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Prevalence of physical activity in the European Union

Objectives: This article is the second in a series of four that present data about physical activity in the 15 member states of the European Union collected by the Eurobarometer 58.2. The focus of this article is on days of vigorous and moderate physical activity, days of walking, and metabolic equivalence estimates (METs) for total physical activity from 15 member states of the European Union using the International Physical Activity Questionnaire (IPAQ).

Methods: Data were collected in 2002 as part of the Eurobarometer by face-to-face interviews. A total of 16 230 respondents age 15 years and older were interviewed. Sample sizes ranged about 1 000 respondents in most nations. Physical activity was assessed with the last 7-days short version of the IPAQ.

Results: Median METs estimates in hours per week were the highest in the Netherlands (39.43 MET-hours/week), Germany (34.65 MET-hours/week in the eastern part, 33.90 MET-hours/week in the western part), and Luxembourg (31.55 MET-hours/week). The lowest METs estimates were reported in Northern Ireland (11.55 MET-hours/week), Sweden (18.65 MET-hours/week) and France (19.55 MET-hours/week).

Conclusion: A comparison of the results with existing data on physical activity prevalence in the member states indicate some inconsistencies between studies which may be related to measurement problems, as well as to conceptual differences in the assessment of physical activity.

Keywords: Physical activity – International Physical Activity Questionnaire – European Union – Prevalence of physical activity – Metabolic equivalents.

The health benefits of regular physical activity are well documented (US Department of Health and Human Services 1996; 2002; Sallis & Owen 1998). Physical inactivity has been estimated to cause 1.9 million premature deaths per year globally (WHO 2002). Sedentary lifestyles have thus, behind death caused by smoking (4 million death annually (Prabhat & Chaloupka 1999)), and death caused by AIDS (2.9 million annually [WHO 2002]), become one of the most prevalent public health burdens of our times.

This development has lead public health experts to push for internationally coordinated efforts to assess and monitor physical activity on the population level (Booth 2000). Such efforts have in the past been hampered by the lack of internationally standardized survey instruments to assess physical activity levels. To overcome such limitations, the International Physical Activity Questionnaire (IPAQ) Executive Committee was founded in 1998. Its goals were to develop a survey instrument that can provide cross-nationally comparative data on physical activity levels that can be used for health monitoring and surveillance purposes.

The IPAQ (and the last 7-days short version that was used in this study) has in the meantime been tested for reliability and validity and has been used in a number of international research projects (Craig et al. 2003; Rütten et al. 2003a; 2003b). The IPAQ measures the frequency, duration, and level of intensity of physical activity in the last seven days. With the IPAQ, metabolic equivalents (METs) in the last seven days can be calculated. Physical activity in the contexts of work, transportation, at home and for recreation or leisure is covered by the IPAQ. The incorporation of physical activity in the different contexts follows international recommendations for physical activity. Such recommendations have shifted in recent years from 15–60 minutes exercise bouts with a 60%–90% maximum heart rate on 3–5 days per week (American College of Sports Medicine 1978; 1990) to lifestyle oriented "health enhancing physical activities" of 30 minutes of moderate levels of intensity on most days of the week (Pate et al. 1995; US Department of Health and Human Services 1996; Fletcher et al. 1996; Byers et al. 2002).

The purpose of this article is to present data on the prevalence of physical activity in 15 member states of the

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European Union using the IPAQ. Cross-national data on physical activity in the European Union do exist (Steptoe et al. 1997; De Almeida et al. 1999; Martinez-Gonzalez et al. 1999; 2001). However, this is among the first studies to use nationally representative samples in 15 nations, assess physical activity with the IPAQ, and thus allow a comparison of days of vigorous and moderate physical activity, walking, and the calculation of metabolic equivalents across the European Union. Such data are valuable for the cross-national assessment of the prevalence of physical activity in the European Union and can assist policy makers and public health experts in developing strategies for the promotion of physical activity.

Methods

Data were collected between October and December of 2002 as part of the Eurobarometer 58.2. The Eurobarometer is conducted since 1970 and has, in the meantime, provided valuable cross-national data on a wide variety of topics (Mossialos & King 1999). The Eurobarometer 58.2 dealt with questions on smoking, environmental pollution, health status, mental health, physical activity, and developmental aid. Fieldwork was carried out in 15 member states of the European Union by a consortium of market and public opinion research agencies (INRA, GfK Worldwide).

The population covered by the Eurobarometer were residents aged 15 years and older of nationalities of the European Union. Data were collected by personal interviews. In all countries, a multi-stage, random sample design was applied. 17 sample areas were created: one for each nation in the European Union, Germany was divided in an eastern and western part, and the United Kingdom was divided into Great Britain and Northern Ireland. The realized sample sizes for each nation were: Belgium (1 110), Denmark (1 000), Eastern Germany (1 020), Western Germany (1 022), Greece (1 003), Spain (1 000), France (1 037), Ireland (1 013), Italy (1 027), Luxembourg (602), the Netherlands (1 035), Austria (1 023), Portugal (1 002), Finland (1 024), Sweden (1 000), Great Britain (1 010), Northern Ireland (302). Across all nations, the mean response rate for the face-to-face interviews was 54.6%. Lowest response rates were achieved in Great Britain (23%) and Denmark (32%); highest rates were achieved in France (84%) and the western part of Germany (78%).

