PAHRC Annual Report 2017

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1. Message from the Director: Prof Nanette Mutrie

Welcome to our 2017 annual report for the Physical Activity for Health Research Centre (PAHRC). This has been another busy year for PAHRC - we have been awarded 5 new grants and currently collaborate in 18 grants totaling over £1.3m to the University of Edinburgh and more than £900,000 for MHSE. We have produced over 40 research outputs and made 45 oral and poster presentations.

Our members are involved in a wide range of research areas: promotion of walking and cycling; investigation of sedentary time; physical activity amongst key at risk groups; measurement and surveillance; and evaluation. In 2017, we have had 27 core members, 48 associate members and 180 friends of PAHRC collaborating in the area of physical activity for health.

We purposefully adopt a research informed teaching approach to deliver our MSc Physical Activity for Health, and this year have accepted our first full cohort on our intercalated BMedSci Physical Activity for Health programme at undergraduate level.

We ensure that knowledge exchange, creating impact and advocacy are all key aspects of our work and this year have collaborated and led work to train volunteers and future and current health care professionals in physical activity for health. We have continued our collaboration with Paths for All, the Scottish Collaboration for Public Health Research and Policy (SCPHRP) and NHS Health Boards.

As an indicator of our expertise in physical activity and sedentary behaviour, four members of our team have been selected to take part in the review of UK CMO Physical Activity Guidelines due to be published in 2019. (Mutrie, Kelly, Fitzsimons and Strain). This is an outstanding achievement for our centre and we look forward to sharing our learning with Scotland.

At PAHRC we try to 'practice what we preach' (which is to sit less and move more) by incorporating physical activity into our working week and teaching. Meeting participants and students are encouraged to stand if they wish and we always have standing ovations for presentations. We take short active breaks to play table tennis, complete a couple of pieces of jigsaw or do 'walk and talk' meetings. We follow the recommendations of not holding meetings too early or too late and we try to keep one day free of meetings (Fridays). We would love our visitors to take part in these activities. We also hold weekly meetings, which are the heart of our research centre, on Wednesdays at 12 noon and you are very welcome to attend any of these events. You can sign up to receive our weekly newsletter, which gives details of our meetings, by contacting pahrc@ed.ac.uk or follow us on Twitter @UoE_PAHRC

If you are interested in physical activity for health, please do get in touch as we develop our networks across and beyond the University.

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2. PAHRC's Objectives

The main focus of PAHRC is to develop, test and implement interventions which encourage people of all ages to 'sit less and move more'.

In December 2012, our strategy for the development of PAHRC identified five key objectives:

I. To attract external funding to support our research (see section 7).
II. To publish in esteemed peer reviewed journals (see section 8).
III. To actively participate in the research community (see sections 5, 9 and 10).
IV. To actively participate in the wider physical activity and health community to facilitate knowledge exchange (see section 5, 11 and 12).
V. To support the development of all group members through an inclusive and mentoring environment (see section 3).

The progress towards each of these goals is discussed throughout this document.

3. About the Research Centre

PAHRC is based within the Institute for Sport, Physical Education and Health Sciences in Moray House School of Education and Sport and has members from across the University. Our membership structure of core, associate and external members of PAHRC facilitates interdisciplinary collaboration and knowledge exchange.

In 2017, we had 27 core members of PAHRC whose activities are summarised in this report. Core members are staff, honorary staff or doctoral research students at the University of Edinburgh for whom physical activity for health is their main area of research. We have 48 associate members from across the University, who are staff and research students for whom physical activity for health research is one aspect of their work (e.g. colleagues in geography, landscape architecture or medicine). External members are considered as 'friends of PAHRC' and this group consists of academics, practitioners or policy makers who are interested in keeping up to date with our work and/or collaborating with us. We currently have 180 'friends of PAHRC'.

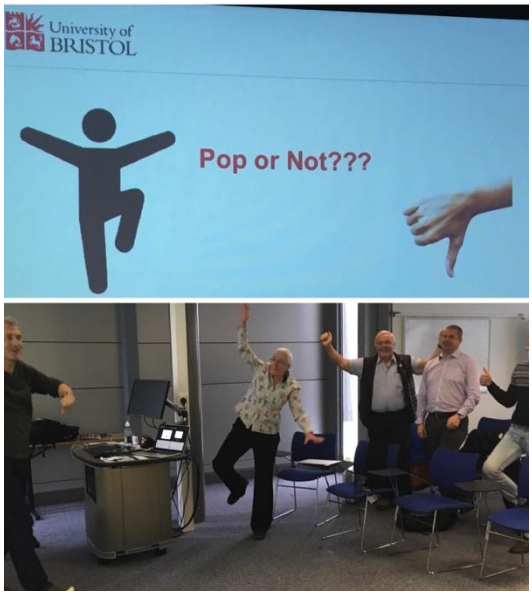
We have weekly research meetings to which core and associate members of PAHRC are invited to attend. Many of these meetings are also open to 'friends'. These meetings allow the team to build and to learn from each other, which nurtures the supportive and mentoring environment we want for PAHRC.

Our meeting topics this year have included responses to policy documents; rehearsal of presentations; interpretations of research results; grant proposal ideas; and workshops on PURE impact reporting, research funding opportunities, data visualisation and flipped classrooms. We have also welcomed eighteen external speakers on related topics (see Section 9)

A final aspect of our style of working is that we endeavour to practice what we preach in terms of sitting less and moving more. We do this by incorporating standing breaks to our meetings and teaching; having 'standing ovations' or 'active applause' after speakers; practicing yoga stretches and engaging in 'walk-and-talk' meetings which are all designed to limit time spent sitting down and incorporate physical activity into discussions. We also try to influence others to adopt similar practices when working across and beyond the University. Our social and meeting area is designed to encourage standing and facilitate active breaks with a table tennis table, golf putting practice, a balance board and jigsaws. We also have a standing desk from Ergotron which we use as a hot desk

"We practice what we preach in terms of sitting less and moving more throughout our working day and encourage others to facilitate this way of working "

Prof Nanette Mutrie



Active audience participation at a PAHRC seminar by Dr Charlie Foster, University of Bristol

Yoga break during a PhD Supervision meeting

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4. Research Themes

Whilst there is a good understanding of the epidemiological risks of inactivity and the patterning of inactivity across the population, there is much less known about how to successfully change behaviour and create more active lifestyles across all ages. The main focus of PAHRC is to develop, test and implement interventions which encourage people of all ages to *'sit less and move more'.* We are interested in all segments of the population, but our current priorities reflect an attempt to reduce health inequalities by targeting those who are at most risk of low physical activity, such as older adults, those with medical conditions and people from ethnic minority groups.

Our research planning follows established frameworks including: acknowledgement of the social-ecological framework that influences health; the MRC guidance on developing and evaluating complex interventions; and the 'seven investments that work' recommended by the Toronto Charter for Physical Activity. Across the settings suggested by the 'seven investments that work' statement and key target groups, there are a number of key themes that we are currently involved with:

- Promotion of Walking and Cycling
- Investigation of Sedentary Behaviour
- Physical Activity amongst Key 'At Risk' Groups
- Measurement and Surveillance
- Evaluation

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4.1 Promotion of Walking and Cycling

Prof Nanette Mutrie leads on a number of walking projects which build on a pedometer based intervention previously developed and tested as part of Walking for Wellbeing in the West ((WWW) – also involved Baker, Fitzsimons and McAdam). This intervention was adapted in a previous grant led by the University of Glasgow in which football fans were encouraged to walk as part of a healthy lifestyle approach to losing weight ('*Football Fans in Training (FFIT')*), funded by the NIHR). This 'social innovation' of using football clubs to promote the healthy lifestyles of their fans has been developed further in a large European grant (*Euro-FIT*) and in new contexts of prisons (*Secure-FIT*), and rugby (*RUFIT*).

We have built upon our internationally recognised track record in developing and testing interventions to promote walking by applying our learning to new contexts and populations such as; workplaces, older adults, ethnic minority groups (See Section 4.3). One other novel area which is explored by PhD Student, Dr Andrew Murray (Supervised by Mutrie, Kelly and Prof Liz Grant and funded by the World Golf Federation) is the use of golf to promote walking for health amongst players and spectators.

We have a strong working relationship with Scotland's national walking charity, Paths for All whose aim is to get *'more people walking, more often'* via interventions such as group Health Walks, path development and workplace challenges. These links are formalised via two PhD scholarships (Laing and Allison), collaboration on funding applications and annual training for walking coordinators to support their continued professional development. Dr Graham Baker leads a research project in collaboration

with Paths for All (Co-Is Mutrie & Niven, funded by MRC PHIND) to explore how to culturally adapt walking interventions, such as Health Walks, for South Asian adults. Nicky Laing (supervised by Niven and Fawkner) is also working on a Paths for All funded project. Her PhD aims to understand determinants of starting and continuing to walk for health in older adults.

Dr Ailsa Niven recently conducted an evaluation of Paths for All's Workplace Step Count Challenge (an 8 week workplace physical activity programme that has been running in Scotland since 2011) and found that on participants increased their walking for transport and for leisure and decreased their sitting time (funded by UoE CHSS KE grant). This work has since led to a PhD Studentship for Mary Allison (supervised by Niven and Ruth Jepson (SCPHRP), and funded by Scottish Graduate School of Social Science (SGSSS)). Mary's PhD will involve completing a realist evaluation to increase the understanding of wider aspects of the Paths For All Step Count Challenge.

In acknowledgement of our expertise in the promotion of walking, Prof Nanette Mutrie was involved in the development of the Scottish Government's Scottish Walking Strategy and Dr Ailsa Niven is a member of the implementation group for this strategy.

Active travel (predominantly walking and cycling) is considered as a practical way for individuals to incorporate physical activity into their daily lives and is a key policy priority for the Scottish Government. Dr Graham Baker (PI) and Dr Paul Kelly (Co-I) and Rebecca Pillinger (RA) are currently researching levels of active travel in a project entitled *'Trends and sociodemographic patterning of active commuting'*. In other parts of the United Kingdom, research has highlighted important differences in the levels of active travel. For example, being older, female and having a higher income are all linked with lower levels of active travel. This type of patterning by different socioeconomic factors has not been conducted in Scotland. The aim of this project is to examine levels of active commuting (walking or cycling to work or study) in Scotland, and to determine the extent these have changed between 2001 and 2011 using data from the Scottish census. We want to find out whether current levels of active commuting, and changes over time since the last census, are affected by factors linked with health inequalities (such as age, gender, ethnicity and socioeconomic status). Using these findings we will also conduct an economic assessment of the health benefits of walking and cycling for sub-groups of the Scottish population using the WHO HEAT tool. The project is funded by the Glasgow Centre for Population Health at the University of Glasgow.

