



Scottish Physical Activity Research Connections 2018

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THE UNIVERSITY *of* EDINBURGH
Physical Activity for Health
Research Centre (PAHRC)



Oral Abstracts

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1. Why do older adults start and continue to walk with organised walking groups? Findings from a qualitative systematic review

Presenting Author: **Nicky Laing** (PhD Student, Physical Activity for Health Research Centre, University of Edinburgh)

Authors: Nicky Laing, Dr Ailsa Niven, Dr Sam Fawkner, Dr Paul Kelly, Dr Anne Martin

As one of the least active groups in Scotland, older adults, and those promoting PA in this age group, could benefit from understanding the individual, social and environmental factors inducing older adults around the world to start and stay walking in groups, enabling the least active to be more active. Findings also relate to wellbeing and resilience.

Background: In Scotland older adults are one of the least active groups within the population, and a key target of the Scottish Government. Walking in groups has been identified as an effective strategy to increase physical activity for this age. In order to promote initial and continued engagement in group walking, a better understanding of the individual, social and environmental factors would provide further insight for organisations promoting group walk initiatives.

Aims of this qualitative systematic review:

The aims of this review were to identify individual, social and environmental factors associated with older adults during both the initiation and continuation phases of walking with a group, and if factors were more similar or different per stage.

Methods: The PRISMA guidelines were adopted for this review and 12 databases were searched adopting a PICOS search strategy. This resulted in 9645 title/abstracts reduced to 293 full texts, resulting in 14 included studies. Data extraction adopted a three stage thematic synthesis, applying the initiation and continuation definitions created. A quality assessment of included studies was also undertaken.

Results/Findings: Ten higher order themes were identified that were common to both phases. There were also commonalities between phases at the sub-theme level, however the majority of factors at this level had stronger associations to either initiation or continuation. The following were more strongly associated with initiation: managing health conditions; self efficacy (individual); companionship; social support; walk leader persona (social); programme structure (environmental). The following were more strongly associated with continuing: lose weight; feel better; more energy; motivation to keep going (individual); sense of belonging (social); benefits of the group (environmental). Social factors were most highly reported, but self efficacy and programme structure were also highly reported.

Conclusion: There were more similarities than differences in factors that influence initiation and continuation of group walking in older adults. In encouraging older adults to start and stay group walking, practitioners should be mindful of the links between individual, social and environmental factors such as managing health, support for this from walk leaders in appropriate terrain. Social factors are the most recounted, so specific attention should be given to these plus factors such as self efficacy, managing health conditions and programme structure.

2. The impact of a step count intervention project on physical activity levels and self-reported general health in University student nurses

Presenting Author: **Dr Audrey Duncan** (Sport and Exercise Science Manager, Institute of Sport and Exercise, University of Dundee)

Authors: Audrey Duncan, Helen M. Collins, Linda C. McSwiggan, Thomas McConnachie, Ginny Henderson, Martyn C. Jones & Michael Gallacher.

Previous research (Duncan et al, 2017) reported that student nurses fall below national trends in physical activity levels and would benefit from targeted intervention. This project aimed to evaluate the feasibility of a step-count intervention project to encourage this inactive group to be more active, and the impact of any change on self-reported well-being.

Aim: Previous research (Duncan et al, 2017) reported that student nurses are falling below national trends in physical activity (PA) levels and would benefit from targeted interventions. The aim of this project therefore, was to evaluate the feasibility of a 10-week step-count intervention project in a student nursing population, and the impact of this on self-reported general health (GH) and life satisfaction (LS) scores.

Methods: With institutional ethics approval, 106 first-year university student nurses were recruited from two campuses (9 males, 97 females; age: 26 ± 8 years; stature: 1.66 ± 0.07 m; body mass: 71.3 ± 15.8 kg) (mean \pm s). Following informed consent and measurement of stretch-stature and body mass, participants were quasi-randomly assigned, according to study groups, to one of two intervention ($n=32/18$) or two campus-matched control ($n=39/17$) groups. Both intervention groups were provided with pedometers and reported daily step counts weekly. Intervention group 1 was also provided with motivational feedback and target step counts. Self-reported GH and LS were evaluated in line with the Scottish Health Survey. Data were analysed using repeated measures ANOVAs with Last Observation Carried Forward, Intention to Treat Analysis.

Results: 86% of participants in the intervention groups completed the step count challenge and provided return data. Both intervention groups significantly improved their average daily step count to 10438 ± 3198 and 10152 ± 3449 respectively (mean \pm s, $P<0.01$) re-classifying 48% as active/ highly-active (20% at baseline) and 18% as low active/ inactive (44% at baseline). There were no significant changes in self-reported GH or LS scores, relative to controls, across the intervention period ($P>0.05$).

Conclusion: While this current project would benefit from follow-up to monitor compliance after the intervention period, early results suggest that a walking intervention is a feasible strategy for improving PA levels in this population. Since healthcare professionals who engage in PA are more likely to prescribe PA to patients (Frank et al, 2010), improving physical activity knowledge and adherence in this group has the potential for far-reaching impact. Future work will consider the impact of walking intensity and/or social support on self-reported general health and life satisfaction scores.

3. Gender Differences in Physical Activity and Sedentary Behaviour in Adults with Intellectual Disabilities: A Systematic Review and Meta-Analysis

Presenting Author: **Sophie Westrop** (PhD Student, Institute of Health and Wellbeing, University of Glasgow)

Authors: Sophie Westrop, Craig Melville, Fiona Mitchell & Arlene McGarty

This systematic review and meta-analysis investigates physical activity inequalities in adults with intellectual disabilities and addresses the role of gender in the health behaviours of this population. The findings provide needed insight into the participation of adults at high risk of physical inactivity and sedentary behaviour, which should inform future research to support this inactive group to be more active.

Aim: Adults with intellectual disabilities (ID) are an inactive and sedentary population. Although widely researched in the general population, the role of gender in the physical activity (PA) and sedentary behaviours (SB) of adults with ID has not been investigated, obscuring potential gender differences. This could have great implications on the development of interventions to increase PA and reduce SB, as highlighted by the growth of gender-specific interventions in the general population. To address this gap in the literature, this systematic review and meta-analysis aimed to quantify gender differences in adults with ID.

Methods: This systematic review was conducted in accordance with PRISMA guidelines. Seven databases were searched from inception to 31/01/2018 to identify papers that measured and reported gender specific PA and / or SB outcomes in adults with ID: MEDLINE; Embase; PsycInfo; Eric; Cinahl; Cochrane library; Web of Science. Reference lists of included studies were hand searched. Screening, data extraction and quality appraisal were conducted by two researchers; conflicts were discussed and resolved. Data were synthesised using a narrative review and a random effects model meta-analysis of relevant PA and SB outcomes.

Results: Twenty-six papers met the eligibility criteria; twenty-five studies measured PA and eight assessed SB. Women with ID were identified as least active by the narrative review, and meta-analysis, with a significant overall effect of gender generated for step counts and moderate to vigorous PA. For SB, mixed findings were reported by the narrative review and no significant overall effect of gender was found for sedentary time.

Conclusions: Gender differences were present in PA but not SB in adults with ID, reflecting findings in the general population. More research is required to support these conclusions, as this review included poor quality studies and results were based on limited papers due to a tendency in ID research to ignore the role of gender when assessing and reporting PA and SB. This will support the development of gender tailored interventions to promote healthy PA and SB levels in the at risk group of adults with ID.

5. Multi-morbidity Rehabilitation, Building an Evidence Base and improving perceived physical function in people with Long Term Conditions

Presenting Author: **Jane Holt** (Physiotherapy Team Lead, NHS Ayrshire and Arran Cardiac Rehabilitation)

Authors: Jane Holt, Dr Aynsley Cowie

Recognising that traditional, condition-specific rehabilitation does not holistically address the increasing prevalence of chronic multiple morbidities within our ageing population, a multi-agency collaborative have been piloting a new rehabilitation model for those with multiple conditions. This group of people are traditionally inactive. The delivery of the model has been sited in rural and deprived communities..

Aim: The aim of this project is to help build an evidence base to show that non condition specific rehabilitation for people affected by multi-morbidities using a multimodal approach is a cost-effective approach, which improves quality of life, ability to perform tasks, self manage their conditions and reduces bed days. The majority of people are completely inactive and fearful of activity.

Methods: This rehabilitation model was designed using a novel, tiered approach. Service users can move between tiers to suit their needs: • Tier 4: Traditional, condition-specific rehabilitation • Tier 3: A new, innovative programme for those struggling to manage multiple conditions • Tier 2: Local leisure services • Tier 1: Third sector community and voluntary groups Initial evaluation focused upon tier 3.

