetes, and hypertension (Model 3). Because including BMI violated the proportional hazard assumption in some models, BMI was also included as a cross-product with follow-up time.

## **DESCRIPTION OF SELF-REPORTED PHYSICAL ACTIVITY AND SCREEN TIME BY LATENT CLASSES**

The self-reported physical activity and screen time measures were calculated for each latent class category (data not shown).

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- Median transportation activity remained at zero across all physical activity and sedentary behavior latent class categories.
- Median moderate to vigorous household activity had a narrow range (0.4-0.8 hours/week) across the latent class categories for percent of MVPA and percent of MVPA bouts, both out of total wearing time. Similarly, for average counts/minute, percent of MVPA\_lifestyle out of total wearing time, and percent of MVPA\_lifestyle bouts out of total wearing time, the median moderate to vigorous household activity ranged from 0.4-0.9 hours/week with a couple exceptions. First, for average counts/minute, class 4 (weekend warrior) had the highest median moderate to vigorous household activity at 1.4 hours/week. Second, the least active class 1 for average counts/minute, percent of MVPA\_lifestyle, and percent of MVPA\_lifestyle bouts had 0 median hours/week of moderate to vigorous household activity. For sedentary behavior and sedentary bouts, the most sedentary class 1 reported 0 median hours/week of moderate to vigorous household activity; the remaining classes ranged from a median of 0.3-0.7 hours/week.
- Median moderate to vigorous leisure activity was generally highest for the most active class 1 or the weekend warrior class (i.e., average counts/minute class 4, percent of MVPA class 3, percent of MVPA\_lifestyle or MVPA\_lifestyle bouts class 4). The median moderate to vigorous leisure activity was lowest for the least active class 1, ranging from 0-0.2 hours/week. For sedentary behavior and sedentary bouts, the most sedentary class 1 also had the lowest median moderate to vigorous leisure activity.
- Median screen time was highest for the least active class 1 (and sometimes 2) and ranged from 2.0-3.5 hours/week for the remaining classes for average counts/minute and percent of MVPA, percent of MVPA bouts, percent of MVPA\_lifestyle, and percent of

MVPA\_lifestyle bouts each out of total wearing time. The median screen time was highest for the most sedentary behavior and bout classes (Class 1) and lowest for the least sedentary behavior and bout classes (Class 5 and 7, respectively).

## **REFERENCES**

1. Zhao G, Li C, Ford ES, et al. Leisure-time aerobic physical activity, muscle-strengthening activity and mortality risks among U.S. adults: the NHANES linked mortality study. *Br J Sports Med.* 2014;48(3):244-249. <http://dx.doi.org/10.1136/bjsports-2013-092731>.

**Appendix**  
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**Appendix Table 1.** Weighted Percent of Latent Classes and Mean Percent of Time at the Intensity Among Adults  $\geq 40$  Years (n=4,510), NHANES 2003-2006

Accelerometry class assignment	N	Weighted %	SE	Weighted average % time in intensity	Weighted mean minutes/day or counts/minute in intensity
Average counts/minute					
Class 6 - Most active	41	0.8	0.14		859.0
Class 5	216	5.7	0.42		557.1
Class 4	66	2.2	0.35		508.6
Class 3	748	18.6	0.75		405.9
Class 2	1,892	45.1	0.80		264.6
Class 1 - Least active	1,547	27.5	1.04		134.3
Percentage of MVPA out of total wear time per day					
Class 5 - Most active	25	0.5	0.12	16.4	123.5
Class 4	158	4.0	0.39	7.9	62.1
Class 3	79	2.7	0.29	6.7	54.1
Class 2	783	20.3	1.16	4.1	33.4
Class 1 - Least active	3,465	72.6	1.41	1.1	8.8
Percentage of MVPA bouts out of total wear time per day					
Class 5 - Most active	89	2.2	0.27	6.8	53.1
Class 4	756	19.4	0.94	2.1	17.1
Class 3	395	9.1	0.63	0.6	4.7
Class 2	291	7.5	0.39	0.5	3.7
Class 1 - Least active	2,979	61.9	1.44	0.0	0.1
Percentage of MVPA_lifestyle out of total wear time per day					
Class 6 - Most active	37	0.6	0.14	39.3	275.1
Class 5	200	4.7	0.37	25.1	192.5
Class 4	103	3.0	0.42	23.8	192.7
Class 3	725	18.6	0.80	17.7	141.6
Class 2	1,731	42.7	0.87	10.8	88.2
Class 1 - Least active	1,714	30.4	1.05	4.3	34.7
Percentage of MVPA bouts_lifestyle out of total wear time per day					
Class 5 - Most active	193	4.0	0.40	19.5	148.5
Class 4	1,030	25.6	0.97	7.9	64.3
Class 3	1,551	36.5	1.10	2.8	23.6
Class 2	852	18.4	0.87	0.7	5.9
Class 1 - Least active	884	15.4	0.70	0.0	0.2
Percentage of sedentary behavior out of total wear time per day					