Changes to the physical environment can also have an impact on walking and cycling. We have previously worked on projects which investigated impacts of changes in physical infrastructure on active travel behaviours - i*Connect* (Mutrie & Baker) and the Traffic & Health in Glasgow / M74 Study (Mutrie, led by Dr David Ogilvie, MRC Unit, Cambridge). iConnect research found that walking and cycling routes can have the most impact on physical activity when they run close to the places where people live. Proximity to new infrastructure is important in that those living within 1km of interventions increased their time spent walking and cycling by on average 45minutes per week more than those living 4km away. Routes that change the environment in a highly visible and dramatic way (e.g. changing the context of local areas, or including superior design features) also may enhance impact. The research also found that changes to travel behaviour take time to occur and the largest changes in physical activity were not seen until two years after construction. In the M74 Study the introduction of a motorway increased car use, with little evidence of decreases in traffic accidents. It also found weak evidence of a decline in physical activity levels and no change to active travel. Those who lived closest to the new motorway had poorer mental wellbeing over time, compared to those who lived further away.

More recently, Dr Paul Kelly and Dr Graham Baker are co-investigators on an NIHR funded study, 'Is 20 plenty for health?' This project examines the impact of 20mph speed limits on safety and public health in Edinburgh and Belfast. Rates of traffic accidents and injuries before and after the change will be measured to look at whether road safety has been enhanced. Any change in transport use will also be scrutinised by examining the take-up of cycling and walking. Kieran Turner (a recent graduate of our MSc) is the research assistant on this project and has also begun to study a PhD in a similar area (supervised by Baker and Niven).

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4.2 Investigation of Sedentary Behaviour

This is a novel area of research that we have explored in recent years. Sedentary behaviour, which can be defined as any waking behaviour where sitting or lying is the dominant posture and energy expenditure is low, has been shown to have a negative impact on health independent of levels of physical activity behaviour. We have used our knowledge of behaviour change in walking to guide the development of interventions which might influence sedentary behaviour. Dr Claire Fitzsimons now leads this area of research and has a particular interest in sedentary time amongst older adults and stroke survivors. Other members of the team have recently begun to explore this area in other settings such as schools (Fawnker) and workplaces (Niven).

Dr Claire Fitzsimons and Prof Nanette Mutrie are co-investigators on a project exploring determinants of sedentary behaviour amongst older adults (*Seniors USP*, led by Prof Dawn Skelton, Glasgow Caledonian University and funded by the MRC). Sedentary behaviour has distinct deleterious health outcomes, yet there is no consensus on best practice for measurement. Together with colleagues at Glasgow Caledonian University, Fitzsimons has been working on behalf of the Seniors USP consortium on the identification of the optimal tool for population surveillance of sedentary behaviour, using a systematic framework. A framework, Taxonomy of Self-report Sedentary Behaviour Tools (TASST), was developed based on a systematic inventory of existing tools. The inventory was achieved through a systematic review of studies reporting sedentary behaviour and tracing back to the original description. Despite the limited evidence, mapping existing sedentary behaviour tools onto the TASST framework has enabled informed

recommendations to be made about the most promising features for a sedentary behaviour surveillance tool, and to identify the aspects on which future research and development should focus. NHS Greater Glasgow and Clyde used this surveillance tool for their Board-Wide Health and Wellbeing Survey in 2017; results from which will be used to help shape local policy and practice in this area.

Dr Victoria Palmer was the qualitative research assistant for the Seniors USP project, who explored older adults' perceptions of sedentary behaviour. This research examined what people do when they are sedentary and how important these activities are to them as well as seeking suggestions for ways older people might be encouraged to become less sedentary and the barriers that might stop them doing so. This work has now been extended with an ESRC Impact Acceleration Award (led by Cindy Gray, University of Glasgow) to work with Paths for All to develop sedentary behaviour information resources specific to older people.

Building on work from USP and EuroFit, in collaboration with colleagues at the University of Glasgow (lead institution), Queen's University, Belfast, Paths for All and PALtechnologies, Dr Claire Fitzsimons and Professor Nanette Mutrie have also been awarded funding from the Chief Scientist Office of the Scottish Government to develop and test a novel technology supported intervention to support older people to sit less and move more.

In collaboration with colleagues in Geriatric Medicine, Dr Claire Fitzsimons is leading on two grants exploring patterns of sedentary behaviour in stroke patients (CSO, ELHF). Prof Nanette Mutrie and Dr Ailsa Niven are Co-Is and Sarah Nicholson is the Research Assistant on a CSO funded project entitled *'Too much sitting in extended bouts in stroke survivors: a qualitative study to inform novel interventions.'* Susan Loh was the Research Assistant on an Edinburgh and Lothian's Health Foundation grant: *'A feasibility study to identify an effective method to provide feedback and remote monitoring on sedentary behaviour in stroke survivors'*. Dr Claire Fitzsimons is also part of a new £3M NIHR award to develop and evaluate strategies to reduce sedentary behaviour after a stroke. This is a multidisciplinary team, led by Professor Anne Forster of the University of Leeds and based in Bradford Teaching Hospitals NHS Foundation Trust, and includes other partners from Leeds, Queen Mary University of London and University of Newcastle (Australia).
The programme titled "Development and evaluation of strategies to reduce sedentary behaviour in patients after stroke and improve outcomes", comprises five interlinked work packages including a large multi-centre cluster Randomised Controlled Trial. The study focuses on reducing sitting time in survivors of stroke once they have been discharged from hospital and therapy services. Dr Sarah Morton is the research assistant on this project, based within Geriatric Medicine. The

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research team will be developing a behaviour change intervention through co-production principles, which will be tested in the trial. A mixed-method process evaluation and cost-effectiveness analysis will run in parallel with the trial.

Dr Ailsa Niven is drawing from psychological theories to understand and reduce sedentary behaviour in the workplace, with current publications resulting from projects undertaken by MSc Physical Activity for Health graduates (Macdonald and Hu). Ailsa led a symposium focusing on psychological perspectives to sedentary behaviour at the British Psychological Society DSEP Annual Conference, with Prof Nanette Mutrie also contributing.

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Dr Sam Fawkner leads research on sedentary behaviour in school settings. Chuchu Li (supervised by Dr Sam Fawkner, Dr Josie Booth and Prof John Sproule) is researching the effect of standing desks on school-age children's sedentary behaviour, classroom behaviour and academic performance.

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4.3 Physical Activity amongst Key 'At Risk' Groups

We believe people of all ages can benefit from becoming more active and so our research takes a life course approach. However, we are particularly interested in children and young people, older adults, ethic minority groups and people with medical conditions as key target groups. Whilst our research is applicable to the whole population, in order to try to reduce health inequalities, we focus on those who are at most risk of physical inactivity.

Children and Young People

Adolescent girls are a key target group for physical activity since there are gender inequalities in physical activity from pre-teens. Previously, Dr Sam Fawkner and Dr Ailsa Niven led research on physical activity amongst adolescent girls and they continue to publish in this area with graduated PhD Students (Dr Yvonne Laird, Dr Ann-Marie Knowles). Whilst most of our research explores public health impact of aerobic physical activity, Helen Weavers (supervised by Dr Sam Fawkner and Dr Josie Booth - an associate member of PAHRC), is exploring resistance training in children and how this might affect overall physical activity and obesity levels.

Older Adults

Older adults are also at risk of low activity and we are exploring physical activity in this age group via two PhD projects and a CSO funded study. In the *'We ROAM'* study (*Walking Experiences: Researching older adult motivations*), Nicky Laing (supervised by Niven and Fawkner and funded by Paths for All) is exploring why older people start and continue to walk with

group led health walks, such as those led by Paths for All. In addition to aerobic activity, the development of strength and balance is another key part of physical activity for health recommendations; one which we have described as 'the forgotten guidelines' (Strain, 2016). Divya Sivaramakrishnan (supervised by Mutrie, Baker and Fitzsimons) is exploring the use of yoga as a mechanism to support strength and balance amongst older adults.

Ethnic Minority Groups

Those from ethnic minority groups are also at risk of physical inactivity and Dr Graham Baker (Chancellor's Fellow) leads research in this area. His research area combines his knowledge from testing walking interventions for the general population via *'Walking for Wellbeing in the West (WWW)'* study and the development of obesity interventions for children from diverse ethnic groups (*DEAL Study*). In the recently completed qualitative project, '*South Asian Walking Study (SAWS)'*, funded by MRC PHIND, and conducted in partnership with Paths for All, Dr Baker, Dr Ailsa Niven and Dr Tasneem Irshad worked with community groups and Paths for All to explore how to adapt walking interventions for South Asian groups. Findings from this work are currently being written up for future publication.

People with Medical Conditions

Prof Nanette Mutrie has continued a research interest in physical activity and breast cancer, following on from a collaborative grant with Professor Annie Anderson at University of Dundee to pilot the use of a breast screening service as a vehicle for providing women with physical activity advice in relation to prevention *('ActWELL'*, led by Prof Annie Anderson, University of Dundee, funded by CSO). The project team has now received funding from the Scottish Government to test the wider implementation of the *'ActWELL'* project in community based settings (Mutrie and McAdam are Co-Is on this project, led by Anderson, University of Dundee). As part of this project, Prof Nanette Mutrie and Dr Chloe McAdam have trained volunteers for Breast Cancer Now who will support women attending breast screening clinics to increase their physical activity, eat a healthier diet and to lose weight and worked with local leisure trusts to facilitate introductions to local facilities.

ActWELL Training Team

In a related area, Prof Nanette Mutrie, Dr Chloe McAdam and Hayley Connell are part of a research team led by Prof Adrian Taylor at Plymouth University Peninsula Schools of Medicine and Dentistry, which was awarded over £780,000 by the National Institute for Health Research Programme Health Technology Assessment (NIHR HTA) for the *'eCoachER'* study. The team are working on a multi-site RCT exploring the potential of adding web based behavioural change support to traditional exercise referral schemes as a way to increase uptake and sustained physical activity by patients. The *'eCoachER'* trial is interested in patients with long-term conditions (obesity, hypertension, type 2 diabetes, osteoarthritis, or a history of depression) who are referred to services to help them become more physically active. Twelve month follow up data collection has recently been completed and analysis, write up and dissemination will follow.