Physical activity was assessed with the short-form of the International Physical Activity Questionnaire (IPAQ) that asks for physical activity in the last seven days. The IPAQ has been tested for reliability and validity in a cross-national study (Craig et al. 2003). In the development of the IPAQ, special emphasis was placed on a high level of cultural equivalence that is needed for the cross-national comparison of physical activity levels. Cultural equivalence was defined as conceptual equivalence (respondents have to attach the same meaning to terms and concepts), metric equivalence (numbers reported should mean the same thing to respondents), and linguistic equivalence (terminology and grammar used in the IPAQ have to have the same meaning across nations). For use in the Eurobarometer the existing English version of the IPAQ was translated into all languages of the member states paying close attention to these problems of cultural equivalence. The translation process did not involve back translations, but expert's opinions were used to assure linguistic equivalence.

In a first step, representatives of the involved national research agencies of all nations translated the English master-version of the IPAQ in their national languages. Secondly, these national versions were sent to physical activity experts in all member states. Physical activity experts had to compare their national version to the English master version in regard to cultural equivalence. Physical activity experts were encouraged to make necessary recommendations in order to increase the cultural equivalence of their national version. Thirdly, the recommendations of the physical activity experts were considered by the national research agencies in the process of finalizing the national versions of the IPAQ that were used in the Eurobarometer.

In the first part of the analysis, mean days of vigorous and moderate physical activity, and mean days of walking in the last seven days are reported for population subgroups and all member states. The IPAQ asks to name such activities, if they were performed for at least 10 minutes at a time.

Physical activity related energy expenditures (MET-hours/week) were calculated by following existing guidelines (Ainsworth et al. 2000). The metabolic equivalents (METs) estimate the ratio of energy expended during a certain physical activity compared to sitting quietly. For the different intensities of physical activity covered by the IPAQ, the following MET estimates were used: 8 METs for vigorous physical activity, 4 METs for moderate physical activity, and 3.3 METs for walking. Since the distribution of the MET-hours/week was highly skewed, the analysis reports mean and median values. It has to be recognized that the reported confidence intervals for medians can be asymmetric and that their limits may lie in the point estimate.

In the analysis, the monthly gross household income is presented as the national income quartile that the respondent belonged to. "––" refers to the lowest national quartile, "++" to the highest national quartile.

Table 1 Mean (95 % C.I.) days of vigorous, moderate physical activity, and walking per week reported by individual's age 15 years and older in the European Union according to a selection of sociodemographic characteristics and nation