This project has aimed to proactively support prevention and self-management in an ageing population with increasing prevalence of chronic multiple morbidities. To help reduce health inequality the project has specifically targeted deprived and rural communities.

EQ-5D-5L, Quality of Life visual analogue scales and Risk factor trackers were used to examine service user perceptions of their health and economic impact of the programme.

Results: EQ-5D-5L Data: Upon completion of tier 3, service users reported improvements in quality of life, fatigue, fitness and ability to perform physical tasks, suggesting the model reduces the impact of chronic disease upon service users. Emergency Admission Data: In the six months following referral, there was a significant reduction in bed days. The cost per quality-adjusted life year for delivering tier 3 was calculated at £29,350 (cost-effectiveness threshold: £30,000) – thus this model is cost-effective

Conclusions: Multi-morbidity rehab is a cost effective sustainable way of improving the lives of people affected by multiple long term conditions and bringing physical activity into their life as a lifestyle change. Comprehensive evaluation of the first year demonstrated that the model reduces the impact of chronic disease, and significantly reduces bed days.

6. Active Forth Exercise Referral Programme- Does participation over 12 weeks improve participants' health?

Presenting Author: **Scott Burton** (Physical Activity Coordinator, Falkirk Community Trust)

Our exercise referral programme allows people who have been diagnosed with a medical condition or have had post-surgery/injuries to exercise in a safe environment. We help people to take control of their health so they can self manage their condition and stay active to improve their physical and mental well-being.

Aim: To show that referral programmes are effective (NICE guidelines 2014). In Scotland there are few programmes that statistically measure changes in their participants overall health. Active Forth set out to determine if completion of its 12 week exercise programme would improve quality of life, physical function and mental health and wellbeing of its participants. Condition group, attendance, age and gender were taken into account.

Methods: 266 referred customers completed an EORTC (European Organisation for research and treatment of cancer) and WEMWBS questionnaire (Warwick Edinburgh mental health and wellbeing scale) at weeks 1, 4 and 12. Participants were grouped via age, gender and condition group to determine if there were significant changes from baseline to completion.

Results/Findings: Those who completed the programme showed significant increases in both physical function and global health scores ($p < 0.001$). Overall, there was a significant change in WEMWBS scores of 4.19 for customers who completed the 12 week programme. A change of 3 or greater is enough to result in a positive mental health and wellbeing change. In relation to physical function, the biggest change was seen in the oldest age group (65+), whereas the biggest change in quality of life was seen in the 55-65 age group. There was a significant correlation in attendance over 25 occasions and a positive change in global health status ($r = .21$, $p < 0.05$). These results suggest that attending the programme more than twice a week can lead to a significant improvement of quality of life and health. This is not excessive to advise our customers.

Conclusion Completing Active Forth's 12 week referral programme is likely to result in improved physical function, quality of life and mental wellbeing. Such evidence is very encouraging for the referred participants of exercise referral programmes. Overall, this study could be used as a template for exercise referral programmes across Scotland to measure their own effectiveness. The longer term effects of referral programmes should also be evaluated. Through studies like this, Scottish programmes can create a stronger and more evidence based 3rd sector exercise referral pathway that health professionals can support.

Poster Abstracts

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5	Benefits of a student-led exercise class in maintaining and improving physical activity in community dwelling adults over 60	Anne Wallace
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1. Sedentary behaviour in stroke survivors: a qualitative study involving stroke survivors, caregivers and staff in two stroke services

Presenting Author: **Dr Jennifer Hall** (Senior Research Fellow, Bradford Teaching Hospitals NHS Foundation Trust, Academic Unit of Elderly Care and Rehabilitation)

Authors: Morton S, Fitzsimons C, Mead G, Hall JF, Corepal R, Forster A, Birch KM, Carter G, English C, Farrin A, Holloway I, Lawton R, Patel A, Clarke DJ

Stroke survivors may be sedentary for up to 80% of the waking day, which compares unfavourably to sex and age-matched controls (English et al. 2016). Study findings are being used to inform the development of an intervention to reduce sedentary behavior after stroke, which is likely to be more achievable in the first instance than 150 minutes of MVPA.

Aim: Stroke survivors can spend up to 80% of their day in prolonged sedentary behaviour(s) (sitting/lying/reclining). Interventions tailored to the needs of stroke survivors to support an increase in frequency and duration of upright behaviours (standing and walking) are needed. This study aims to understand current behaviour(s) and perceptions of stroke survivors, caregivers and staff, and existing work practices within stroke services.

Methods: (1) Non-participant observations in two UK (Scotland, England) stroke services, each including a stroke unit and linked community service (132.5 hours); (2) Fifty-nine semi-structured interviews with staff, stroke survivors and their caregivers to explore capabilities, opportunities and motivations associated with reducing sedentary behaviour (stroke survivors) and supporting stroke survivors to reduce sedentary behaviour (staff and caregivers). Field-note data were thematically analysed and interview data were analysed using the Framework method.

Findings: The physical and social environment, perceptions of stroke survivors' physical and psychological capability to increase upright behaviours and be active, and routinized practices enacted by staff, contribute to a consistent pattern of sedentariness in the inpatient setting. This behaviour can become habitual, and is often carried over when stroke survivors leave hospital; however, stroke survivors perceive greater control over their behaviour upon returning home. Most staff, stroke survivor and caregiver interviewees recognised the value of reducing sedentary behaviour after stroke, and certain routine staff activities already promote breaking up sedentary behaviour, for example, fatigue management strategies such as spreading activities across the whole day. However, staff expressed willingness to develop their knowledge of safe, appropriate and more direct methods to encourage stroke survivors to reduce / break up sedentary behaviour. Interviewees perceived that strategies that can be integrated within the daily lives of stroke survivor and that incorporating meaningful activities will be acceptable and effective.

Conclusion: Efforts to reduce sedentary behaviours in stroke survivors are recognised as necessary and potentially beneficial for improving long-term outcomes. Findings from this study are informing a co-production study taking place in two sites (Scotland, England) to develop a tailored sedentary behaviour intervention.

2. Development of an intervention to reduce sedentary behaviour after stroke: a co-production approach

Presenting Author: **Dr Sarah Morton** (Research Fellow, University of Edinburgh, College of Medicine, Centre for Clinical Brain Sciences)

Authors: Morton S, Fitzsimons C, Hall J, Lawton R, English C, Clarke DJ, Birch KM, Carter G, Farrin A, Forster A, Holloway I, Mead G, Patel A, Lawton R

Physical inactivity (insufficient activity to meet current recommendations) and high levels of sedentary behaviours are common post-stroke, hindering rehabilitation and recovery. We are interested in supporting stroke survivors to reduce/break up sedentary behaviours. This may be more achievable in the first instance than 150 minutes of MVPA.

Background: Time spent in sedentary behaviours (sitting / lying / reclining without otherwise being active) in the general population has been associated with reduced physical function, poor mental health and increased cardiovascular risk. Stroke survivors, as a patient population, are known to be highly inactive, and therefore sedentary. Reducing time spent in sedentary behaviours and breaking the pattern of long uninterrupted sedentary events, could have substantial long-term benefit. Intervention strategies to break up and reduce extended periods of sitting and lying are lacking.

Aims: Using a collaborative and iterative co-production approach this study looks to develop a robust intervention, suitable for integration into the UK stroke care pathway.

Methods: Systematic reviews were undertaken (Oct17 – June18) to update evidence on adults' perceptions and views of sedentary behaviour, effective intervention components and health outcomes. Review findings, together with observational data from inpatient and community stroke services, and interviews with stroke survivors, caregivers and stroke service staff, will be integrated into five co-production workshops running concurrently in Bradford and Edinburgh (Oct18 – Feb19). Guided by the COM-B model of behaviour change (Capability, Opportunity and Motivation to change Behaviour), stroke survivors, caregivers, and staff will define user needs in relation to reducing sedentary behaviours, and consider appropriate intervention components.

Findings: We intend to develop an intervention based on user needs and co-produced by end users, to increase the acceptability and effectiveness of the intervention. The prototype will be tested during a feasibility trial (2019) ahead of a planned 34-site RCT (2020 onwards). The intervention will focus on increasing the frequency and duration of time spent in upright behaviours (standing and walking) to encourage a reduction in sedentary behaviour in a population recognised as having high levels of inactive behaviour in comparison to their healthy age-matched counterparts.

