

# Assessing Levels of Physical Activity in the European Population – the ALPHA project

D. Meusel<sup>1</sup>, J. R. Ruiz<sup>1,2</sup>, F. B. Ortega<sup>1,2</sup>, M. Hagströmer<sup>1</sup>, P. Bergman<sup>1</sup>, M. Sjöström<sup>1</sup>

## Valoración de los niveles de actividad física en la población Europea - Proyecto ALPHA

### Summary

*Although our understanding of the positive relationship between physical activity and health is increasing daily, our knowledge of the patterns and levels of physical activity in the general population is still poor. This is due to the gap in comparable data, resulting from non-standardised instruments.*

*The project ALPHA is being initialized to develop and find consensus for a comprehensive set of assessment methodology for physical activity levels in European Member States and their underlying key factors. These methodologies include: physical activity questionnaire, accelerometry, Geographical Information Systems data, and health-related fitness tests.*

**Key words:** Physical activity. Monitoring. Public Health Programme. IPAQ. Methodology. Accelerometry.

### Introduction

A vast body of literature exists about the multiple positive effects of a physically active life on health. Whereas our understanding of this relationship is increasing day by day, our knowledge on the following questions is still poor: How active/inactive is the total population? How active/inactive are certain parts of the population in comparison to others? What are the current trends? Which factors promote or prevent most people from being physically active in their daily lifestyles? To what extent are promotional activities (campaigns, individual counselling, etc) successful?

Those and similar questions need to be answered in order to translate our understanding about the relationship between physical activity and health into successful and practicable health policy. For planning and implementation of international strategies to increase physical activity, one further question is: How active/inactive is the population of one country in comparison to another country?

Our poor knowledge on patterns of physical activity in the total population of a given country or region partially derives from a lack of comparable information about actual population activity levels and their key factors. Currently, there is a gap in available data on physical activity due to non-comparable assessment methodologies in individual countries and regions, in Europe (EU) as well as world-wide.

### Background

Nevertheless, the last years have seen huge efforts to overcome this gap. One of these activities is the

<sup>1</sup> Unit for Preventive Nutrition, Department of Biosciences and Nutrition at NOVUM, Karolinska Institutet, Huddinge, Sweden.

<sup>2</sup> Department of Physiology, School of Medicine, University of Granada, Granada, Spain.

challenge of developing a standardised questionnaire to measure levels of physical activity in different cultural settings in a comparable way, namely the International Physical Activity Questionnaire (IPAQ). Collaborative efforts to develop a valid and reliable questionnaire measuring health-related physical activity suitable for both, research and surveillance, started in 1996.

Since then, validity and reliability of the IPAQ have been tested in a study involving 12 countries (1). Furthermore, feasibility has been tested in 20 countries including Argentina, Brazil, Colombia, Portugal, and Spain. Given the increased global interest in the role of physical activity to prevent chronic disease, the World Health Organisation developed the Global Physical Activity Questionnaire (GPAQ) for physical activity surveillance in developing countries (2).

In view of that, Hallal and colleagues (3) point to the problem of low comparability between previous studies on physical activity levels in South America, the United States, Australia and England because diffe-

rent physical activity measurement techniques had been used. Furthermore, the authors emphasise the unique opportunity of using IPAQ for inter-study comparisons as well as employing the IPAQ short version to compare physical activity patterns in two urban areas in Brazil.

On European level, efforts have been started to develop a comparable data basis on a broad range of health indicators. This work started with the Health Monitoring Programme between 1997 and 2002 carried out by the European Commission, Directorate General Public Health and Consumer Protection (DG SANCO).

In order to advance the health indicator on levels of physical activity, the project "European Physical Activity Surveillance System" (EUPASS) has been co-funded under this programme. EUPASS aimed at testing the validity and reliability of the IPAQ Questionnaire and its feasibility for population based monitoring. The conclusion of the EUPASS project was that IPAQ was promising but needed further development (4).

## Project ALPHA

The subsequent Public Health Programme 2003-2008, also carried out by the European Commission, Directorate General Public Health and Consumer Protection (DG SANCO), carries on the work of the Health Monitoring Programme in its Health Information Strand. The annually work plan for 2006 considered the need for further developing instruments for assessing levels of physical activity in different population groups (5).

