

**National Health and Nutrition  
Examination Survey 2005–2006**

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**Documentation, Codebook,  
and Frequencies**

**Physical Activity Monitor**

**Examination**

**Survey Years:  
2005 to 2006**

**SAS Transport File:  
PAXRAW\_D.XPT**



June 2008

# NHANES 2005–2006 Data Documentation

## Exam Component: Physical Activity Monitor Intensity File (PAXRAW\_D)

Years of Coverage: 2005–2006

First Published: June 2008

Last Revised: NA

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### **Component Description**

The physical activity monitor (PAM) component was added to NHANES in 2003. The primary objective of the component is to collect objective information on physical activity. Activity patterns are difficult to study in free-living populations. Self-reported interview data are of limited value because respondents' perceptions of activity intensity vary and periods of physical activity are difficult for respondents to recall and quantify. NHANES interview data for children and adolescents less than 16 years of age are usually provided by a proxy respondent and may be incomplete. Children may spend large amounts of time away from home and engage in sporadic periods of activity that are difficult for a proxy respondent to recall and quantify.

The physical activity monitors (PAMs) used in NHANES collected objective information on the intensity and duration of common locomotion activities such as walking and jogging. The device used in NHANES was the ActiGraph AM-7164 (formerly the CSA/MTI AM-7164), manufactured by ActiGraph of Ft. Walton Beach, FL. This device is powered by a small watch battery; a small electric signal is emitted during movement. The device is programmed to detect and record the magnitude of acceleration or "intensity" of movement; acceleration data are stored in memory according to a specified time interval. A one minute time interval or "epoch" was used in NHANES. Intensity readings were summed over each 1-minute epoch.

The activity monitors were not waterproof. Therefore, activities such as swimming and water aerobics were not recorded. Additionally, the device records uniaxial movement; activity information recorded for persons who use stationary bikes, elliptical trainers, or equipment that primarily involved upper body movement, such as rowing, may not be recorded accurately. Walking and similar types of activity are thought to be the main source of physical activity for most individuals. The information about locomotor activities is believed to be more complete and objective than self-reported information. A detailed description of the monitors and studies that have used this device is posted on the ActiGraph website:

<http://www.theactigraph.com/studysearch2.asp>

**Eligible Sample**

The NHANES examined sample 6 years of age and over received physical activity monitors to wear at home for 7 consecutive days. Subjects who used wheelchairs and subjects with other impairments that prevented them from walking or wearing the PAM device were not given a monitor.

**Protocol and Procedure**

Subjects were recruited for the component at the mobile examination center. A health technician or phlebotomist described the protocol to eligible subjects. The monitors were programmed to begin recording activity information for successive 1 minute intervals (epochs) beginning at 12:01 a.m. the day after the health examination. The device was placed on an elasticized fabric belt, custom-fitted for each subject, and worn on the right hip. Subjects were told to keep the device dry (i.e. remove before swimming or bathing) and to remove the device at bedtime.

A toll-free telephone number and information materials describing the monitor were given to the subjects. Subjects were not asked to maintain activity logs, diaries, or records of their monitor wear. The activity monitors were returned by mail in postage-paid padded envelopes that were provided. Subjects received \$40 remuneration after their monitors were returned.

The PAXRAW file is a very large data file (> 2 GB) and contains multiple records per subject. The intensity file records consist of sequential minute by minute records of activity intensity beginning from the time the device was initialized. Subjects have up to 10,080 intensity count records. The intensity data were released in are available in 2 formats: a DVD format (2 GB) and an online zipped file format.

The PAM component was completed in the body measurements/anthropometry component room of the mobile examination center. The PAM protocol is described in Chapter 6 of the Body Measurements Procedures Manual which is listed on the NHANES 2005-2006 website along with other examination component manuals.

**Quality Assurance & Quality Control**

Survey staff completed an examiner training program that covered the basic operating features of the PAM device, equipment operation, subject recruitment strategies, PAM device initialization, and troubleshooting. Field performance and response rates were monitored by NCHS and contractor staff.

