International Physical Activity Questionnaire: 12-Country Reliability and Validity

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ABSTRACT

CRAIG, C. L., A. L. MARSHALL, M. SJÖSTRÖM, A. E. BAUMAN, M. L. BOOTH, B. E. AINSWORTH, M. PRATT, U. EKELUND, A. YNGVE, J. F. SALLIS, and P. OJA. International Physical Activity Questionnaire: 12-Country Reliability and Validity. *Med. Sci. Sports Exerc.*, Vol. 35, No. 8, pp. 1381–1395, 2003. **Background:** Physical inactivity is a global concern, but diverse physical activity measures in use prevent international comparisons. The International Physical Activity Questionnaire (IPAQ) was developed as an instrument for cross-national monitoring of physical activity and inactivity. **Methods:** Between 1997 and 1998, an International Consensus Group developed four long and four short forms of the IPAQ instruments (administered by telephone interview or self-administration, with two alternate reference periods, either the "last 7 d" or a "usual week" of recalled physical activity). During 2000, 14 centers from 12 countries collected reliability and/or validity data on at least two of the eight IPAQ instruments. Test-retest repeatability was assessed within the same week. Concurrent (inter-method) validity was assessed at the same administration, and criterion IPAQ validity was assessed against the CSA (now MTI) accelerometer. Spearman's correlation coefficients are reported, based on the total reported physical activity. **Results:** Overall, the IPAQ questionnaires produced repeatable data (Spearman's ρ clustered around 0.8), with comparable data from short and long forms. Criterion validity had a median ρ of about 0.30, which was comparable to most other self-report validation studies. The "usual week" and "last 7 d" reference periods performed similarly, and the reliability of telephone administration was similar to the self-administered mode. **Conclusions:** The IPAQ instruments have acceptable measurement properties, at least as good as other established self-reports. Considering the diverse samples in this study, IPAQ has reasonable measurement properties for monitoring population levels of physical activity among 18- to 65-yr-old adults in diverse settings. The short IPAQ form "last 7 d recall" is recommended for national monitoring and the long form for research requiring more detailed assessment. **Key Words:** MEASUREMENT, SURVEILLANCE, EPIDEMIOLOGY

Physical inactivity is now considered a global health concern, but no standardized approaches to measurement exist, and international comparisons and global surveillance are difficult (3,10,11). In 1996, one of the authors (MLB) initiated an international effort to develop comparable measures, and this was followed by the development of an International Consensus Group, which met in Geneva in 1998. The objective was to develop a self-reported measure of physical activity suitable for assessing population levels of physical activity across countries.

Initial pilot testing occurred during 1998–1999, and eight versions of the International Physical Activity Questionnaire (IPAQ) were developed, with four short and four long versions of the questionnaire. These could be administered by telephone interview or self-administration. There were two different reference periods under investigation, either the "last 7 d" or a "usual week" (see Appendix A, Table 1). To determine the measurement properties of these questionnaires, a reliability and validity study was carried out in 14 centers in 12 countries during 2000 (see Appendix A, Table 2 for country codes). This paper reports on the international reliability and validity study of the IPAQ instruments, in an effort to determine the suitability of different forms of the IPAQ instrument for international physical activity surveillance.

METHODS

Procedure

Related short and long physical activity questionnaires were pilot tested and selected for international evaluation.

TABLE 1. MET energy expenditure estimates assigned to each self-reported physical activity category.

Form Format	Activity Domain	Activity Type or Intensity	Self-Reported Pace	MET Estimate*
Long format	Occupational	Vigorous		8
		Moderate		4
		Walking	Vigorous	5
			Moderate	3.3
			Slow	2.5
	Transport	Sitting		1
		Walking	Vigorous	5
			Moderate	3.3
			Slow	2.5
		Cycling	Vigorous	8
			Moderate	6
			Slow	4
	Yard/garden	Vigorous		5.5
		Moderate		4
	Household	Vigorous		3
	Leisure	Vigorous		8
		Moderate		4
		Walking	Vigorous	5
			Moderate	3.3
			Slow	2.5
	Sitting	Weekday		1
		Weekend		1
Short format	All	Vigorous		8
		Moderate		4
		Walking	Vigorous	5
			Moderate	3.3
			Slow	2.5
	Sitting	Weekday		1
		Weekend		1

* MET estimates were based on the updated Compendium of Physical Activities (1), but due to the generic nature of the self-reported vigorous and moderate physical activity questions, an average of all vigorous and moderate physical activities was used.

The questionnaires were designed to be used by adults aged 18–65 yr. The short version (9 items) provided information on the time spent walking, in vigorous- and moderate-intensity activity and in sedentary activity. Participants were instructed to refer to all domains of physical activity. The long version (31 items) was designed to collect detailed information within the domains of household and yard work activities, occupational activity, self-powered transport, and leisure-time physical activity as well as sedentary activity. An additional question asked about the pace of walking and cycling. Standard methods were used to translate and adapt the questionnaires to the study centers in different countries (8,15). In each country, clinical research or institutional ethics committees had approved the study, and informed consent ("written" where literacy allowed this) was obtained from participants at each study site.

Data Collection

The reliability study was conducted over a 3- to 7-d period, requiring two participant contacts. During the first visit, the selected version of IPAQ was completed, and demographic data were obtained. Participants also read and signed institutional human subject consent forms. Up to 1 wk later, participants completed the same IPAQ version(s).

In the validity studies, participants completed the same assessments but also wore a CSA motion detector (now MTI) for 1 wk between visits 1 and 2, and had height and weight measured. Centers that administered both the reliability and validity protocols also had participants complete a third study visit, 3 d after the second visit to complete the reliability component.

Validity Criteria

Validation of reported activity levels used objective data recorded on the Computer Science and Application's Inc. (Shalimar, FL) accelerometer (CSA model 7164). The technical specification and performance properties of the CSA activity monitor have been described elsewhere (4–7,9,12,16). Participants wore the monitors during the 7 d of the validity study, and data were summed and stored in 1-min intervals.

Protocol and data management. All centers used a standardized protocol for reliability and validity assessment, overseen by a protocol coordinator (BEA). Adherence to the study protocols was well maintained, with few variations to the procedures reported. In South Africa and Guatemala, the telephone versions of the questionnaires were administered via personal interview. In general, samples were drawn from specific populations and were usually convenience samples, but collectively, the participants represented a wide range of age, education, income, and activity levels (Table 2). Additional qualitative input from each data collection site was also received to assist the understanding of issues surrounding the administration and interpretation of IPAQ, across developed and developing countries. The Data Management Center (Sydney, Australia: AEB, ALM) and two members of the IPAQ Executive [BEA and CLC] developed a standardized approach to cleaning, scoring, and analyzing the data.