Conclusion: This work will generate, using the needs, lived experiences, and expertise of stroke survivors, caregivers and stroke service staff, a co-produced intervention to reduce or break up sedentary behaviours after stroke. A successful intervention has potential to substantially improve long-term functioning, health, and well-being outcomes for stroke survivors.

3. Greenspace interventions to encourage long-term independence post-stroke: a rapid review

Presenting Author: **Dr Sarah Morton** (Research Fellow, University of Edinburgh, College of Medicine, Center for Clinical Brain Sciences)

Authors: Morton S, Mead G, Fitzsimons C, Ward Thompson, C, Hicks K

There is extensive evidence highlighting the benefits of physical activity and rehabilitation for stroke survivors, however there is less evidence highlighting the potential benefits of access to greenspace following stroke. This work looks to understand what could be possible, by reviewing evidence of the benefit of greenspace for other health issues, and suggesting how this could be applied post-stroke.

Background: Access to good quality greenspace is highly beneficial for health and wellbeing – both mental and physical. Efforts to increase accessibility for different patient populations (e.g. Type 2 Diabetes, cardiovascular disease, and dementia) are gaining popularity and there is interest in increasing availability, particularly in terms of offering patients an alternative to indoor physical activity and/or rehabilitation. There is much work in the context of physical activity and rehabilitation for stroke survivors, however there is less evidence highlighting the potential benefits of access to greenspace following stroke. Our work looks to explore this, and to ascertain if there could be benefit in developing a greenspace-based rehabilitation intervention post-stroke.

Methods: A rapid review of evidence was undertaken to: understand how greenspace is (variously) defined and establish the parameters of ‘access to greenspace’ (i.e. does engagement have to be physical, or can viewing greenspace also have an effect?); survey empirical evidence of health conditions that have benefited from a greenspace intervention, including outcomes; understand pathways to benefits of accessing greenspace, including relationships to quality and accessibility of greenspace; and identification of other greenspace trials, and a summary of these (including outcomes if available).

Findings: The review found few studies about the benefits of greenspace for stroke survivors, with just one study indicating that access to greenspace could result in improved survival rates following ischemic stroke. Outcomes for other health conditions in the wider population, particularly mental health, appear positive and there is much evidence to suggest positive health benefits for a wide range of health conditions. However, delivery method of interventions to encourage engagement with greenspace was identified as a key component of initial and sustained engagement, as was quality of greenspace. Outcome measures appear to reflect short-term effects, and are largely qualitative.

Conclusion: This work indicates a lack of evidence exploring how stroke survivors might benefit from greenspace, and therefore there is potential for further work in this area, including developing a greenspace intervention to support rehabilitation post-stroke. Based on studies relating to other health conditions, it seems it would be appropriate to involve users in developing an intervention (co-production).

4. A protocol of a systematic review of the effectiveness of sitting breaks on objectively assessed musculoskeletal spinal outcomes in sedentary adults

Presenting Author: **Eva Coral Almeida** (PhD student, Physical Activity for Health Research Centre, The University of Edinburgh)

Authors: Eva Coral Almeida, Dr Ailsa Niven, Dr Samantha Fawcner, Dr Graham Baker

This systematic review contributes to the Active Scotland Outcomes Framework, due to its focus on investigating how periodic breaks from sitting can affect an individual's health. Additionally, the study will increase the understanding of using sitting breaks as an alternative to decreasing prolonged sitting and its detrimental health outcomes.

Background: Prolonged sitting has been identified as a related cause for musculoskeletal disorders (MSDs), and several detrimental health outcomes. Periodic breaks are recommended to alleviate the negative effects of prolonged sitting, and an important element for the prevention of growing MSDs in the workplace and other sedentary occupations. To the present, reviews exploring this topic have focused solely on subjective outcomes, whilst objective outcomes can be debated to have additional clinical significance.

Aim: The aim of this systematic review is to assess the effectiveness of periodic breaks on adults' prolonged occupational sitting, as assessed by objectively measuring musculoskeletal outcomes related to the spine (i.e. spinal shrinkage).

Methods: Following a pre-published protocol, a final search syntax containing keywords related to the review question, will be carried out in diverse electronic databases (i.e. MEDLINE and EMBASE). Results from searches will be imported to COVidence; title and abstract screening will be made to identify the studies to be included. Data extraction will be carried out after selection of studies, and a quality assessment will be made to assess risk of bias. Studies evaluating the effect of sitting breaks on objectively assessed musculoskeletal spinal outcomes in sedentary adults will be included in this systematic review. Interventions using any type of sitting break (active or passive), with any time duration and exploring short, medium or long-term effects will be included.

Results: From the extracted data we will examine: 1. Effect of the intervention on objective musculoskeletal outcomes pre–post intervention, compared with a control group where possible. 2. Acute to chronic changes on musculoskeletal outcomes. Subgroup analysis will explore the intervention effects in musculoskeletal outcomes (short/long-term effects), effects between active and passive breaks, as well as the effects of the sitting break time (short vs long-break).

Conclusion: Findings from this systematic review will determine if sitting breaks are effective in improving musculoskeletal outcomes. Furthermore, if sufficient data is identified it may be possible to determine the effect of the type and duration of sitting breaks on these outcomes. These findings could inform future interventions to reduce prolonged sitting and address the problem of MSDs in occupational settings.

5. Benefits of a student-led exercise class in maintaining and improving physical activity in community dwelling adults over 60

Presenting Author: **Anne Wallace** (Academic Strategic Lead, School of Physiotherapy, Robert Gordon University)

Authors: Paul Moran, Stewart Macdonald, Anne Wallace, Emily Geddes, Jacqui Omichinski, Kaitlin Saunders and Sarah Vickery

Studies have demonstrated strong evidence that people who are active have numerous health benefits. The purpose of this service evaluation focusses on how we can encourage and enable the active to stay active throughout life particularly in a community dwelling adult over 60's population.

Aim: (i) investigate participants' perceptions of a weekly student physiotherapy exercise class and (ii) compare the effects on physical function and activity levels for a community dwelling adult over 60's population.

Methods: Process & design:

- Participants aged over 60 years old who attend a weekly exercise class were invited to undertake a "Personal Fitness MOT" physical activity questionnaire. Participants continued to attend the weekly 1-hour class led by physiotherapy students and repeated the questionnaire at 6 month intervals up to 18 months.
- 12 participants undertook an individual semi structured interview to explore their perceptions of the class and influence on their activity levels.

Outcomes: 30 second chair stand, chair sit and reach, back scratch, 8 foot up and go, handgrip strength, single leg stance, 6-minute walk and physical activity questionnaire.

Results:

- Demographics: 24 participants, mean age 77.5 years.
- Self-reported PA was found to be maintained or improved at 6, 12 and 18 months
- Physical function was found to be maintained or improved at 12 months
- Interviews/focus groups highlighted several benefits and themes for participants and students: fitness levels and need for improvement, variety, class design, learning opportunity, social and enjoyment

Discussion: The benefits of participating in a physiotherapy student-led exercise class were identified by older people and students. The students identified the positive influence on the older people's activity levels as well as their own development. The older people identified the positive influence on their own physical activity levels, and they found it motivating that they were contributing to the development of future physiotherapists. Further research should investigate the positive trend you have identified.

Conclusions: This provides a model for encouraging and enabling older adults to exercise effectively whilst conferring benefits to the students' learning and allowing the University to maintain a strong positive link with its local community. Student led exercise classes could be used to promote physical activity and support local services.

6. Why are people living with a stoma not being active enough? Can a "real-life" physical activity intervention help?

Presenting Author: **Julie Munro** (Researcher, University of the Highlands and Islands, School of Health, Social Care & Life Sciences)

Authors: Julie Munro, Claire Taylor; Will Goodman; Rebecca Beeken; Raymond Oliphant; Angus J Watson; Gill Hubbard

This abstract contributes to the Active Scotland Outcomes Framework as it examines the barriers to becoming active, and encourages an increase in activity in people living with a stoma. The abstract offers an insight into the feasibility of referring this clinical population to existing physical activity services, and provides patient feedback about this approach.

Aim: The aim is to determine the feasibility and potential benefit of a physical activity (PA) intervention for bowel cancer, and IBD patients with a stoma. The intervention aims to increase physical activity by addressing stoma-related barriers to it, and thereby improve quality of life (QoL), physical function, and fatigue.

