

School for Public Health Research (SPHR)

Project Title	<i>Active Buildings: modelling physical activity and movement in office buildings</i>
Project ID	SPHR-UCL-PH1-WPD
Lead Researchers	Jane Wardle, Alexi Marmot – University College London (UCL)
SPHR Collaborators	Lee Smith, Abigail Fisher, Marcella Ucci, Mark Hamer, Benjamin Gardner – UCL
Start Date	5 November 2012
End Date	31 March 2015
Outline	<p>The health benefits of physical activity are well documented, but only 5% of UK adults meet recommended guidelines (Weiler et al. 2010). A target of at least 10,000 steps per day (one domain of physical activity) has been recommended, although any increase may improve health. Half of UK working adults have sedentary occupations (e.g. those who work in an office environment), and estimates of physical activity levels for office-based workers suggest daily step counts of no more than 4000-6000 (Tudor-Locke et al. 2004). Workplace based physical activity promotion strategies can be effective in increasing physical activity levels (Abraham et al. 2009). Many interventions have been based on bolstering workers' motivation or capability for translating motivation into action, or offering greater physical activity opportunities to those motivated to be more active. However, such interventions have typically shown only short-term success, with step counts returning to baseline over the longer term. They also tend to favour those who are motivated to change and neglect unmotivated workers who may benefit the most (Abraham et al. 2009).</p> <p>Previous work has demonstrated the effectiveness of using the office environment for physical activity promotion (Dishman et al. 2009), and a sizeable literature has shown that the external built environment influences physical activity behaviour. However, to our knowledge no work has yet focused on the role that the layout of the indoor office environment may play in facilitating or inhibiting physical activity behaviour. It seems feasible that office layout, and in particular the distance required to reach office "activity hot spots" (i.e. printers, refreshment points, toilets, meeting rooms), would affect workers' physical activity. Restructuring office environments (e.g. by manipulating distances to hot spots) might therefore increase physical activity passively by providing greater physical activity opportunities; avoiding dependency on workers' motivation. Although such an intervention would likely result in only modest physical activity increases, any physical activity increase above baseline may improve health (Warburton et al. 2006) and breaking up prolonged periods of sitting may also be beneficial. Evidence is needed to document how and where office workers accumulate physical activity within buildings to determine the potential for physical activity change arising from spatial reconfiguration of the workplace. We are not aware of such evidence.</p> <p>The aim of this study is to understand how physical activity accumulates within office environments and to model the relationship between workplace layout and physical activity behaviour. This data will be used as a basis for estimating the potential for physical activity change through layout modification in future interventions or the design of new buildings. The study is a unique collaboration between public health and built environment researchers.</p>
Findings	<i>To follow...</i>
Publications / Outputs	Dissemination:



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- Presentation of Active Buildings Methodology at the NIHR School for Public Health (SPHR) annual conference in October 2013
- Presentation of Active Buildings protocol at the European Public Health Conference in Brussels in October 2013
- Visiting Fellowship and team video conference, Nov 2013, with Curtin University, Perth Western Australia researchers on **Active Workplace Design** from Architecture, Centre for Health Promotion Research, School of Public Health and the Centre for Sport and Recreation Research. This may result in future joint research
- Presentation of Active Buildings at the Public Health Improvement Research Network, Health Challenge Wales Seminar Series on Tackling Workplace Sedentary Behaviour, Sept 2014.
- Presentation of the study and collaboration meeting at the Centre for Active Design (CAD) in New York in November 2014. Discussion around the best methods of ensuring that results reach the appropriate end users. The CAD have agreed to include relevant study findings in their 'Guidelines for Active Workplaces' policy documents and include findings in their monthly newsletters (issued to architects, designers, researchers).
- The Active Buildings team are guest editing a special issue of the specialist journal Built Environment Research on physical activity and the built environment. We are planning a dissemination event or seminar to coincide with the launch of this issue in July 2015.
- Publications of peer-reviewed manuscripts by Active Building funded researchers:

Smith, L., Ucci, M., Marmot, A., Spinney, R., Laskowski, M., Sawyer, A., Konstantatou, M., Hamer, M., Ambler, G., Wardle, J. & Fisher, A. (2013). Active Buildings: Modelling Physical Activity and Movement in Office Buildings, an Observational Study Protocol. *BMJ Open*, 3(11)

Smith, L. Kipps, C. Aggio, D. Fox, P. Robinson, N. Trend, V. et al. (2014). Camden Active Spaces: Does the Construction of Active School Playgrounds Influence Children's Physical Activity Levels? A Longitudinal Quasi-Experimental Protocol. *BMJ Open*. doi: 10.1136/bmjopen-2014-005729

Smith, L. Gardner, B. & Hamer, M. (2014). Childhood Correlates of Adult TV Viewing Time: A 32 Year Follow-Up of the 1970 British Cohort Study. *J Epidemiol Commun Health*. doi:10.1136/jech-2014-204365

Hamer, M. & Smith, L. (2014). Response: Influence of Sleep Disorders on Television Viewing Time, Diabetes and Obesity. *Diabetic Medicine*. doi: 10.1111/dme.12609.