Scoring and data reduction. After cleaning the data for missing and out-of-range values, the data collected from the long IPAQ questionnaires were summed within each physical activity domain to estimate the total time spent in occupational, transport, household, and leisure related physical activity, as well as total time reported sitting per week. Data from the short IPAQ questionnaires were summarized according to the physical activities recorded (walking, moderate, and vigorous activities) and estimated time spent sitting per week. Note that the sitting questions were developed as separate indicators and not as part of the summed physical activity score. Both the short and long form data were then used to estimate total weekly physical activity by weighting the reported minutes per week within each activity category by a MET energy expenditure estimate assigned to each category of activity (Table 1). MET levels were obtained from the 2000 compendium of physical activities (1) to include moderate-intensity activities between 3 and 6 METs and vigorous-intensity activities as >6 METs (1). The weighted MET-minutes per week (MET·min·wk^{-1}) were calculated as duration × frequency per week × MET intensity, which were summed across activity domains to

TABLE 2. Demographic characteristics of each sample from the data collection sites.

Data Collection Site*	N	Gender N (%) Male	Age Mean Years (SD)	Education Mean Years (SD)	Employed N (%)	Hours worked Mean (SD)	Residential Location N (%) Large City	Health Status N (%) Good+	Height Mean cm (SD)	Weight Mean kg (SD)
AUST	62	40 (65)	35.9 (11.7)	14.2 (3.2)	61 (98)	43.2 (12.2)	55 (89)	58 (94)	—	—
BRA	257	108 (42)	36.8 (13.8)	12.7 (5.2)	187 (73)	6.0 (3.8)	257 (100)	230 (90)	—	—
	28 CSA**	12 (43)	42.9 (14.2)	13.3 (4.1)	17 (61)	6.5 (4.6)	28 (100)	23 (82)	—	—
UK1	149	68 (46)	35.2 (10.6)	16.3 (3.6)	128 (87)	35.6 (13.4)	117 (79)	137 (92)		
UK2	101	38 (38)	41.1 (8.4)	15.4 (4.9)	88 (88)	34.2 (12.6)	6 (8)	85 (84)	167.4 (8.2)	74.3 (16.5)
CAN	210	88 (42)	49.2 (14.8)	14.0 (2.6)	132 (63)	—	15 (7)‡	—	—	—
	199	72 (36)	46.5 (16.5)	13.7 (2.5)	128 (64)	—	68 (34)‡	—	—	—
	208	93 (45)	39.1 (17.5)	8.0 (2.6)	126 (61)	—	39 (34)‡	—	—	—
FIN	88	43 (49)	55.6 (8.6)	12.7 (3.9)	50 (57)	41.6 (11.0)	63 (72)	74 (84)	—	—
GU	41 Ub	23 (56)	25.2 (5.5)	13.4 (4.3)	35 (85)	43.4 (14.9)	39 (95)	37 (90)	166.4 (12.2)	66.2 (12.2)
	40 Ru	20 (50)	27.3 (5.8)	6.4 (3.4)	26 (65)	35.7 (20.1)	0 (0)	20 (50)	157.6 (6.3)	61.3 (12.8)
	34 Ub	16 (47)	26.8 (5.1)	15.9 (2.5)	32 (94)	46.1 (23.2)	33 (97)	29 (85)	162.6 (9.6)	64.8 (13.7)
	40 Ru	19 (48)	27.2 (4.8)	5.1 (3.2)	32 (80)	38.7 (18.4)	0 (0)	13 (33)	157.2 (8.4)	58.4 (8.7)
	61 CSA	45 (73)	25.9 (5.0)	11.0 (5.5)	51 (84)	42.9 (15.8)	49 (80)	45 (74)	164.4 (8.9)	64.9 (13.4)
NET	74	34 (40)	32.7 (10.9)	##	71 (96)	35.5 (8.2)		73 (99)	—	—
JAP	144	74 (51)	33.8 (10.2)	17.1 (2.9)	116 (81)	38.8 (15.8)	125 (88)	124 (87)	164.4 (8.2)	59.8 (10.7)
PORT	196	96 (49)	35.1 (11.5)	—	—	—	—	-	163.4 (24.6)	65.6 (11.2)
USA1	28	7 (25)	48.9 (6.1)	—	28 (100)	—	—	-	168.3 (10.0)	78.8 (22.7)
SA	144 Ub	76 (53)	31.8 (12.0)	12.7 (4.3)	109 (76)	32.7 (21.4)	76 (53)	125 (97)	168.6 (9.3)	73.2 (15.7)
	108 Ru	48 (44)	35.6 (12.1)	9.1 (4.2)	28 (26)	9.2 (18.2)	0 (0)	75 (69)	162.4 (8.1)	66.3 (17.1)
	107 A	54 (51)	32.3 (8.5)	12.4 (4.1)	103 (96)	41.8 (13.6)	44 (41)	91 (85)	167.4 (9.9)	73.5 (17.1)
	92 Ub	46 (50)	31.6 (7.5)	13.5 (3.3)	88 (96)	42.0 (14.6)	79 (90)	82 (89)	168.2 (9.7)	75.7 (17.1)
USA2	30 s1§	15 (50)	37.4 (11.9)	18.3 (3.4)	29 (97)	36.8 (14.7)	22 (73)	29 (97)	169.9 (10.2)	76.2 (16.9)
	30 s2§	14 (47)	36.1 (12.8)	17.4 (3.0)	27 (90)	35.0 (12.7)	25 (83)	28 (93)	171.4 (9.7)	77.3 (17.3)
SW	50	22 (44)	40.7 (10.8)	15.8 (3.8)	49 (98)	38.3 (8.4)	30 (60)	48 (95)	169.2 (16.3)	70.5 (10.3)
	200	77 (39)	47.1 (13.6)	12.7 (3.2)	144 (72)	38.2 (9.4)	0 (0)	152 (76)	172.3 (8.8)	71.2 (12.9)

* See Appendix A, Table 2 for key to the abbreviations used to refer to the countries.
** CSA, CSA sample only.
† City with >100,000 people.
‡ City with >75,000 people.
§ s1, sample completed IPAQW forms LUT, SUT; s2, sample completed IPAQ forms L7S ANS S7S.
70% greater than 18 yr education in Netherlands sample.

produce a weighted estimate of total physical activity from all reported activities per week (MET·min·wk^{-1}). For brevity and clarity of presentation, only the total physical activity MET-minutes per week and total minutes per week in sitting activities are reported here.

