Delivering world-class research and applied solutions for promoting physical activity and reducing sedentary behaviour
Who we are
The Physical Activity Exchange (PAEx) is part of the world leading Research Institute for Sport and Exercise Sciences (RISES) at Liverpool John Moores University. RISES is the top UK institution for research in sport and exercise sciences having been ranked 1st for Research Quality at the Research Excellence Framework (REF) 2014 in UoA26 based on Research Quality Index data.

Our key research themes
- School-based physical activity promotion and sedentary behaviour reduction
- Improving physical literacy across the life-course
- Family-based interventions for promoting physical activity and reducing sedentary behaviour
- Physical activity, exercise and weight management in populations with or at risk of disease
- Workplace health promotion
- Health interventions in natural outdoor spaces
- Community-based interventions to improve physical activity and sport participation
- Interventions implemented through sports organisations to improve health

What we do
The PAEx is committed to conducting research that impacts policy and practice. For over 20 years we have worked in partnership with local government, public health, industry and the third sector to deliver world-class research and applied solutions in physical activity, sedentary behaviour and health.

We support organisations from health, education, sport, leisure and recreation, and transport sectors. We work together with commissioners, practitioners and service-users to co-produce evidence-based interventions that are feasible, effective and sustainable in practice.

The nature of the health problem
We examine the effects of physical activity and sedentary behaviour on health and well-being

Measuring impact
We use robust measures to provide information on levels of physical activity, sedentary behaviour and health

Understanding behaviour
We explore the factors that affect participation in physical activity and sedentary behaviour

Changing behaviour
We develop, implement and evaluate interventions to change behaviour

Translate into practice
We share and communicate evidence to improve policy and practice

Adapted from the Behavioural Epidemiological Framework (Sallis & Owen, 1999)
Mixed methods research and insight

Our staff have expertise in quantitative (e.g. surveys, health parameters, objective indicators) and qualitative research (e.g. focus groups, interviews, creative methodologies with children, subjective indicators) to observe, understand and analyse physical activity, sedentary behaviour and health behaviours.

Mixed methods are important in evaluating complex interventions, providing an opportunity to give a ‘voice’ to participants and deliverers to enhance understanding of behaviour change strategies and causal pathways. Depending on the research questions, quantitative and qualitative approaches can be used to produce rich, comprehensive data. Stakeholders and participants can also be actively involved in the process through participatory approaches and contributing to research designs.

Intervention design, implementation and evaluation

We use the National Institute for Health and Care Excellence (NICE) and Medical Research Council (MRC) guidance to design and evaluate complex interventions.

Inter-disciplinary approaches

We use an inter-disciplinary approach to inform research design, methods, outcome measures and evaluation. Our expertise encompasses sub-disciplines of psychology, physiology, nutrition, physical education, motor development, physical activity, sedentary behaviour and health.

Measuring physical activity, sedentary behaviour and fitness

We have a track record of using sophisticated technologies and measures to assess physical activity, sedentary behaviour and health- and skill-related fitness in children and adults. Our expertise includes accelerometry, systematic observation of physical activity and fundamental movement skills, fieldbased fitness testing, and fixed and portable indirect calorimetry.

Assessing physical, mental and social health and well-being

We are one of few research groups globally to combine field based measures with clinical assessments of health using laboratory techniques.

These sensitive measures allow us to estimate risk and determine if interventions are effective at preventing or reducing the risk of chronic disease.

We use or develop surveys to increase our understanding of psychological and socio-cultural influences and outcomes associated with physical activity, sedentary behaviour and health. Surveys include measures of confidence and motivation, readiness to change behaviour, enjoyment of physical activity, mood, depression, well-being and quality of life.