Methods: Participants are adults with stage I-IV bowel cancer, or a diagnosis of IBD (Crohns disease, and Ulcerative Colitis) and living with a stoma. A stoma nurse will refer participants to a PA specialist trained to help people with stomas exercise safely. Participants will receive a personalised PA plan for 12 weeks, and given a pedometer to track weekly activity. The PA consultations will be face-to-face or by video-conference once a week for 12 weeks.

QoL, physical function, fatigue, body image, and PA will be measured before and after the PA intervention to assess if the intervention is likely to be effective. The following self-report questionnaires will be used: FACT-C, Stoma-QoL (which includes questions about body image), Short inflammatory Bowel Disease Questionnaire (SIBDQ) and FACIT-Fatigue. Physical activity will be measured objectively by accelerometer. Physical function will be measured objectively using the 6 minute walk, chair stand, arm curl, and sit and reach test.

Results/Findings: Currently unavailable as recruitment is ongoing. Preliminary results will be available, and presented in November if the abstract is successful.

7. Co-designing a behaviour change intervention for older adults living with cancer: Identifying the optimum theoretical basis

Presenting Author: **Lynsey Brown** (PhD Researcher, Edinburgh Napier University)

Authors: Lynsey Brown, Karen Campbell & Richard Kyle

The resulting theoretically informed intervention targeting physical activity, diet and sedentary time contributes to the Active Scotland Outcomes, as the co-design process is expected to lead to an acceptable, effective and sustainable community based intervention. Thus, encouraging older adults living with cancer who may or may not have been active to be active, as well as improving their well-being.

Background: 1 in 8 people in the UK aged ≥ 65 are living with a cancer diagnosis. Protective health behaviours can reduce the effects of cancer in older adults. Due to a lack of participation interventions to promote these behaviours in this group are common. However, a definitive theoretical basis for such interventions is still to be determined, as is an acceptable and effective intervention that achieves maintenance of behaviour change.

Aim: To determine a theoretical basis for a behaviour change intervention targeting physical activity, diet and sedentary time for older adults living with cancer.

Methods: 24 participants, 12 older adults living with cancer and 12 individuals who support adults with cancer within the community were recruited to take part in a co-design process, drawing on Experience Based Co-design (EBCD), alongside other co-design methods. An Adaptive theory approach was embedded in this process to ascertain the optimum theoretical basis for the intervention. Initially the Transtheoretical Model (TTM) was presented as a potential theoretical basis, due to its dominance in previous interventions for the target population. Throughout the primary stages of the co-design process the six stages of the adaptive theory approach will be used to adapt or change the initial theory, ultimately determining the optimum theory of behaviour change.

Initial results: Results have highlighted the social and interactive requirements of both the theory and proceeding intervention. A strong focus on a variety of factors is also evident including gender, isolation, perceived control, locus of control, motivation and identity, indicating a need to adapt or move away from the TTM in order to encompass the components which appear to be important to those who will use and/or provide the intervention.

Conclusion: Working in this manner is a novel way to determine the theoretical basis of an intervention and is expected to lead to an acceptable, effective and sustainable intervention for this population, targeting physical activity, diet and sedentary time.

8. “Why does being physically active matter when I have chronic pain?” Exploring the perceptions of the national physical guidelines in individuals with chronic pain in Glasgow.

Presenting Author: **Fraser Bell** (Clinical Specialist Physiotherapist, NHS Greater Glasgow and Clyde/Robert Gordon University)

Authors: Fraser Bell, Anne Wallace

Individuals with chronic pain are less physically active than the general population. To encourage and enable these individuals to increase activity levels a better understanding of the reasons for inactivity in this population is required. This study explores perceptions of physical activity in relation to national guidelines in individuals with chronic pain and considers the direction of future work.

Background: Physical inactivity is now one of the greatest risk factors worldwide for individuals developing non-communicable diseases (World Health Organisation 2016). Engagement with daily targets for physical activity is challenging (NHS Health Scotland 2018), especially for those with long-term conditions, such as chronic pain (The Scottish Government 2018a). Within the chronic pain population there is a more than two-fold risk of early mortality due to lifestyle factors, such as not being physically active (Macfarlane, Barnish and Jones 2017). Little data exists on how individuals with chronic pain understand and engage with physical activity guidance.

Aim: The aim of the study is to explore the knowledge of, and attitudes to, the national physical activity guidelines in individuals with chronic pain.

Methodology: A focus group methodology was selected. Convenience sampling was used to select participants who were graduates of a pain management programme (PMP) and had lived with chronic pain for more than 6-months. 13 participants attended one of two focus groups: mean age 53 years and an average of 13 years living with pain. A thematic analysis was used with data independently cross-checked. Full ethical consent was gained prior to the study.

Key Findings: Participants demonstrated a good awareness of the benefits of being physically active yet lacked understanding of what constituted physical activity. They also perceived the physical activity guidelines to be unachievable. Despite reporting feeling confident using many self-management skills, participants reported lacking confidence in implementing these skills to engage further in physical activity. Barriers included a lack of self-efficacy, linked to a feeling their condition was not well understood and participants own thoughts and fears about the impact of physical activity on their condition.

Conclusion: This exploratory study highlighted the need for more research to understand how individuals with chronic pain engage with physical activity and their perceptions of the current recommendations. In particular, understanding the drivers behind self-efficacy and how current clinical practice could improve addressing these barriers. Additionally, chronic pain research should seek to use more measures of physical activity to increase understanding of the topic.

9. Increasing physical activity levels: Designing a referral pathway to a community- and volunteer-based physical activity programme

Presenting Author: **Dr Gozde Ozakinci** (Senior Lecturer in Health Psychology, University of St Andrews)

Authors: Ozakinci, G., Carstairs, S; Rogowsky, R; Cunningham, K; Wilkie, L; Stevens, J; Mactavish, M; Shield, I; Sullivan, F.

This project plans to create partnership between primary care and a community-based physical activity programme, jogscotland, which is well-established and used by a wide range of people for physical and mental health benefits. Enabling an effective method of referral provides a unique opportunity to increase physical activity levels for patients in Fife and the potential to be adaptable across Scotland.

Background/Aim: The NICE guideline on exercise referral schemes to promote physical activity suggests that referral to activities based outside of the gym may be linked to improved adherence. We aim to design and pilot a process of referring patients attending primary care to community-based jogscotland groups and to examine the barriers and facilitators of such a process for health professionals and patients.

Methods: GPs and nurses from over 20 practices across Fife have expressed interest in the study. Exploratory interviews with health professionals and patients of primary care practices in Fife will be conducted (N=15-25 primary care registered patients with no physical health barriers to engage in physical activity and N=15-25 GPs/Nurses). These interviews will be guided by Theoretical Domains Framework and analysed using thematic analysis. Informed by findings from the interviews, a process of referral to jogscotland will be designed around how community-based programmes can acceptably be introduced through GP/nurse consultations. Lastly, a feasibility study testing this method of offering referral to jogscotland will be conducted.

Results: The findings will enable the design of a full trial to test a community-based approach to physical activity participation that would be scalable cross Scotland.

Conclusion: This project will link primary care patients to a structured and volunteer-led physical activity programme in their community that is not gym-based. Given these factors, it has the strong potential of being successful in maintaining behaviour change and achieving positive health outcomes for patients. This project additionally provides a unique opportunity to develop a partnership between primary care and community-based physical activity groups.

10. Active Scotland - Active Dundee - The Dundee Green Health Partnership

Presenting Author: **Dr Viola Marx** (Green Health Partnership Co-ordinator, Dundee City Council / NHS Tayside)

Authors: Viola Marx, Mary Colvin, Alison Anderson

The Green Health Partnership supports wellbeing and resilience in communities through physical activity and encourages and enables the active to stay active throughout life as well as encouraging the inactive to become active again. This is the focus of Our Natural Health Service's Physical Activity Implementation plan, and the basis of the Dundee Green Health Partnership.

Background: Being surrounded by nature has mental and physical health benefits for depression, stress, anxiety, mental fatigue, surgery recovery times, and acts as preventative medicine. In Dundee, several green interventions support people's wellbeing and resilience in communities. Unfortunately, there is a disconnect between interventions, NHS referrals, and information access.

Aim: The Dundee Green Health Partnership (DGHP) is currently created addressing the current disconnect. The DGHP aims to increase overall public health, and health and social care for people with a defined need together with the general population.

Overall public health, health improvement and social care will be increased through Scotland's natural environment and green infrastructure, increasing everyday contact with nature, nature biased health promotion initiatives, and nature based interventions with defined health or social outcomes.