Additional data collected on self-reported walking and cycling pace were evaluated separately from the main IPAQ analysis to determine whether these questions improved the data quality. Further additional analysis excluded the walking time reported to be at a slow pace. The MET estimates used to weight the different intensities of reported walking and cycling according to pace are shown in Table 1.

Total physical activity, expressed as minutes per week was also categorized to determine the proportion of each sample who met the CDC-ACSM physical activity guideline, which is often interpreted as "at least 150 min·wk^{-1} of at least moderate-intensity physical activity" (13,17). To more properly represent time spent in vigorous activity at the recommended volume (defined as three 20-min sessions per week for a total of 60 min·wk^{-1}), time spent in vigorous activity was multiplied by two, consistent with the method used by Armstrong et al. (2).

The raw CSA data were prepared for analysis using software written in Microsoft Access by the Swedish study Center (UE, YA, MS). For the CSA data to be included in the analyses at least 600 min of registered time was required each day for at least 5 d (one of which had to be a weekend day). The total amount of physical activity recorded by the CSA, expressed as total counts per registered time (counts·min^{-1}), was used as the criterion measure in the validity analyses. To identify the time spent in moderate-intensity activity, the CSA counts had to be >1952 and <5724 counts·min^{-1}, and to identify time spent in vigorous-intensity activity, the CSA counts had to be >5725 counts·min^{-1} (6). These data were used to compare with the 150-min·wk^{-1} criterion of adequate physical activity described previously with the time spent in moderate and vigorous-intensity activity recorded by the CSA being treated in the same way as for the self-report IPAQ data.

To validate the IPAQ sitting data, a pragmatic CSA cut-point of < 100 counts·min^{-1} was used to define time spent being sedentary. This cut-point was determined from several studies, which have appraised the activity counts recorded by the CSAs during a variety of different activities (5,16).

Data Analysis

Three separate types of analyses were planned, depending on the IPAQ study protocol adopted by each data collection site:

1. Reliability assessment: the test-retest repeatability of the same IPAQ forms administered at two different times not more than 8 d apart for the "last 7 d" recall forms and not more than 10 d apart for the "usual week" forms.

2. Concurrent (inter-method) validity: compared the self-report data from two different IPAQ forms that were administered during the same day, e.g., comparing the agree-

TABLE 3. Test-retest Spearman's reliability coefficients for the IPAQ long forms.

IPAQ Long Forms*	Data Collection Site**	Visit/s	N	Total All PA Spearman's ρ†	Total All PA Spearman's (Using Pace)ρ§	Total All PA Spearman's (excl slow pace)ρ§	Total All PA Spearman's ρ (− Job-Related Activity)‡	Total Sitting Time Spearman's ρ	Categorical Measure of >150 min·wk⁻¹ [% Agreement]
L7T	SW	V1-V2	200	0.79	0.80	0.77	0.70	0.80	0.84
L7S	UK1	V2-V3	149	0.70	0.70	0.72	0.74	0.74	0.92
	NET	V2-V3	68	0.91	0.90	0.90	0.89	0.87	1.0
	USA1	V2-V3	28	0.87	0.87	0.88	0.77	0.89	0.96
	USA2	V1-V2	19	0.72	0.67	0.69	0.84	0.78	1.0
	USA2	V2-V3	30	0.88	0.81	0.88	0.83	0.85	0.96
LUT	USA2	V1-V2	27	0.72	0.72	0.77	0.76	0.87	0.96
		V2-V3	30	0.96	0.90	0.96	0.95	0.85	0.96
LUI	GU	V1-V2	81	0.77	0.77	0.73	0.58	0.81	0.93
	GU Ub	V1-V2	41	0.85	0.83	0.84	0.70	0.75	0.90
	GU Ru	V1-V2	40	0.52	0.49	0.39	0.38	0.28	0.95
	SA	V1-V2	252	0.66	0.67	0.67	0.60	0.59	0.96
	SA Ub	V1-V2	144	0.79	0.77	0.75	0.66	0.74	0.99
	SA Ru	V1-V2	108	0.46	0.48	0.54	0.46	0.30	0.91
	SA Ub	V2-V3	92	0.86	0.86	0.83	0.77	0.80	0.99
LUS	FIN	V1-V2	87	0.82	0.83	0.82	0.77	0.93	0.99
	JAP	V1-V2	144	0.86	0.86	0.82	0.87	0.66	0.90
	JAP	V2-V3	144	0.93	0.93	0.94	0.93	0.77	0.98
	PORT	V1-V2	196	0.90	0.88	0.88	0.90	0.69	0.92
	USA1	V2-V3	28	0.91	0.90	0.86	0.84	0.93	1.0
	SW	V1-V2	50	0.87	0.87	0.86	0.88	0.78	0.96
	BRA	V1-V2	255	0.69	0.69	0.69	0.74	0.76	0.95

* See Appendix A, Table 1 for key to the abbreviations used to refer to the eight different IPAQ forms.
** See Appendix A, Table 2 for key to the abbreviations used to refer to the countries.
† Correlation coefficient based on total MET per minute summed across all physical activity dimensions using generic MET estimates for vigorous, moderate, and walking activity.
‡ Correlation coefficient based on total MET per minutes summed across all physical activity dimensions minus job-related physical activity using generic MET estimates for vigorous, moderate, and walking activity.
§ Correlation coefficient based on total MET per minutes summed across all physical activity dimensions using pace related MET estimates for vigorous, moderate, and walking activity.

ment between the long and short IPAQ forms. A comparison between telephone and self-administered modes of data collection was also conducted by Canada.

3. Criterion validity: compared the physical activity and sitting data from the self-report IPAQ forms with the CSA measure of physical activity recorded over 7 d.

As the self-reported IPAQ data were not normally distributed, nonparametric Spearman correlation coefficients (ρ) were calculated as a primary measure of agreement: between visits (reliability), between forms (concurrent validity), and between the IPAQ data and CSA counts (criterion validity). All valid data were included, without excluding outliers, as this did not affect the results to any substantive degree. The categorical data were analyzed by calculating the percent agreement (average correct classification, ACC), to determine how many participants in each sample were classified in the same category by the method being compared (either reliability across visits, concurrent validity within visits and/or criterion validity between IPAQ forms and the CSA data).