**Data Processing and Editing**

Initial data reviews were performed by NCHS and survey collaborators from the National Cancer Institute (NCI), the agency that funded the PAM component. The intensity files were reviewed for outliers and unreasonable values. The criteria used for reasonable ranges of activity count data were based on published literature and expert judgment. Notes pertaining to the variables in this file are provided in the codebook file.

PAXSTAT: A component status code is included in the file. A PAXSTAT value of '1' indicates that the activity monitor records were deemed to be reliable based on a preliminary review of the raw data. A PAXSTAT code of '2' denotes data that may be less reliable based upon a preliminary review. An exhaustive review of the PAM data was not performed however and analysts are encouraged to review the data carefully when completing their analyses.

PAXDAY: Day of the week; PAXDAY=1 for Sunday, 2 for Monday and so forth.

PAXN: Sequential observation number in minutes as recorded by the monitor device. The range begins with minute 1 on Day 1 (PAXN=1) and ends with the last minute of day 7 of monitor wear (PAXN=10080). Each day of wear produces 1440 individual minute records. The PAXN values for Day 1 range from 1 to 1440; Day 2 PAXN range from 1441-2880, and so forth.

PAXHOUR-hour of day the intensity data were recorded in military time or 24 hour clock.

PAXMINUT- minute value associated with a particular hour (PAXHOUR). The minute value shown is the start of the minute. For example, for the time 1201 hours, the start of the minute occurs at 1200 hours and PAXMINUT would be 00.

PAXINTEN is the intensity value recorded by the device. Each

minute has an intensity value.

PAXSTEP is the step count value recorded by the device. The PAXSTEP value is expressed as step counts per minute.

PAXCAL- Denotes whether the monitor was in calibration when it was returned by the subject. The data for monitors that were out of calibration (PAXCAL=2) may be less reliable.

## **Analytic Notes**

The NHANES examined sample weights should always be used for analyses with PAM data. Please refer to the NHANES Analytic Guidelines for further details on the use of the NHANES sample weights and other analytic issues.

The NHANES website for this data set includes a link to the NCI website. SAS programs and additional information about accelerometry data are included.

## **References**

Janz, KF (1994). Validation of the CSA Accelerometer for Assessing Children's Physical Activity. *Medicine and Science in Sports and Exercise*, 26, 369-75.

Trost SG, Ward DS, Moorehead SM, Watson PD, Riner W, Burke J (1998). Validity of the Computer Science and Application (CSA). *Medicine and Science in Sports and Exercise*, 30, 629-33.

## Locator Record

**Title:** Physical Activity Monitor Intensity File (PAXRAW\_D)

**Contact Number:** 1-866-441-NCHS

**Years of Content:** 2005–2006

**First Published:** June 2008

**Revised:** NA

**Access Constraints:** None

**Use Constraints:** None

**Geographic Coverage:** National

**Subject:** Physical activity monitor intensity and step count records

**Record Source:** NHANES 2005–2006

**Survey Methodology:** NHANES 2005–2006 is a stratified multistage probability sample of the civilian non-institutionalized population of the U.S.

**Medium:** NHANES Web site; SAS transport files

**National Health and Nutrition Examination Survey  
Codebook for Data Production (2005-2006)**

**Physical Activity Monitor - Raw Intensity Value Data (PAXRAW\_D)  
Person Level Data**

June 2008



<b>SEQN</b>	<b>Target</b>
	B(6 Yrs. to 150 Yrs.)
<b>Hard Edits</b>	<b>SAS Label</b>
	Respondent sequence number
<b>English Text:</b> Respondent sequence number.	
<b>English Instructions:</b>	

<b>PAXSTAT</b>	<b>Target</b>
	B(6 Yrs. to 150 Yrs.)
<b>Hard Edits</b>	<b>SAS Label</b>
	Data Reliability Status Flag
<b>English Text:</b> Flag indicating whether or not the data is reliable.	
<b>English Instructions:</b>	

Code or Value	Description	Count	Cumulative	Skip to Item
1	Data is deemed reliable	72294851	72294851	
2	Data reliability is questionable	2579244	74874095	
.	Missing	0	74874095	



