

Wednesday 15th August 2012 Day Theme: Falls and Fractures/Balance and Bone Health

Plenary Keynotes

PREVENTING FALLS AND FRACTURES WITH PHYSICAL ACTIVITY AND EXERCISE

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Epidemiological evidence suggests that, compared with a sedentary lifestyle, over three hours targeted exercise each week can halve the risk of osteoporosis, falls-related injuries and hip fracture. People spending less than 4 hours a day on their feet also have a greater risk of osteoporosis. To maintain healthy bone mass, three 20-30 min sessions of weight-bearing exercise each week are recommended. To reduce falls, weight bearing balance exercise is also recommended, but with the caveat of a 50 hour dose. But we know some forms of exercise, in certain groups of older people, can actually increase the risk of a fall or fracture. Brisk walking, although has many endurance benefits, is often unsafe in those with poor balance and strength. There have been literally hundreds of studies that have looked at different types of exercise, different durations or intensities, different progressions and different frequencies per week. Do we have to exercise three times a week and are the effects better when we exercise in groups or alone? Once we are a faller or have osteoporosis, do the exercises change and does it matter who delivers them? How are we to make sense of the array of evidence and guidelines? Although this lecture cannot answer all of these, there will be some common-sense thoughts on research so far and where we can go in the future.

PROMOTING AND MARKETING PHYSICAL ACTIVITY TO OLDER PEOPLE

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Most governments, healthcare systems and corporations remain ill prepared for population aging. Significant gaps exist in all areas that need to be filled—gaps that provide challenges and opportunities for society. One such gap is the health and well-being of older adults. One opportunity to fill these gaps is the promotion and marketing of physical activity to the older population. However, research shows that relatively few marketers focus on the older-adult demographic, and most of those who do get a failing grade. How can this change? By attending this forward-thinking session, you will journey into the mind of the older adult to learn about their core needs, and to better understand why current sales and marketing efforts fail to address them. In addition, you will learn how to transform your marketing

efforts to capture this group's hearts and minds and learn more about what it takes to make your marketing relevant to their lifestyles, capabilities, needs, dreams, aspirations and expectations, while achieving a response.

Symposia

OCCUPATIONAL THERAPY AND FALLS: PROMOTING ACTIVE ENGAGEMENT WITH OLDER PEOPLE IN FALLS PREVENTION

Ballinger, Claire¹; Clemson, Lindy²; Robertson, Kate³; Brooks, Charlotte¹; Schwab, Petra⁴

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Elders' falls are recognised internationally as a cause of significant morbidity and mortality. Good evidence exists for multifactorial interventions, and strength and balance exercises in the prevention of falls. However, environmental and behavioural factors in the prevention of falls have, until recently, been poorly understood. Falls prevention initiatives may also be compromised by poor uptake of and adherence to interventions. Occupational therapists are well placed to work together with older people to minimise their falls risk, and optimise confidence, function, health and wellbeing. **Keywords:** Morbidity and Mortality; Strength; Balance; Prevention of Falls.

Exploring visually impaired elders' views about occupational therapy falls prevention interventions: How focus group findings will inform the VIP2UK trial

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Visual impairment is a risk factor for falls. The 'VIP' trial (Campbell et al 2005) evaluated the effectiveness of a home safety intervention and an exercise programme in preventing falls among older people with visual impairment. Although fewer participants randomised to the home safety arm of the trial experienced a fall, adherence to both interventions was sub-optimal. This paper reports on research exploring visually impaired elders' views about falls prevention, with the aim of enhancing uptake and adherence within the VIP2UK trial. Four focus groups were held with older people and their carers, and two with health care professionals (HCPs). Individual interviews were carried out with nine people in their homes, and with an additional two HCPs. Barriers to uptake and adherence included potential stigma, lack of perceived risk, poor HCP education around visual impairment and inappropriate supporting written material. Enablers included careful and sensitive explanation, peer acceptability, demonstration and appropriate supporting material, individually tailored interventions and the involvement of carers. We will discuss the implications of these findings for the two occupational therapy interventions to be delivered in the VIP2UK trial (home safety and exercise), and also how the trial peer mentors might use this information. **Reference:** Campbell AJ, Robertson MC, La Grow SJ, Kerse NM, Sanderson GF, Jacobs RJ, Sharp DM, Hale LA (2005) Randomised controlled trial of prevention of falls in people aged ≥75 with severe visual impairment: the VIP trial *British Medical Journal* 331, 817-20.

The design, development and application of LiFE, the Lifestyle-integrated Functional Exercise program to reduce falls in older people

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In the LiFE approach balance and strength activities are individually tailored for the older person and embedded within their daily routines. It involves changing everyday habits and draws on concepts of self-efficacy to prescribe and teach an individualised tailored program. A nationally funded randomized trial, led by Clemson, rigorously examined the efficacy of this novel approach to falls prevention. It was proven to significantly reduce falls and to have very positive and significant functional outcomes for older at-risk community residing older people. LiFE expands our knowledge about the role of functional balance and strength activities in falls prevention. It provides another exercise choice that can be taught by occupational therapists and physiotherapists. There are positive outcomes that can be marketed to potential participants: having enhanced energy to do more, improved function in doing activities and enhanced participation in daily life. LiFE has the potential to challenge and to expand our home visit focus working with older people to find opportunities to incorporate balance and strength training into daily life. The presentation will discuss the design, development and explore the application of the program to current practice. It will conclude with an outline of future research plans.

Thinking falls, taking action: Development of the Guide to Action for Falls Prevention Tools

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Background: We developed a multiagency tool for use with community dwelling older people which highlights falls risk factors for the individual and suggests actions to take to reduce falls. This tool was then adapted for use within a care home setting. **Methods:** The Guide to Action for Falls Prevention Tools was developed through an iterative process by a team of clinicians, academics, older people and carers. Appraisal of evidence of risk factors for falling in older people and successful interventions to reduce falls was completed. The Tools were developed, trialled and embedded in clinical practice. **Results:** Audit of the community based tool showed it was easy to use, highlighted previously unrecognised falls risk factors but required clinicians to be trained in its use to be most effective. A study of the use of the Care Homes Tool showed it was quick and easy to use and acceptable to care home staff, increased understanding of falls risks and actions to reduce falls and that training in the tool's use improved implementation within care home settings.