RESULTS

Demographics

The samples were reasonably similar across data collection sites, with comparable gender proportions and each sample being predominantly middle-aged (Table 2). Com-

parisons of education levels showed the urban samples were slightly more educated than the rural samples from SA and GU, and the UK1, USA2, and NET (see Appendix A, Table 2 for country abbreviations) samples were more educated than other IPAQ samples. The majority of subjects were employed and reported working similar hours per week across all samples, except for one of the rural SA samples. Most samples were from residents of large cities, but adults from smaller communities were included in the UK2, CAN, SA, and SW samples. Overall, the samples used in all sites tended to be well educated, and the only representative population samples used were from CAN and SW.

Long and Short Questionnaire Reliability

Test-retest reliability data for the long IPAQ questionnaires are presented in Table 3. These data show Spearman correlation coefficients ranging from 0.96 (USA2) to 0.46 (SA Ru), but most were around 0.8 indicating very good repeatability. Overall, long form data were completed by 1880 adults, with a median of 3699 MET-min reported weekly, and 89% meeting the 150 min·min⁻¹ threshold. The long forms' pooled data showed a repeatability coefficient of $\rho = 0.81$ (95% CI 0.79–0.82). The various long forms showed similar levels of repeatability, with L7T ($N = 200$, $\rho = 0.79$), L7S ($N = 294$, $\rho = 0.77$), LUT ($N = 482$, $\rho = 0.76$), and LUS ($N = 904$, $\rho = 0.83$). Specific analyses for

TABLE 4. Test-retest Spearman's reliability coefficients for the IPAQ short forms.

IPAQ Short Forms*	Data Collection Site*	Visit/s	N	Total All PA Spearman's ρ†	Total All PA Spearman's ρ (Using Pace)‡	Total All PA Spearman's ρ (Excel Slow Pace)§	Total Sitting Time Spearman's ρ	Categorical measure of >150 min·wk^{-1} [% Agreement]
S7T	SW	V1-V2	200	0.66	0.68	0.70	0.50	0.86
	UK2	V1-V2	101	0.87	0.87	0.82	0.86	0.81
S7S	UK1	V2-V3	151	0.69	0.68	0.71	0.73	0.93
	NET	V2-V3	64	0.85	0.84	0.85	0.95	0.94
	USA1	V2-V3	28	0.81	0.81	0.85	0.92	0.96
	USA2	V1-V2	19	0.88	0.89	0.89	0.85	0.93
	USA2	V2-V3	30	0.66	0.66	0.66	0.71	1.0
SUT	USA2	V1-V2	27	0.83	0.81	0.75	0.84	0.93
	USA2	V2-V3	30	0.73	0.73	0.73	0.90	0.97
SUI	GU	V1-V2	74	0.57	0.57	0.56	0.67	0.82
	GU Ub	V1-V2	34	0.88	0.86	0.86	0.76	0.89
	GU Ru	V1-V2	40	0.25	0.26	0.19	0.18	0.78
SUI	SA	V1-V2	252	0.56	0.57	0.56	0.57	0.94
	SA Ub	V1-V2	144	0.69	0.69	0.65	0.72	0.95
	SA Ru	V1-V2	108	0.32	0.35	0.40	0.35	0.93
	SA Ub	V2-V3	92	0.84	0.84	0.79	0.76	0.97
SUS	FIN	V1-V2	87	0.65	0.64	0.61	0.94	0.95
	JAP	V1-V2	144	0.68	0.69	0.67	0.58	0.77
	JAP	V2-V3	144	0.76	0.76	0.77	0.73	0.84
	PORT	V1-V2	196	0.77	0.77	0.79	0.69	0.99
	USA1	V2-V3	28	0.84	0.84	0.83	0.94	0.86
	SW	V1-V2	50	0.77	0.79	0.83	0.79	0.96
	BRA	V1-V2	257	0.73	0.74	0.75	0.79	0.91

* See Appendix A, Table 1 for key to the abbreviations used to refer to the eight different IPAQ forms.
** See Appendix A, Table 2 for key to the abbreviations used to refer to the countries.
† Correlation coefficient based on total MET per minutes summed across all physical activity dimensions.
§ Correlation coefficient based on total MET per minutes summed across all physical activity dimensions using pace related MET estimates for vigorous, moderate, and walking activity.

activity by intensity levels (not shown here) indicated that the repeated recall of vigorous physical activities were generally better than moderate physical activities. However, further analyses using pace specific MET-minutes per week did not substantially change the correlation coefficients for total physical activity (Table 3). The repeatability coefficients based on data using specific pace related MET-minutes either decreased or stayed the same in 21 of the 22 separate correlations. Furthermore, excluding the data that reported "slow walking pace" resulted in 19 of 21 correlation coefficients decreasing or staying the same. Additional analyses based on including or excluding occupational (job-related) physical activity in the total estimate did not influence their repeatability (Table 3).

The test-retest reliability of sitting recall between visits in the IPAQ long forms was generally good with more than four-fifths of the coefficients above 0.70. The lowest reliability coefficients were observed in the rural GU and SA samples. The ability of the IPAQ long forms to reliably classify respondents using the categorical estimate of "sufficient physical activity" was very good, with percent agreements ranging from 1.00 (NET and USA2) to 0.84 (SW) (Table 3). There were no major differences in repeatability coefficients between the "last 7 d" and the "usual week" reference periods or the telephone/personal interview and self-administered modes of administration.

Reliability data for the IPAQ short questionnaires are presented in Table 4. Repeatability was again at an acceptable level, with 75% of the correlation coefficients observed above 0.65 and ranging from 0.88 (USA2 and GU Ub) to 0.32 (rural SA). Overall, the short questionnaires were completed by 1974 people, with a median of 2514 MET·min reported across all studies and 82% achieving the 150-min cut-point for "sufficiently active." The pooled ρ was 0.76 (95% CI 0.73–0.77). The various short forms were similar in their estimated repeatability, with the S7T ($N = 300$, $\rho = 0.74$), S7S ($N = 292$, $\rho = 0.75$), and SUS ($N = 906$, $\rho = 0.79$). Only the SUT questionnaire was slightly less repeatable ($\rho = 0.64$, 95% CI 0.58–0.69).