	n	Vigorous PA days per week	Moderate PA days per week	Walking days per week
All	16 016	1.49 (1.46–1.53)	2.70 (2.65–2.74)	4.25 (4.21–4.29)
Gender				
Female	8 620	1.20 (1.16–1.24)	2.67 (2.61–2.73)	4.27 (4.22–4.33)
Male	7 396	1.83 (1.78–1.88)	2.72 (2.66–2.78)	4.22 (4.16–4.28)
Age				
15–24	2 435	1.97 (1.88–2.06)	2.89 (2.78–2.99)	4.66 (4.56–4.77)
25–34	2 812	1.77 (1.68–1.85)	2.77 (2.67–2.87)	4.16 (4.06–4.27)
35–44	3 014	1.76 (1.68–1.84)	2.93 (2.84–3.03)	4.19 (4.09–4.29)
45–54	2 555	1.54 (1.45–1.63)	2.80 (2.69–2.91)	4.23 (4.13–4.34)
55–64	2 269	1.23 (1.15–1.32)	2.73 (2.61–2.84)	4.23 (4.12–4.35)
65+	2 931	0.71 (0.65–0.77)	2.10 (2.01–2.20)	4.07 (3.94–4.18)
Marital status				
Single	3 734	1.80 (1.73–1.88)	2.71 (2.63–2.79)	4.53 (4.44–4.62)
Married/with partner	9 582	1.50 (1.46–1.55)	2.81 (2.76–2.87)	4.20 (4.15–4.26)
Widowed/divorced	2 526	0.96 (0.89–1.04)	2.22 (2.11–2.32)	4.03 (3.92–4.14)
Gross household income				
– –	2 716	1.21 (1.13–1.28)	2.41 (2.30–2.51)	4.12 (4.01–4.23)
–	2 782	1.50 (1.42–1.59)	2.80 (2.79–2.91)	4.22 (4.12–4.32)
+	2 575	1.68 (1.59–1.77)	2.86 (2.75–2.96)	4.35 (4.25–4.46)
++	2 535	1.57 (1.49–1.65)	2.79 (2.69–2.89)	4.31 (4.21–4.42)
Nation				
Austria	976	1.24 (1.12–1.37)	2.31 (2.16–2.47)	4.02 (3.85–4.20)
Belgium	1 093	1.26 (1.13–1.38)	2.69 (2.53–2.86)	3.31 (3.15–3.48)
Denmark	997	1.47 (1.34–1.61)	3.00 (2.84–3.18)	4.89 (4.73–5.05)
Finland	1 022	1.51 (1.38–1.64)	2.38 (2.22–2.54)	4.72 (4.57–4.87)
France	1 028	1.33 (1.20–1.45)	1.67 (1.53–1.82)	3.77 (3.59–3.94)
Germany (West)	1 000	1.81 (1.68–1.95)	2.91 (2.75–3.06)	4.36 (4.20–4.52)
Germany (East)	998	1.92 (1.77–2.06)	3.06 (2.90–3.23)	4.61 (4.46–4.79)
Great Britain	1 004	1.34 (1.22–1.48)	2.22 (2.06–2.38)	4.29 (4.11–4.46)
Greece	1 001	1.98 (1.81–2.14)	3.06 (2.88–3.24)	4.18 (4.00–4.35)
Ireland	1 001	1.46 (1.32–1.60)	2.33 (2.17–2.50)	4.23 (4.07–4.40)
Italy	1 010	1.18 (1.06–1.31)	1.96 (1.81–2.12)	4.34 (4.17–4.51)
Luxembourg	592	1.66 (1.48–1.83)	2.97 (2.74–3.20)	4.36 (4.13–4.58)
Netherlands	1 021	1.86 (1.73–2.00)	5.10 (4.96–5.25)	3.52 (3.35–3.70)
Northern Ireland	300	1.54 (1.26–1.82)	1.88 (1.59–2.18)	3.58 (3.26–3.91)
Portugal	989	1.63 (1.47–1.79)	3.68 (3.49–3.87)	4.63 (4.46–4.81)
Spain	991	1.08 (0.96–1.21)	2.06 (1.90–2.22)	4.94 (4.76–5.10)
Sweden	993	1.18 (1.06–1.30)	2.06 (1.91–2.21)	4.18 (4.02–4.34)

Results

Overall, 16 230 interviews were conducted in the 15 member states. In average, respondents reported a mean of 1.49 days per week with some vigorous physical activity, 2.70 days with some moderate physical activity, and 4.25 days with walking in the last seven days (Tab. 1). Men reported more days with vigorous physical activity (1.83 days) than women (1.20 days). With increasing age, the average number of days with vigorous physical activity declined.

Across nations, respondents in Greece reported in average the highest number of days with vigorous physical activity (1.98 days), while respondents in Spain reported the lowest number (1.08 days). Days with physical activities of moderate intensity were reported most frequently in the Netherlands (5.10 days), and least frequent in Northern Ireland (1.88 days). Days with walking in the last seven days reported were lowest in Belgium (3.31) and highest in Denmark (4.89 days). Results for men and women are reported in Table 2.

The median MET-hours per week spent on physical activity were 24.00 MET-h/week across all member states (Tab. 3). Men reported a median of 28.43 MET-h/week, while women reported 23.10 MET-h/week. The age group of the 15–24 years old reported the highest median MET-h/week (33.70 MET-h/week), with progressing age the reported median MET-h/week declined to 13.95 MET-h/week among respondents age 65 and older.

Respondents who reported being single had the highest median of MET-h/week (30.74 MET-h/week), those who were widowed or divorced had the lowest MET-h/week (16.50 MET-h/week). Respondents in the lowest income quartile had also the lowest median MET-h/week (20.09 MET-

Table 2 Mean (95 % C.I.) days of vigorous, moderate physical activity, and walking per week reported by females and males in the member states of the European Union