<b>PAXCAL</b>		<b>Target</b>		
		B(6 Yrs. to 150 Yrs.)		
<b>Hard Edits</b>		<b>SAS Label</b>		
		Was the Monitor in Calibration?		
<b>English Text:</b> Was the monitor in calibration?				
<b>English Instructions:</b>				
<b>Code or Value</b>	<b>Description</b>	<b>Count</b>	<b>Cumulative</b>	<b>Skip to Item</b>
1	Yes	71159460	71159460	
2	No	3714635	74874095	
9	Don't know	0	74874095	
.	Missing	0	74874095	

<b>PAXDAY</b>		<b>Target</b>		
		B(6 Yrs. to 150 Yrs.)		
<b>Hard Edits</b>		<b>SAS Label</b>		
		Day of the Week		
<b>English Text:</b> The day of the week.				
<b>English Instructions:</b>				
<b>Code or Value</b>	<b>Description</b>	<b>Count</b>	<b>Cumulative</b>	<b>Skip to Item</b>
1	Sunday	10688322	10688322	
2	Monday	10705886	21394208	
3	Tuesday	10715049	32109257	
4	Wednesday	10709780	42819037	
5	Thursday	10700083	53519120	
6	Friday	10691594	64210714	
7	Saturday	10663381	74874095	
.	Missing	0	74874095	

<b>PAXN</b>	<b>Target</b>			
	B(6 Yrs. to 150 Yrs.)			
<b>Hard Edits</b>	<b>SAS Label</b>			
	Sequential Observation Number			
<b>English Text:</b> The person-level sequential observation number recorded in the device.				
<b>English Instructions:</b>				
<b>Code or Value</b>	<b>Description</b>	<b>Count</b>	<b>Cumulative</b>	<b>Skip to Item</b>
1 to 10080	Range of Values	74874095	74874095	
.	Missing	0	74874095	

<b>PAXHOUR</b>	<b>Target</b>			
	B(6 Yrs. to 150 Yrs.)			
<b>Hard Edits</b>	<b>SAS Label</b>			
0 to 23	Hour of the Day			
<b>English Text:</b> The hour of the day for which the intensity value was recorded.				
<b>English Instructions:</b>				
<b>Code or Value</b>	<b>Description</b>	<b>Count</b>	<b>Cumulative</b>	<b>Skip to Item</b>
0 to 23	Range of Values	74874095	74874095	
.	Missing	0	74874095	

<b>PAXMINUT</b>	<b>Target</b>			
	B(6 Yrs. to 150 Yrs.)			
<b>Hard Edits</b>	<b>SAS Label</b>			
0 to 59	Minute of the Hour			
<b>English Text:</b> The minute of the hour for which the intensity value was recorded.				
<b>English Instructions:</b>				
<b>Code or Value</b>	<b>Description</b>	<b>Count</b>	<b>Cumulative</b>	<b>Skip to Item</b>
0 to 59	Range of Values	74874095	74874095	
.	Missing	0	74874095	

<b>PAXINTEN</b>	<b>Target</b>			
	B(6 Yrs. to 150 Yrs.)			
<b>Hard Edits</b>	<b>SAS Label</b>			
0 to 32767	Device Intensity Value			
<b>English Text:</b> The intensity value recorded by the physical activity monitor.				
<b>English Instructions:</b>				
<b>Code or Value</b>	<b>Description</b>	<b>Count</b>	<b>Cumulative</b>	<b>Skip to Item</b>
0 to 32767	Range of Values	74874095	74874095	
.	Missing	0	74874095	

<b>PAXSTEP</b>	<b>Target</b>			
	B(6 Yrs. to 150 Yrs.)			
<b>Hard Edits</b>	<b>SAS Label</b>			
0 to 32767	Device Step Count			
<b>English Text:</b> The step count recorded by the physical activity monitor.				
<b>English Instructions:</b>				
<b>Code or Value</b>	<b>Description</b>	<b>Count</b>	<b>Cumulative</b>	<b>Skip to Item</b>
0 to 32767	Range of Values	74874033	74874043	
.	Missing	62	74874095	