'Training to Impact Exercise Referral (TIER)' is another project exploring the potential of exercise referral. TIER is led by Dr Chloe McAdam, Dr Ailsa Niven and Dr Graham Baker and is in partnership with NHS Greater Glasgow & Clyde and funded by ESRC IAA. TIER aims to understand what Behavioural Change Techniques are successful in physical activity consultations, to co-develop training to support exercise referral advisors to use these techniques, and measure the impact of this training on consultations and patient retention

Dr Dave Saunders is an exercise physiologist in PAHRC with a research interest in exercise training after stroke. Exercise can increase the low levels of fitness among stroke survivors, improve their day-to-day physical functioning, it may improve mood and reduce the chance of other health problems, including recurrent stroke. Dave has a particular methodological interest in systematic review and meta-analysis techniques and leads the Cochrane Reviews in exercise after stroke with Dr Claire Fitzsimons, and colleagues in Geriatric Medicine.

We also have an interest in supporting physical activity amongst those with a disability. Previous study (WalkWELL, led by Melville, University of Glasgow, Funded by CSO) found that a walking intervention and physical activity consultations were not successful in increasing walking or reducing sedentary behaviour amongst adults with intellectual disability. It is likely that adults with intellectual disability face more barriers to increasing activity due to a reliance on social and practical support from family members and paid carers in order to walk more. Social care budget cuts may mean that paid carers do not have time to support adults in physical activity interventions.

A new member of PAHRC, PhD student, Graham Condie (supervised by Dr Graham Baker, Dr Shirley Gray and Dr Sarah MacIsaac), is investigating experiencing and living with cerebral palsy or a similar neurological condition and finding meaning in recreation and disability sport.

4.4 Measurement and Surveillance

Appropriate and high quality measurement of physical activity and sedentary behaviour is fundamental to research, policy and practice; whether monitoring population trends, understanding sub-populations and high-risk groups, assessing correlates and determinants, or testing intervention effects and economics. Thus, this work is an over-lapping and integral component of the research conducted across all of PAHRC's key themes. We are interested in how we can improve our understanding and selection of available methods and develop new and refine existing approaches.

The measuring of Behavioural Change Techniques (BCTs) in psychological interventions has also been a focus of our recent work. We have used a tool kit to assess BCTs in published papers as part of systematic reviews to understand effective interventions and have recently audited BCTs in exercise consultations delivered as part of a NHS Greater Glasgow and Clyde's exercise referral scheme to help assess the quality of consultations (Baker, McAdam, Niven with NHS Greater Glasgow & Clyde).

Surveillance is a core aspect of our measurement work. It has an important role to play in national policy. Strain (recently completed PhD student) published a key paper on participation in muscle strengthening and balance and co-ordination activities by adults and older adults in Scotland using our National Surveillance measure (the Scottish Health Survey). This was well-received and subject to national media coverage.

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4.5 Evaluation

Dr Paul Kelly has a research interest in evaluation of physical activity which builds on the expertise in this area of Professor Nanette Mutrie and Avril Blamey.

Dr Paul Kelly, Dr Chloe McAdam and Kieran Turner completed a project for NHS Dumfries & Galloway in a project evaluating physical activity interventions in the health board and mapping projects to key aspects of the Toronto Charter. This commissioned research builds on Paul's work on HEAT (Health Economic Assessment Tool) and Pragmatic Evaluation and was commissioned by NHS Dumfries & Galloway to prioritise future funding and guide practice. Dr Paul Kelly, Dr Ailsa Niven and Chloe Williamson completed a second commissioned research project in late 2017 which was a qualitative investigation of why youth fail to engage in physical activity provision in Dumfries and Galloway.

In 2017, Paul Kelly and Tessa Strain (PhD Student) investigated whether the current formula behind the HEAT tool was appropriate for use, on behalf of WHO Europe. The HEAT tool is an online calculator that estimates the number of deaths that could be prevented if walking or cycling levels increased in a population. They found that the current formula provides the best estimates in the majority of situations given the information that users are required to provide about their scenario. They also suggested improvements that could be made if the users were asked more specific information about their scenario. Paul Kelly presented these findings in Copenhagen in March 2017.

In Section 4.1, we discussed evaluations of Paths for All projects and the development of a research area utilising a 'Realist Evaluation' approach as part of a PhD studentship (Mary Allison). These techniques and approaches are crosscutting across our research areas.

Dr Paul Kelly co-led the 5th Pragmatic Evaluation in Physical Activity and Public Health course which was held in Vancouver, Canada in June 2017. The course was an official Satellite event of the annual International Society of Behavioural Nutrition and Physical Activity (ISBNPA) conference held in Victoria 8th-11th June 2017.

The course successfully brought together academics, practitioners and policy-makers for joint capacity building in practically applied research and rigorous evaluation of physical activity programs. Delegates shared experiences from their home countries and it was an opportunity to learn from various settings and cultures. There were 9 faculty members from both the local region and international experts in evaluation who ran skill development sessions and shared learning from real world pragmatic evaluations.

Participants at the Pragmatic Evaluation Course in 2017

HEAT
Health economic assessment tool

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5. Knowledge Exchange and Other Activities

Much of our KE activities have been discussed alongside our research themes in order to showcase some of the developing areas for Impact. Some additional activities are also discussed below. These help promote our research centre, advocate for physical activity and share our expertise and styles of working with others in related fields. Many of our team are also active members of professional bodies (e.g. British Association of Sport and Exercise Scientists (BASES), British Psychological Society (BPS), International Society for Physical Activity & Health (ISPAH) and The International Society for the Advancement of Kinanthropometry (ISAK)). We continue to participate in the wider research community by reviewing journal articles, examining PhD theses and participating in networking and career development events.

5.1 Research Informed Teaching

We purposefully adopt a research informed teaching approach to deliver on our teaching. The MSc Physical Activity for Health, now in it's 5th year, continues to deliver a unique programme combining theory, research and practice to create graduates ready for a variety of employment opportunities in the field of physical activity for health. Our students are encouraged to become actively involved in PAHRC and our graduate testimonials showcase the extremely positive experience the students are afforded (https://www.ed.ac.uk/education/graduate-school/taught-degrees/physical-activity/students).

Dr Paul Kelly and Dr Sam Fawkner have also led on the development of an intercalated BScMedSci in Physical Activity for Health. The inaugural year was delivered to 9 medical students in 2017-18 and we are already fully subscribed for the 2018-19 academic year.

Building on a University of Edinburgh, Institute of Academic Development Networking grant, we have developed links with the Medical School in order to enhance the learning undergraduate medical students receive on physical activity. This has led to 2 publications on Medical Student's attitudes and knowledge about PA for health. As health professionals, Prof Chris Oliver and Dr Andrew Murray are excellent advocates of this area of work and continue to publish blogs and articles in this area.
Dr Jenni Harden and Dr Sam Fawkner (Joint PIs with Co-Is – Dr Danijella Gasevic, Dr Paul Kelly and Professor Chris Oliver) were awarded a Principal's Teaching Award Scheme (PTAS) grant for 'A Flipped Classroom Approach' to facilitate a formal teaching and learning opportunity in which first year medical students will be exposed to the basic principles of physical activity for disease prevention and treatment. This was first delivered as a pilot in Oct 2017 representing the first time PA content was timetabled in the medical curriculum. Evaluations were very positive and presented at the 2017 SPARC conference. The 2018 delivery is currently being evaluated, and the expectation is that the session will be retained in the medical curriculum for the foreseeable future. Material developed for this purpose will be utilised to provide self-study opportunities for all medical students.

5.2 Sit Less, Get Active Massive Open Online Course (MOOC)

The Sit Less, Get Active Massive Open Online Course (MOOC) is led by Dr Danijela Gasevic (Usher Institute of Population Health Sciences and Informatics, University of Edinburgh, PAHRC Core member), which also involves PAHRC core members (Nanette Mutrie, Graham Baker, Andrew Murray, Chris Oliver) and Helen Ryall from Sport and Exercise (University of Edinburgh, PAHRC associate member). MOOCs are online courses that can be taken by anyone from any part of the world as long as the person has access to the Internet.

The main goal of this 3-week MOOC, which started in May 2016, is to empower and enable people to sit less and move more in various settings such as their neighbourhood, home, work, or school. Various practical

examples on how to sit less and be more active are presented, such as helping people learn how to monitor their activity, setting realistic goals and providing suggestions for how to make activity a habit Embedded within the course is a pragmatic evaluation of the impact of the MOOC on learners' physical activity and sedentary behaviour and associated health outcomes.

Almost 27,000 people signed up for the first delivery of the course and since then over 150,000 in total have signed up.

5.3 Scottish Physical Activity Research Connections (SPARC)

In November 2017, 150 researchers, practitioners and policy makers from across Scotland came together to discuss current physical activity research relevant to policy and practice at the second Scottish Physical Activity Research Connections (SPARC) Conference. SPARC was organised by PAHRC and Active Scotland Division, Scottish Government. The event was funded by the Active Scotland Division at the Scottish Government.

The theme this year was *'Implementation of Physical Activity Interventions – How research, policy and practice can be implemented to achieve a more active Scotland'*. We invited abstracts, which related to the Active Scotland Outcomes Framework, which sets out the Scottish Government's ambitions for a more active Scotland. The keynote addresses were given by Professor Theo van Achterberg (KU Leuven), Professor Kate Hunt (MRC/CSO Social and Public Health Sciences Unit, University of Glasgow) and Dr Catherine Calderwood (Scotland's Chief Medical Officer). There were also a number of oral and poster presentations, workshops and an opportunity to network and make new connections.

Following the success of this event, a further conference is planned for November 2018. Conference report and video are available to view on-line.

5.4 Midlothian Science Festival

As part of our commitment to the wider community, researchers from PAHRC (Dr Sam Fawkner, Divya Sivaramakrishnan and Kieran Turner) attended Newbattle High School in October for the 2017 Midlothian Science Festival. The researchers ran a treasure hunt activity with the aim of helping children and parents understand the health benefits of physical activity. The activity was well received, and contributed to increasing physical activity levels on the day, and raising awareness of the topic. The researchers also used this opportunity to raise awareness of the 20mph speed limit being introduced in the City of Edinburgh, a neighbouring local authority area to Midlothian, which members of the research team are evaluating.

5.5 Yoga for an Older Adult Population

PAHRC organised a knowledge exchange event in October 2017 for yoga teachers, programme developers and researchers. Divya Sivaramakrishnan, shared findings from her research, and other information relevant to this audience including guidance for yoga instructors, strategies for promoting yoga, physical activity guidelines, and the effectiveness of yoga in older adults. Participants shared **their** views, provided feedback, and engaged in stimulating discussions. This event was a good platform for us to share research findings, and get inputs from yoga teachers and program designers. The workshop helped create a network of people interested in yoga for an older adult population. A visual illustrator captured the content of the discussion during the day.