	n	Vigorous PA days per week	Moderate PA days per week	Walking days per week
Males				
Austria	373	1.52 (1.30–1.73)	2.32 (2.08–2.56)	4.01 (3.74–4.29)
Belgium	510	1.48 (1.29–1.67)	2.67 (2.43–2.90)	3.45 (3.21–3.71)
Denmark	510	1.67 (1.46–1.87)	2.92 (2.68–3.15)	4.72 (4.47–4.95)
Finland	431	1.81 (1.59–2.02)	2.40 (2.16–2.64)	4.33 (4.08–4.57)
France	476	1.69 (1.48–1.89)	1.73 (1.52–1.94)	3.55 (3.30–3.81)
Germany (West)	467	2.09 (1.88–2.30)	2.86 (2.64–3.08)	4.31 (4.08–4.55)
Germany (East)	443	2.32 (2.10–2.55)	3.27 (3.03–3.50)	4.50 (4.25–4.74)
Great Britain	339	1.59 (1.36–1.82)	2.40 (2.13–2.67)	4.32 (4.03–4.62)
Greece	496	2.37 (2.11–2.62)	2.91 (2.66–3.16)	4.27 (4.02–4.53)
Ireland	476	1.97 (1.75–2.19)	2.57 (2.33–2.80)	4.13 (3.88–4.37)
Italy	469	1.46 (1.26–1.66)	1.87 (1.65–2.10)	4.37 (4.12–4.62)
Luxembourg	262	2.06 (1.78–2.35)	2.93 (2.61–3.26)	4.48 (4.15–4.80)
Netherlands	478	2.14 (1.93–2.34)	4.86 (4.64–5.07)	3.59 (3.33–3.84)
Northern Ireland	131	1.86 (1.41–2.30)	1.98 (1.53–2.42)	3.50 (2.99–4.00)
Portugal	424	2.03 (1.78–2.28)	3.52 (3.24–3.79)	4.81 (4.55–5.07)
Spain	470	1.62 (1.41–1.83)	2.25 (2.01–2.49)	4.95 (4.70–5.19)
Sweden	456	1.40 (1.22–1.59)	2.21 (1.99–2.44)	3.98 (3.73–4.22)
Females				
Austria	556	1.06 (0.90–1.22)	2.31 (2.10–2.52)	3.97 (3.74–4.19)
Belgium	546	1.08 (0.91–1.24)	2.75 (2.51–2.99)	3.08 (2.86–3.31)
Denmark	492	1.32 (1.14–1.50)	3.15 (2.90–3.40)	5.04 (4.82–5.27)
Finland	577	1.31 (1.14–1.47)	2.37 (2.16–2.57)	5.00 (4.81–5.19)
France	536	0.98 (0.83–1.13)	1.59 (1.40–1.79)	3.91 (3.67–4.14)
Germany (West)	497	1.55 (1.36–1.74)	2.97 (2.74–3.20)	4.36 (4.14–4.59)
Germany (East)	524	1.53 (1.34–1.71)	2.89 (2.66–3.12)	4.68 (4.47–4.89)
Great Britain	659	1.22 (1.06–1.37)	2.13 (1.93–2.33)	4.25 (4.04–4.47)
Greece	498	1.56 (1.34–1.77)	3.22 (2.96–3.48)	4.07 (3.82–4.31)
Ireland	512	1.00 (0.83–1.17)	2.11 (1.88–2.33)	4.30 (4.07–4.53)
Italy	498	0.91 (0.75–1.07)	2.05 (1.82–2.28)	4.29 (4.05–4.53)
Luxembourg	305	1.29 (1.07–1.52)	3.06 (2.73–3.38)	4.27 (3.96–4.57)
Netherlands	517	1.61 (1.43–1.79)	5.37 (5.17–5.57)	3.48 (3.24–3.71)
Northern Ireland	157	1.15 (0.80–1.49)	1.83 (1.42–2.23)	3.58 (3.14–4.01)
Portugal	493	1.40 (1.19–1.62)	3.80 (3.54–4.05)	4.48 (4.24–4.73)
Spain	490	0.59 (0.45–0.73)	1.87 (1.64–2.10)	4.85 (4.61–5.09)
Sweden	517	0.97 (0.82–1.11)	1.92 (1.71–2.13)	4.33 (4.11–4.54)

h/week), respondents in the highest income quartile reported the highest median of MET-h/week (27.80 MET-h/week).

Total MET-h/week varied significantly across nations. Respondents in the Netherlands reported the highest median MET-h/week (39.43 MET-h/week) among the member states. Respondents in Germany (34.65 MET-h/week in the eastern part and 33.90 MET-h/week in the western part), Luxembourg (31.55 MET-h/week), and Denmark (29.20 MET-h/week) did also report higher than average MET-h/week. The lowest MET-h/week were reported in Northern Ireland (11.55 MET-h/week), Sweden (18.65 MET-h/week), France (19.55 MET-h/week), Belgium (20.58 MET-h/week), and Italy (21.95 MET-h/week).

Table 4 reports the results for males. Across the member states, men in the Netherlands (43.55 MET-h/week), the eastern part of Germany (43.30 MET-h/week), Luxembourg (39.78 MET-h/week), and the western part of Germany (36.28 MET-h/week) had the highest median MET-h/week. Men living in Northern Ireland (14.85 MET-h/week), Sweden (21.19 MET-h/week), Italy (23.10 MET-h/week), and France (23.15 MET-h/week) reported the lowest median MET-h/week.

Among females, women living in the Netherlands (35.70 MET-h/week), the western part of Germany (31.28 MET-h/week), Denmark (28.88 MET-h/week), and the eastern part of Germany (28.33 MET-h/week) reported the highest median MET-h/week. Women living in Northern Ireland (11.50 MET-h/week), France (14.60 MET-h/week), Belgium (16.00 MET-h/week), and Sweden (16.75 MET-h/week) reported the lowest median MET-h/week.