The readability of English language falls prevention websites aimed at the public

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Background: Low literacy levels are associated with poor health outcomes and increasing age (1,2). Older people are increasingly accessing the internet for health-related materials (3). Previous studies have explored the quality and representations of old age in falls prevention websites (4,5). However, no other literature has been identified assessing the readability of such websites. **Objective:** To evaluate the literacy levels of frequently accessed English

language falls prevention websites offering advice on falls risk and prevention for the public. **Methods:** Websites will be searched for using the strategy previously employed in both a systematic-style review and a qualitative analysis of falls prevention websites. Fifty-four searches will be implemented on three search engines. The reading grade level of text selected from the websites will be established using the standardised Gunning –FOG and Simple Measure of Gobbledygook formulas. **Findings:** Preliminary findings indicate the websites are not reaching recommended literacy levels for health education material. **Conclusion / Impact:** If falls prevention websites are not accessible or understandable to individuals with lower literacy levels, current government initiatives to increase patient control may result in widening healthcare inequalities. **References:** 1. Dewalt D, Berkman N, Sheridan S, Lohr K and Pignone M (2004) Literacy and health outcomes: a systematic review of the literature. *Journal of General Internal Medicine* 19(12): 1228-39; 2. Von Wagner C, Knight K, Steptoe A and Wardle J (2007) Functional health literacy and health-promoting behaviour in a national sample of British adults. *Journal of Epidemiology and Community Health* 61(12): 1086-90; 3. Office for National Statistics (2008) *Internet access 2008: households and individuals*. Newport: ONS; 4. Nyman S, Hogarth H, Ballinger C and Victor C (2011) Representations of old age in falls prevention websites: Implications for likely uptake of advice by older people *British Journal of Occupational Therapy* 74(8):366-74; 5. Whitehead S, Skelton D and Todd C (2012) The quality of websites offering falls related advice to older members of the public and their families: a systematic style review. *Health Informatics Journal* 18 (1): 50-65.

Fall prevention—A matter of balance: Experiences of occupational therapists concerning fall prevention for community-dwelling elderly

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Background/Aim: Given the aging population and falls as challenge to individuals and society, the area of working with community-dwelling elderly people will expand in the future. In consideration of the societal importance of falls and the lack of knowledge concerning the Austrian situation of occupational therapy fall-prevention, this study aims to explore how Austrian occupational therapists experience the current practice of fall-prevention intervention for community-dwelling elderly people. **Method:** For this study, a grounded theory approach was used. Focus group and single-in-depth interviews with in total seven occupational therapists from a major city in Austria were conducted. All participants had experience of 10 - 25 years working within the field of fall prevention with community-dwelling elderly. **Findings:** 'Balancing autonomy and safety' was found to be the core-category and OTs central concern in fall-prevention. To keep the balance between autonomy and safety 'balancing responsibilities' emerged to be the second major category accompanied by 'managing various OT roles', 'affecting client's habits and values' and 'balancing the roles of relatives'. **Conclusion:** Occupational therapists experienced fall-prevention as a highly challenging matter of balancing autonomy and safety. A client-centred approach is suggested to achieve successful fall-prevention which aims as much on client's autonomy as on safety.

IDENTIFYING AND ADDRESSING FEAR OF FALLING IN HIP FRACTURE PATIENTS: PRELIMINARY RESULTS OF A MULTIFACTORIAL INTERVENTION

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Hip fractures are one of the most serious consequences of a fall and a high risk for becoming community immobile and functionally dependent. There is some evidence that fear of falling (FoF), self-efficacy and perceived control are important psychological variables in the recovery from hip fracture. In contrast to interventions for community-residing older people, there is little knowledge about sensitive screenings and cognitive behavioural interventions targeting such psychological variables during inpatient rehabilitation. Based on the Short Falls Efficacy Scale International (FES-I) a set with 16 icon cards including less demanding activities (e.g. transfer situations) was developed. Together with single questions on fall-related post-traumatic stress and fears of future falls the icon set are part of the FoF screening. This approach will be discussed in regard to the clinical judgment of physiotherapists, the patient's experience of the injurious fall and psychological variables like anxiety control and psychological flexibility. Based on a theoretical framework a multifactorial intervention to improve physical activity and falls efficacy was developed. Six components (1. relaxation techniques, 2. mobility goals, 3. falls-related cognitions and emotions, critical situations, 4. individual physical exercise programme for home-based training of strength and balance plus functional floor exercises if feasible, 5. implementation of physical exercises and activities into daily life, 6. fall hazards) are delivered by physiotherapists in 8 face-to-face sessions during rehabilitation plus 4 telephone contacts and one home visit after discharge. The goals of the components, the impact of the psychological supervision, first results and patient examples of the ongoing randomized controlled trial will be presented. **Keywords:** Fear of Falling; Hip Fractures; Fall Risk; Multifactorial Intervention.

AGEUK FALLS AWARENESS WEEK

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Falls Awareness Week was originally set up in 2005 to provide a focus for local action and encourage organisations working with older people to organise events to raise awareness of the practical ways to reduce the risk of falls. This symposium will give an overview of the last eight years and present some of the highlights to demonstrate the impact of a coordinated local and national approach to raising awareness and reducing falls. It will include the following sessions with allocated time for questions at the end of the symposium. **Introduction:** A background to the campaign, including: Why do we do it?; Background to the issue of falls; Putting policy & research into practice: engaging with older people and delivering effective health promotion; What does it achieve?; Reach: media coverage, participants; Partnerships/ongoing programmes of work; How do we do it?; Using different themes: from pavements to vision. The following three 'case studies' will be presented as examples of FAW events and initiatives that can lead on to ongoing programmes of work and local partnerships. 1. **The role of pharmacists in falls prevention** (Zul Mamon, Avicenna). This session will focus on the pharmacy campaign run by Avicenna pharmacy group to enable their members to identify older people at risk from falls and ensure appropriate signposting for effective treatment and rehabilitation. During Falls Awareness Week 2010 Avicenna members were invited to take part in a specially devised training programme, encompassing osteoporotic treatments, medicines and combinations of medicines linked to falls, and put this to use with the Falls Risk Assessment Tool to reduce falls among individual older people. In addition to training and guidance for members, the group produced additional materials for use in