Methods: To bring together health, environment, and relevant sectors to better co-produce, facilitate, and plan joint working between stakeholder groups, the GHP will coordinate, target, and upscale existing programs, depending on demand. Funding has been secured to market signposting of greenspaces, increasing green health across the city. In support the DGHP the council continues to improve green-spaces and - infrastructure across the city.

The DGHP works towards a new referral scheme using 'green prescriptions', an intervention for prescribing bodies referring people to a dial-up service, finding patients a suitable intervention programme.

Results: We would like to present a preliminary evaluation framework aiming to monitor the increased connectivity and sustainability of the DGHP. Green prescriptions can be monitored at the Dial-up service and through attendance of the intervention itself.

The establishment of the DGHP provides a basis for deliverers to connect and grow their services, the NHS to reduce medical costs, the communities to increase their health, and researchers to help produce means and measures to increase the effectiveness of green interventions.

Conclusion: The proposed development of 'green prescriptions', promotion of green active travel, marketing of greenspace benefits, co-designing greenspaces with people are all likely to increase the uptake of green health. Wider uptake of green interventions can decrease medical costs nationwide and the DGHP aims to provide a foundation for this, locally.

11. Evaluating ALBA: an update

Presenting Author: **Nicola Peddie** (PhD Student, Edinburgh Napier University)

Authors: Nicola Peddie, Austyn Snowden, Nina Allinson, Rozita Weaver and Tony Westbury

This research contributes to the Active Scotland Outcomes Framework as it focuses on the evaluation of a behaviour change intervention which aims to encourage inactive participants with mental or physical health conditions to become more active. The intervention also aims to improve well-being and resilience by using cognitive behavioural techniques to help support individuals to change their physical activity behaviour.

Background: Physical activity has been shown beneficial for physical and mental wellbeing, and has been positively linked to reducing symptoms in a broad range of mental health conditions. However, there is evidence to indicate people with mental illnesses are significantly less active than the general population. SAMH, Scotland's largest mental health charity, has developed a behaviour change intervention, ALBA, which has been designed to specifically target individuals with mental health conditions to increase motivation and adherence to physical activity. The intervention launched in March 2017 and has now been running for 18 months.

Aim: The aim of the research is to evaluate the implementation and effectiveness of a behaviour change intervention aimed at increasing adherence to physical activity.

Method: Participants have been recruited through the existing exercise referral schemes in 3 areas of Scotland. Participants complete baseline and are given activity trackers, which they are asked to wear for the duration of the 16 week intervention. The intervention involves participants engaging in 1:1 cognitive behavioural sessions with their local behaviour change practitioners, prior to and throughout the intervention period. At the end of the 16 weeks participants completed the post intervention measures, and were offered the opportunity to opt into the long term study, where the measures were repeated at 6, 12 and 18 months post intervention. Qualitative data on participants' experience of taking part and the acceptability of the intervention will be collected.

Results: Data collection is on-going, at present, 221 participants have been recruited. Preliminary results will be presented and discussed. It is hypothesized that the intervention will increase adherence to physical activity in both long and short term study. It is also hypothesised that results will show an increase in self-esteem, a positive improvement in mental wellbeing, and increased self-efficacy, and motivation to exercise.

12. Getting people active: government policy and citizen encouragement – evidence from successful projects in Scotland – THIS ABSTRACT HAS BEEN WITHDRAWN

Presenting Author: **Dr Robert Rogerson** (Academic Director, University of Strathclyde, Institute for Future Cities)

Authors: Robert Rogerson, Sue Sadler, Marilyn Lennon, David Rowe, Alison Kirk and Sir Harry Burns

This research explicitly focusses on getting people who are inactive to become and stay active, working with project interventions deemed by Scottish Government to be successful to measure change and to explore how national guidelines can be adapted to encourage and enable a step change in physical inactivity.

Aim: Despite a series of initiatives the proportion of the Scottish adult population (21%, all ages) reaching the national guidelines used by the Scottish Government has remained stubbornly unmoved. As part of a public policy initiative to create a step change in levels of physical activity, Scottish Government funding was allocated to the Spirit of 2012 Trust in 2015 to engage with 11 project teams across Scotland who had already demonstrated that they were successfully targeting inactive people with the aim to gather evidence of how their success could be scaled up.

Our research co-designed with these 11 project teams means to measure the physical activity outcomes from their interventions and to provide evidence to explore whether the use of a policy single metric (set as aspirational levels) is masking meaningful change and potentially acting as an inhibitor to encouraging citizen to aspire to and reach that level.

Methods: Pre-intervention and post-intervention comparisons were made of 921 participants who completed research survey questionnaires which provided measures of nature, duration and intensity of physical activity, as well as anticipated and realised benefits and motivations.

Results/findings: 30.9% of those involved were, at the start of the programme, at or above the recommended level of physical activity, and an almost identical proportion (31%) reached this level at the end. Below this level, however, there were important significant changes, not only a significant decline in the proportion who undertook none or only limited physical activity, from 21% to 13%, but increasing numbers who undertook smaller positive 'step changes' currently not reflected in evidence-base for policy making.

Conclusion: Taking small, realistic steps to increase levels of physical activity is progress - inactive people undertaking some activity or those who are active for a short period of time to do more, for longer and of greater intensity. Such change can and should be measured, and used as a platform towards higher levels of physical activity. National guidelines need to reflect this, creating a 'step ladder' towards the current recommended levels which acts to reward and incentivise further progress. But such policy change requires additional research evidence.

13. Get the message? A scoping review on physical activity for health messaging

Presenting Author: **Chloë Williamson** (PhD student, University of Edinburgh, Physical Activity for Health Research Centre)

Authors: Chloë Williamson, Graham Baker, Ailsa Niven, Nanette Mutrie, Paul Kelly

Findings from this study could shed light on promising techniques to relay physical activity guidelines to different populations in meaningful way, as well as highlight which areas within this field require more research. These findings could result long term in more inactive populations becoming active, as well as aiding active populations to remain active.

Background: Physical inactivity is widely accepted as a major contributor to the growing global burden of non-communicable disease. It is imperative that we find more ways to help more people meet the Government physical activity (PA) guidelines for health in order to reduce this burden. However, knowledge of PA guidelines is very low with only around 5% of adults in Scotland being able to correctly report them. The guidelines are an epidemiological threshold of what PA dose is required to reduce risk of morbidity and mortality and improve health outcomes, but do not necessarily translate to people understanding, meeting, or maintaining them. Nor do we know how they impact attitudes, motivation or self-efficacy. It is for this reason that PA guidelines should be augmented with messages that explain how and why they could be met in a format that is digestible, actionable and meaningful to the target audience. There is a lack of evidence to suggest what the most effective message content, mode, or dose is when communicating PA for health information.

Aims:

1. Review what is known around messaging and communicating PA for health information.
2. Highlight key research gaps.

Methods:

Design: scoping review.

Data sources: Ovid (MEDLINE), ProQuest, SPORTDiscus (Ebscohost), Web of Science.

Screening and reporting: 9111 records were identified and screened by a team of researchers. Included full texts were analysed reported according to content, delivery, and aim of the message(s).

Results: Of the 9111 studies identified, 105 full texts were included in the review. Data extraction is complete and at time of writing data synthesis is underway. Preliminary findings suggest important evidence and gaps around 5 key themes; (i) the aim of the message; (ii) the content and design; (iii) targeting and tailoring; (iv) dose and delivery; and (v) use of theory.

Conclusion: More needs to be known about how to effectively communicate PA for health to different audiences. This review will highlight what is already known and can be recommended for practice (e.g. communication of the 2018 UK Physical Activity Guidelines) and will also help prioritize evidence gaps for future research.

14. Fitness assessment with a mobile app: Potential tool in clinical care and as facilitator and motivator to physical activity behaviour change

Presenting Author: **Dr Liane Lewis** (Research Fellow in Cancer Care. University of Strathclyde, Computer and Information Sciences)

Study findings will lead to the development of a tool that could improve levels of fitness and physical activity in healthy people and people living with illness in Scotland. Clinicians expressed interest to use the app as a tool for pre-surgery assessment, and they see the potential for it to be a motivator for physical activity beyond clinical intervention.

Background: Measuring patients' levels of fitness has multiple benefits in a clinical environment, such as assessment of pre-surgery fitness assessment, baseline measure to monitor progress, and facilitator to engage in conversation about physical activity, to name a few. However, measurements are either resource intense and therefore not easily accessible, or too subjective to be meaningful. We developed the 6 minute walk app (6MW-app) for self-assessment of fitness using a mobile phone. Its simplicity could replace current assessment practice.