Discussion

The study is among the first to report data on the number of days of physical activity of different types of intensities and MET-hours/week for 15 nations of the European Union

Table 3 Mean and median MET-hours (95% C.I.) per week reported by individuals age 15 years and older in the European Union according to a selection of sociodemographic characteristics and nation

	n	MET-h/week (Mean; 95 % C.I.)	MET-h/week (Median; 95 % C.I.)
All	16 230	34.30 (33.75–34.85)	24.00 (23.55–24.83)
Gender			
Female	8 730	31.03 (30.33–31.73)	23.10 (21.90–23.10)
Male	7 500	38.11 (37.25–38.96)	28.43 (27.55–29.70)
Age			
15–24	2 466	42.08 (40.57–43.59)	33.70 (32.00–35.78)
25–34	2 852	36.55 (35.22–37.89)	28.00 (25.90–29.78)
35–44	3 053	36.65 (35.36–37.95)	28.00 (26.28–29.83)
45–54	2 599	34.47 (33.08–35.85)	24.00 (23.01–25.65)
55–64	2 298	32.06 (30.66–33.46)	23.10 (21.90–23.30)
65+	2 962	25.05 (23.94–26.16)	13.95 (12.38–15.55)
Marital status			
Single	3 780	38.82 (37.65–40.00)	30.74 (29.20–32.00)
Married/with partner	9 717	34.33 (33.62–35.04)	24.25 (23.55–25.55)
Widowed/divorced	2 557	27.07 (25.79–28.36)	16.50 (14.92–18.33)
Gross household income			
– –	2 741	30.55 (29.27–31.82)	20.09 (18.85–22.83)
–	2 809	35.73 (34.37–37.10)	25.55 (23.88–27.55)
+	2 611	36.57 (35.20–37.94)	27.00 (25.27–28.50)
++	2 561	35.63 (34.32–36.95)	27.80 (25.90–29.20)
Nation			
Austria	862	29.70 (27.72–31.68)	23.10 (20.00–24.00)
Belgium	968	30.29 (28.14–32.44)	20.58 (18.37–23.10)
Denmark	937	37.51 (35.42–39.60)	29.20 (27.55–32.00)
Finland	983	35.24 (33.08–37.40)	25.50 (23.10–28.00)
France	963	28.49 (26.53–30.46)	19.55 (16.40–22.20)
Germany (West)	861	41.49 (39.00–43.97)	33.90 (30.85–36.43)
Germany (East)	869	42.10 (39.59–44.61)	34.65 (31.70–38.00)
Great Britain	976	31.49 (29.34–33.63)	21.84 (18.15–23.40)
Greece	963	38.57 (36.24–40.90)	28.25 (25.70–32.95)
Ireland	970	33.16 (31.04–35.29)	23.10 (21.70–24.63)
Italy	876	30.28 (28.22–32.34)	21.95 (19.55–23.10)
Luxembourg	531	38.81 (35.98–41.63)	31.55 (27.85–35.55)
Netherlands	898	45.42 (43.03–47.80)	39.43 (35.70–41.90)
Northern Ireland	278	27.36 (23.09–31.62)	11.55 (9.90–14.95)
Portugal	798	33.38 (31.04–35.73)	23.10 (19.55–25.65)
Spain	874	30.56 (28.53–32.60)	23.10 (19.55–23.10)
Sweden	936	27.17 (25.49–28.83)	18.65 (20.00–24.00)

using the International Physical Activity Questionnaire (IPAQ). Across member states, adults had a median of 24 MET-h per week. For the Netherlands, the country with the highest METs per week, median METs expended were 39.4 MET-h/week. For Northern Ireland, the country with the lowest METs, the median METs-h/week were 11.6. This compares to 12 MET-h per week for a person of 70-kg who meets the recommended minimal physical activity level of 30 minutes of moderate physical activity on most days of the week (Pate et al. 1995). Results have to be interpreted against previously reported physical activity and METs estimates for the nations of the European Union.

As part of the European Food Study, Martinez-Gonzalez et al. (2001) reported METs estimates for leisure-time physical activity using the questionnaire by Paffenbarger et al. (1978). It has to be recognized that the comparison of MET-h/week between the European Food Study and the Eurobarometer is thus very limited. However, a comparison of the results of both studies indicates for most nations that, as one would expect, METs estimates for physical activity across all contexts are above METs estimates for leisure-time physical activity. Exceptions are Austria and Sweden. For Austria Martinez-Gonzalez et al. (2001) reported a METs estimate of 23.0 MET-h/week for leisure time physical activity, this study calculated an estimate of 23.1 MET-h/week for physical activity performed across all contexts. For Sweden, Martinez-Gonzalez et al. (2001) reported a METs estimate of 24.0 MET-h/week for leisure-time physical activity, while this study estimated the METs to be 18.7 MET-h/week for physical activity across all contexts. The reason for such differences is not fully understood. To a part, seasonal variations in physical activity patterns might contribute to a lower comparability of IPAQ results to METs estimates from other studies. Additionally, methodological differences in the data