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Class 1 - Most sedentary	451	7.3	0.50	82.0	675.5
Class 2	1,286	26.9	0.82	69.6	578.8
Class 3	1,640	39.2	0.86	58.7	474.0
Class 4	872	21.3	0.75	47.4	377.0
Class 5 - Least sedentary	261	5.4	0.24	36.0	272.3
Percentage of sedentary bouts out of total wear time per day					
Class 1 - Most sedentary	417	6.6	0.44	83.3	690.3
Class 2	934	19.0	0.79	65.8	546.6
Class 3	327	8.0	0.52	49.6	412.2
Class 4	903	19.5	0.75	50.9	423.4
Class 5	1,063	26.3	0.94	35.8	286.4
Class 6	163	4.0	0.36	34.5	279.9
Class 7 - Least sedentary	703	16.6	0.62	20.5	157.6

*Note:* The weighted percents in this table correspond to Figures 1 and 2.

NHANES, National Health and Nutrition Examination Survey; MVPA, moderate to vigorous physical activity



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**Appendix Table 2.** Median Physical Activity/Sedentary Behavior for Each Latent Class Among Adults  $\geq 40$  Years (n=4,510), NHANES 2003-2006

<b>Accelerometry class assignment</b>	<b>N</b>	<b>Median counts/minute</b>	<b>Median MVPA minutes/day</b>	<b>Median MVPA_lifestyle minutes/day</b>	<b>Median sedentary minutes/day</b>
Average counts/minute					
Class 6 - Most active	41	852.2	105.3	256.0	299.7
Class 5	216	551.0	45.9	184.0	319.1
Class 4	66	518.0	49.6	175.3	393.2
Class 3	748	397.8	26.6	139.1	385.4
Class 2	1,892	257.6	10.9	82.3	469.6
Class 1 - Least active	1,547	133.7	2.1	28.6	581.4
Percentage of MVPA out of total wear time per day					
Class 5 - Most active	25	908.3	122.3	289.1	289.1
Class 4	158	553.1	59.3	169.6	378.6
Class 3	79	516.5	54.6	162.6	412.3
Class 2	783	387.8	31.6	125.1	431.6
Class 1 - Least active	3,465	205.5	5.4	58.0	499.3
Percentage of MVPA bouts out of total wear time per day					
Class 5 - Most active	89	559.0	70.1	155.7	395.3
Class 4	756	355.9	31.3	107.9	464.9
Class 3	395	301.2	19.0	101.0	471.3
Class 2	291	302.6	17.9	103.9	463.0
Class 1 - Least active	2,979	197.7	4.3	54.7	492.6
Percentage of MVPA_lifestyle out of total wear time per day					
Class 6 - Most active	37	756.9	98.9	287.6	234.7
Class 5	200	519.7	38.4	191.3	317.4
Class 4	103	513.5	42.1	189.4	325.1
Class 3	725	388.7	24.3	138.3	396.6
Class 2	1,731	263.1	12.0	84.4	477.3

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Class 1 - Least active	1,714	140.4	2.1	31.3	566.2
Percentage of MVPA bouts_lifestyle out of total wear time per day					
Class 5 - Most active	193	570.1	47.3	206.6	314.4
Class 4	1,030	385.3	26.5	132.3	412.1
Class 3	1,551	259.2	12.3	83.3	480.4
Class 2	852	180.8	4.1	49.3	526.2
Class 1 - Least active	884	112.5	1.4	20.1	565.4
Percentage of sedentary behavior out of total wear time per day					
Class 1 - Most sedentary	451	77.8	1.3	14.0	672.3
Class 2	1,286	165.1	4.5	46.8	577.6
Class 3	1,640	257.2	10.4	81.6	475.9
Class 4	872	368.4	18.4	122.6	377.7
Class 5 - Least sedentary	261	496.8	27.1	176.7	271.4
Percentage of sedentary bouts out of total wear time per day					
Class 1 - Most sedentary	417	76.4	1.3	12.4	672.4
Class 2	934	149.2	3.7	41.3	592.5
Class 3	327	234.4	9.6	75.4	502.1
Class 4	903	219.1	8.3	69.6	520.0
Class 5	1,063	297.2	13.1	95.0	436.4
Class 6	163	322.5	16.7	106.9	410.3
Class 7 - Least sedentary	703	409.2	20.1	133.3	320.6