ongoing awareness raising, including leaflets and home safety checklists, as well as links to local community services, NHS falls prevention teams and voluntary sector services. Outcomes from one participating pharmacy included: 26 FRAT assessments conducted; 18 Medicine Use Reviews conducted; six patient referrals to optometrist; one patient referral to GP; postural hypotension found in three patients; eight patients recommended calcium and vitamin D supplements. 2. *The voluntary sector perspective*. The session will include an example from an AgeUK event at this year's Falls Awareness Week to highlight the issue of falls and bone health. 3. *'On the Buses': working with local bus companies*. This session will highlight the work conducted by Central London Community Healthcare NHS Trust to raise awareness of the risks of falls on buses, including activities that were run on Falls awareness Day in 2009 to educate bus drivers and bus company managers about falls and their impact on older people, as well as those that were targeted towards older bus users. The session will also showcase the work done by CLCH, Help the Aged and First Group in producing safety information and materials for older passengers, including a Safe Journey card, and follow-up work with local councils and Transport for London to raise awareness among Freedom Pass holders, and introduce a component on falls within ongoing training for bus drivers. **Keywords:** Falls Awareness; Charity; Reduction of Risk of Falls; Training of Professionals.

ENHANCING PARTICIPATION IN EXERCISE INTERVENTIONS FOR THE PREVENTION OF FALLS

Nyman, Samuel R¹; Tiedemann, Anne²; Campbell, John³; Rose, Debbie⁴

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Falls are recognised around the world as a major cause of morbidity and mortality among older people. Exercise interventions are proven to prevent falls, yet sedentary activity is prevalent among older people. The aim of this symposium is to stimulate discussion of the potential factors that might enhance participation among older people.

Current evidence on older people's participation in exercise interventions for the prevention of falls

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Rationale: Low uptake and adherence from participants can threaten the effectiveness of interventions, but little is known about the issue in regard to falls prevention. Therefore, we conducted a review to collate the evidence on older people's participation and engagement in falls prevention trials with an emphasis on exercise interventions. **Method:** A recent authoritative Cochrane systematic review evaluated interventions to prevent falls among older people in the community (Gillespie et al., 2009). We supplemented this review by re-analysing the single and multi-factorial randomised controlled trials (RCTs) (n = 99) on four outcome variables: 1) recruitment into the RCT, 2) attrition from the RCT at 12 months, 3) adherence to the intervention, and 4) any tests for whether adherence moderated the effect of the intervention on falls. Descriptive statistics were conducted using medians, ranges, and interquartile ranges. **Results:** The average recruitment rate into the RCTs was high (median = 70.7%, range 64.2–81.7%), and the average attrition rate at 12 months (excluding mortality) was low (median = 9.3%, range = 7.5–10.8%). Exercise interventions

had the lowest recruitment rate (64.2%), but a very low attrition rate at 12 months (median = 8.0%). Adherence rates were ~80% for vitamin D/calcium supplementation; ~70% for walking and class-based exercise; 52% for individually targeted exercise; approximately 60–70% for fluid/nutrition therapy and interventions to increase knowledge; 58–59% for home modifications; but there was no improvement for medication review/withdrawal of certain drugs. Adherence to multifactorial interventions was generally ~75% but ranged 28–95% for individual components. Moderator analyses were tested in 13 studies that had mixed results, with five exercise interventions reporting non-significant moderator effects of adherence on trial outcomes. **Conclusion:** Using median rates for recruitment (64%), attrition (10%), and adherence (52–70%), we estimate that, at 12 months, on average 30–40% of community-dwelling older people are likely to be adhering to exercise interventions for the prevention of falls.

Predictors of exercise adherence among community-dwelling older people

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Background: It is widely acknowledged that physical activity has wide-ranging benefits for the health and well-being of people of all ages. In older people in particular, there is clear evidence that structured exercise can prevent falls (Gillespie, et al. 2009). However, a major limitation of physical activity and exercise as a public health intervention is low rates of participation. **Objective:** This study aimed to identify physiological, psychological, health and lifestyle factors associated with poor exercise adherence in retirement village residents. **Methods:** The study involved 344 people, aged 62 years and over who participated in a falls-prevention exercise program in Sydney, Australia. 163 low adherers (those who attended less than 30% of exercise classes over a six-month period) were compared to the rest of the sample. **Results:** Several baseline measures of balance, cognition, walking speed and health and mobility were impaired in the low adherers compared to the rest of the sample. Logistic regression analysis identified three variables: postural instability (OR = 1.83, 95% CI 1.17-2.87), taking four or more medications (OR = 1.75, 95% CI 1.12-2.73) and poor Mini Mental State Examination (MMSE) score (OR = 1.79, 95% CI 1.14-2.80), as significant, independent predictors of poor adherence. The area under the curve (AUC) for this model was 0.64 (95% CI 0.58 to 0.70), bootstrap-corrected AUC = 0.64. **Conclusion:** Logistic regression modelling identified postural instability, polypharmacy and poor cognition as the most significant independent predictors of poor exercise adherence. These findings may assist in the development of pre-exercise screening techniques that could be used in public health programs. **References:** Gillespie LD, Robertson MC, et al. 2009. Interventions for preventing falls in older people living in the community. Cochrane Database of Systematic Reviews: Issue 2. Art. No.: CD007146. DOI: 10.1002/14651858.CD007146.pub2.

Barriers to Otago exercise participation among older people with visual impairment

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Fall prevention exercise programmes need to be maintained for continued effectiveness and this may be more difficult than usual for those with disability. In a trial of an exercise programme, proven to reduce falls when used in older people with normal sight, we found no significant reduction in falls in those with severe visual impairment in the intention to

treat analysis. There are a number of possible reasons for this but lack of adherence to the programme contributed. Those who carried out the exercise programme regularly had a significant reduction in falls compared with those who did not exercise regularly. Those with severe visual impairment may not consider that they are able to take regular exercise and may be especially concerned about the safety of any programme. Modifications may need to be made to a programme proven to be of value in those with normal sight. For example, if an outside walking schedule is part of a programme it may not be safe and need to be modified or omitted. The information about the programme and instructions for each exercise may need to be given by audiotape. All illustrations need to be simple, and clearer than usual. The instructor overseeing the person's programme should look for a suitable and safe place within the home for the person to carry out the exercises. Initial participation in groups may increase confidence. Involvement of special organisations such as the Royal Foundation of the Blind may help with the establishment of groups and provide assistance and encouragement to continue the programme at home. Families also can be very helpful in providing initial support and reinforcing the need for continuation. Intercurrent illness or injury is a common reason for stopping participation in any exercise programme for older people. People with impaired sight are at greater risk of falls and injury and processes need to be in place to reassess and restart the programme when it has been discontinued for a period for health reasons.