Table 4 Mean and median (95% C.I.) MET-hours per week reported by males and females age 15 years and older in the member states of the European Union

	n	MET–h/week (Mean; 95% C.I.)	MET–h/week (Median; 95% C.I.)
Males			
Austria	412	32.81 (29.36–36.26)	25.33 (21.90–31.55)
Belgium	529	34.62 (31.25–37.99)	23.32 (21.78–26.55)
Denmark	496	38.92 (35.79–42.06)	29.48 (27.10–34.33)
Finland	437	37.06 (33.65–40.46)	26.60 (23.10–29.78)
France	490	32.74 (29.62–35.86)	23.15 (20.55–28.00)
Germany (West)	497	43.08 (39.44–46.72)	36.28 (31.10–40.00)
Germany (East)	473	47.62 (43.83–51.41)	43.30 (39.10–47.70)
Great Britain	344	37.01 (33.06–40.95)	25.30 (23.10–32.00)
Greece	501	42.12 (38.71–45.54)	34.65 (28.00–40.00)
Ireland	491	38.78 (35.48–42.08)	28.24 (24.00–33.00)
Italy	497	34.34 (31.22–37.46)	23.10 (21.78–28.88)
Luxembourg	285	44.97 (40.41–49.52)	39.78 (34.65–44.67)
Netherlands	500	47.87 (44.34–51.39)	43.55 (37.55–48.00)
Northern Ireland	135	32.03 (25.10–38.96)	14.85 (10.03–23.10)
Portugal	459	37.06 (33.35–40.77)	26.40 (23.10–31.55)
Spain	485	36.00 (32.73–39.26)	23.70 (23.10–31.80)
Sweden	469	29.03 (26.56–31.51)	21.19 (18.13–23.33)
Females			
Austria	518	27.63 (25.28–29.99)	21.05 (17.33–23.10)
Belgium	494	26.14 (23.48–28.79)	16.00 (13.20–20.00)
Denmark	471	36.11 (33.35–38.88)	28.88 (25.78–32.55)
Finland	564	33.88 (31.09–36.68)	23.55 (22.60–28.25)
France	506	24.66 (22.24–27.07)	14.60 (11.55–18.40)
Germany (West)	437	39.94 (36.55–43.33)	31.28 (27.30–35.10)
Germany (East)	480	37.62 (34.33–40.92)	28.33 (23.10–32.38)
Great Britain	645	28.60 (26.08–31.12)	17.90 (15.40–21.90)
Greece	488	35.12 (31.96–38.28)	24.63 (22.60–29.20)
Ireland	506	28.02 (25.36–30.67)	17.90 (14.43–23.10)
Italy	442	26.30 (23.65–28.95)	18.40 (13.30–23.10)
Luxembourg	281	33.33 (29.96–36.70)	25.55 (23.10–31.20)
Netherlands	463	43.11 (39.88–46.35)	35.70 (32.95–39.55)
Northern Ireland	153	23.54 (18.26–28.83)	11.50 (7.70–13.43)
Portugal	431	30.25 (27.30–33.21)	19.55 (16.00–23.55)
Spain	451	25.47 (23.05–27.89)	17.33 (14.00–22.33)
Sweden	500	25.54 (23.27–27.81)	16.75 (15.08–19.55)

collection between the two studies might have produced the observed differences.

METs estimates of the European Physical Activity Surveillance System (EUPASS) project (Rütten et al. 2003a; Rütten et al. 2003b) were also generated by the last 7-days short-form of the IPAQ. The EUPASS project collected data in Belgium, Finland, France, Germany, Italy, the Netherlands, Spain, and the United Kingdom. Data collection took place in the months of May to October, mode of data collection were telephone interviews. METs estimates were calculated the same way as in this study. Compared to the METs estimates of this study, the EUPASS project generated for most nations much higher median METs estimates (Rütten et al. 2003a). The EUPASS median MET-h per week generated for Belgium was 67.0 MET-h/week, in this study it was 20.6 MET-h/week. A comparable magnitude of difference exists for Finland (EUPASS: 70.2 MET-h/week; Eurobarometer: 25.5 MET-h/week), France (EUPASS: 63.8 MET-h/week; Eurobarometer: 19.6 MET-h/week), and Germany (EUPASS: 84.5 MET-h/week; Eurobarometer: 33.9–34.7 MET-h/week). Also for Spain and the Netherlands estimates of the EUPASS project were higher than estimates of this study.

Several reasons might be responsible for the observed differences in METs estimates between the two studies. Firstly, the IPAQ assesses physical activity in the last seven days. Physical activity patterns vary however between seasons, and thus METs estimates might depend on the season data were collected. However, even if data for the month of October are compared, the only month data were collected by both studies, the observed differences persisted.