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**Appendix Table 3.** Adjusted Hazard Ratios of All-Cause Mortality on Accelerometer-Assessed Physical Activity/Sedentary Behavior Latent Classes Among Adults  $\geq 40$  Years (n=4,510), NHANES 2003-2006

Accelerometry class assignment	No. of deaths	Model 1		Model 1A		Model 2		Model 3	
		AHR (95% CI)	p-value	AHR (95% CI)	p-value	AHR (95% CI)	p-value	AHR (95% CI)	p-value
Average counts/minute			<0.0001		<0.0001				<0.0001
Class 6 - Most active	0	-		-		-		-	
Class 5	6	0.40 (0.17, 0.92)		0.40 (0.17, 0.92)				0.38 (0.16, 0.88)	
Class 4	0	-		-		-		-	
Class 3	30	0.47 (0.32, 0.71)		0.47 (0.32, 0.71)				0.47 (0.31, 0.71)	
Class 2	115	0.50 (0.40, 0.62)		0.50 (0.40, 0.62)				0.52 (0.41, 0.65)	
Class 1 - Least active	348	1.00		1.00				1.00	
Percentage of MVPA out of total wear time per day			0.23		0.24		0.49		0.42
Class 5 - Most active	0	-		-		-		-	
Class 4	na	0.31 (0.10, 0.97)		0.31 (0.10, 0.98)		0.35 (0.11, 1.10)		0.33 (0.10, 1.03)	
Class 3	0	-		-		-		-	
Class 2	37	0.78 (0.55, 1.12)		0.79 (0.55, 1.12)		0.91 (0.64, 1.31)		0.90 (0.63, 1.28)	
Class 1 - Least active	459	1.00		1.00		1.00		1.00	
Percentage of MVPA bouts out of total wear time per day			0.004		0.004		0.024		0.016
Class 5 - Most active	na	0.13 (0.02, 0.94)		0.13 (0.02, 0.94)		0.14 (0.02, 0.97)		0.13 (0.02, 0.91)	
Class 4	40	0.70 (0.50, 0.97)		0.70 (0.50, 0.98)		0.73 (0.52, 1.03)		0.71 (0.51, 1.00)	
Class 3	24	0.73 (0.48, 1.11)		0.73 (0.48, 1.11)		0.81 (0.53, 1.23)		0.82 (0.54, 1.25)	
Class 2	11	0.45 (0.24, 0.82)		0.45 (0.25, 0.82)		0.52 (0.28, 0.96)		0.51 (0.28, 0.94)	
Class 1 - Least active	423	1.00		1.00		1.00		1.00	
Percentage of MVPA_lifestyle out of total wear time per day			<0.0001		<0.0001		<0.0001		<0.0001
Class 6 - Most active	0	-		-		-		-	
Class 5	6	0.38 (0.16, 0.87)		0.37 (0.16, 0.86)		0.45 (0.19, 1.06)		0.45 (0.19, 1.05)	
Class 4	na	0.13 (0.02, 0.93)		0.13 (0.02, 0.91)		0.15 (0.02, 1.10)		0.16 (0.02, 1.17)	
Class 3	27	0.40 (0.26, 0.61)		0.40 (0.26, 0.61)		0.46 (0.30, 0.72)		0.48 (0.31, 0.75)	
Class 2	89	0.42 (0.33, 0.54)		0.42 (0.33, 0.53)		0.46 (0.36, 0.60)		0.48 (0.37, 0.62)	
Class 1 - Least active	376	1.00		1.00		1.00		1.00	
Percentage of MVPA_lifestyle bouts out of total wear time per day			<0.0001		<0.0001		<0.0001		<0.0001
Class 5 - Most active	na	0.11 (0.03, 0.45)		0.11 (0.03, 0.44)		0.13 (0.03, 0.53)		0.12 (0.03, 0.51)	
Class 4	49	0.37 (0.27, 0.52)		0.37 (0.27, 0.52)		0.43 (0.30, 0.61)		0.43 (0.30, 0.61)	
Class 3	113	0.46 (0.36, 0.59)		0.46 (0.36, 0.59)		0.52 (0.40, 0.67)		0.51 (0.40, 0.66)	
Class 2	93	0.57 (0.44, 0.72)		0.57 (0.45, 0.73)		0.61 (0.47, 0.79)		0.61 (0.47, 0.78)	
Class 1 - Least active	242	1.00		1.00		1.00		1.00	
Percentage of sedentary behavior out of total wear time per day			<0.0001		<0.0001		0.0001		<0.0001
Class 1 - Most sedentary	171	2.71 (1.34, 5.49)		2.82 (1.39, 5.71)		1.50 (0.61, 3.65)		1.57 (0.64, 3.85)	