Maximising uptake and adherence when implementing an exercise intervention to prevent falls

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The development of a broad continuum of fall risk reduction programs that address the needs of older adults at different levels of fall risk are becoming increasingly important as the older adult segment of the population worldwide continues to rapidly expand. Multi-component exercise interventions have been particularly effective in lowering fall risk and/or fall incidence rates in the short-term (Gillespie et al., 2009). When designing these types of interventions, however, it is important to consider the factors that influence client uptake and adherence, both during and after the acute phase of the program ends. To date, very little fall-risk-reduction research has systematically included any strategies designed to effect long-term changes in behaviour and compliance with recommended fall prevention activities. Recommended strategies for increasing uptake include matching the needs, preferences, and capabilities of the older adult to the intervention, promoting the specific benefits of an intervention relative to improving balance and reducing fall risk, and fostering self-management skills by having the participant take an active versus passive role in the intervention process. Ascertaining the behavioural readiness of potential enrollees is also central to facilitating uptake. Patient activation and/or profiling tools have been successfully used in health behaviour research to better match clients to a particular intervention. Systematically including strategies aimed at changing attitudes and actual behaviours that contribute to heightened fall risk are important for achieving long-term engagement in physical activity and other supportive fall-risk-reduction behaviours (e.g., modifying the home and immediate environment for added safety, getting regular vision and hearing check-ups, eliminating risky behaviours). Finally, designing a step-down approach aimed at fostering the older adults self-direction and management of risk following the acute phase of the intervention has also been shown to foster long-term adherence. Examples of effec-

tive methods used to foster regular engagement in physical activity and/or the adoption of protective behaviours include post-program social support groups, and/or scheduling of in-person refresher training sessions, and telephone counselling.

CULTURE, ETHNICITY & PHYSICAL ACTIVITY: PROMOTING ACTIVE AGEING IN OLDER PEOPLE FROM BLACK & MINORITY ETHNIC GROUPS

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Increasing physical activity (PA) levels in older adults remains an international concern of health policy (WHO, 2010). Levels of physical activity decrease with increasing age among all groups of older adults, but higher rates of inactivity are seen among Black and Minority Ethnic (BME) groups across the world. Ethnicity and culture may affect attitudes towards and participation in exercise and PA. This symposium focuses on the influence of culture and ethnicity on exercise and PA uptake and adherence. The symposium explores key issues and challenges concerned with older adults' experiences and factors influencing exercise and PA uptake and adherence among BME groups. The symposium will conclude by drawing together issues, implications and recommendations for practice, research and policy. **Reference:** World Health Organization (2010). Global recommendations for physical activity and health. Geneva: World Health Organization.

Attitudes and beliefs associated with uptake and maintenance of physical activity among South Asian older adults aged 60–70

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Background: Sedentary behaviour among South Asian (SA) older adults is common, with only 11% of SA men and 8% of SA women aged 55 years and over in the UK meeting the recommended levels for physical activity (PA) (Sproston & Mindell 2006). At the same time these individuals experience greater levels of heart disease, stroke and type-2 diabetes; conditions that can be prevented or improved through regular participation in PA (Gill et al., 2007). This presentation reports on research undertaken to identify attitudes and beliefs associated with the uptake and maintenance of PA among SA older adults aged 60-70 to inform our understanding of how PA programmes could be designed and presented to motivate SA older adults to take up and adhere to a regular PA programme. **Method:** An exploratory qualitative approach was utilized using five focus groups (n = 29) and 17 in-depth interviews were conducted to explore the motivational factors associated with initiating and maintaining PA among SA older adults. Data analysis followed the framework approach. **Findings:** Health, maintaining independence, and social support were important in terms of initiating PA activity, whereas social support, psychosocial elements of activity, health and integrating physical activity within everyday activities were important for adherence. Gendered physical activity sessions were important to initiating exercise among Muslim South Asian 60-70 year-olds. **Conclusions:** Building PA in and around day-to-day activities and promoting active lifestyles are important strategies to increasing activity levels. Culturally appropriate facilities and peer mentors, who could assist those with language barriers, specific tailored advice and general social support, could promote uptake and subsequent adherence among this population group. **References:** Gill PS, Kai J, Bhopal RS, Wild S. (2007). Health Care

Needs Assessment of Black and Minority Ethnic Groups. In: Stevens A, Raftery J, Mant J, Simpson S (Eds). *The Epidemiologically Based Health Needs Assessment Reviews*. London: Radcliffe. Sproston, K. & Mindell, J. (Eds) (2006). *Health Survey of England 2004: The health of minority ethnic groups*. London: Information Centre.

Living Independently for Elders: Increasing physical activity for nursing home eligible urban African Americans