Secondly, the assessment of physical activity is in general difficult, and vulnerable to relatively low validity and reliability scores. The IPAQ is among the few physical activity measurements that have been tested for validity and reliability. The IPAQ group, in its own reliability studies, reported Spearman's Rhos from 0.66 to 0.88 (Craig et al. 2003). The EUPASS analyses, however, showed only reliability scores ranging between 0.3 and 0.5 for the IPAQ last seven days short version, i.e., the version which has been used in the present study

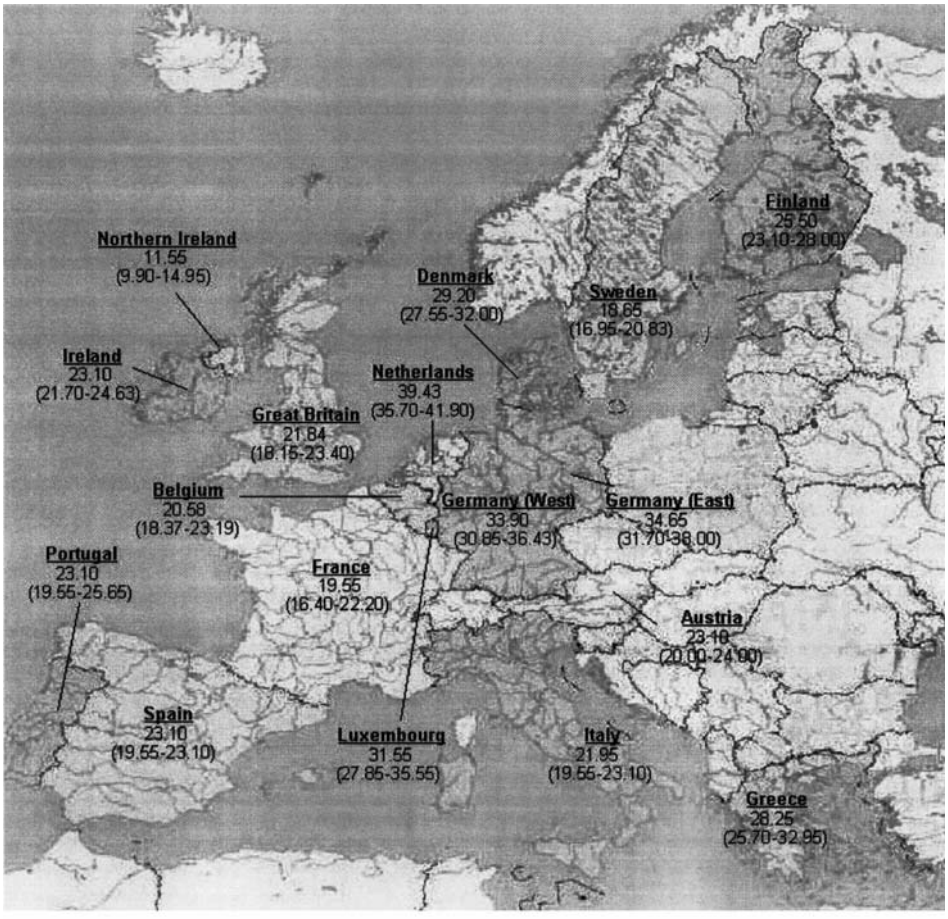

Figure 1 Median MET-h/week for individuals age 15 years and older in the member states of the European Union (95 % C.I.)

(Rütten et al. 2003b). For criterion validity a Spearman's Rho from 0.02 to 0.47 (IPAQ against accelerometer) was reported by the IPAQ group (Craig et al. 2003). The IPAQ group concludes from their validity and reliability studies that the instrument has acceptable measurements properties. Against this, the EUPASS results as well as the aforementioned differences of the present results in comparison to other studies applying the same IPAQ instrument may indicate particular weaknesses of the IPAQ that need to be addressed in further research. It should, however, be noted that such differences might be caused by differences in the sample design between the two studies: While the IPAQ group used a convenience sample; the EUPASS project used a random sample.

Finally, it can be noted that a comparison of the METs across the member states in this study does not show the well-known north south gradient in physical activity levels (Fig. 1). The existence of such a gradient was proposed by several other studies (Martinez-Gonzalez et al. 2001; Rütten et al. 2000) and was based on leisure-time physical activity estimates. Thus, including other contexts of physical activity such as physical activity at the work place, at home, and for transport, obviously leads to a quite different picture of physical activity prevalence in the European Union.

It should at this point be mentioned, that the long version of the IPAQ assesses physical activity in the four contexts (work, home, transport, leisure-time) separately and thus allows for the calculation of METs expended for each context. While the use of the long version would certainly increase the comparability of results of the IPAQ with other studies, it is at the same time much longer than the short version and thus has limited applicability in survey research. The assessment of physical activity across all contexts has also important public health implications and thus should be carefully considered in the future.

Zusammenfassung

Prävalenz von körperlicher Aktivität in der Europäischen Union

Fragestellung: Dieser Beitrag ist der zweite in einer Reihe von vier Beiträgen, die Daten zu körperlicher Aktivität aus dem Eurobarometer 58.2 für 15 Mitgliedsstaaten der Europäischen Union vorstellen. Es werden Daten zu verschiedenen Formen körperlicher Aktivität und den daraus berechneten metabolischen Äquivalenten (METs) für 15 Mitgliedsstaaten der Europäischen Union präsentiert.