5.6 Case Study with Cerebral Palsy International Sports and Recreation Association (CPISRA)

A collaboration between PAHRC and the Human Performance Science Research Group has been successful in securing a CAHSS KE and Impact Grant. Led by Dr Ailsa Niven and Dr Shaun Phillips, the project title is "Exploring the potential of animation to enhance knowledge exchange and impact of research: A case study with the Cerebral Palsy International Sports and Recreation Association (CPISRA)." The project will include a workshop on the potential for animation in the research areas of physical activity and human performance science

5.7 Research Impact Communications PhD Intern Role

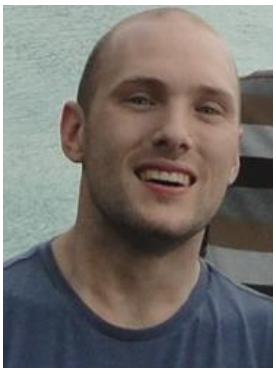
PAHRC PhD student, Divya Sivaramakrishan, was appointed to the Research Impact Communications intern post. This role focuses on capturing and communicating impact from research activity across the School in a public-facing way. Divya will be working with researchers and research teams to develop impact 'snapshots', develop the School's research blog, help build capacity and confidence amongst researchers for communicating their work, and help ensure that the School's excellent work is shared and recognised. Divya will be in this role from October 2017 till June 2018

6. The PAHRC Team

PAHRC currently has 27 core members (including 2 honorary professors) whose research focuses on physical activity for health. We have 38 associate members from across the University for whom physical activity is an aspect of their work.

Mary Allison, PhD Student
mary.allison@ed.ac.uk Twitter @MaryWestview
With a BA in Recreation and a MA in Sport and Physical Education, Mary's research interests have always focused on physical activity and quality of life. She has held important roles in strategy, policy and research in NHS Scotland, Scottish Government, SportScotland and latterly as the Director of Breast Cancer Now. Mary's PhD topic is a realist evaluation of the Paths For All Step Count Challenge. This is a workplace physical activity programme that has been running in Scotland since 2011.

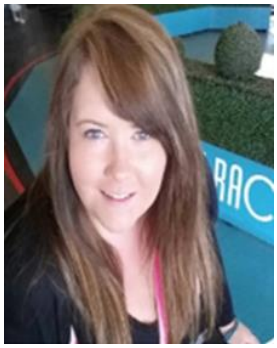
Dr Graham Baker, Chancellor's Fellow
graham.baker@ed.ac.uk Twitter @DrGrahamBaker
Graham has a background in exercise psychology and his principle interest is in the development and evaluation of interventions to promote lifestyle physical activities. He has a particular interest in how successful interventions could be adapted for other groups such as those from ethnic minority populations and those with physical impairments.



Graham Condie, PhD Student
s1690038@sms.ed.ac.uk Twitter: @condie_graham
Graham is a part time PhD Student looking at the influence of disability athletics and other recreational experiences on individuals with Cerebral Palsy identities, self-determination, health and wellbeing. His research interests' are in disability, the experience of having a medical condition and how leisure and recreation can empower people and improve their well being (in particular, those with medical conditions). He is also interested in disability sport, the meaning of different leisure experiences and Therapeutic Recreation.

Helen Collins, PhD Student
H.M.Collins@dundee.ac.uk Twitter: @helen_collins1
Helen's PhD focuses on the effect of resistance training on physical activity in youths. In particular she is interested in the impact of resistance training on fundamental movement skills, 'the self' and weight status, which, in turn, may have a positive effect on physical activity, levels

Hayley Connell, Research Assistant (until Jun 17)
hayley.connell@ed.ac.uk Twitter: @hconne200
Hayley is an RA on the e-CoachER project- a randomised controlled trial investigating whether the addition of a web-based resource can enhance the outcomes of traditional exercise referral. Hayley is also completing her PhD on increasing physical activity and reducing sedentary behaviour in stroke survivors using a personalised behavioural intervention.



Thelma Dugmore, Research Secretary
thelma.dugmore@ed.ac.uk
Thelma provides administrative support for the research centre and co-ordinates the Scottish Physical Activity Research Connections (SPARC) events. Please contact Thelma if you would like any information about PAHRC.

Dr Sam Fawkner. Senior Lecturer in PA and Health
s.fawkner@ed.ac.uk Twitter @sfawkner
Sam is a paediatric physiologist, with a focused interest on the role of growth and maturation on health and well-being and in particular on changes in physical activity behaviour during childhood and adolescence.

Dr Claire Fitzsimons, Chancellor's Fellow
claire.fitzsimons@ed.ac.uk Twitter: @CFFitzsimons
Claire has a background in exercise physiology and her current research fellowship focuses on sedentary behaviour, specifically how older people perceive sedentary behaviours, the health risks and testing out possible interventions.

Dr Tasneem Irshad, Research Associate (until Feb 17)
Tasneem.Irshad@ed.ac.uk Twitter: @tasneem_irshad
Tasneem has a background in ethnicity and health and is currently involved in an MRC funded project to develop a culturally adapted walking intervention in South Asians. Tasneem's research interests have included exploring end of life care needs in South Asians, exploring experiences of diagnostic testing for people with perceived allergic problems, the experience of cancer in South Asian children and their families and bladder control in people with MS.

Dr Paul Kelly, Lecturer in Physical Activity for Health
p.kelly@ed.ac.uk Twitter: @narrowboat_paul
Paul's interests are physical activity epidemiology, evaluation, measurement of health behaviours, walking, cycling and active travel benefits.

Nicky Laing, PhD Student
nicky.laing@ed.ac.uk Twitter: @LaingNicky
In 2010, Nicky completed a Masters in Public Health Practice at Queen Margaret University. Since then, Nicky worked with our research group as an RA for over 2 years before embarking on a PhD that is focused on understanding determinants of walking for health in older adults.

Chuchu Li, PhD Student
s1501607@sms.ed.ac.uk
Chuchu's PhD focuses on the effect of standing desk on children's sedentary behavior, classroom behavior, cognition development and academic performance. She has an interest in children's cognition development and how interventions would influence it.

Susan Loh, Research Assistant (until Dec 2017)
susan.loh@ed.ac.uk
Susan is currently working on a study funded by the Edinburgh and Lothian's Health Foundation to explore the use of commercially available activity monitors to provide feedback on sedentary behaviours to stroke survivors. She is trained as a physiotherapist and has an interest in researching physical activity and exercise prescription as a treatment in medical conditions.

Dr Chloe McAdam, RKE Coordinator
chloe.mcadam@ed.ac.uk
Twitter @UoE_PAHRC/@ChloeMcAdam
Chloe has a background in physical activity research and has an interest in knowledge exchange and creating impact from research by working closely with policy and practice.

Dr Sarah Morton, Research Fellow
Sarah.morton@ed.ac.uk Twitter: @_sarah_morton

Sarah's research looks to involve patient populations in identifying realistic solutions to complex health issues using co-design and behaviour change approaches. Current work focuses on understanding sedentary behaviour following stroke and developing an intervention to reduce these behaviours (Recreate study), and; the role of green space and physical activity in supporting improved long-term recovery outcomes for stroke survivors. Sarah is also interested in developing adaptable solutions that can be implemented as part of an individual patient care package.

Professor Marie Murphy, Honorary Professor
mh.murphy@ulster.ac.uk Twitter: @MarieHMurphy

Marie is Professor of Exercise and Health and leads the Centre for Physical Activity and Health Research (CPAHR) at the University of Ulster. Marie's research interests include the role of exercise, in particular walking, on health. Current research includes outcome measures ranging from the behavioural to the biochemical and she embraces a multidisciplinary approach to physical activity and exercise research questions.

Dr Andrew Murray, PhD Student
docandrewmurray@gmail.com
Twitter: @DocAndrewMurray

Andrew is dual qualified in Sport and Exercise Medicine and General Practice and works at Fitness Assessment and Sports Injuries Centre (FASIC). He also works with the European Tour Golf, the SportScotland Institute of Sport and the Scottish Rugby Union. His PhD focuses on golf and health.

Prof Nanette Mutrie
Chair in Physical Activity for Health/PAHRC Director
nanette.mutrie@ed.ac.uk Twitter @nanettemutrie

Nanette is an exercise and sport psychologist with over 20 years of research in designing and testing interventions to help people to walk more. She has particular interest in the role of walking to promote mental health and walking for those with medical conditions.

Sarah Nicholson, Research Assistant
scarrol1@exseed.ed.ac.uk
Sarah is currently working on a Chief Scientist Office project: Too much sitting in extended bouts in stroke survivors: a qualitative study to inform novel interventions. Sarah is also completing her PhD on the development of a behaviour change intervention to increase physical activity after stroke.

Dr Ailsa Niven, Senior Lecturer in PA and Health
ailsa.niven@ed.ac.uk Twitter @AilsaNiven
Ailsa's background is in sport and exercise psychology and her research focuses on the psychological determinants and consequences of physical activity within a range of groups, including adolescent girls, adults and older adults.

Professor Chris Oliver, Honorary Professor
Chris.oliver@ed.ac.uk Twitter: @cyclingsurgeon
Chris is an NHS Consultant Orthopaedic Trauma Surgeon at Royal Infirmary Edinburgh. His main interests are: active travel, obesity, cycling, kayaking, 20mph, development and promotion of undergraduate medical education in physical activity in UK.

Dr Victoria Palmer, Research Assistant (until Oct 2017)
Victoria.Palmer@glasgow.ac.uk Twitter:@vicstic76
Victoria has an interest in researching physical activity and sedentary behaviour using qualitative and mixed methods approaches. Her previous research drew on the large body of physical activity research from the sport and exercise sciences, as well as sociological theory to capture negotiations of physical activity in three generational families. She is currently working as an RA with the Seniors USP project conducting qualitative interviews with older adults about sedentary behaviour.

Rebecca Pillinger, Research Assistant
rebecca.pillinger@ed.ac.uk Twitter: @Neremanth
Rebecca is a statistician with an interest in using complex models to address substantive questions in the social sciences. She is currently working on a project using Census data to examine the factors influencing people's choice of an active mode of transport to work. She is also employed by the Usher Institute for Population Health Sciences and Informatics where she is working on a project looking at the relationship between female sex hormones and asthma.