Including reported walking and cycling "pace" did not greatly influence the reliability of the data, where 20 of the 23 reliability studies correlations decreased or stayed the same (Table 4). Similarly using pace to exclude the "slow-paced walking" data again did not influence (17 of the 23 reliability coefficients decreased or stayed the same). The sitting time data were quite repeatable, with two-thirds of all repeatability coefficients above 0.70. The categorical estimates of sufficient physical activity between visits were very repeatable with percent agreement ranging from 100% (USA2) to 77% (JAP).

Concurrent Validity

The observed concurrent validity (inter-method) coefficients between IPAQ forms suggested that the short and long forms showed reasonable agreement (Table 5). The pooled ρ, for comparisons between long and short forms was 0.67 (95% CI 0.64–0.70) and for comparisons of dif-

TABLE 5. Total physical activity (MET·min·wk⁻¹) concurrent validity Spearman's coefficients comparing IPAQ long and short forms administered at the same time.

IPAQ Forms	Data Collection Site	Visit 1 N	Total PA ρ	Total PA – Job ρ	Total PA Pace ρ	Total PA Ex Pace ρ	ACC >150 ρ	Sitting ρ	Visit 2 N	Total PA ρ	Total PA – Job ρ	Total PA Pace ρ	Total PA Ex Pace ρ	ACC >150 ρ	Sitting ρ	Visit 3 N	Total PA ρ	Total PA – Job ρ	Total PA Pace ρ	Total PA EX Pace ρ	ACC >150 ρ	Sitting ρ
L7T v S7T	SW	200	0.60	0.61	0.61	0.61	0.75	0.57	200	0.63	0.65	0.65	0.75	0.81	0.91	-	-	-	-	-	-	-
L7S v S7S	UK1	-	-	-	-	-	-	-	161	0.69	0.56	0.69	0.69	0.81	0.82	151	0.76	0.69	0.76	0.77	0.89	0.84
	FIN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	87	0.75	0.77	0.76	0.75	0.94	0.94
	NET	71	0.85	0.75	0.83	0.85	0.93	0.91	65	0.88	0.84	0.86	0.85	0.95	0.97	0.67	0.85	0.81	0.81	0.84	0.94	0.90
	USA1	-	-	-	-	-	-	-	28	0.61	0.45	0.60	0.66	0.82	0.69	28	0.68	0.71	0.70	0.75	0.82	0.89
	USA2	30	0.78	0.73	0.79	0.77	0.97	0.89	30	0.72	0.55	0.71	0.71	0.93	0.90	30	0.89	0.71	0.89	0.88	0.90	0.92
	SW	-	-	-	-	-	-	-	-	-	-	-	-	-	-	49	0.73	0.75	0.74	0.80	0.86	0.89
LUT v SUT	USA2	30	0.61	0.42	0.62	0.59	0.90	0.96	30	0.79	0.79	0.80	0.81	0.93	0.97	30	0.70	0.76	0.69	0.77	0.93	0.93
LUT v SUT	CAN	210	0.71	0.45	-	0.71	0.89	0.61	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LUT v SUI	SA-A	257	0.70	0.60	0.71	0.71	0.96	0.80	257	0.69	0.57	0.70	0.70	0.95	0.81	-	-	-	-	-	-	-
	SA-Ub	145	0.75	0.56	0.75	0.75	0.97	0.75	145	0.75	0.59	0.76	0.73	0.95	0.82	-	-	-	-	-	-	-
	SA-Ru	112	0.66	0.66	0.62	0.65	0.96	0.87	112	0.54	0.52	0.56	0.62	0.97	0.80	-	-	-	-	-	-	-
	SA-Ub	-	-	-	-	-	-	-	-	-	-	-	-	-	-	92	0.82	0.51	0.83	0.83	0.96	0.71
LUS v SUS	BRA	257	0.53	0.48	0.54	0.54	0.88	0.73	255	0.62	0.60	0.62	0.62	0.89	0.75	-	-	-	-	-	-	-
	FIN	88	0.68	0.69	0.67	0.63	0.91	0.96	87	0.71	0.73	0.72	0.69	1.0	0.96	-	-	-	-	-	-	-
	JAP	144	0.78	0.81	0.78	0.77	0.83	0.89	144	0.78	0.68	0.80	0.81	0.88	0.78	144	0.79	0.71	0.80	0.82	0.83	0.87
	PORT	196	0.49	0.48	0.45	0.45	0.84	0.60	196	0.43	0.45	0.43	0.44	0.89	0.42	-	-	-	-	-	-	-
	USA1	-	-	-	-	-	-	-	28	0.71	0.59	0.72	0.52	0.86	0.82	28	0.76	0.74	0.79	0.76	0.79	0.85
	SW	50	0.77	0.81	0.78	0.84	0.90	0.79	50	0.87	0.89	0.87	0.83	0.86	0.84	-	-	-	-	-	-	-
S7T v SUT	CAN	199	0.68	-	0.68	0.68	0.88	0.62	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SUT v SUS	CAN	208	0.47	-	0.47	0.49	0.80	0.75	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Telephone script used to administer questionnaire by personal interview.
† Correlation coefficient based on Total MET per minutes summed across all physical activity dimensions.

TABLE 6. Criterion validity Spearman's coefficients comparing the IPAQ long forms with the CSA total counts per registered time for both long and short forms of the questionnaires.