Methoden: Die Daten wurden im Jahre 2002 als Teil des Eurobarometers 58.2 mit persönlichen Interviews erhoben. Insgesamt wurden 16 230 Personen ab 15 Jahren befragt. Die durchschnittliche Samplegrösse lag in den meisten Nationen bei ca. 1 000 Interviews. Körperliche Aktivität wurde mit der „letzten sieben Tage Kurzversion" des International Physical Activity Questionnaire (IPAQ) ermittelt.

Ergebnisse: Betrachtet man das Ergebnis für metabolische Äquivalente insgesamt, so wurden die höchsten METs-Mediane in den Niederlanden (39,43 MET-Stunden/Woche), Deutschland (34,66 MET-Stunden/Woche in Ost-Deutschland; 33,90 MET-Stunden/Woche in West-Deutschland) und Luxemburg (31,55 MET-Stunden/Woche) ermittelt. Die niedrigsten METs-Mediane wurden für Nord-Irland (11,55 MET-Stunden/Woche), Schweden (18,65 MET-Stunden/Woche) und Frankreich (19,55 MET-Stunden/Woche) berechnet.

Schlussfolgerungen: Ein Vergleich dieser Ergebnisse mit denen anderer europäischer Studien zur körperlichen Aktivität weist einige Inkonsistenzen auf, die sowohl mit Messproblemen als auch konzeptionellen Unterschieden bei der Erfassung körperlicher Aktivität in Zusammenhang stehen könnten.

Résumé

Prévalence de l'activité physique dans l'Union Européenne

Objectifs: Cet article est le second d'une série de quatre qui présentent des données sur l'activité physique dans 15 états membres de l'Union Européenne, récoltées par Eurobaromètre 58.2. Cet article est centré sur les jours d'activité physique vigoureuse ou modérée, les jours de marche et les équivalents métaboliques (METs) pour l'activité totale dans des 15 états membres de l'Union Européenne ayant utilisé le questionnaire international d'activité physique (abréviation anglaise IPAQ).

Méthodes: Les données ont été récoltées en 2002 dans le cadre des interviews face à face de l'Eurobaromètre. Au total, 16 230 personnes âgées de 15 ans et plus ont été interrogées. La taille de l'échantillon est d'environ 1 000 répondants dans la plupart des nations. L'activité physique a été estimée avec la dernière version courte du rappel de sept jours de l'IPAQ.

Résultats: Les METs médians estimés en heures par semaine étaient les plus élevés en Hollande (39.43 MET-heures/semaine), en Allemagne (34.65 MET-heures/semaine dans la partie est, 33.90 MET-heures/semaine dans la partie ouest) et au Luxembourg (31.55 MET-heures/semaine). Le MET le plus bas a été observé en Irlande du Nord (11.55 MET-heures/semaine), en Suède (18.65 MET-heures/semaine), et en France (19.55 MET-heure/semaine).

Conclusions: Une comparaison des résultats avec les données existantes sur la prévalence de l'activité physique dans les états membres manque de cohérence, peut-être en raison de problèmes de mesures et de différences conceptuelles dans l'estimation de l'activité physique.

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Appendix

Table A1 Metabolic equivalents (METs) in hours per week in men (n = 6717). European Union (2002)

Age (years)	n	Percentiles (P)					
		P10	P25	P50	P75	P90	Mean (SD)
15–24	1 054	4.9	18.2	42.9	71.1	97.4	48.7 (38.0)
25–34	1 174	0.0	11.0	32.5	59.3	88.0	39.8 (35.8)
35–44	1 208	1.7	11.6	32.0	58.7	87.1	39.7 (35.2)
45–54	1 084	0.3	9.9	27.6	56.1	84.0	37.3 (35.7)
55–64	1 016	0.0	7.7	23.4	52.3	82.6	34.6 (34.7)
65–74	794	0.0	6.6	19.9	46.2	70.7	29.7 (31.2)
75+	387	0.0	1.3	15.9	39.1	71.5	27.6 (34.8)

Table A2 Metabolic equivalents (METs) in hours per week in women (n = 7826). European Union (2002)

Age (years)	n	Percentiles (P)					
		P10	P25	P50	P75	P90	Mean (SD)
15–24	1 146	2.5	11.6	27.6	52.0	80.8	36.0 (33.1)
25–34	1 361	0.8	5.8	24.0	49.7	76.6	33.8 (32.7)
35–44	1 498	1.1	8.3	24.8	49.7	80.8	34.2 (33.4)
45–54	1 231	0.3	7.9	23.1	46.2	75.0	31.9 (32.3)
55–64	1 078	0.0	7.7	22.1	43.6	67.1	29.7 (30.5)
65–74	1 001	0.0	1.7	13.2	36.8	63.0	24.7 (28.2)
75+	511	0.0	0.0	7.7	25.6	46.2	16.6 (21.4)