According to this request, the project "Instruments for Assessing Levels of Physical Activity and related Health Determinants" (ALPHA) has been proposed in May 2006 and is expected to be started in March 2007. The main objective of ALPHA is to develop and find consensus for a comprehensive set of assessment methodology for physical activity levels in European Member States and their underlying key factors.

The project comprises 4 main components: (1) The further development of the IPAQ questionnaire to fit the needs of population based-health monitoring; (2) the further development of accelerometry as an objective measurement for levels of physical activity; (3) the use of existing Geographical Information Systems (GIS) data sources to assess urban built environment features for its physical activity promoting or preventing features, and (4) the consensus on a health-related

Argentina, 2007, de Agosto

### QUESTIONARIO INTERNACIONAL DE ACTIVIDAD FISICA

Estamos interesados en averiguar acerca de los tipos de actividad física que hace la gente en su vida cotidiana. Las preguntas se referirán al tiempo que usted destinó a estar físicamente activo en los **últimos 7 días**. Por favor responda a cada pregunta aún si no se considera una persona activa. Por favor, piense acerca de las actividades que realiza en su trabajo, como parte de sus tareas en el hogar o en el jardín, moviéndose de un lugar a otro, o en su tiempo libre para la recreación, el ejercicio o el deporte.

Piense en todas las actividades **intensas** que usted realizó en los **últimos 7 días**. Las actividades físicas **intensas** se refieren a aquellas que implican un esfuerzo físico intenso y que lo hacen respirar mucho más intensamente que lo normal. Piense solo en aquellas actividades físicas que realizó durante por lo menos **10 minutos** seguidos.

1. Durante los **últimos 7 días**, ¿en cuántos realizó actividades físicas **intensas** tales como levantar pesos pesados, cavar, hacer ejercicios aeróbicos o andar rápido en bicicleta?

\_\_\_\_\_ días por semana

Ninguna actividad física intensa → **Vaya a la pregunta 3**

2. Habitualmente, ¿cuánto tiempo en total dedicó a una actividad física **intensa** en uno de esos días?

\_\_\_\_\_ horas por día

\_\_\_\_\_ minutos por día

No sabe/No está seguro

Piense en todas las actividades **moderadas** que usted realizó en los **últimos 7 días**. Las actividades **moderadas** son aquellas que requieren un esfuerzo físico moderado que lo hace respirar algo más intensamente que lo normal. Piense solo en aquellas actividades físicas que realizó durante por lo menos **10 minutos** seguidos.

3. Durante los **últimos 7 días**, ¿en cuántos días hizo actividades físicas **moderadas** como transportar pesos livianos, andar en bicicleta a velocidad regular o jugar dobles de tenis? **No** incluya caminar.

\_\_\_\_\_ días por semana

Ninguna actividad física moderada → **Vaya a la pregunta 5**

Figure 1. Argentinean Version of the IPAQ short self-administered questionnaire (Page 1).

fitness test for population based-health monitoring. The ALPHA project includes partners from Belgium, Germany, Finland, France, Slovenia, Spain, Sweden, UK as well as collaborations with networks promoting physical activity in Europe and worldwide, such as the HEPA Europe network (Health Enhancing Physical Activity), WHO EURO, the IPAQ Development group and others.

### Core Components of ALPHA

For population based assessment of levels of physical activity, questionnaires are still the cheapest, but not very reliable and valid source of data. Based on the IPAQ and GPAQ questionnaires, surveys including the assessment of physical activity have been carrying out by various institutions, such as Eurostat, Eurobarometer (6), WHO and various European member states. In some cases, the questionnaire was modified. On one hand, these modifications imply some limitations for the comparability of the results. On the other hand, it shows the need for further development of the IPAQ core instrument in order to establish one effective questionnaire, proven to deliver reliable results.

Furthermore, the ALPHA project aims to extent the questionnaire to include reliable modules on the assessment of workplace activity, transport-related physical activity as well as on the assessment of urban environmental promoters or barriers to physical activity.