	Data Collection Site**	N	Visit Self-Report Data Came from	Total PA (ρ)	Total PA Using Pace (ρ)	Total PA Excl Slow Pace (ρ)	ACC >150 min·wk^{-1}	Sitting (ρ)†
IPAQ long forms*								
L7S	UK1	151	2	0.43	0.42	0.38	0.83	0.25
	FIN	84	3	0.52	0.52	0.49	0.89	0.51
	USA1	26	2	0.05	0.05	0.06	0.31	0.26
	USA2	26	2	0.32	0.36	0.34	0.81	0.49
	NET	30	2	0.38	0.37	0.38	1.0	0.35
	SW	49	3	0.24	0.25	0.29	0.82	0.20
LUT	USA2	29	2	0.52	0.52	0.52	0.86	0.23
LUT	GU	61	2	0.59	0.59	0.57	0.80	0.46
	GU Ub	49	2	0.61	0.62	0.60	0.80	-
	GU Ru	12	2	0.39	0.43	0.41	0.75	-
LUI	SA	107	2	0.52	0.52	0.51	0.86	0.37
	SA Ub	92	2	0.46	0.45	0.44	0.85	-
LUS	JAP	127	2	0.36	0.36	0.33	0.72	0.19
	USA1	26	2	−0.02	−0.01	0.02	0.35	0.22
	BRA	28	2	−0.27	−0.28	−0.31	0.46	0.14
IPAQ short forms*								
S7T	AUS	62	2	0.12	0.14	0.23	0.74	0.32
S7S	FIN	84	3	0.47	0.49	0.51	0.88	0.46
	USA1	26	2	0.26	0.27	0.25	0.46	0.45
	USA2	26	2	0.27	0.27	0.28	0.81	0.49
	NET	28	2	0.32	0.30	0.34	0.93	0.22
	SW	49	3	0.02	0.02	0.14	0.71	0.12
	UK1	151	2	0.40	0.40	0.38	0.81	0.25
SUT	USA2	29	2	0.57	0.57	0.57	0.86	0.27
SUI	GU	61	2	0.54	0.54	0.43	0.79	0.61
	GU Ub	49	2	.45	.39	−0.01	0.77	-
	GU Ru	12	2	0.42	0.40	0.37	0.80	-
SUI	SA	107	2	0.45	0.45	0.43	0.85	0.33
	SA Ub	92	2	0.37	0.35	0.33	0.84	-
SUS	JAP	127	2	0.32	0.33	0.30	0.65	0.26
	USA1	26	2	0.13	0.14	0.13	0.50	0.40
	BRA	28	2	−0.12	−0.14	−0.17	0.75	0.07

* See Appendix A, Table 1 for key to the abbreviations used to refer to the eight different IPAQ forms.
** See Appendix A, Table 2 for key to the abbreviations used to refer to the countries.
† IPAQ time spent sitting was correlated to activity recorded at <100 counts per minute by the CSA.

ferent short instruments was 0.58 (0.51–0.64). Over half the correlation coefficients calculated between the data collected at visit 1 were above 0.65, whereas with the data collected at visit 2, over 60% of the correlations were over 0.65, and by visit 3 all correlations were above 0.65.

The amount of time reported sitting in the long and short IPAQ forms were in agreement, with correlations ranging from 0.96 (USA2 and FIN) to 0.57 (SW) at visit 1. The correlation coefficients for sitting did not appear to be influenced by the reference period ("last 7 d" or "usual week") nor mode of administration (telephone or self) as indicated by all the data but specifically by the two CAN samples (Table 5).

The correlation coefficients for the short and long form total MET-minutes per week also did not appear to be influenced by reference period ("last 7 d" or "usual week"). These correlation coefficients were reasonable for both modes of administration (telephone or self-administered).

Criterion Validity

The criterion validity of the self-report IPAQ data against CSA accelerometers is shown in Table 6 for both the long and short forms. Overall, there was fair to moderate agreement between the two measures, with a total of 744 adults testing the long forms against the CSA (pooled $\rho = 0.33$, 95% CI 0.26–0.39), and for the short forms and CSA ($N = 781$, $\rho = 0.30$, 95% CI 0.23–0.36).

The criterion validities of the long and short forms were almost equivalent, but there appeared to be a wider range of correlation values associated with the long form. Higher associations were observed between the data produced by the categorical estimates of sufficient physical activity, with about 80% of the estimates showing agreement coefficients of at least 70% and around four-fifths of all individuals being similarly classified by both the IPAQ forms and CSA data. This may in part be due to the fact that the majority of participants were already meeting the requirement for suf-

ficient physical activity. Again using walking and cycling pace to more specifically estimate MET-minutes per week scores did not improve the criterion validity correlations, and in most instances excluding slow-paced activity only worsened the relationship.

The correlation between the IPAQ sitting data and an estimate of sitting accounted for by the CSAs showed similar correlations to the physical activity data indicating moderate agreement between subjective and objective measures of this sedentary behavior (Table 6).

Process (qualitative) feedback. A summary of the qualitative reports submitted by the data collection centers identified some research issues among the data collection sites. The more frequent issues reported were: (i) technical problems with the CSA monitors; (ii) not having enough CSAs on hand, which was a particular problem for developing countries (as they are expensive); (iii) difficulty in conducting follow-up interviews at the exact protocol-defined time; (iv) interpretation of a "usual week" was sometimes problematic as participants were not able to identify "what is usual?" and participants deferred to recall of the "last 7 d" as a "usual week"; (v) difficulty in distinguishing vigorous and moderate physical activity; (vi) pace was not consistently defined in all cultures; (vii) the inability of participants to accurately estimate the number of 10-min bouts they had participated in; and finally, (vii) the examples of vigorous- and moderate-intensity activities used were not always locally relevant despite the IPAQ protocol allowing the use of culturally applicable examples.

Some developing countries sites also reported a preference for using the self-administered mode of data collection, as telephones were not sufficiently available. To overcome this issue the Guatemalan and South African investigators used the telephone script to administer the forms as a personal interview instead of using the telephone, which appears a viable option in developing countries. Administering the questionnaire this way may be the preferred option as some participants completing the questionnaire by self-administration skipped some questions.

The short form was generally better received in sites that administered both the long and short forms. The long form was reported as being "too boring and repetitive," and too long, and therefore expensive, for routine surveillance. Nine data collection sites reported a preference for using the "last 7 d" over the "usual week" reference period and this preference was expressed by both developed and developing countries.

DISCUSSION

The burgeoning global problem of physical inactivity (10,13,17), and the need for population surveillance and inter-country comparisons, has led to the development of the IPAQ measure. These IPAQ instruments underwent several stages of development and testing, culminating in this large multi-country reliability and validity study. These results of the IPAQ reliability and validity study show that IPAQ exhibited measurement properties that are at least as good as other established self-report physical activity measures. For comparison purposes, a recent review (14) summarized reliability and criterion validity results for seven self-report physical activity measures evaluated in adults. They reported reliability correlations ranged from 0.34 to 0.89, with a median of about 0.80 and criterion validity correlations ranged from 0.14 to 0.53, with a median of about 0.30. Typical IPAQ correlations were about 0.80 for reliability and 0.30 for validity. Considering the diversity of the samples and countries present in this study, compared with the usual developed country samples, these results support the acceptability of the psychometric performance of the IPAQ questionnaires.

Given the minimal contribution that walking and cycling pace made to reliability and validity, these pace questions have been removed from both the long and short versions of IPAQ. One further question was the issue of occupational activity, collected in detail in the long form, which may have contributed to the absolute differences between long and short forms. Excluding the job-related physical activity did not substantially influence correlations between long and short forms, suggesting that the short form questionnaires provided a global estimate of total physical activity, including a similar amount of job related activity.