Dr Dave Saunders
Senior Lecturer in Exercise Physiology
dave.saunders@ed.ac.uk Twitter: @DrDaveSaunders

Dave is an exercise physiologist and leader of the BSc Applied Sport Science degree at Edinburgh. His research involves use of systematic review methodologies to examine the role of exercise in patient groups, particularly stroke.

Divya Sivaramakrishnan, PhD Student
Divya.sivaramakrishnan@ed.ac.uk
Twitter: @DivyaSivaramak

Divya's PhD topic is evaluating the health benefits of incorporating yoga into the physical activity plan of older adults. Divya's research interests are physical activity promotion, implementation of interventions and adherence, evaluation of physical activity regimes across the life span, studying the effects of physical activity on chronic diseases and understanding the effects of yoga.

Tessa Strain, PhD Student
Tessa.strain.ed.ac.uk Twitter: @tessastraining

Tessa has an MSc in exercise physiology and has experience working with large datasets. She is currently undertaking a PhD using Scottish Health Survey data to explore the physical activity behaviours of adults in Scotland.

Kieran Turner, Research Assistant/PhD Student
kieran.turner@ed.ac.uk Twitter: @Kierant26

Kieran has an interest in how transport policies and the environment can influence physical activity behaviour. Since graduating from the MSc in Physical Activity for Health in 2015, he has been working on a qualitative project investigating the perceptions of key informants of 20mph speed limits in Edinburgh and contributed to the formation of an NIHR grant proposal to evaluate the health benefits of 20mph speed limits being implemented in Edinburgh.

7. Research Awards

In 2017, PAHRC collaborated in 16 projects with associated research grants.

1. **Paths for All PhD studentship: Walking for health in older adults**
   PI – Niven (Co-I Fawkner)
   01/10/13 – 30/09/19
   Total Award to UoE - £45,000. Total to MHSE, UoE, £45,000.
   Funded by Paths for All.

2. **Social innovation to improve physical activity and sedentary behaviour through elite European football clubs: European Fans in Training (Euro-FIT)**
   Led by Wyke, University of Glasgow. (Co-I Mutrie) 01/11/13 – 30/10/18
   Total Award to UoE - £144, 739. Total to MHSE, UoE - £110,444.
   Funded by European Commission FP7

3. **The M74 study: longitudinal follow-up of the health effects of a new urban motorway**
   Led by Ogilvie, University of Cambridge. (Co-I Mutrie)
   1/01/13 - 31/01/17
   Total to UoE - £26,011. Total to MHSE, UoE - £26,011- Funded by NIHR PHR

PAHRC currently collaborates in grants worth over £1.3 million to UoE.

4. **Seniors USP (Understanding Sedentary Patterns)**
   Led by Skelton, Glasgow Caledonian University. (Co-Is Mutrie and Fitzsimons)
   01/05/14 – 30/04/17
   Total Award to UoE - £383, 355. Total to MHSE, UoE - £70,666. Funded by MRC

5. **Long-term weight loss trajectories in participants in a randomised controlled trial of a weight management and healthy lifestyle programme for men delivered through professional football clubs: the Football Fans in Training follow up**
   Led by Gray, University of Glasgow (Co-I Mutrie.
   1/01/15 - 31/01/17
   Total to UoE - £2,230. Total to MHSE, UoE - £2,230. Funded by NIHR

6. **e-CoachER: A multi-centred RCT of an augmented exercise referral scheme using web-based behavioural support in individuals with metabolic, musculo-skeletal and mental health conditions**
   Led by Taylor, University of Plymouth (Co-I Mutrie)
   01/01/15 - 31/01/18
   Total to UoE - £202, 425. Total to MHSE, UoE- £161,940. Funded by NIHR HTA

7. **Too much sitting in extended bouts in stroke survivors: a qualitative study to inform novel interventions**
   PI – Fitzsimons (Co-I Mutrie)
   01/06/15 - 31/03/17
   Total to UoE - £225, 367. Total to MHSE, UoE - £170,928. Funded by CSO

8. **Development of a culturally adapted walking intervention for South Asian adults in Scotland** PI -Baker (Co-Is - Mutrie, Niven & Sheikh) 1/09/15 - 28/02/17
   Total Award to UoE - £170, 548, Total to MHSE, UoE - £136,438, Funded by MRC PHIND

9. **A feasibility study to identify an effective method to provide feedback and remote monitoring on sedentary behaviour in stroke survivors**
   PI – Fitzsimons (CoI Mutrie)
   01/04/16 – 31/08/17
   Total to UoE - £40,001. Total to MHSE, UoE - £40,001. Funded by Edinburgh and Lothians Health Foundation (ELHF)

10. **Physical activity in medical curriculum: a flipped classroom approach**
    Co-PI – Fawkner (Co-Is: Gasevic, Kelly, Oliver)
    01/06/16 – 31/08/18

Total to MHSE - £5,000. Funded by UoE

11. **Guidance on the best investments for physical activity in Dumfries and Galloway modelled on Global Best Investments paper but informed by local level evidence**
PI Kelly (Co-I McAdam)
01/08/16 – 31/12/18
Total to UoE - £9,000, Total to MHSE UoE - £9,000. Funded by NHS Dumfries and Galloway)

12. **A randomised control trial to assess the impact of a lifestyle intervention (ActWELL) in women attending NHS breast screening clinics**
Led by Anderson, University of Dundee (Co-Is Mutrie, McAdam)
01/01/17 – 31/12/19 Total to UoE - £34,664. Total to MHSE, UoE - £34,664.
Funded by Scottish Government

13. **TIER Training to Influence Exercise Referral - Co-production between PAHRC and NHSGGC of training to support Exercise Referral Scheme advisors to deliver successful behavioural change consultations.**
PI McAdam (CoIs Niven & Baker)
01/02/17 – 30/03/18
Total to UoE/MHSE £14, 109
Funded by ESRC IAA

14. **RECON REducing and preventing COgnitive impairment iN older age groups: the RECON programme**
Led by Little, University of Southampton
(CoI Mutrie)
13/03/2017 - 12/07/2026
Total to UoE - £6,644, Total to MHSE UoE - £6,644
Funded by NIHR PGfAR

15. **Development and evaluation of strategies to reduce sedentary behaviour in patients after stroke and improve outcomes**
PI Fitzsimons
1/10/17 → 30/09/24
Total to UoE/MHSE - £25,150
Funded by NIHR

16. **Improving sedentary behaviour and physical activity in community-dwelling older adults: Development and feasibility of a technology-supported intervention**
PI – Fitzsimons (Co-I Mutrie)
1/11/17 → 31/01/20
Total to UoE/MHSE - £19,654
Funded by CSO

17. **A systematic review of the effect of High Intensity Interval Exercise (HIIE) on affect, enjoyment and perceived competence in adults.**
PI – Niven (Co-I Phillips & Saunders)
01/02/17 – 01/02/18
Total to UoE/MHSE - £1,447
Funded by UoE MHSE Seedcorn

18. **Exploring the potential of animation to enhance knowledge exchange and impact of research: A case study with the Cerebral Palsy International Sports and Recreation Association (CPISRA)**
PIs Niven & Phillips
20/11/17 – 19/04/2018
Total to UoE/MHSE £3,037
Funded by UoE CAHSS KE & Impact Grant

8. Research & Knowledge Exchange Outputs for 2017

8.1 Research Outputs

These are a mixture of high impact, peer-reviewed publications, advocacy pieces, editorials, blogs and theses. All available on Edinburgh Research Explorer Authors from PAHRC are denoted in bold.

Altmetrics ranks 2 PAHRC papers (10 & 32) in the Top 100 most discussed global journal articles of 2017 and 4 in the all time Top 10 of University of Edinburgh's research (10, 32, 33 & 39)

Altmetric

Book Chapters

1. **Paul Kelly, Marie Murphy, Nanette Mutrie** (2017) 'The Health Benefits of Walking' (Book Chapter) Link

2. Woods, C. & **Mutrie, N.** 18 Dec 2017 Routledge Handbook of Physical Activity Policy and Practice. Piggin, J., Mansfield, L. & Weed, M. (eds.). Routledge, p. 22-34 13 p. (Routledge International Handbooks) 'Putting physical activity on the policy agenda' (Chapter in book) Link

Peer Reviewed Journal Articles

3. Campbell, A., Calderwood, C., Hunter, G. & Murray, A. 4 Dec 2017 In: British Journal of Sports Medicine. p. 1-2 2 p. 'Physical activity investments that work - Get Scotland walking: A national walking strategy for Scotland' (Article) Link

4. Dall, P., Coulter, E. H., Fitzsimons, C., Skelton, D. A., Chastin, S. & Mutrie, N. 1 Apr 2017 In: BMJ Open. 7, p. 1-12 e013844 'The Taxonomy of Self-reported Sedentary behaviour Tools (TASST) framework for development, comparison and evaluation of self-report tools: Content analysis and systematic review' (Article) Link

5. Donnachie, C., Wyke, S., **Mutrie, N**. & Hunt, K. 5 May 2017 In: International Journal of Behavioral Nutrition and Physical Activity. 14, 61, p. 1-14 14 p. ''It's like a personal motivator that you carried around wi' you': Utilising self-determination theory to understand men's experiences of using pedometers to increase physical activity in a weight management programme' (Article) Link

6. Elmesmari, R., Reilly, J. J., **Martin, A.** & Paton, J. Y. 22 Jun 2017 In: PLoS One. 'Accelerometer Measured Levels of Moderate-to-Vigorous Intensity Physical Activity and Sedentary Time in Children and Adolescents with Chronic Disease: a Systematic Review and Meta-Analysis' (Article) Link

7. **Fazzi Gómez, C., Saunders, D.,** Linton, K., Norman, J. & Reynolds, R. 16 Mar 2017 In: International Journal of Behavioral Nutrition and Physical Activity. 14, p. 1-13 13 p. 'Sedentary behaviours during pregnancy: A systematic review' (Article) Link

8. Gates, L. S., Leyland, K. M., Sheard, S., Jackson, K., **Kelly, P.,** Callahan, L. F., Pate, R., Roos, E. M., Ainsworth, B., Cooper, C., Foster, C., Newton, J. L., Batt, M. E. & Arden, N. K. 25 Feb 2017 In: Rheumatology international. p. 1-10. 'Physical activity and osteoarthritis: A consensus study to harmonise self-reporting methods of physical activity across international cohorts' (Article) Link

9. Gill, J. M., Hawari, N. S., Maxwell, D. J., Louden, D., Mourselas, N., Bunn, C., Gray, C. M., Van Der Ploeg, H. P., Hunt, K., **Martin, A.,** Wyke, S. & **Mutrie, N.** 16 Oct 2017 In : Medicine & Science in Sports & Exercise. p. 1-28 28 p. 'Validation of a novel device to measure and provide feedback on sedentary behavior' (Article) Link