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Background: Living Independently for Elders (LIFE) at the University of Pennsylvania (UPenn) is an academic nurse run community based long-term care practice. The focus of this interdisciplinary practice is to prevent institutionalization in community dwelling frail older adults who qualify for nursing home placement. This practice serves dual eligible older adults who are covered by Medicaid (State) and Medicare (Federal) insurance. LIFE UPenn is both the members' provider and insurer. **Project:** The LIFE UPenn program currently has 430 members age 55+, 95% of whom are African American with 5 or more chronic illnesses. Urban African American typically have low vitamin D levels which impacts not only their bones but their mobility (Wilkins et al. 2009). This population is already frail, predisposing them to increased vulnerability, poorer health outcomes, institutionalization and death (Lang et al. 2009). Engaging this population in PA is essential in maintaining them in the community (Duru et al. 2010). The LIFE UPenn day center provides an interdisciplinary setting to engage the members in physical activities (Sullivan-Marx et al., 2010). Members of LIFE UPenn are assigned to Nurse Practitioner led teams. Each team consists of a physical, occupational and recreational therapist, primary nurse, physician, social worker and a consulting nurse practitioner who focuses on mental health of the members. The team focuses is on keeping members well enough to live in the community which includes keeping them physically active. **Discussion:** This presentation will describe the successful interdisciplinary programs used to facilitate increased physical activity and discuss the techniques used to motivate and increase engagement and adherence to physical activity programs e.g. Vitamin D repletion, structured walking programs, fall reduction program and innovative recreational therapy including Tai Chi, line dancing and movement therapy. Successful techniques to increase engagement and adherence to PA programs will also be described, such as identifying and training African American caregiver staff to champion activity and motivate members to participate and receiving guidance from the Council of Elders to identify culturally appropriate PA programs for the Members (Sullivan-Marx et al. 2011). **References:** Duru, C.K., Sarkisian, C.A., Leng, M., Mangione, C.M. (2010). Sisters in motion: A randomized controlled trial of a faith-based physical activity intervention. *Journal of the American Geriatrics Society*, 58, 1863-1869; Sullivan-Marx, EM, Bradway, C., Barnsteiner, J. (2010). Innovative collaboration: A case study for academic owned nursing practice. *Journal of Nursing Scholarship*. 42(1), 50-57; Sullivan-Marx, EM, Mangione, KK, Ackerson, T., Sidorove, I., Mailin, G.G., Volpe, S., Craik, R. (2011); Recruitment and retention strategies among older African American women enrolled in an exercise study at a PACE program. *Gerontologist*, 51, Suppl. 1:S73-81.

Active ageing and fall prevention among older Chinese people

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Background: To promote active ageing cultural awareness is needed since culture influences how people understand and interpret their experiences and how they respond to active ageing (Horton & Dickinson, 2011). Ethnicity and culture may affect attitudes towards and participation in exercise and fall prevention strategies although there is little understanding of this influence (Horton & Dickinson, 2011; Horne et al., 2009). This presentation aims to report on research undertaken to explore the perceptions of older Chinese people in relation to falls and fear of falling, and the barriers and facilitators identified to taking up fall prevention interventions (Horton & Dickinson, 2011). **Method:** Grounded Theory approach with a purposive sample of 30 Chinese older people (9 men and 21 women) who attended Tai Chi classes, two focus groups with ten people in each and ten face-to-face in-depth interviews were conducted in Mandarin or Cantonese. Interview transcripts, back translated were analysed using constant comparative analysis. **Findings:** A range of health-seeking behaviours were identified following a fall. Chinese culture, rooted in the beliefs and practices of the Chinese philosophical assumptions about health, illness and healing, and their acquired ways of coping with the experience of falls influenced Chinese older people's decisions to taking up fall prevention interventions. Although the family is still regarded as the cornerstone of their society they remain fairly conservative in clinging to the 'social' aspect traditional Chinese society as cultural intergenerational relations had an impact on taking actions to prevent falls and whether or not to take up Tai Chi as a 'Chinese' option. **Conclusion:** Cultural diversity affects Chinese older adults' acceptance of fall prevention interventions. **References:** Horne, M., Speed S., Skelton D. & Todd C. (2009). What do community dwelling Caucasian and South Asian 60-70 year olds think about exercise for fall prevention? *Age and Ageing*, 38 (1): 68-73; Horton, K. & Dickinson, A. (2011). The Role of Culture and Diversity in the Prevention of Falls among Older Chinese People. *Canadian Journal of Ageing*, 30; 1: 57-66.

FALLS, FALL PREVENTION AND PHYSICAL ACTIVITY IN OLDER PEOPLE WITH INTELLECTUAL DISABILITIES

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People with intellectual disabilities have different patterns of health when compared with the general population, and can experience health inequalities. They have higher rates of mortality compared to the general population, although life expectancy is increasing (1). As longevity increases for people with intellectual disabilities, promoting healthy and active ageing becomes even more important. Falls are a recognised problem for people with intellectual disabilities. Previous research has demonstrated that adults with intellectual disabilities experience high rates of falls, which are similar to those of older adults in the general population (2, 3), but they are experiencing falls at a younger age³. Despite this however, there has been little or no investment to date, in developing falls assessment or prevention strategies for people with intellectual disabilities. The purpose of this symposium is to present an overview of falls experienced by people with intellectual disabilities, including risk factors identified for falls, with a view to drawing on the expertise and good practice guidelines of researchers working with older adults to prevent falls; to develop falls assessment and falls prevention strategies which are tailored for people with intellectual disabilities. Physical activity and exercise interventions will be presented and considered in relation to this topic, as part of healthy and active ageing (4, 5). **References:** 1. Emerson et al. (2012) Health Inequalities &

People with Learning Disabilities in the UK: 2011. Improving Health and Lives: Learning Disabilities Observatory: Durham, UK; 2. Finlayson et al. (2010) Injuries, falls and accidents among adults with intellectual disabilities: Prospective cohort study. *Journal of Intellectual Disability Research* 54 (11): 966-980; 3. Cox et al. (2010) Incidence of and risk factors for falls among adults with intellectual disability. *Journal of Intellectual Disability Research* 54 (12): 1045-1057; 4. Carmeli et al. (2005) Can physical training have an effect on well-being in adults with mild intellectual disability. *Mechanisms of Ageing and Development* 126: 299-304; 5. Carmeli et al. (2008) Perceptual-motor coordination in persons with mild intellectual disability. *Disability & Rehabilitation* 30 (5): 323-329.