Additional analyses conducted on the reliability and validity of the sitting questions led to the decision that only weekday sitting time needed to be included on the short form. This was based on reasoning that 5 weekdays tends to be more representative of sitting time than two weekend days and may permit better tracking of societal transitions in emerging economies as they adopt sedentary lifestyle patterns of the industrialized nations. However, the IPAQ long form retains both questions on weekday and weekend sitting time.

The reliabilities of the long and short forms were comparable, as were the "usual week" and "last 7 d" reference periods. The reliability of telephone administration was not very different to a self-administered method of data collection. Both the long and short form reliability testing showed evidence of a "learning effect" over time, where subjects who were administered the same IPAQ forms over serial visits showed improvements over time in reliability and inter-method agreement.

More IPAQ countries expressed a qualitative preference for using the short form as they seemed to be more acceptable to both investigators and survey respondents. However, it is clear that although some respondents found the long questionnaires difficult to answer, the data are reproducible and can provide reliable estimates for a range of physical activity domains. Furthermore, after testing, most sites indicated a preference for the "last 7 d" reference period for population prevalence studies.

A strength of IPAQ is that it was tested in both developed and developing countries, and demonstrated acceptable reliability and validity properties across both, especially in the urban samples. Limitations of this study include the generally volunteer samples from urban settings, albeit from diverse cultures. Only two centers, Sweden and Canada,

used representative samples. Overall, the samples were highly active, given the selection effects in the samples used and also given the number of physical activity domains that the IPAQ measures consider. Compared with usual physical activity surveillance tools, such as the BRFSS, which measures mostly leisure time physical activity (LTPA), the IPAQ instrument assesses multiple domains of activity in addition to LTPA. This is needed for an internationally acceptable physical activity measure, especially in developing countries, but will lead to higher prevalence rates, as multiple domains are reported. Given this higher prevalence, new cut-points for "health" may need to be explored. The urban samples did show better reliability than in the two rural samples. This may have been due to educational differences and less experience in completing surveys, or to greater daily variability in physical activity patterns or variation in types of activity carried out among rural populations. There were also some differences in reported interpretation of the questions in different cultures, but this did not influence the observed measurement properties of IPAQ. Further work is also required to examine the absolute validity, especially between CSA and self-reported IPAQ data.

Thus, IPAQ can be used with confidence in developed countries or in urban samples in developing countries, but with some caution in rural or low literacy samples from developing countries. Further research is recommended to examine possible cultural or population differences in validity and reliability of IPAQ, as well as further exploration of any regional, gender, age, or socioeconomic differences. It is important to note that the primary target group for IPAQ was middle-aged adults and that IPAQ measurement properties in older adults or adolescents are not known.

The results of the IPAQ study are broadly relevant to a wide range of countries. The content validity of IPAQ is high, because frequency, intensity, and duration of physical activity are assessed, as well as sedentary behavior, which is an emerging concern. The long form evaluates four domains of physical activity (occupational, transport, household, and leisure) that are relevant for intervention planning. IPAQ is suitable for any mode of administration, and examples can be culturally adapted for local populations.

Recommendations. Based on the results of these qualitative and quantitative results, the IPAQ Executive concluded that: first, the IPAQ short "last 7 d" measure could be used for national and regional prevalence studies.

To have internationally comparable prevalence studies, one measurement instrument should be used, and the short form IPAQ "last 7 d" is recommended based on participating country preference. The short form is feasible to administer, and there was no difference between the reliability and validity of the short and long IPAQ forms. Second, the long version of IPAQ could be used for research purposes or studies requiring more detail on the separate domains or dimensions of physical activity. Third, questions related to walking and bicycling pace should be excluded from the questionnaire, and fourth, time spent sitting should continue be an integral part of IPAQ. Finally, caution should be used when comparing population prevalence rates between the long and short versions, because the long version appears to produce higher estimates of physical activity.

This international study has demonstrated that reliable and valid physical activity data can be collected by the IPAQ instruments in many countries. These initial results are promising and suggest that these instruments are ready for use to compare population estimates of physical activity. The World Health Organization (WHO), WHO Pan-American Health Organization, the WHO Mega Country Project, and the European Union are developing international health monitoring projects and are likely to adopt short versions of IPAQ for use in these surveillance systems.

Note: The IPAQ short form "last 7 d" questionnaire is available for download at www.ipaq.ki.se; the current (August 2002) telephone administered version is provided in Appendix B.

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APPENDIX A

TABLE 1. The eight IPAQ instruments and abbreviated titles.

Format	Reference Period	Mode of Administration	Abbreviated Title
Short format	Last 7 d	Telephone	S7T
Short format	Last 7 d	Self	S7S
Short format	Usual week	Telephone	SUT
Short format	Usual week	Self	SUS
Long format	Last 7 d	Telephone	L7T
Long format	Last 7 d	Self	L7S
Long format	Usual week	Telephone	LUT
Long format	Usual week	Self	LUS

TABLE 2. Countries involved in the IPAQ reliability and validity study including abbreviations and site coordinators.

Country (and Site)	Abbreviation
Australia	AUST
Brazil	BRA
Canada	CAN
Finland	FIN
Guatemala	GU*
Netherlands	NET
Japan	JAP
Portugal	PORT
South Africa	SA*
Sweden	SW
United States, San Diego	USA1
United States, South Carolina	USA2
United Kingdom, Bristol	UK1
United Kingdom, Cambridge	UK2

* Note the Guatemala and South Africa data were also analysed by Urban (Ub) and Rural (Ru) based on residential location.

APPENDIX B

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

(August 2002 version)

SHORT LAST 7 DAYS TELEPHONE FORMAT

For use with Young and Middle-aged Adults (15-69 years)

The International Physical Activity Questionnaires (IPAQ) comprises a set of 4 questionnaires. Long (5 activity domains asked independently) and short (4 generic items) versions for use by either telephone or self-administered methods are available. The purpose of the questionnaires is to provide common instruments that can be used to obtain internationally comparable data on health–related physical activity.

Using IPAQ

Use of the IPAQ instruments for monitoring and research purposes is encouraged. It is recommended that no changes be made to the order or wording of the questions as this will affect the psychometric properties of the instruments.