10. Lear, S. A., Hu, W., Rangarajan, S., **Gasevic, D**., Leong, D., Iqbal, R., ... Yusuf, S. (2017). The effect of physical activity on mortality and cardiovascular disease in 130 000 people from 17 high-income, middle-income, and low-income countries: the PURE study. *The Lancet*. Link **HIGH RANKING ALTMETRIC**

11. Luscombe, J., **Murray, A.,** Jenkins, E. & Archibald, D. 5 Nov 2017 In : BMJ Open. 18 p. 'A rapid review to identify physical activity accrued whilst playing golf' (Article) Link

Martin, A., Adams, J. M., Bunn, C., Gill, J. M. R., Gray, C. M., Hunt, K., Maxwell, D. J., P van der Ploeg, H., Wyke, S. & **Mutrie, N.** 11 Oct 2017 In: BMJ open sport & exercise medicine. p. 1-10 e000285 'Feasibility of a real-time self-monitoring device for sitting less and moving more: A randomised controlled trial' (Article) Link

12. **Martin, A.,** Booth, J., McGeown, S., Niven, A., Sproule, J., **Saunders, D**. & Reilly, J. 10 Jul 2017 In: Current Obesity Reports. 17 p. 'Longitudinal association between childhood obesity and academic achievement: Systematic review with focus group data' (Article) Link

13. Matthews, L., Kirk, A., McCallum, M., **Mutrie, N**., Gold, A. & Keen, A. Feb 2017 In: Practical Diabetes. 34, 1, p. 7-12 'The feasibility of a physical activity intervention for adults within routine diabetes care: A process evaluation' (Article) Link

14. Maynard, M., **Baker, G**. & Harding, S. 24 Feb 2017 In: Preventive Medicine. 6, p. 130-136 7 p. 'Exploring childhood obesity prevention among diverse ethnic groups in schools and places of worship: Recruitment, acceptability and feasibility of data collection and intervention components' (Article) Link

15. **Murray, A. D., Turner, K**., Archibald, D., Schiphorst, C., Griffin, S. A., Scott, H., Hawkes, R**., Kelly, P.,** Grant, L. & **Mutrie, N.** 1 Aug 2017 In: BMJ open sport & exercise medicine. 3, 1, p. e000244 'An observational study of spectators' step counts and reasons for attending a professional golf tournament in Scotland' (Article) Link

16. **Mutrie, N.** & 47 others Jan 2017 In: Cancer treatment reviews. 52, p. 91-104 14 p. 'Effects and moderators of exercise on quality of life and physical function in patients with cancer: An individual patient data metaanalysis of 34 RCTs' (Article) Link

17. Prins, R. G., L, F., **Mutrie, N**. & Ogilvie, D. 27 Jul 2017 In: International Journal of Behavioral Nutrition and Physical Activity. 14, 102, p. 1-10 10 p. 'Effects of

urban motorways on physical activity and sedentary behaviour in local residents: A natural experimental study' (Article) Link

18. Olsen, J., Mitchell, R., **Mutrie, N**., L, F. & Ogilvie, D. 28 Sep 2017 In: Preventive Medicine. 8, p. 129-134 'Population levels of, and inequalities in, active travel: A national, cross-sectional study of adults in Scotland' (Article) Link

19. Pearce, M., **Saunders, D.,** Allison, P. & Turner, A. 2017 In: Journal of Physical Activity and Health. 15, 1, p. 40-45 6 p. 'Indoor and outdoor context-specific contributions to early adolescent MVPA as measured by combined diary, accelerometer and GPS' (Article) Link

20. Reilly, J. J., **Martin, A.** & Hughes, A. Jun 2017 In: Current Obesity Reports. 6, p. 127–133 7 p. 'Early-Life Obesity Prevention: Critique of Intervention Trials During the First One Thousand Days' (Article) Link

21. **Strain, T., Kelly, P., Mutrie, N. & Fitzsimons, C.** 2017 Journal of Sports Sciences. 36, 7, p. 1-10 10 p Differences by age and sex in the sedentary time of adults in Scotland (Article) Link

22. Tremblay, M., Aubert, S., Barnes, J. D., Saunders, T. J., Carson, V., Latimer-Cheung, A. E., Chastin, S., Altenburg, T. M., Chinapaw, M. J. M. & **Fitzsimons, C.** 10 Jun 2017 In: International Journal of Behavioral Nutrition and Physical Activity. 14, 75, p. 1-17 'Sedentary Behavior Research Network (SBRN) – Terminology Consensus Project' (Article) Link

23. Verschuren, O., **Fitzsimons, C.,** Mead, G., van Wijck, F., van den Berg-Emons, R., Dallmeijer, A. & Balemans, A. 20 Oct 2017 In: Jacobs Journal of Sports Medicine. 4, 1 'Daily physical activity and exercise for people with long term neurological conditions: A delicate balance between training and recovery' (Article) Link

Editorials

24. Mackenzie, G., **Murray, A. & Oliver, C. W.** 2 Mar 2017 In: British Journal of Sports Medicine. p. 1-2 2 p. 'Virtual attendance at an international physical activity meeting using Twitter: How can data visualisation provide a presence?' (Editorial)Link

25. Murray, I., **Murray, A.,** Wordie, S., **Oliver, C. W.,** Simpson, H. & Haddad, F. S. 6 Dec 2017 In: Bone and Joint Journal. 99, B, p. 1557-1558 2 p., vol. 99-B no. 12 'What surgeons need to know about infographics' (Editorial) Link

26. Murray, I., **Murray, A.,** Wordie, S., **Oliver, C. W.,** Murray, A. & Simpson, H. 7 Nov 2017 In : Bone & Joint Research. 'Maximising the impact of your work using infographics' (Editorial) Link

27. Griffin, S., **Oliver, C. W. & Murray, A.** 22 Aug 2017 In: British Journal of Sports Medicine. p. 1-2 2 p. ''Altmetrics'! Can you afford to ignore it?' (Editorial) Link

28. Scott, H., **Fawkner, S., Oliver, C. W. & Murray, A**. 1 Aug 2017 In: British Journal of Sports Medicine. p. 1183-1184 2 p. 'How to make an engaging infographic?' (Editorial) Link

29. Robertson, G., Wood, A. **& Oliver, C. W**. 12 May 2017 In: British Journal of Sports Medicine. 2 p. 'Displaced middle-third clavicle fracture management in sport:

still a challenge in 2018: Should you call the surgeon to speed return to play?' (Editorial) Link

30. Stamatakis, E., **Kelly, P.**, Titze, S., Pedisic, Z., Bauman, A., Foster, C. E., Hamer, M., Hillsdon, M. & Oja, P. 8 Feb 2017 In: British Journal of Sports Medicine. p. 1-3 'The associations between participation in certain sports and lower mortality are not explained by affluence and other socioeconomic factors' (Editorial) Link

From 2016, but ranked by Altmetrics as 2017

31. Oja P, Kelly P, Pedisic Z*, et al* (Nov-16) Associations of specific types of sports and exercise with all-cause and cardiovascular-disease mortality: a cohort study of 80,306 British adults *Br J Sports Med* 2017; **51:812**-817 (Article) Link
HIGH RANKING ALTMETRIC

32. Scott, H., Fawkner, S., Oliver, C. W., & Murray, A. (2016). Why healthcare professionals should know a little about infographics. *British Journal of Sports Medicine*. Link
** HIGH RANKING ALTMETRIC**

Reports, Blogs and Other Outputs

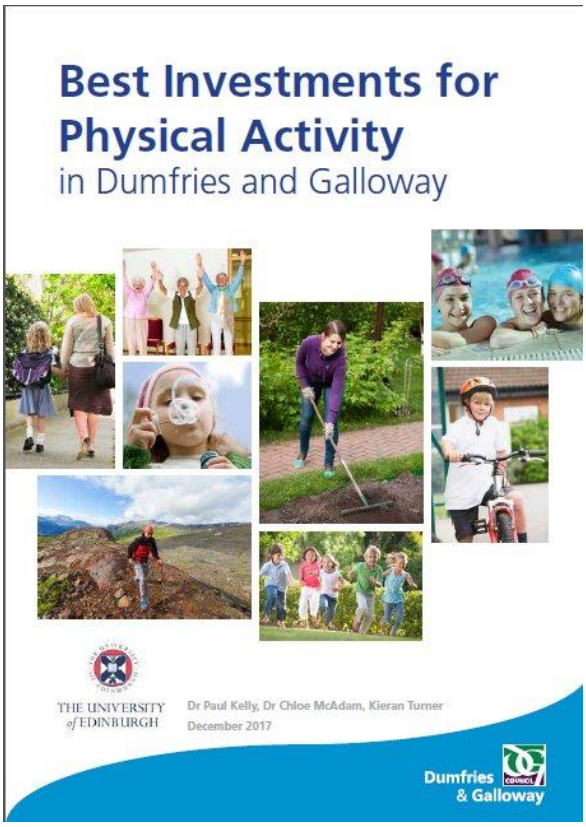
33. Jarman, P., Forup, S. **& Oliver, C. W.** 30 Mar 2017 British Medical Journal 'Play on pedals: Engaging preschool children in cycling to improve mental and physical health of future generations' (Blog) Link

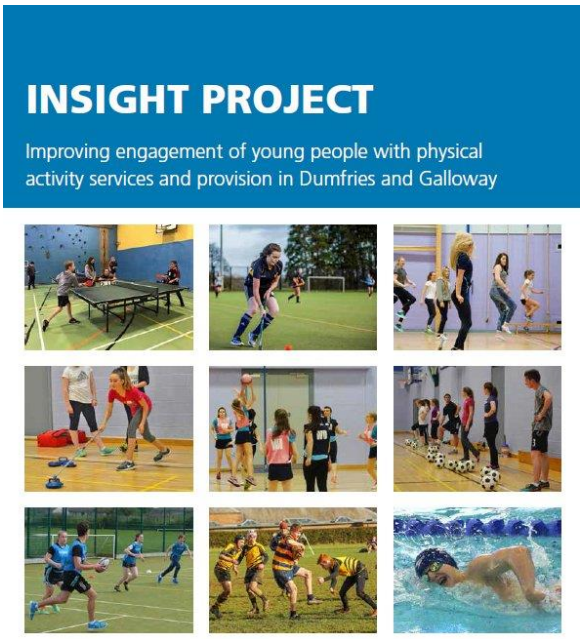
34. Kelly, McAdam & Turner (2017) Best In vestments for Physical Activity in Dumfries and Galloway (Report)