Preventing falls and promoting physical activity in people with intellectual disabilities

Finlayson, Janet

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Background: People with intellectual disabilities (IDs) have different patterns of health and experience some health problems more commonly when compared with the general population. Previous research has demonstrated that adults with IDs high rates of falls, which are similar to those of older adults in the general population, but they are experiencing falls at a younger age. In addition, previous research has also demonstrated that adults with IDs are more likely to have low patterns of regular physical activity (PA), that are similar to those found in sedentary adults who do not have intellectual disabilities in the general population. **Aim:** The aim of this research was to investigate the incidence of falls in a population and community-based cohort of adults with IDs, and to identify risk factors for i) falls/fall injury, and ii) low levels of PA. **Participants and Methods:** Interviews were conducted with 511 adults with IDs and their carers who live in Glasgow, UK at time 1 (baseline), and at time 2 (two-year follow up). Self/proxy-reported data was collected on falls/fall injuries experienced over the previous 12 months, and PA undertaken in a typical week. **Results:** 40.1% (205) adults experienced at least one fall in the previous 12 months, and incident injury due to falls was 12.1% (62). Independently predictive risk factors for incident fall injury were epilepsy (epilepsy-related included), and urinary incontinence and not having Down syndrome (epilepsy-related excluded). Only 150 (34.6% of 433) undertook any regular physical activity of at least moderate intensity. Older age, having immobility, epilepsy, no daytime opportunities, living in congregate care and faecal incontinence were independently predictive of low levels of PA. **Conclusion:** Adults with IDs require tailored strategies and interventions for preventing falls and promoting PA. As longevity increases for adults with IDs, promoting healthy and active ageing becomes increasingly important. **Keywords:** Falls Prevention; Physical Activity; Risk Factors; Healthy Active Ageing.

Physical exercises to improve strength, balance and coordination in older adults with intellectual disabilities

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Background: Older adults with intellectual disability (ID) are often physically inactive and frequently show signs of 'premature aging', with a greater tendency towards de-conditioning and morbidity. The causal influences and possible barriers to participation in physical exercises (PE) may be related to lack of PE appreciation on one hand, and on the other hand lack of caregiver support and difficulty finding experienced personnel to train them. There

is a strong correlation between low muscle strength, poor balance and physical inability in activities of daily living and well-being. The aim of the study was to investigate the effect of PE on balance, coordination, strength, and general well-being in adult people with ID. **Participants & Methods:** The target population comprised of persons with ID who were the permanent care center resident, and aged 50 or older. Mobility and balance tests were measured by a Timed Get-up and Go test and Beam forward walking, and Posture Scale Analyzer system used to examine postural stability; Seven sensory-motor tasks included elements of hand-eye coordination; Knee muscles strength were measured on a Biodex dynamometer; The self-concept of well-being was measured by direct interview with a questionnaire consisting of 37 structural statements. **Intervention:** PE program was conducted four times a week for six consecutive months: twice a week treadmill walking or biking, and twice a week general exercises including ball games and dancing. **Results:** Six months of PE significantly improved balance, coordination, muscle strength, and well-being among older adults with ID.

Fall prevention in people with intellectual disability: Pilot risk assessment study

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Introduction: In people with intellectual disabilities (ID) falls are a threat for the functional status and quality of live. Compared to older persons the consequences are similarly multifactorial. As some research has indicated [1], there can be more injuries, higher costs for the health system, reduced physical activity, additional workload for staff members and increased fear of falling. But in depth information regarding the number and frequency of falls are rare. This is in contrast to the scientific expertise on falls in older people, living in a nursing home or independently at home. In addition information on fall risk factors, possible assessment tools for risk factors, and designs as well as effects of a multifactorial intervention for fall prevention is lacking. Because of this deficit, our study is focused on obtaining and defining risk factors in people with ID. Furthermore information on the circumstances and consequences of a fall are gathered. In addition the study analyses the adaptability and reliability of approved assessment tools in persons with ID to screen for risk of falling. **Assessment Tools:** The Timed „Up and Go” Test, Chair-Stand and Romberg-Balance-Test are very well known for assessing fall risk in older people in the general population. These tests have already been used to measure strength, balance and complex movement in people with intellectual disability. But little is known about the feasibility of these assessment-tools in the ID-population or even the reliability and interrater-reliability. In a pilot-study, we focus on the adaptability and reliability of these approved assessment tools. **Setting and Sample:** Study will take place in a special residential institution for people with ID. More than 200 residents are living there, with different grades of ID, and support needed. Two-thirds are female and the mean age is 54.11 years.

Development of a physical activity based intervention (PrefallID)

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In people with intellectual disabilities (ID) falls are a threat for the functional status and quality of life. Compared to older persons the consequences are similarly multi-factorial. In contrast to fall prevention research in community-dwelling older persons or in nursing homes settings, knowledge and evidence for appropriate interventions are rare and missing. In a recent review on balance and gait capacities in persons with ID, it has been demonstrated that due to delayed balance and gait capacities in the developmental process persons with ID start on a lower functional balance and gait level. But these are the limiting factors – among others – for mobility and fall risk, and therefore it seems mandatory to address both, balance and gait, in a physical activity based intervention. In addition, this approach is in line with evidence of exercise intervention in community-dwelling older persons. Some research has already been done to investigate the trainability of both balance and gait in persons with ID but the evidence is weak. Due to the multifactorial nature of falls in persons with ID, physical activity based intervention have to target other domains as well. This approach is nested in the model of the ICF, and taking into account the personal factors e.g. motivation for physical activity also in account as environmental factors (accessibility of gymnastic rooms). The presentation will outline first planning and structuring a physical activity based exercise program in persons aged 18 and older with ID.

THE PROACT65+ EXERCISE TRIAL SYMPOSIUM: AN OVERVIEW, PRACTICAL IMPLICATIONS AND LESSONS LEARNED

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Background: The ProAct65+ Trial is a multi-centre cluster randomised controlled trial comparing two exercise interventions, the Otago home based exercise programme (OEP), and, the Falls Management Exercise (FaME) programme, with a control group, in patients aged 65 and over in primary care. The study has recruited a total of 1256 participants through GP practices in London and Nottingham/Derby. **Aims:** To give an overview of the ProAct65+ Trial and how it has worked in practice and the lessons that have been learned from conducting the research and how these may be applied to its practical implication in “the real world.” **Method:** After a brief overview of the study, the symposium will be divided into four presentations and conclude with a group discussion. 1: The Interventions: a discussion of the home and community based exercise programmes, how these have worked in practice, the challenges that have been faced and the quality assurance techniques that have been utilised. 2: Participant Recruitment and characterisation: how do we get GPs and participants to join an exercise promotion trial run through general practice and what are the people like who do join? 3: Money Matters: what financial costs are associated with running a trial like this and how does this relate to the “real world”? 4: Safety Issues: how have we ensured that people who have participated in the trial have stayed safe and how have we dealt with any safety issues or concerns that we have come across.