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Class 2	163	1.35 (0.67, 2.70)	1.39 (0.69, 2.79)	0.83 (0.38, 1.84)	0.85 (0.38, 1.90)
Class 3	115	1.07 (0.54, 2.14)	1.10 (0.55, 2.19)	0.77 (0.37, 1.60)	0.78 (0.37, 1.62)
Class 4	41	0.96 (0.47, 2.00)	0.98 (0.48, 2.04)	0.80 (0.39, 1.68)	0.82 (0.39, 1.71)
Class 5 - Least sedentary	9	1.00	1.00	1.00	1.00
Percentage of sedentary bouts out of total wear time per day					
		<0.0001	<0.0001	<0.0001	<0.0001
Class 1 - Most sedentary	166	2.91 (1.90, 4.46)	3.00 (1.95, 4.62)	2.09 (1.11, 3.93)	2.10 (1.11, 3.97)
Class 2	136	1.46 (0.96, 2.23)	1.49 (0.98, 2.28)	1.11 (0.65, 1.89)	1.10 (0.64, 1.89)
Class 3	20	1.042 (0.59, 1.85)	1.06 (0.59, 1.88)	0.88 (0.48, 1.63)	0.86 (0.47, 1.60)
Class 4	77	1.16 (0.75, 1.81)	1.19 (0.76, 1.84)	0.97 (0.59, 1.58)	0.97 (0.59, 1.58)
Class 5	60	1.02 (0.65, 1.60)	1.04 (0.66, 1.62)	0.91 (0.57, 1.44)	0.93 (0.58, 1.48)
Class 6	11	1.62 (0.81, 3.26)	1.62 (0.81, 3.26)	1.44 (0.71, 2.93)	1.39 (0.68, 2.83)
Class 7 - Least sedentary	29	1.00	1.00	1.00	1.00

*Notes:* The hazard ratios for Model 3 in this table correspond to Figures 1 and 2. The *p*-value represents a linear test for trend. Model 1 controlled for age (40-49, 50-59, 60-69, ≥70), gender, race/ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, other), education (<high school, high school or GED, >high school), married (yes, no), cigarette smoking (never, former, current), current employment (yes, no), current employment\*follow-up time, need special equipment to walk (yes, no), arthritis (yes, no), cancer (no, non-melanoma skin cancer, any other type of cancer), angina (yes, no), myocardial infraction (yes, no), stroke (yes, no), coronary heart disease (yes, no), and congestive heart failure (yes, no).

Model 1A controlled for covariates in Model 1 along with average daily accelerometer wear time.

Model 2 controlled for covariates in Model 1 along with other physical activity/sedentary behavior components, which varied by model.

The latent class variable on average counts per minute did not control for other physical activity/sedentary behavior components.

The latent class variable on MVPA (including bouts) controlled for sedentary and light.

The latent class variable on sedentary (including bouts) controlled for light and MVPA.

Model 3 controlled for covariates in Model 2 along with BMI (underweight, normal, overweight, obese class I, obese class II/III), BMI categories\*follow-up time, hypertension (no, prehypertension, yes), and diabetes (no, prediabetes, yes).

NHANES, National Health and Nutrition Examination Survey; AHR, adjusted hazard ratio; MVPA, moderate to vigorous physical activity; na, not applicable (the number of deaths for this category was based on small counts and not considered reliable)