Sawyer, A., Smith, L., Schrempft, S., Jaarsveld, E., Wardle, J. & Fisher, A. (2014). Parental Knowledge of Paediatric Physical Activity Recommendations in the United Kingdom and its Association with Parental Behaviour: An Observational Study. *BMC Public Health*. doi:10.1186/1471-2458-14-795

Smith, L., Thomas, L., Bell, J. & Hamer, M. (2014). The Association between Objectively Measured Sitting and Standing with Body Composition: A Pilot Study using Magnetic Resonance Imaging. *BMJ Open*. doi:10.1136/bmjopen-2014-005476

Smith, L. & Hamer, M. (2014). Television Viewing Time and Risk of Incident



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Diabetes Mellitus: The English Longitudinal Study of Aging. *Diabetic Medicine*. doi: 10.1111/dme.12544

- Manuscripts in press:

Smith L., Hamer M., Ucci M., Marmot A., Gardner B., Sawyer A., Wardle J. & Fisher A. (in press). Weekday and Weekend Patterns of Objectively Measured Sitting, Standing and Stepping in a Sample of Office-Based Workers: The Active Buildings Study. *BMC Public Health*

Ucci, M., Law, S., Andrews, R., Fisher, A., Smith, L., Sawyer, A. & Marmot, A. (in Press). Indoor School Environments, Physical Activity, Sitting Behaviour, Pedagogy: Scoping Review. *Building Research and Information*

Smith, L., Euklud, U. & Hamer, M. (in Press). The Potential Yield of “Non-Exercise Physical Activity” Energy Expenditure in Public Health. *Sports Medicine*

Aggio, D., Smith, L., Fisher, A. & Hamer, M. (in Press). Mothers’ Perceived Proximity to Green Space is Associated with TV Viewing Time in Children: The Growing up in Scotland Study. *Preventive Medicine*

- Manuscripts under review:

Smith, L., Fisher, A. & Hamer, M. (Under Review). Television Viewing Time and Risk of Obesity and Central Obesity: The English Longitudinal Study of Aging. *BMC Obesity*

Smith, L., Gardner, B., Fisher, A. & Hamer, M. (Under Review). Patterns and Correlates of Physical Activity Behaviour Over 10 Years in Older Adults: Prospective Analyses from the English Longitudinal Study of Ageing. *The British Journal of Sports Medicine*

Smith, L., Duijts, S., Wardle, J. & Fisher, A. (Under Review). Is Receiving Returning to or Staying in Work Advice After Diagnoses of Colorectal Cancer Associated with Returning to or Staying in Work? *PlosOne*

Smith, L., Gardner, B., Aggio, D. & Hamer, M. (Under Review). Association between Participation in Outdoor Play and Sport at 10 Years with Physical Activity in Adulthood. *Preventive Medicine*

Gardner, B., Smith, L., Biddle, S. & Hamer, M. (Under Review). How to Reduce Sedentary Behaviour? A Systematic Review of Methods Used to Design and Evaluate Sedentary Behaviour Reduction Intervention Studies Conducted Among Adults. *Health Psychology Review*

Fisher, A., Smith, L. & Hamer, M. (Under Review). Screen Time and Cognitive Performance in Young People: Cross-Sectional Analyses from the Growing Up in Scotland Study. *Pediatrics*

Aggio, D., Smith, L., Fisher, A. & Hamer, M. (Under Review). Association of Light Exposure on Physical Activity and Sedentary Time in Young People. *Pediatrics*

Hamer, M., Smith, L. & Stamatakis, E. (Under Review). Prospective association of TV viewing with acute phase reactants and coagulation markers: English



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	<p>Longitudinal Study of Ageing. Heart</p> <ul style="list-style-type: none">• Manuscripts in preparation <p>Spinney, R. Smith, L. Ucci, M. Fisher, A. Wardle, J. Marmot, A. New frontiers in the epidemiology of indoor physical activity: the use of tracking systems to elucidate the behaviour of office workers.</p> <p>Smith, L., Ucci, M., Marmot, A., Spinney, R., Sawyer, A., Konstantatou, M., Hamer, M., Wardle, J. & Fisher, A. Is the physical office environment associated with office workers work time activity?</p> <p>Fisher, A. Spinney, R. Smith, L. Ucci, M. Konstantatou, M. Marmot, A. Wardle, J. Development of objective spatial metrics to examine whether spatial layout is related to workplace physical activity and sedentary time: Active Buildings protocol II</p>
Impact	<i>To follow...</i>
Funding	£506,824
Further information	Dr Abigail Fisher Tel: 020 7679 1722 Email: abigail.fisher@ucl.ac.uk http://www.activebuildings.co.uk



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