Recording adverse events for a complex intervention such as exercise in older people: How can we achieve consistency?

Belcher, Carolyn on behalf of the ProAct65+ team

Introduction: An adverse event (AE) is any unfavourable and unintended sign, symptom, syndrome or illness that develops or worsens during a period of observation in a trial. Adverse events were recorded from participants taking part the ProAct65+ trial. This was especially important since exercise within this age group may be associated with an increased risk of AEs, particularly falls. All AEs were assessed for seriousness and causality. If a non-serious AE was judged to be possibly, probably or definitely related to the trial, this was recorded as an Adverse Reaction. A system of comparing results, for improved consistency, between the two participating centres was developed and modified. **Methods:** AEs were recorded in a several ways. Participants were questioned about possible AEs at follow-up appointments through falls and health-service-utilization diaries throughout the trial; and during telephone physical activity questionnaires. If insufficient information was included in diaries a researcher collected those details by telephone. As a measure of consistency, blinded AE forms were exchanged between the two centres and graded. Mismatches between sites were identified, and blinded forms then passed to the principal investigators who agreed a final category. **Results:** An initial comparison of 269 AEs showed a mismatch of 19% with the category of "possibly related" being open to subjective interpretation. As a result of these findings, a category of Possible Adverse Reaction was introduced. The mismatch rate in subsequent comparisons went down to less than 6%. **Conclusion:** Researchers on complex intervention trials need to set up a well-defined system of AE reporting which allows for consistency checking. Results from early comparisons can be used to modify categories if necessary.

Working with volunteer peer mentors and paid professional exercise instructors in a trial of exercise interventions

Stevens, Zoe & Pearl, Mirilee on behalf of the ProAct65+ team

Introduction: ProAct65+ tests whether a home-based (OEP) or group-based (FaME) exercise intervention promotes a long-term change in exercise behaviour. This presentation will discuss the use of health promoters in each exercise intervention; Postural Stability Instructors (PSI) in the FaME arm and Peer Mentors (PM) in the OEP arm, and describe the PMs experiences. **Methods:** Specialist PSIs were recruited through Later Life Training, or trained specifically for the trial, and employed by ProAct65+. Regular quality assurance visits reviewed performance against specific criteria and provided individual feedback to the PSI. PMs were recruited locally through exercise classes, email and newspaper advertisements on a voluntary basis. They were trained in OEP as Peer Mentors and attended quality assurance events regularly during the intervention period. Ten PMs were interviewed about their experiences on the trial and data was analysed using Thematic Content Analysis. **Results:** Despite quality assurance visits to standardise delivery, PSIs efforts to test and extend participants' skill level varied considerably. They were also less consistent than PMs in completing research documentation (attendance diaries, participant achievements etc). Recruiting PMs was difficult with significant regional variations between sites. PMs found home visits more useful than telephone contact to assist with exercise promotion, but barriers included difficulty making contact and locality issues. As lay volunteers, PMs' exercise promoting activity varied considerably as did their motivational expertise. PMs indicated they enjoyed meeting OEP participants and watching them progress throughout the intervention. **Conclusions:** It can be easier to recruit PSIs than volunteer peer mentors by training exist-

ing exercise instructors and PSIs are better equipped to deliver a standardised intervention. PSIs however, appear less focused on the research aspects of the intervention. ProAct65+ PMs experiences are consistent with other research on peer mentors. It is important that face-to-face contact is included in any PM intervention involving exercise.

ProAct65+: Resource implications of ProAct65+ exercise interventions for the NHS

Gage Heather & Jackson, Daniel on behalf of the ProAct65+ team

Introduction: ProAct65+ is investigating the health benefits of two existing exercise interventions, delivered over 24 weeks, to people aged 65+, in two sites (London, and Nottinghamshire/ Derbyshire), compared with usual care (no specific exercise intervention). An economic evaluation is being conducted alongside the clinical trial. This paper reports the relative costs of delivering the interventions within the NHS. **Methods:** A 'top-down' approach was used to capture the resource implications for the NHS of delivering the interventions. FaME (Falls Management Exercise) is a community-centre based group programme delivered by Postural Stability Instructors (PSIs). OEP (Otago Exercise Programme) is a home-based exercise and walking plan comprising a professional-led induction and assessment meeting, followed by trained peer mentor support through home visits and telephone calls. Data were collected prospectively from PSIs and peer mentors (using specially designed logbooks) and from study records. Resource use will be converted into costs; total and average (per participant). Costs incurred by the NHS to deliver the interventions will be compared between FaME and OEP. **Results:** Four categories of resources were involved: SET UP: appointment of PSIs, peer mentors and training of mentors; FACILITIES: Hire of halls (24 sessions per group for PSI) and hire of halls for induction meetings; EQUIPMENT: Therabands, mats and instruction booklets for PSI and ankle cuff weights and booklets for OEP; HUMAN RESOURCES: remuneration and travel cost for PSIs and travel and phone call reimbursement for mentors. **Conclusion:** Intervention costs incurred by the NHS are only one element of overall costs. Others include: private / participant out-of-pocket expenses (e.g. travel to exercise classes, purchase of exercise clothing); costs of treating any new exercise-related injuries. Costs may be offset if exercise improves health and thereby reduces other service utilisation. Overall costs will be combined with measures of effectiveness to indicate the relative value-for-money of the interventions.

How do we recruit participants to an exercise promotion trial run through general practice and who joins? The experience of the ProAct65+ trial

Carpenter, Hannah & Haworth, Deborah on behalf of the ProAct65+ team

Introduction: The ProAct65+ exercise trial has recruited 1256 participants, aged 65 and over in Nottinghamshire, Derbyshire and London. Participants were recruited through their GP practice and various barriers to recruitment were encountered. This presentation will describe this process and the type of people recruited to the study. **Methods:** General practices were recruited to the study through local Primary Care Research Networks. GP practices excluded unsuitable patients and posted an invitation pack to randomly selected eligible patients. Participants were recruited from 43 practices in the study areas. Baseline data collected included: age, sex, ethnicity, educational attainment, number of long-term conditions and repeat medications. Data were also collected on socioeconomic group, income and current level of physical activity. Participant characteristic data were compared with data from The Active People Survey 5 from Sport England. **Results:** The trial invited 20507 patients to participate. After a higher than expected response rate, the conversion rate from

'expression of interest' to 'recruited' was lower than anticipated. The mail-out size at each GP practice was increased from 450 to 600 to account for this. Of the 1530 patients booked in for assessment, 1256 were consented. Small list sizes at some GP practices meant that additional GP practices had to be recruited. The average age of participants was 73 with 84% of participants younger than 80. 62% of participants were female. 34 languages were spoken and 14% of participants were non-white. 43% of participants had completed some form of further education. On average, each individual had 2 co-morbidities and were on 4 medications. **Conclusion:** The ProAct65+ trial successfully reached its recruitment target due to a number of strategies, including adapting its methods when faced with barriers to recruitment. Participants in this trial are more likely to be female and under the age of 80. Compared to The Active People Survey participants, ProAct65+ participants were more educated, had a higher income and were more ethnically diverse.