Secondly, accelerometers can be used as an objective measurement for the population wide monitoring of levels of physical activity. Accelerometers, comparable to the widespread pedometers, are little devices measuring the vertical acceleration during a one week's time-frame and thus allow conclusions about the activity patterns of the individuals wearing it.

Esliger and colleagues conclude that recent technological advances have led to decreases in both the size and cost of accelerometers while increasing functionality, but a lack of common data reduction and standardized reporting procedures dramatically limit their potential for the use in population-based surveys at the moment (7).

The project ALPHA aims in one designated work package to develop a standardised operating procedure for the use of accelerometers in population based surveys in European member states. Figure 2 shows a accelerometer worn by a subject on the lower back. Figure 3 shows the output graph from the software, which ships with the accelerometer.

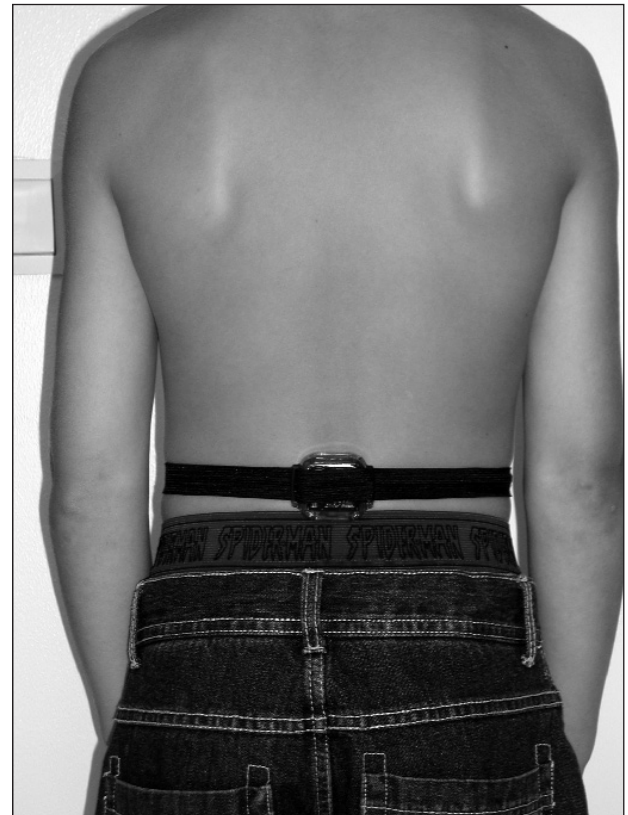


Figure 2. Accelerometer worn on the lower back (thank you Johan for being model).

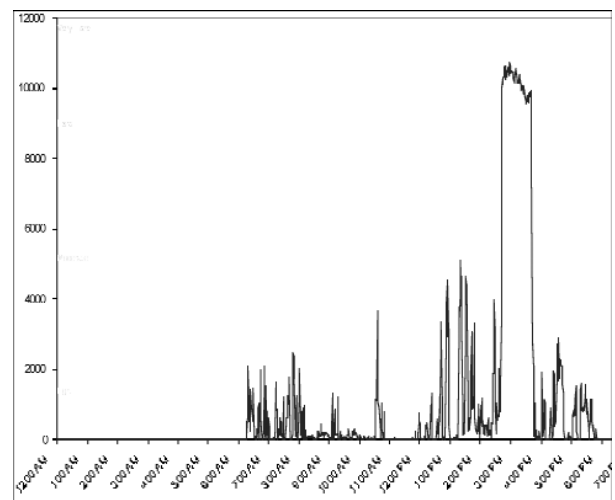


Figure 3. Output Graph from the Accelerometer Software. The subject (a female, 25 yrs, university student) woke up 06.15, started at university 08.30, moved to an other building at 10.30, new lecture for an hour, had lunch after that. She did various practical activities for 1,5 hours. At 02.30 she went out for a longer jogging-tour (about one hour), and in the evening carried out some further activities at various intensity levels.

Thirdly, Geographical Information Systems (GIS) can be considered as a valuable source for the characterisation of urban built environments with respect to how good or not good they promote or prevent a physical active daily life. Today, GIS data are already available in many European countries. Nevertheless, form, specificity and format differ from country to country.