Aim: For further development of the app, we aimed to assess the internal validity, and evaluate the app for usability and perceived usefulness in healthy adults.

Methods: Healthy participants were visitors at the Glasgow Explorathon, and staff at the University of Strathclyde. Participants were aged 18 and over, had access to an android smart phone and spoke English. They performed two fitness tests using the 6MW-app and completed a short survey based on the Technology Acceptance Model. Test-re-test reliability was calculated using Pearson correlation and intra-class coefficient. Statistical mean was calculated for survey data.

Results: The Explorathon is taking place on 29th September, and therefore, data collection has not completed. Based on initial testing with 10 students, we expect the internal validity to be excellent and the app usability and usefulness to be highly acceptable.

Conclusion: If validity and usability is as expected, the next step would involve testing with a clinical population and clinicians. The 6MW-app has the potential to be easily integrated into patient care, in particular as a pre-surgery assessment tool and start a conversation about lifestyle changes in patients.

15. Investigating the Free-Living Validity and Reliability of the iPhone Health Application as a Pedometer

Presenting Author: **Chris McColm** (Postgraduate Student, University of Edinburgh, Institute for Sport, Physical Education and Health Sciences)

Authors: Chris McColm, Dr Paul Kelly

Smartphones represent a novel and accessible way to measure physical activity, in particular step count. Measurement is critically important when assessing the effectiveness of an outcome based framework such as the Active Scotland Outcomes Framework. With the ever growing popularity of smartphones, it is important for research to explore how this technology can monitor and promote physical activity in future.

Background: Physical activity monitoring is one of the most effective ways to encourage physical activity. Smartphones represent a novel, convenient and widely accessible method to record step counts in a community setting. In recent years there has been a dramatic increase in the popularity of smartphones and associated health promoting applications. The health application is a consumer targeted application with pedometer functions, pre-installed on all new iPhones. Previous research investigating the validity and reliability of the iPhone as a pedometer has primarily been laboratory based, with only one study including free-living data.

Aim: The purpose of this study was to investigate the free-living criterion validity and reliability of the health application as a pedometer.

Methods: A sample of 39 healthy university students were recruited. Participants were fitted with a valid and reliable activity monitor at the start of a 4-hour free-living test. For this period participants used their own iPhone as normal while completing their normal daily activities. Upon completion of the 4-hour data collection period step counts from the iPhone and activity monitor of each participant was compared.

Results: The iPhone undercounted steps with a mean bias of 7.8% over the 4-hour free-living period. Despite a statistically significant undercount ($p < 0.001$) by the iPhone health application, mean bias was within the range generally acceptable for consumer grade pedometers. The iPhone health application had poor reliability, however this is negated when examining mean step counts over a number of days. Conclusion: The iPhone health application was deemed to be a valid tool for users to self-monitor of step counts. Good validity allows users to monitor their step counts over prolonged periods promoting long term engagement in physical activity.

16. The use of social media in postural improvement, population engagement and behavioural change. #StopTheSlouch

Presenting Author: **Victoria Park** (Lecturer in Physiotherapy, Robert Gordon University, School of Health Sciences)

Authors: Victoria J Park, Bailey Campbell, Michelle Fiset, Sylvian Gourjaud, James Kirrane, Jonathan Krebs, Jethro Mendola-Byatt, Madison Quail and Sarah Vickery.

The initiative contributes to the Active Scotland Outcomes Framework as it encourages and enables the inactive to become more active in their study and working environments ultimately support wellbeing. It has the potential to be adapted for a variety of populations and to be disseminated nationally and globally.

Background: Contemporary health promotion initiatives utilising social media can engage individuals and communities to become more active. A key result of inactivity, slouching is one of the most common postural misalignments in modern times frequently leading to wider musculoskeletal problems. Social cognitive theory suggests that we use social influences to expose ourselves to new behaviours and provide incentives for change. Physiotherapy students at RGU set out to explore whether social media could be effective in targeting a university population with an educational postural correction health promotion message.

Aim: To explore the impact and population engagement of a social media postural correction campaign.

Methods: A pilot study explored the engagement of a university population with 3 'angel' exercises promoted by a Snapchat® geofilter with wings #StopTheSlouch over a period of 5 days. Following the intervention numbers of people who engaged with the initiative were recorded.

Results/Findings: Over a period of 5 days 2300 people engaged with the Snapchat® filter worldwide. Thus the impact of the initiative was not isolated to the university.

Conclusion: Over a period of only 5 days a Snapchat® filter demonstrated significant engagement and great potential to influence postural behavioural change and reduce physical inactivity within the university setting and a wider global population.

17. Evidence for the impact of taking part in the Daily Mile on children's cognition and mood in Scotland

Presenting Author: **Dr Josie Booth** (Lecturer, University of Edinburgh)

Authors: Josie Booth, Ross A. Chesham, Naomi E. Brooks, Trish Gorely & Colin N. Moran

This abstract describes work from school pupils in Scotland concerning the wider benefits of physical activity. The findings will help support efforts to encourage young people to take part in regular physical activity.

Background: The Daily Mile is one example of a short physical activity break from the classroom. This particular programme involves school pupils running or walking at a self-determined pace for 15 minutes each school day. It is estimated that pupils from 4000 schools across more than 40 countries take part in this initiative. We have previously reported on the health benefits of this programme, however it is not known what impact it may have on children's cognitive function and subjective wellbeing.

Aims: To determine the impact of taking part in the Daily Mile on children's cognition and subjective wellbeing.

Method: This study was part of the BBC Terrific Scientific programme, which is a citizen science project across the UK. 1536 pupils from 71 schools across Scotland took part in the study (50% male). Teachers reported whether their class did the Daily mile or similar activity. Pupils completed the Children's Feeling Scale and Felt Arousal Scale to give a measure of subjective wellbeing, plus computer-based tasks assessing attention/inhibition, visual-spatial and verbal working memory.

Results: Teachers from 52.4% of participating classes reported that their pupils did the Daily Mile or similar activity on at least three days of the week. Preliminary analysis suggests that pupils whose teacher reported Daily Mile activity had greater levels of subjective wellbeing and higher scores on the cognitive tasks; further analysis is underway.

Conclusion: Our findings show that pupils who have been taking part in short physical activity breaks regularly each week have greater levels of subjective wellbeing and higher scores on tasks of cognitive function. Both of these are important for supporting children to be ready to learn. The Scottish Government has already suggested that all schools should be adopting physical activity breaks and these findings serve to support efforts to promote this.

18. Results from the 2018 Active Healthy Kids Scotland Report Card

Presenting Author: **Dr Adrienne Hughes** (Lecturer, University of Strathclyde, Physical Activity for Health)

Authors: Dr Adrienne Hughes, Avril Johnstone, Farid Bardid, John J Reilly

National surveys are used to measure progress towards Active Scotland Outcomes (ASO). However, our work identified limitations in the measurement and reporting of several PA indicators within these surveys, leading to an inaccurate representation of progress towards ASO. Addressing these limitations would improve surveillance of PA in young people and provide a more accurate picture of progress towards these outcomes.

Background: Active Healthy Kids Scotland Report Cards from 2013 and 2016 demonstrated that only a small proportion of children and adolescents meet the recommended amount of daily moderate-to-vigorous physical activity (MVPA; ≥ 60 minutes), despite a favourable physical and policy environment in Scotland.

Aims: The 2018 Report Card provides an updated 'state of the nation' assessment of physical activity (PA) among children and adolescents in Scotland and highlights limitations in surveillance.

Methods: We graded nine PA indicators based on data which were: recent, derived from nationally representative surveys, affected by minimal bias, and determined by the percentage of young people meeting an evidence-based benchmark/recommendation, ranging from A+ (94%-100%) to F (<20%). Results: C grades were assigned to Active Transportation to school/nursery (49%) and Government (many national policies include PA promotion, however implementation and evaluation of these policies is more limited). Organised Sport and PA was graded as B (68%), though participation was lower among children from deprived areas. Community and Environment was graded as B- as access to local play areas was high (92%), but perceived safety was lower, especially in more deprived areas. Physical fitness could not be graded due to a lack of national data. Active Play and Family & Peers could not be graded as no data source had reported these indicators in line with the benchmarks. The F grades (based on adolescent data from the 2014 HBSC) for Overall PA and Sedentary Behaviours were carried forward from the 2016 card because no data source since the previous card has measured and/or reported these indicators according to evidence-based recommendations.