Assessment of cardiovascular structure and function (echocardiography and vascular ultrasound), cardiometabolic risk via blood sampling and measuring fat, muscle and bone body composition using Dual Energy X-ray Absorptiometry.
The Physical Activity Exchange goes global – Active Cities

We are working at multiple levels to support the Global Active City Development Project. The project is led by TAFISA (International Sport for All) and links in with Evaleo (Sustainable Health Organisation), the International Olympic Committee and Liverpool Active City. We have been long-time collaborators with the Liverpool City Council and other partners in Liverpool Active City and this is currently held up as the model of good practice in the Global Project.

We are supporting the following programmes:

- Development of ISO standards related to Active City Accreditation
- Supporting with presentations, visits, technical expertise and report writing on the ‘Pilot City’ phase of the Global Project
- Active delivery on the ‘Take Back Your Streets’ and ‘Take Back your Future’ elements of active city development and physical activity event proposals

Staff from the Physical Activity Exchange have made an important contribution over many years to the Active City Agenda in Liverpool. They are now a crucial part of the support for the Global Active City Development programme. Moving forward, this group at LJMU can have a significant impact upon physical activity in many cities across the globe.

John Marsden, Head of Public Health Delivery in Liverpool and Global Active City Development Team

Schools In!
Promoting Children’s Physical Activity and Health in Educational Settings

This REF 2014 impact case study summarised our research on children’s physical activity and health promotion in educational settings in north west England. Our research has been utilised by the Local Authorities that partnered with us to develop and deliver health and physical activity monitoring (SportsLinx), evidenced-based programmes of physical activity for schoolchildren (school-based interventions) and educational practice development (teacher training) that have demonstrably enhanced children’s physical activity and health.

Details of this and our second REF 2014 impact case study on ‘Sporting Playgrounds: It’s time to play’ – modifying school playground environments to increase physical activity can be found at: impact.ref.ac.uk/CaseStudies/Results.aspx?HEI=64

New horizons

We are currently involved in around 30 research projects, which include public engagement and impact. From this research, our impact journey for REF 2021 will centre on two case studies: ‘Education, Community and Health’ and ‘Active Cities’. Research themes within these case studies are workplace, GP and clinical, education and natural environment settings and research associated with the Liverpool Active City programme.
The aim:
To develop and evaluate a multi-agency approach to promote healthy weight in pre-school children in BwD.

The objectives:
a) To explore current practices for addressing pre-school child weight across BwD and map these onto a visual pathway
b) To use participatory research to develop training for frontline practitioners dealing with pre-school child weight issues
c) To pilot and evaluate the training with a view to implementation across BwD

The public health outcomes:
Development of a multi-agency care pathway for managing pre-school child weight in BwD, leading to the implementation of evidence-based practices that are sustainable beyond the period of the PhD.

Bringing together evidence and practice
The Blackburn with Darwen Pre-school Child Weight Management Project (current PhD)

The issue:
Over one in five children in England are overweight or obese by the time they start school. Public health managers in Blackburn with Darwen (BwD) have expressed concern about the way pre-school child weight is managed, with no clear care pathway, lack of routine growth BMI measures, lack of provision for underweight children and challenges faced by health professionals in raising weight issues with parents.

The project: BwD Borough Council and PAEx jointly designed a three-year PhD project to address the issue of pre-school child weight in BwD. The PhD is funded 50:50 between BwD borough council and LJMU, ensuring co-ownership and multidisciplinary collaboration. A full-time PhD student is responsible for the day to day management of the project, supported by a multidisciplinary steering group who meet quarterly (alternating venues between Blackburn and Liverpool).

The research being carried out is of major importance for everyone involved in improving health and well-being in the Borough. Being overweight or underweight in childhood is associated with both physical and psychosocial health consequences and the growing prevalence of unhealthy weight in children presents a serious public health concern. The research will feed directly into local strategies to develop and commission future services.