The ALPHA project aims to develop a recommendation on how merge existing GIS data in the European member states and thus accompanying with it the assessment of urban environment characteristics (activity friendly environments).

Finally, in addition to the assessment of physical activity by questionnaire, the measurement of health-related fitness can more accurately identify population groups with increased health risks and thereby assist health policy planning with more reliable data in the future. Ruiz et al. have recently shown that health-related fitness is a proven key health Indicator (8).

Easily applicable and reliable tests are already available for population-based measurement of health-related fitness today, but European member countries are using differing tests, making the comparison of results difficult. The ALPHA project aims in one designated work package to find a consensus on one standardised health related test battery for European Health Monitoring activities as well as for health monitoring activities in EU member states.

## Conclusion

In summarizing, the ALPHA project intends to develop methodology for assessing levels of physical activity in the European population in a comparable way. In order to do so, consensus on a questionnaire instrument needs to be found as well as standard operating procedures for accelerometry, and GIS data analysis. The assessment of health related fitness needs to be standardized across Europe. The ALPHA project builds on extensive work that has been carried out previously by European and international networks and therefore can contribute to a better comparable data basis on levels of physical activity in the European member states.

## Acknowledgement

This study is being carried out with financial support from the Commission of the European Communities, specific the Public Health Programme 2003-2008 of the Directorate General Health and Consumer Protection Lu-

xembourg, 800259 'Instruments for Assessing Levels of Physical Activity and related Health Determinants' (ALPHA). The study does not necessarily reflect the Commission's views and in no way anticipates the Commission's future policy in this area.

## Sources of Funding

The project ALPHA is co-financed by the European Commission, Directorate General Health and Consumer Protection, under the Public Health Programme 2003-2008. FBO and JRR were supported by grants from the Consejo Superior de Deportes (109/UPB31/03, 13/UPB20/04) and the Ministerio de Educación y Ciencia de España (AP2003-2128, AP2004-2745).

---

Correspondence:  
Dr. Dirk Meusel  
Karolinska Institutet  
Unit for Preventive Nutrition  
Department of Biosciences and Nutrition at Novum  
Hälsövägen 7-9  
SE-141 57 Huddinge  
Sweden  
dirk.meusel@prevnut.ki.se

## References

1. Craig CL, Marshall AL, Sjöström M et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc* 2003;35: 1381-95.
2. World Health Organisation. Global Physical Activity Surveillance (online accessed 06 Feb 2007). URL: <http://www.who.int/chp/steps/GPAQ/en/index.html>.
3. Hallal PC, Matsudo SM, Matsudo VKR et al. Nível de atividade física em adultos de duas áreas do Brasil: semelhanças e diferenças (Physical activity in adults from two Brazilian areas: similarities and differences). *Cad. Saúde Pública* 2005; 21: 573-580.
4. Ruetten A, Vuillemin A, Ooijendijk W et al. Physical activity monitoring in Europe. The European Physical Activity Surveillance System (EUPASS). Approach and indicator testing. *Public Health Nutrition* 2003; 6: 377-384.
5. European Commission. Commission Decision of 10 February 2006 adopting the work plan for 2006 for the implementation of the programme of Community action in the field of public health (2003-2008), including the annual work programme for grants. *Official Journal of the European Union* 2006; L 42/29.
6. Sjöström M, Oja P, Hagströmer M, Smith BJ, Bauman A. Health-enhancing physical activity across European Union countries: the Eurobarometer study. *J Public Health* 2006;14: 291-300.
7. Eslinger DW, Copeland JL, Barnes JD, Tremblay MS. Standardizing and Optimizing the Use of Accelerometer Data for Free-Living Physical Activity Monitoring. *Journal of Physical Activity and Health* 2005; 3: 366-383.
8. Ruiz JR, Ortega FB, Meusel D, Harro M, Oja P, Sjöström M. Cardiorespiratory fitness is associated with features of metabolic risk factors in children. Should cardiorespiratory fitness be assessed in a European health monitoring system? *The European Youth Heart Study. J Public Health* 2006; 14: 94-102.