Conclusions: Despite a favourable physical and policy environment, and good grades for Active Transportation, and Organised Sport and PA (though socioeconomic inequalities were evident), levels of MVPA are low in Scottish children and adolescents, and levels of sedentary behaviour are high. Greater focus on implementation of child-focussed PA policies is needed to improve Active Scotland Outcomes. Several indicators, which are used to monitor progress towards Active Scotland Outcomes, could not be graded due to limitations within national surveys. Improved surveillance of PA in Scottish children and adolescents is required.

19. A feasibility cluster randomised controlled trial of an active play intervention on physical activity and fundamental movement skills in children from a low socio-economic status

Presenting Author: **Avril Johnstone** (PhD Student, University of Strathclyde, Physical Activity for Health)

Authors: Avril Johnstone, Dr Adrienne R Hughes; Dr Lizann Bonnar; Dr Josie Booth; Professor John J Reilly

One of Active Scotland's key outcomes is to 'develop physical confidence and competence from an early age'. Promotion of active play ('a form of gross motor or total body movement in which young children exert energy in a freely chosen, fun, and unstructured manner') could be a novel approach to achieving this outcome.

Introduction: One of Active Scotland's key outcomes is to 'develop physical confidence and competence from an early age'. Promotion of active play ('a form of gross motor or total body movement in which young children exert energy in a freely chosen, fun, and unstructured manner') could be a novel approach to achieving this outcome.

Aim: The aims of this study were to determine the feasibility of a 10-week school-based 'Active Play' intervention and present preliminary findings on two outcomes: school day physical activity levels and fundamental movement skills (FMS).

Methods: This was a feasibility cluster RCT in which eight primary schools were matched and randomly allocated to either the 10-week intervention (n=4) or wait-list control (n=4). The Active Play intervention was delivered by local play charities and consisted of a 1-hour outdoor physical activity session per week, incorporating 30 minutes of facilitated games and 30 minutes of free play. School day physical activity was measured using an ActiGraph GT3X accelerometer and FMS were assessed using the Test of Gross Motor Development-2 (TGMD-2).

Results: 66% of eligible children (n=137 children in primary 3) agreed to participate in the research. No schools withdrew from the study and only three participants were lost to follow-up. Data lost to follow-up were minimal; and most was lost for the school day physical activity outcome (14%). Compliance to the intervention was high as only four participants missed two Active Play sessions, and none missed more than two sessions. Active play sessions were often shorter than the planned hour by approximately 10-minutes, but participants spent a high percentage of their time in moderate-to-vigorous physical activity (MVPA) at 39.4%. Preliminary findings suggested that there was no evidence of significant intervention effects on MVPA ($p=0.13$) and total FMS score ($p=0.06$).

Conclusion: The Active Play intervention was feasible and benefitted from a high MVPA content; however, preliminary findings suggest the intervention had no significant effect on the outcomes. Having more Active Play sessions per week and/or extending the duration of the intervention may increase the effects and should be tested in a future definitive cluster RCT.

20. Exploring employers and employees perspectives of providing physical activity in paid time at work

Presenting Author: **Dr Gemma Ryde** (Lecturer, University of Stirling, Faculty of Health Sciences and Sport)

Authors: Dr Gemma Ryde, Dr Trish Gorely, Ms Patricia Aitchison, Ms Martine Stead, Dr Josie Evans.

Providing physical activity in paid work time as part of people's jobs has the potential to encourage and enable both active and inactive employees to be active at work. This study explores barriers and benefits of physical activity in paid time which are essential to understand prior to implementation of such initiatives.

Background: Physical activity is an effective strategy to prevent and treat many health conditions including mental ill health and depression. Increasing employees physical activity levels should be a key priority for employers considering that mental ill-health affects 1 in 6 of the workforce and is a leading cause of sickness absence, presenteeism and staff turnover in the UK costing employers up to £42 billion every year. Providing employees with physical activity in paid time at work might be an effective strategy to increase employees physical activity levels given that perceived lack of time is the most commonly reported barrier to being active. However, employers and employees views of this idea are unknown and understanding these are essential for implementation of such an initiative.

Aim: The aim of this study was to explore employee and employer perspectives of physical activity in paid time.

Methods: Focus groups were conducted with employees and managers at workplaces in central Scotland with larger numbers of desk based employees. Focus groups were digitally recorded and transcribed verbatim. Data were analysed using the thematic analysis and interpretation of data undertaken.

Results/Findings: Three out of five organisations approached took part in the study and focus groups were held with 18 managers and 45 employees. Barriers identified included organisational barriers (cost of lost time), the nature of the job (workload, logistical considerations) and existing workplace norms (colleague's expectations and a 'no break' culture). Similar benefits were reported from both employees and managers and included improved mental health, productivity and perceptions of the employer.

Conclusion: This study suggests that there are significant barriers to physical activity in paid time. Whilst numerous benefits were also reported by both employees and managers, physical activity in paid time is unlikely to be an effective strategy to increase physical activity of employees until the negative culture towards movement at work is addressed.

21. How do workplace step counting challenges generate their outcomes, for whom and in what contexts? A case study of building realist programme theory

Presenting Author: **Mary Allison** (PhD Student, University of Edinburgh, Jointly in PAHRC and SCPHRP)

Author: Mary Allison, Ailsa Niven, Ruth Jepson

This abstract contributes to our understanding of how workplace walking interventions work. Adults spend most of their waking hours in work and UK workers spend more time at work than EU counterparts. Understanding how to increase PA and reduce sitting through workplace interventions will be vital to the achievement of the Active Scotland Outcomes.

Introduction: The value of walking for health is established and is acknowledged in health policy (WHO, Dec 2017). To promote walking in the workplace there has been growth in 'step count' challenges; however there is limited evidence of effectiveness from RCT studies (Freak-Poli et al. 2013). This study adopts a realist research approach, with a focus on explaining how such challenges might work, for whom and why. It uses Scotland's 'Step Count Challenge' (SCC) as its focus.

Method: In line with RAMESES standards (2014) for realist research, the first stage generated initial rough programme theories (IRPTs). The IRPTs were shaped iteratively from: content analysis of programme documentation (2010-2017); stakeholder workshop; and, interviews with programme coordinators. These IRPTs were refined and re-conceptualised by reviewing primary literature from classes of programmes relevant to IRPTs. In keeping with realist approaches, included literature is multi-disciplinary and does not follow a methodological hierarchy. For transparency, and given the novelty of this approach, the data, iterations and refinements have been managed in NVivo.

Findings: The findings show that the SCC offers a wide range of commonly-used behaviour change resources: goal-setting, self-monitoring, rewards, role models, social support etc. The findings also show that these SCC resources resulted in diverse reactions from SCC participants. These reactions were related to personal, interpersonal, cultural and environmental contexts. These reactions to the SCC resources were conceptualised as mechanisms in that they had 'triggered' a behavioural response that led to both positive and negative outcomes. The identified mechanisms, contexts and outcomes were specifically configured into 7 programme theories. Their 'shorthand' descriptions are: 'sense of permission', 'alignment with health goals', 'nature-based distraction', 'bringing people together', 'striving to go beyond', 'reluctant peer pressure' and 'focused on a plan'. These were then found to be supported and explained by a range of mid-range theories including 'Attention Restoration Theory', 'Social Cognitive Theory', 'Self-Efficacy Theory' and 'Social Support Theory'.

Conclusion: Realist programme theory is relatively absent in physical activity research but is of value to understanding programme mechanisms and how they operate in specific contexts. The detailed explanation of method and findings may help others to consider.

22. Barriers and facilitators to the implementation of 20mph speed limit schemes in Edinburgh and Belfast: A qualitative exploration

Presenting Author: **Kieran Turner** (Research assistant, The University of Edinburgh, Physical Activity for Health Research Centre)

Authors: Kieran Turner, Graham Baker, Ruth Hunter, Ruth Jepson

Introducing 20mph speed limits (an example of altering the built environment) may impact opportunities for physical activity. This study describes the barriers and facilitators to the implementation of 20mph speed limits. These findings will help policymakers and practitioners in the planning and implementation of similar schemes across Scotland.

Aim: If delivered as intended, twenty mile per hour (20mph) speed limits may increase opportunities for walking and cycling. Process evaluations are important for understanding the implementation of interventions – they assess implementation fidelity and quality, barriers and facilitators to implementation, and they identify contextual factors associated with variation in outcomes. This study aimed to understand the barriers and facilitators to the recent implementation of a citywide 20mph speed limit in Edinburgh (introduced in a phased approach between 2016-2018), and a city-centre 20mph speed limit in Belfast (introduced at one time-point in 2016).