35. Kelly, Niven & Williamson (2017) Insights Report: Improving engagement of young people with physical activity services and provision in Dumfries and Galloway. (Report)

Infographic from Research Output 39

Infographic from Research Output 28





36. Marko Tainio, James Woodcock, Soren Brage, Thomas Götschi, Anna Goodman, **Paul Kelly,** Audrey de Nazelle. Government Report: Research into valuing health impacts in transport appraisal. (Report) Link

37. **Oliver, C. W.** 14 Sep 2017 Scottish Collaboration Public Health Research and Policy, p. 35 38 p. 'Implementing Policy for Physical Activity and the International Futures Forum' (Blog) Link

38. Robertson, G., **Oliver, C. W.** & Scott, H. 11 Apr 2017 In: British Journal of Sports Medicine. 'Infographic: Return rates and return times to sport after Middle-Third clavicle fracture: Important knowledge for management of these injuries in athletes' (Infographic) Link

39. **Saunders, D**., Horrell, A. & **Murray, A**. 18 Mar 2017 In: British Journal of Sports Medicine. 5 p. 'Infographics for student assessment: More than meets the eye' (Editorial) Link

40. Schiphorst, C., **Oliver, C. W., Murray, A., Kelly, P.** & Bull, F. 1 Aug 2017 In: British Journal of Sports Medicine. 51, p. 1227-1228 2 p. 'Infographic: Best investments for physical activity' (Article) Link
** HIGH RANKING ALTMETRIC**

41. Temple, J. & **Oliver, C. W.** 25 Oct 2017 British Journal of Sports Medicine Blog, 1, 1, p. 1 1 p. 'Attention! Obesity and healthcare professionals: Support the UK National Student Health Programme' (Blog) Link

8.2 Presentations

Helen Collins

1. 'The effect of resistance training interventions on weight status in youth: a meta-analysis', Scottish Physical Activity Research Connections, November 2017

Dr Claire Fitzsimons

2. 'Feedback on sedentary time to stroke survivors: a feasibility study'. UK Stroke Forum, Nov 2017

3. Seniors USP Workshop: Presented results from Seniors USP, IAA leaflet and training and plans for CSO grant, September 2017

4. Seniors USP Conference: Presented results from WP4 Seniors USP qualitative work, IAA impact award including Sit Less Move More Leaflet and CSO activator grant, October 2017

5. Seniors USP Webinar on determinants of Sedentary Behaviour: Presentation on the qualitative work from WP4, the IAA award and sit less move more leaflet and introduced the CSO activator award, October 2017

6. 'Sit Less Walk More' Seminar, Department of Clinical Therapies, University of Limerick, November 2017

Dr Paul Kelly

7. 'Making the economic case for walking and cycling'. Welsh Government Active Travel Conference, Feb 2017

8. 'What makes a good PhD?', Keynote speech at University of East Anglia PhD Day, May 2017

9. 'Prescribing walking for health benefit', Workshop, International Society of Behavioural Nutrition and Physical Activity (ISBNPA), June 2017

10. 'Sit less, move more: helping people see the value of physical activity', NHS Greater Glasgow and Clyde Podiatry Development Day, June 2017

11. Workshop on physical activity for people who have undergone breast cancer treatment, Breast Cancer Care's Moving Forward Programme, June 2017

12. 'Modelling the health economic benefits of walking and cycling', keynote speech at 2017 Society for Chinese Scholars for Exercise Physiology and Fitness Annual Conference, August 2017

13. 'Modelling the health economic benefits of walking and cycling', keynote speech at 2017 Sports Science Seminar, August 2017

14. 'What don't we know about physical activity? And how do we get people to listen?', Edinburgh Sport and Exercise Medicine Society National Undergraduate conference, November 2017

15. 'Problems of lack of physical activity', Transport for London Symposium, November 2017

Dr Chloe McAdam

16. 'Go to Guide to Physical Activity, NHS Greater Glasgow and Clyde Podiatry Development Day, June 2017

Prof Nanette Mutrie

17. 'Helping older adults sit less and walk more: pedometers, SitFITs and other devices', Get A Move on Workshop, June 2017

Dr Ailsa Niven

18. 'Increasing understanding of office workers' beliefs about sitting at work', Seminar on Workplace Sedentary Behaviour, Glasgow Caledonian University, March 2017

19. 'Understanding behaviour change in a Paths for All context'. Workshop delivered to Paths for All Edinburgh and Perth, November 2017

20. 'Psychological perspectives on sedentary behaviour'. Symposium at BPS DSEP annual conference, December 2017

Prof Chris Oliver

21. 'Cycling to physical activity: couch potato consultant surgeon to endurance athlete', Obesity Action Campaign Conference, March 2017

22. ukactive's Edinburgh Promising Practice Regional Roadshow Physical Activity. Lecture: 'Promising Scottish physical activity programmes'. ukactive Research Institute, Public Health England and the National Centre for Sport and Exercise Medicine, April 2017

23. 'Pilates has a role in health promotion, 1st International Pilates Gathering, September 2017

24. 'Where are we now with physical activity', National Undergraduate Sports and Exercise Medicine Conference, October 2017

25. 'Turning Your Life Around: The Role of Physical Activity', Improving health and wellbeing through our natural health service, October 2017

Dr Dave Saunders

26. 'Sitting, physical activity and exercise after stroke', International Association of Chartered Physiotherapists in Neurology, March 2017

Divya Sivaramakrishnan

Presented the following two papers at HEPA Europe on 16 November 2017:

27. 'The effects of yoga on physical functioning and health related quality of life in healthy older adults - systematic review and meta-analysis' (Divya Sivaramakrishnan, Dr. Claire Fitzsimons, Dr. Graham Baker, Dr. Paul Kelly, Dr. Dave Saunders, Kim Ludwig and Prof Nanette Mutrie)

28. 'Examining perceptions of yoga among older adults: a qualitative study' (Divya Sivaramakrishnan, Dr. Claire Fitzsimons, Prof Nanette Mutrie and Dr. Graham Baker)

Tessa Strain

29. 'Sedentary behaviour amongst adults in Scotland', Seminar on Workplace Sedentary Behaviour, Glasgow Caledonian University, March 2017

Kieran Turner

30. 'Development and refinement of a programme theory for evaluating the public health impact of signage only 20mph speed limits', International Society of Behavioural Nutrition and Physical Activity (ISBNPA), June 2017

8.3 Posters

1. 'Activity behaviours in lean and morbidly obese pregnant women' **Caterina Fazzi** (presenting), J E Norman, **D H Saunders**, RM Reynolds. International Society of Behavioural Nutrition and Physical Activity (ISBNPA), June 2017

2. 'Is 20 plenty for health? Evaluation of the 20mph speed limit networks in Edinburgh and Belfast on a range of public health outcomes' **Kieran Turner** (presenting), Ruth Jepson, **Graham Baker,** Andy Cope (Sustrans), Neil Craig, Charlie Foster, Ruth Hunter, Frank Kee, Michael P Kelly, **Paul Kelly**, Karen Milton, Glenna Nightingale, Andrew James Williams, James Woodcock. Scottish Physical Activity Research Connections, November 2017

3. 'Physical Activity in Medical Education: A Flipped Classroom Approach' Alice Harper (presenting), Louise Lynch, Nikola Wasag, Chaoyang Wang, Emma Sharland, Scott Mckinnon, Jeni Harden, **Paul Kelly, Danijela Gasevic, Chris Oliver and Samantha Fawkner.** Scottish Physical Activity Research Connections, November 2017

4. 'An investigation of the influence of gender, socioeconomic status, and motivation on young people's sport participation within a Scottish context'. Steven Young (presenting), Russell Martindale, **Graham Baker.** Scottish Physical Activity Research Connections, November 2017

5. 'Differences in child physical activity data analysis between Scotland and England'. **Chloe Williamson (presenting), Paul Kelly, Tessa Strain**. Scottish Physical Activity Research Connections, November 2017

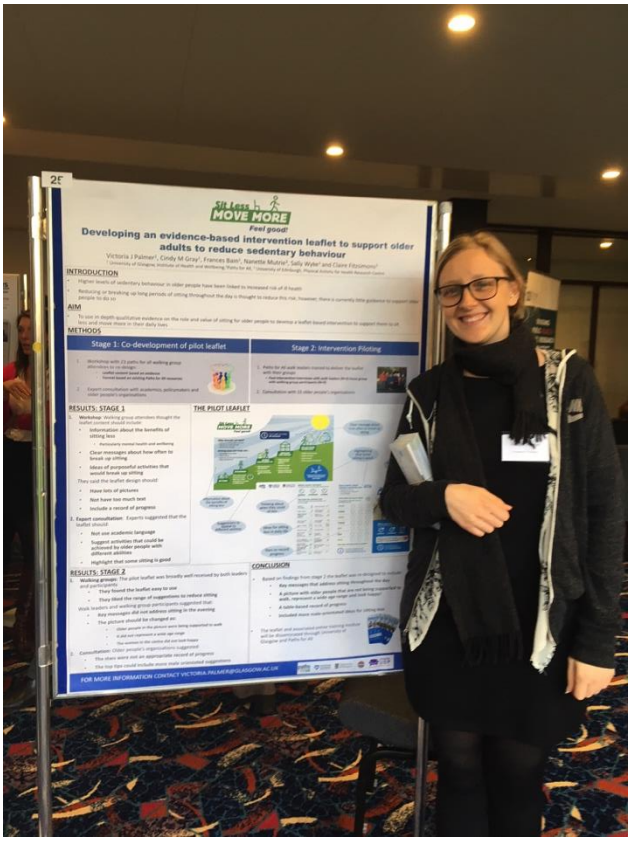
6. 'Teachers' and young adolescents' qualitative opinions of an eight-week, feasibility/pilot, sit-stand desk intervention' Amanda Pitkethly (presenting), Anna Campbell, John Sproule, Josie Booth, **Sam Fawkner**, Danielle Hutson. Scottish Physical Activity Research Connections, November 2017

7. 'Changes in sedentary behaviour and on-off-task following the introduction of sit-to-stand desks in a primary school; a pilot study' Danielle Hutson (presenting), Amanda Pitkethly, Josie Booth, John Sproule and **Samantha Fawkner**. Scottish Physical Activity Research Connections, November 2017