Translation from English and Cultural Adaptation

Translation from English is supported to facilitate worldwide use of IPAQ. Information on the availability of IPAQ in different languages can be obtained at www.ipaq.ki.se. If a new translation is undertaken we highly recommend using the prescribed back translation methods available on the IPAQ website. If possible please consider making your translated version of IPAQ available to others by contributing it to the IPAQ website. Further details on translation and cultural adaptation can be downloaded from the website.

Data Entry and Coding

Attached to the response categories for each question are suggested variable names and valid ranges to assist in data management and interviewer training. We recommend that the actual response provided by each respondent is recorded. For example, "120 minutes" is recorded in the minutes response space. "Two hours" should be recorded as "2" in the hours column. A response of "one and a half hours" should be recorded as either "1" in hour column and "30" in minutes column.

Further Developments of IPAQ

International collaboration on IPAQ is on-going and an *International Physical Activity Prevalence Study* is in progress. For further information see the IPAQ website.

More Information

More detailed information on the IPAQ process and the research methods used in the development of IPAQ instruments is available at www.ipaq.ki.se and Booth, M.L. (2000). Assessment of Physical Activity: An International Perspective. Research Quarterly for Exercise and Sport, 71 (2): s114-20. Other scientific publications and presentations on the use of IPAQ are summarized on the website.

Short Last 7 Days Telephone IPAQ

READ: I am going to ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active person. Think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

READ: Now, think about all the *vigorous* activities which take *hard physical effort* that you did in the last 7 days. Vigorous activities make you breathe much harder than normal and may include heavy lifting, digging, aerobics, or fast bicycling. Think only about those physical activities that you did for at least 10 minutes at a time.

1. During the **last 7 days**, on how many days did you do **vigorous** physical activities?

   _____ Days per week [VDAY; Range 0-7, 8,9]
   8.   Don't Know/Not Sure
   9.   Refused

   [**Interviewer clarification**: Think only about those physical activities that you do for at least 10 minutes at a time.]

   [**Interviewer note**: If respondent answers zero, refuses or does not know, skip to Question 3]

2. How much time did you usually spend doing **vigorous** physical activities on one of those days?

   __ __ Hours per day   [VDHRS; Range: 0-16]

   __ __ __ Minutes per day   [VDMIN; Range: 0-960, 998, 999]

   998.   Don't Know/Not Sure
   999.   Refused

   [**Interviewer clarification**: Think only about those physical activities you do for at least 10 minutes at a time.]

[**Interviewer probe**: An average time for one of the days on which you do vigorous activity is being sought. If the respondent can't answer because the pattern of time spent varies widely from day to day, ask: "How much time in total would you spend **over the last 7 days** doing vigorous physical activities?"

___ ___ Hours per week   [VWHRS; Range: 0-112]

___ ___ ___ ___Minutes per week   [VWMIN; Range: 0-6720, 9998, 9999]

9998. Don't Know/Not Sure

9999. Refused

READ: Now think about activities which take *moderate physical effort* that you did in the last 7 days. Moderate physical activities make you breathe somewhat harder than normal and may include carrying light loads, bicycling at a regular pace, or doubles tennis. Do not include walking. Again, think about only those physical activities that you did for at least 10 minutes at a time.

3.   During the **last 7 days,** on how many days did you do **moderate** physical activities?

___ ___ Days per week   [MDAY; Range: 0-7, 8, 9]

8.   Don't Know/Not Sure

9.   Refused

[**Interviewer clarification**: Think only about those physical activities that you do for at least 10 minutes at a time]

[**Interviewer Note**: *If respondent answers zero,* refuses or does not know, skip to Question 5]

4.   How much time did you usually spend doing **moderate** physical activities on one of those days?

___ ___ Hours per day [MDHRS; Range: 0-16]

___ ___ ___ Minutes per day   [MDMIN; Range: 0-960, 998, 999]

998.   Don't Know/Not Sure

999.   Refused

[**Interviewer clarification**: Think only about those physical activities that you do for at least 10 minutes at a time.]

[**Interviewer probe**: An average time for one of the days on which you do moderate activity is being sought. If the respondent can't answer because the pattern of time spent varies widely from day to day, or includes time

spent in multiple jobs, ask: "What is the total amount of time you spent over the **last 7 days** doing moderate physical activities?"

___ ___ ___ Hours per week [MWHRS; Range: 0-112]

___ ___ ___ ___ Minutes per week [MWMIN; Range: 0-6720, 9998, 9999]

9998. Don't Know/Not Sure

9999. Refused

READ: Now think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

5.   During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ Days per week [WDAY; Range: 0-7, 8, 9]

8.   Don't Know/Not Sure

9.   Refused

[**Interviewer clarification**: Think only about the walking that you do for at least 10 minutes at a time.]

[**Interviewer Note**: *If respondent answers zero,* refuses or does not know, skip to Question 7]

6.   How much time did you usually spend **walking** on one of those days?

___ ___ Hours per day [WDHRS; Range: 0-16]

___ ___ ___ Minutes per day [WDMIN; Range: 0-960, 998, 999]

998.   Don't Know/Not Sure

999.   Refused

[**Interviewer probe**: An average time for one of the days on which you walk is being sought. If the respondent can't answer because the pattern of time spent varies widely from day to day, ask: "What is the total amount of time you spent walking over **the last 7 days**?"

___ ___ ___ Hours per week [WWHRS; Range: 0-112]

___ ___ ___ ___ Minutes per week [WWMIN; Range: 0-6720, 9998, 9999]

9998. Don't Know/Not Sure

9999. Refused

READ: Now think about the time you spent sitting on week days during the last 7 days. Include time spent at work, at home, while doing course work, and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television.

7. During the last 7 days, how much time did you usually spend *sitting* on a **week day**?

___ ___ **Hours per weekday** [SDHRS; 0-16]

___ ___ ___ Minutes per weekday [SDMIN; Range: 0-960, 998, 999]
998. Don't Know/Not Sure
999. Refused

[**Interviewer clarification**: Include time spent lying down (awake) as well as sitting]

[**Interviewer probe**: An average time per day spent sitting is being sought. If the respondent can't answer because the pattern of time spent varies widely from day to day, ask: "What is the total amount of time you spent *sitting* last **Wednesday**?"

___ ___ Hours on Wednesday [SWHRS; Range 0-16]
___ ___ ___ Minutes on Wednesday [SWMIN; Range: 0-960, 998, 999]
998. Don't Know/Not Sure
999. Refused