Methods: Semi-structured interviews were conducted with key stakeholders based on their involvement within four areas of implementation of the 20mph schemes in Edinburgh and Belfast: legislation; introduction of signage; awareness-raising and education; and enforcement activities. These included representatives from the local authority, central government, and relevant enforcement agencies.

Purposeful and snowball sampling methods were used. Interviews investigated: what implementation consisted of; implementation fidelity; barriers and facilitators to implementation; contextual factors influencing implementation; and differences between implementation phases (Edinburgh only). Data were managed in NVivo 11, and key themes were identified using thematic analysis.

Results: Fifteen initial interviews were conducted in Edinburgh, with five follow-up interviews taking place after implementation was completed. Seven interviews took place in Belfast. Ensuring effective collaborative working between involved parties (i.e. the local authorities, enforcement agency, and schools) was described as facilitating implementation. Additionally, the geographical street layout of both sites was viewed as lending itself to lower traffic speeds. One barrier to implementation identified was the lengthy statutory processes associated with introducing such schemes. Issues such as limited resources and competing operational priorities were discussed as hindering 20mph enforcement activity. Bad weather conditions caused a delay in the delivery of one implementation phase in Edinburgh, indicating the influence of the wider environmental context.

Conclusion: Authorities should note the substantial processes required before 20mph policies can be delivered, and consider the importance of 'joined-up working' for effective implementation. They should also be mindful of the potential for limited resources being available for enforcement of 20mph speed limits.

23. A systematic review of affective responses to acute high intensity interval exercise Vs continuous exercise in adults

Presenting Author: **Dr Ailsa Niven** (Senior Lecturer Physical Activity and Health, University of Edinburgh, Physical Activity and Health Research Centre)

Authors: Ailsa Niven, Yvonne Laird, Dave Saunders, Shaun Phillips

The time-efficient nature of high intensity interval exercise (HIIE) means that it could be attractive to the large number of both inactive and active individuals who perceive that they don't have time to be active. This study will contribute to our understanding of how individuals feel during HIIE, which can be used to inform promotion and implementation of this activity.

Background and Aim: High intensity interval exercise (HIIE) has been defined as brief repeated bursts of relatively intense or all-out exercise separated by rest or low intensity exercise, with total intense exercise time equal to 10 minutes and the total session time equal to 30 minutes. A substantial body of evidence now supports the physical health benefits of HIIE in both clinical and non-clinical groups, suggesting that HIIE may have a role to play in addressing the public health problem of physical inactivity. However, other researchers contest this claim, arguing that HIIE is not an appropriate mode of activity for the general population. These counter-arguments are based, in part, on the assertion that compared with moderate-intensity activity participants will experience negative affective responses during HIIE. The aim of this study was to investigate this assertion by systematically reviewing the current evidence relating to participants' affective responses to acute HIIE compared with continuous exercise.

Method: Following a pre-registered protocol (PROSPERO #CRD42017058203), in April 2018 we searched 6 databases using a search strategy including terms relating to the intervention (e.g., high-intensity interval exercise), and outcomes (e.g., affect). All titles and abstracts were imported into Covidence, and duplicates removed. Two reviewers independently screened each title and abstract, and then full-text papers to identify included studies. Conflicts were resolved within the research team. Risk of bias was assessed using the Cochrane risk of bias tool. Data relating to affect were extracted by two reviewers who then met to confirm accuracy of data extraction. The data from studies using the same instrument were meta-analysed to establish the pooled effect of HIIE compared to continuous exercise on affect during and following activity.

Results: Twenty-two studies were included, and although the analysis is incomplete at this point, preliminary findings indicate mixed results with some studies favouring a more positive affective response during HIIE, and others continuous exercise. Full findings will be reported at the conference.

Conclusion: How participants feel during physical activity has implications for future engagement and adherence. Therefore these findings will have implications for if and how we should promote HIIE to the general population.

24. Teaching physical activity in the medical curriculum; evaluation of a flipped classroom approach

Presenting Author: **Dr Sam Fawcner** (Senior Lecturer PA for Health, University of Edinburgh, Physical Activity for Health Research Centre)

Authors: Alice Harper, Louise Lynch, Nikola Wasag, Chaoyang Wang, Emma Sharland, Scott Mckinnon, Jeni Harden, Paul Kelly, Chris Oliver and Samantha Fawcner

This abstract presents a project aimed at increasing tomorrow's doctors' knowledge of the potential for prescribing PA to their patients for both disease prevention and treatment. As such it speaks to a number of the Active Scotland Outcomes by contributing to a philosophy that physical activity is promoted to all throughout both primary and secondary care.

Aim: Physical inactivity has been termed a global pandemic due to the devastating implications that high levels pose for health. Doctors play a crucial role in the health behaviour changes of the general public, often providing the initial and only source of evidence-based information. However, despite this, compelling evidence suggests that future doctors lack the required knowledge and skills to prescribe physical activity in alignment with the current CMO guidelines. Therefore, the purpose of this study was to evaluate the efficacy of a flipped classroom approach to providing medicine students at the university of Edinburgh with the understanding of the physical activity guidelines that is required of today's healthcare professionals.

Methods: Using a semi-structured questionnaire guide, one focus group discussion was conducted with 8 first year medicine students (1 male, 7 female), and data were analysed in Microsoft word using an inductive thematic analysis approach.

Results: Students felt that the flipped classroom approach allowed them to learn more effectively than traditional teaching methods, which was ascribed to not only the flexibility of the approach, but also to the interactive nature of the learning material. In addition, students also expressed that owing to a greater engagement and enjoyment of the learning process, they were more confident in their ability to effectively prescribe physical activity in accordance with current medical guidelines (CMO?)

Conclusion: This study provides novel evidence to suggest that a flipped classroom approach is an effective method for delivering education on physical activity guidelines within the UK medicine syllabus. It is therefore hoped that when time is of the essence, that tutors can confidently utilise this innovative learning technique to provide an enjoyable and effective learning experience for UK medicine students that may bridge the current gap in the medical syllabus, and better equip our doctors of tomorrow to prescribe physical activity.

25. Flow in Les Mills BodyBalance instructors: An interpretive phenomenological analysis

Presenting Author: **Alexandra Todd**

Instructors' flow and peak performance are valuable for enhancing instructor and potentially customer experience. Consequently, people endeavour to maintain flow enhancing activities in their daily routines. This may facilitate physical activity adherence amongst instructors and class participants and, in turn, contribute to the burdens of physical inactivity within Scotland's communities.

Background: Research on yoga-based physical activity indicates practicing regular BodyBalance could improve psychological and physiological wellbeing. To maximise these benefits, it is important that there is quality instruction. Understanding factors influencing BodyBalance instructors' peak performance is valuable to enhance instructor and customer experience, and facilitate physical activity adherence. Flow offers a perspective for understanding optimum performance, and is described as an autotelic experience where one is deeply absorbed in an activity. Although research has examined flow within sport and exercise domains, no research to date has considered fitness instructors' flow experiences.

Aim: This study's aim was to conduct an interpretive phenomenological analysis of BodyBalance instructors' experiences of flow. Objectives included discovering the existence of and the extent to which instructors experience flow, and what the facilitators and inhibitors to the occurrence of flow are.

Methods: 2 males and 8 females with ≥ 6 months BodyBalance teaching experience were recruited. 10 semi-structured interviews were conducted. Flow theory directed the design of the interview guide. An inductive approach with interpretative phenomenological analysis was adopted to analyse the data.

Results: Flow existed in all 10 instructors with the most dominant flow symptom being intrinsically rewarding behaviour, as instructors were intrinsically motivated to provide participants an optimal class experience. This indicated instructors do not seek a state of flow only for their own benefit, but also for the welfare of others. Facilitators to flow comprised pre-class facilitators involving preparation, facilitators during the class including intrinsic motivation to support participants, and BodyBalance programme facilitators involving personal development. Inhibitors to flow comprised pre-class inhibitors including personal life, inhibitors during the class involving uncontrollable disruptions, and BodyBalance programme inhibitors including a challenge/skill imbalance during the early stage of the programme release.

Conclusions: Instructors' flow and peak performance are valuable for enhancing instructor and potentially customer experience. This may facilitate PA adherence and, in turn, contribute to decreasing global burdens of physical inactivity. Future research should investigate whether instructors' flow is transmittable to participants. Pilot classes should be held for instructors to practice achieving a challenge/skill balance, and consequently a state of flow and peak performance.