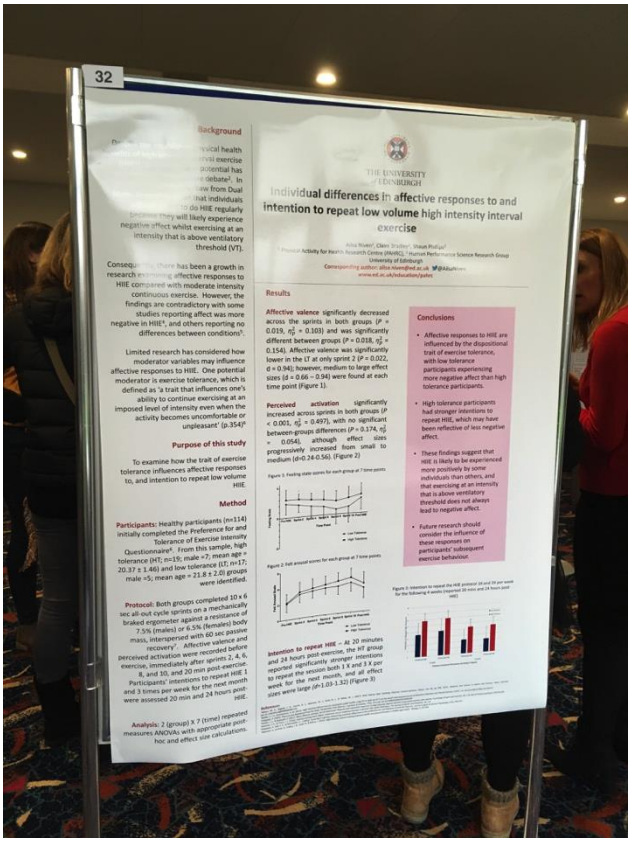
8. 'Designing a physical activity intervention among severely obese pregnant women to reduce sedentary behaviour by promoting active sitting: Involving patients in the study design' **Caterina Fazzi** (presenting, **David H. Saunder**s, Jane E. Norman, Rebecca M. Reynolds. Scottish Physical Activity Research Connections, November 2017

9. "I ken I've been sitting too long. I get up, walk about and do something" What stroke survivors do when sitting and strategies used to break prolonged sitting' Sarah Nicholson (presenting), **Ailsa Niven**, Jacqui Morris, Seb Chastin, Gillian Mead. Scottish Physical Activity Research Connections, November 2017

10. 'Sit Less, Move More, Feel Good!': Developing an evidence-based intervention leaflet to support older



Poster 10 by Victoria Palmer



Poster 14/15 by Ailsa Niven

adults to reduce sedentary behaviour' **Victoria J Palmer,** Cindy M Gray, Frances Bain, **Nanette Mutrie**, Sally Wyke, **Claire Fitzsimons**. Scottish Physical Activity Research Connections, November 2017

11. 'Optimising recruitment of older adults to walking studies: reflections from the WE:ROAM study' **Nicky Laing (Presenting), Ailsa Niven, Sam Fawkner**. Scottish Physical Activity Research Connections, November 2017

12. Examining Perceptions of Yoga among Older Adults: A Qualitative Study' **Divya Sivaramakrishnan** (presenting), **Claire Fitzsimons, Nanette Mutrie, Graham Baker.** Scottish Physical Activity Research Connections, November 2017

13. "Movement Meditation" – A Study of Flow Experiences in Hot Yoga Practitioners. Niamh Hart (presenting), **Ailsa Niven**. Scottish Physical Activity Research Connections, November 2017

14. 'Individual differences in affective responses to and intention to repeat low volume high intensity interval exercise' **Ailsa Niven** (presenting), Claire Bradley, Shaun Phillips. Scottish Physical Activity Research Connections, November 2017

15. **'**Individual differences in affective responses to and intention to repeat low volume high intensity interval exercise' **Ailsa Niven** (presenting), Claire Bradley, Shaun Phillips. BASES Annual Conference, November 2017

8.4. PAHRC Seminars

We organise a range of seminars/workshops which are open to PAHRC core and associate members and PAHRC friends from a wide range of organisations. All our Wednesday lunchtime sessions are advertised through PAHRC e-news.

1. Peter Rawcliffe (Unit Manager, People and Places, Scottish Natural Heritage): 'Developing Scotland's natural health service' (Jan 2017)

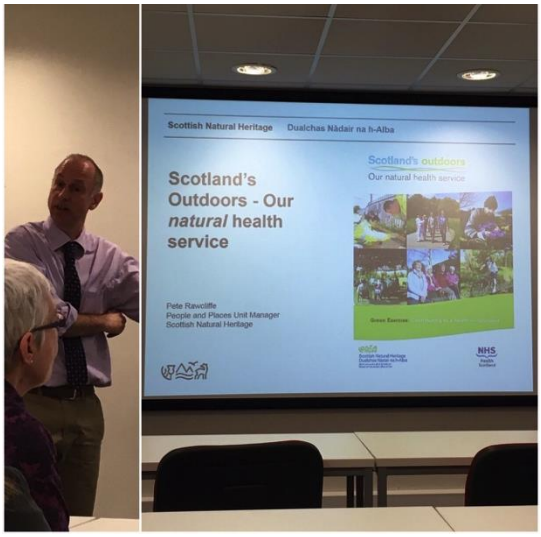
2. Douglas Maxwell (CEO) and Dr Kate Lyden (Clinical Research Scientist, PAL Technologies): 'Rich data visualisation – unlocking the context of free-living behaviour from accelerometer data' (Jan 2017)

3. Dr Josie Booth (University of Edinburgh), Dr Colin Moran, Dr Gemma Ryde and Ross Chesham (University of Stirling): 'Exploring the impact of taking part in the Daily Mile' (Feb 2017)

4. Prof Nanette Mutrie, Dr Amanda Martindale and Divya Sivaramakrishnan (University of Edinburgh): Workshop: Impact pathways and recording impact on PURE; (Feb 2017)

5. Dr Graham Baker and Tasneem Irshad (PAHRC): 'Emergent findings from the South Asian walking study' (Feb 2017)

6. Dr Azucena Guzman (University of Edinburgh): 'Psychomotor Dance Therapy Intervention for people living with dementia in care homes' (March 2017)



Peter Rawcliffe, SNH

Kate Lyden, Nanette Mutrie and Douglas Maxwell at Data Visualisation Seminar

Dr Graham Baker and Dr Tasneem Irshad

Dr Azucena Guzman

Dr Ailsa Niven with Dr Eva Jaarsma

7. Wendy Timmons (University of Edinburgh): 'Seated swing: introduction to a dance project for day care users with early onset dementia' (March 2017)

8. Dr Eva Jaarsma (University of Birmingham): ‘Getting people with disabilities physically active’ (March 2017)

9. Dr Davis Banda (University of Edinburgh): ‘Practical aspects in sports and CSR programme design: lessons from low income countries for communities in the Global North’ (March 2017)

10. Thamra Al-Ghafri (University of Dundee): ‘Physical Activity in the management of type 2 diabetes in primary health care in Oman’ (April 2017)

11. Dr Sam Fawkner (PAHRC): Workshop – ‘Flipped Classrooms’ (May 2017)

12. Adam Turner (IBM): ‘Transforming health – one cognitive step at a time’ (May 2017)

13. Graham Mackenzie (Consultant in Public Health, NHS Lothian): ‘From individual to population health: thoughts on physical activity and social media’ (May 2017)

14. Prof Chris Weir (University of Edinburgh): ‘Handling missing data summaries in meta-analysis: systematic review of methods’ (May 2017)

15. Prof Qiqiang He (Wuhan University, China): ‘Physical Activity among Chinese population’

16. Suzanne Forup (Cycling UK), Cherie Morgan (Play Scotland), Matt Wilberton (Cycling Scotland): 'Play on Pedals – embedding physical activity in the early years' (Sept 2017)

17. Dr Charlie Foster (University of Bristol): 'What are population approaches to promoting physical activity? Reflections on this evidence base for research and policy' (Oct 2017)

18. Susan Moug (Consultant Surgeon, NHS Greater Glasgow and Clyde/Honorary Clinical Associate Professor, University of Glasgow): 'Improving outcomes for patients undergoing surgery with bowel cancer: how to establish physical activity into the perioperative treatment pathway' (Nov 2017)

19. Dr Danijela Gasevic (University of Edinburgh): 'The effect of physical activity on mortality and cardiovascular disease in high-, middle- and low-income countries' (Nov 2017)

20. Dr Sara Hayes (University of Limerick): 'The design and evaluation of physical activity interventions; the need for change' (Dec 2017)

21. Prof Paddy Ekkekakis (Iowa State University):'Physical activity messages as social marketing: Lessons from the recent revival of the intensity debate' (Dec 2017)

Prof Nanette Mutrie with Prof Paddy Ekkekakis

9. Media Coverage

Members of PAHRC and their research are often highlighted in the media. The following paper received widespread media coverage: Strain, T., Kelly, P., Mutrie, N., and Fitzsimons, C. 2017. Differences by age and sex in the sedentary time of adults in Scotland. Journal of Sports Sciences. The paper was reported in over 15 newspapers PAHRC. PhD student, Tessa Strain, also took part in two BBC radio interviews.

The press release associated with the launch of the NIHR 20mph Project was also picked up by several media sources.

Other PAHRC related media coverage can be viewed at Edinburgh Research Explorer

10. Local, National and International Policy Making

Part of our work as academics is advocacy and trying to inform policy and practice and support the use of best available evidence. We are involved in a number of activities in this area in Scotland, UK and globally:

- Contributed to UK wide CMO Physical Activity Review and Infographics
- Member of National Strategic Oversight Group for Physical Activity at Scottish Government
- Member of Health and Social Care Delivery Group at Scottish Government's Active Scotland Outcome and monitoring framework
- Provided advice to Scottish Government on content, sampling and analysis of Scottish Health Survey and Scottish Household Survey
- Gave written and oral evidence to Scottish Government's Review of Scotland's Obesity Route Map and Obesity Strategy
- Contributed to Scottish National Walking Strategy and Action plan
- Contributed to NICE consultation on Physical Activity and the Environment
- Completed advisory work and consultancy for WHO and WHO HEPA Europe
- Member of Steering Committee for Golf for Health Project, World Golfing Federation
- Member of NHS Health Scotland Physical Activity Special Interest Group
- Guest speakers at the Scottish Government Cross Party Group on Sport session on the economics of physical activity

Paul Kelly, Nanette Mutrie and Charlie Foster (Cross Party Group on Sport meeting

11 Conclusion

We hope you have enjoyed reading our 2017 Annual Report. If you would like further information on any of the topics covered please contact us at pahrc@ed.ac.uk.

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PAHRC

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