The academic outcomes:
Evidence to enhance our understanding of how pre-school child weight can be effectively managed within multi-agency care pathways. Project data will be disseminated through conference presentations and peer-reviewed journal articles.
Co-production of a GP physical activity referral scheme

**The issue:** There are numerous GP exercise referral (ER) schemes in the UK aimed at providing exercise for individuals who have or are at risk of health conditions. Typical ER schemes involve 12 weeks’ exercise in a leisure centre. Although these schemes are beneficial for some people in the short-term, further research is needed to learn how ER schemes can help people change their physical activity behaviours in the long-term (NICE PH54, 2014).

**The project:** Co-production of a GP ER scheme in Liverpool that draws on academic evidence but is driven by local need.

**The methods:**

**Step 1:** A series of development meetings involving a multidisciplinary group of commissioners, GPs, ER practitioners, service managers, health trainers, service users and academics. Participatory workshops are led by an independent facilitator to ensure all stakeholders have a voice. Local experience, knowledge and practicalities dictate what the evidence-based intervention will look like in practice.

**Step 2:** An intervention pilot in a small area of Liverpool. The aim of step 2 is to overcome teething problems, test delivery methods, test outcome measures and explore the feasibility of the intervention.

**Step 3:** A controlled trial of the intervention on a larger scale. The aim of step 3 is to establish the effectiveness of the intervention for further roll-out across Liverpool.

**The outcome:** The study aims to co-produce a GP ER scheme that is focused on helping people become and stay physically active for life. At the end of the three year PhD local stakeholders will have a blueprint for an ER scheme that is evidence-based, deliverable and sustainable within local resources.

The Physical Activity Exchange team are helping clarify our thinking around the Liverpool GP exercise referral scheme. They have worked with the Physical Activity and Sport team to develop a robust research project that will inform Liverpool CCG and Liverpool City Council future commissioning plans. The PAEx Team provide expertise and enthusiasm and are able to draw on a wide range of previous research programmes to inform their approach.

Dr Maurice Smith, Liverpool Clinical Commissioning Group

**Our Healthy Workforce projects are guided by a four-step model:**

**Assess:** Identify employee health risks and concerns, and, organisational activity, capacity and need for workplace physical activity and sedentary behaviour interventions.

**Plan:** Work with employers and employees to identify and develop sustainable interventions that are possible to implement within existing infrastructures.

**Implement:** Put interventions in place and make them available to employees.

**Evaluate:** Investigate the effectiveness and cost-effectiveness of interventions using mixed methods.

To achieve our research aim, we conduct multidisciplinary laboratory and field studies. This includes studies to identify beneficial patterns of active breaks for cardiovascular and cognitive function, understand the relationship between health, work performance and behaviour profiles, and develop low cost, sustainable interventions for contact centres and city councils. Our contact centre research has led to collaboration with Call North West, a support centre for 700+ contact centres in the North West, with Managing Director Jane Thomas recently commenting on a quarterly forum the Exchange hosted and the Healthy Workforce programme of research.

**Healthy Workforce Research**

Workers are most productive and creative in an environment that supports their health and wellbeing.

Unproductive and absent workers are costly, and workplace physical activity programmes can reduce presenteeism, absenteeism and turnover and promote job satisfaction and health. At a time when the workforce is ageing and working for longer, the health and economic benefits of encouraging workers to move more and sit less have never been greater. Accordingly, our overarching research aim is to develop and evaluate workplace interventions to improve employee health through moving more and sitting less.

**Our Healthy Workforce projects are guided by a four-step model:**

Health and performance have long been recognised as one of the key indicators in successful businesses, but achieving both in a productivity-driven industry can present a challenge. Dr Graves and his team questioned how contact centres could address this area, culminating in a high energy workshop session, where all delegates embraced the challenge to change current working practices. Sharing best practice is critical to ensuring that the contact centre industry offers staff the best options to create and promote health and well-being, and value them as priority performance indicators. I look forward to the industry working closely with LJMU and getting involved in the very worthwhile research Dr Graves and his team are undertaking to achieve this.

Jane Thomas, Managing Director of Call North West