SUSTAINABLE COMMUNITY-BASED FALLS PREVENTION: THE EXPERIENCE OF STEPPING ON

Clemson, Lindy

University of Sydney, Australia.

Falls are common with injury costs far exceeding motor vehicle accidents, and the consequences can result in institutionalisation. For many people there are resultant quality of life issues with a third reporting they curtail usual activities. Reducing risk of falls, enabling people with the right tools as well as a sense of control will keep people safe, active and connected with their community. However, the challenge is to implement and sustain evidence-based programs. *Stepping On*, a community-based falls prevention program based on adult learning principals, self efficacy and a decision making framework, was found to reduce falls by 31% ($P = .025$) and is being widely implemented in the US and Australia. A Delphi review by experts and qualitative findings of interviews with program leaders and participants from several projects provides an understanding of the underlying concepts and how these translate for older people to enable them to apply preventive techniques and enhance their sense of control. Drawing on research from Australia and the US, this presentation will explore some of the experiences in the development of Stepping On and the models of service delivery used to give a wider reach and support sustainability of the program. **Keywords:** Falls; Prevention; Quality of Life; Wellbeing.

AGILE: CHARTERED PHYSIOTHERAPISTS WORKING WITH OLDER PEOPLE SYMPOSIUM

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The AGILE Symposium aims to focus on specific factors related to falling that are of interest to both Physiotherapists working in this area, and other Allied Health Professionals. Both sessions will have a strong practical element with take home messages that can be directly applied to practice. Firstly, Professor Rochester will examine gait, and the motor and non-motor characteristics of gait. She will focus on the requirements for successful mobility, especially in a community setting and the features of gait that predict functional decline and reduced mobility. Secondly, Bex Townley will take us through the exercise continuum,

with a particular focus on integrating service and how safe and effective exercise formats can be achieved for frailer older people at risk of falls.

Exercise formats for strength and balance programmes in the falls prevention exercise continuum: The Carmarthenshire model: An integrated approach to delivering evidence based exercise programmes

Townley, Bex

Carmarthenshire County Council, UK.

Maintaining and extending rehabilitation gains made within physiotherapy exercise sessions is a key aim of exercise professionals working in leisure/community settings. Physiotherapy exercise interventions within hospital settings work either on a one to one basis or small group numbers and operate at fixed term programme durations enabling ease of baseline, mid-point and end point assessment. They also focus on outcomes for the primary clinical pathology (i.e. cardiac rehab, pulmonary rehab, stroke rehab, and falls). This presentation focuses on the challenges faced by specialist exercise-referral services receiving referrals from multiple exercise pathways/ physiotherapy teams for patients presenting with multiply pathologies. The session will provide an overview of Carmarthenshire's integrated approach to evidence based exercise programmes within a falls-prevention exercise continuum service and its strong links with primary and secondary prevention teams. It will provide practical examples of how safe and effective exercise formats can be achieved for frailer older people at risk of falls.

Gait, mobility and falls

Rochester, Lynn

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Increasing life expectancy challenges us to age successfully in order to remain safe and independently mobile. A life free from risk of falls and their negative consequences includes retaining the ability to mobilise independently at home and in the community. This requires a higher level of motor control as well as cognitive flexibility to address necessary motor skills whilst attending to a range of environmental stimuli and concurrent tasks. Gait is a complex motor function requiring input from multiple motor and non-motor domains in the central nervous system. In particular, recognition of the important role of non-motor characteristics such as cognitive and executive function to gait in older adults has influenced our understanding of complex gait performance. Important insights into the role of cognition have also been gained using dual-task paradigms which address automatic control of gait. Selected characteristics of gait are predictive of falls risk, mobility impairment and cognitive decline whilst cognitive decline in older adults predicts falls and loss of mobility. Impaired dual-task performance highlights potential difficulties faced in more challenging environments or during multiple task performance with subsequent increased risk of postural instability and falls. This presentation prioritises the requirements for successful mobility rather than falls prevention presuming that these skills will be protective against falls risk. The presentation will address: control of gait, including ambulation in complex environments such as the community; features of gait that are predictive of functional decline and reduced mobility; and strategies to address these.

A NEW APPROACH FOR PERSONALIZED FALL RISK PREDICTION & PREVENTION: TAILORED EXERCISES, UNOBTRUSIVE SENSING & ADVANCED REASONING

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In our ageing society, falls and their consequences cause tremendous problems as related to fractures, quality of life and health care costs. Due to the ongoing changes in the age structure of the population, this problem with all its consequences will further increase in the near future and innovative solutions to avoid falls in community dwelling older adults are urgently needed. The aim of iStoppFalls is to develop and implement ICT-based technologies which can be easily integrated in daily life practices of older people living at home, and which allow for continuous exercise training, reliable fall risk assessment, and appropriate feedback mechanisms, based on discreet measuring technologies and adaptive assistance functions. The Senior Mobility Monitor (SMM) as a component of the iStoppFalls system will unobtrusively and continuously monitor mobility in daily life. It will evaluate quantitative information on frequency, duration and type of mobility activities and qualitative information on balance function and muscle power. On the other hand, our Kinect based fall preventive exercise training game (Exergame) will facilitate real preventive exercise training at home (3 times a week), where data is acquired by unobtrusive sensing together with biomechanical modeling and optional heart rate data assessment. Our Knowledge Based System for Fall Prediction & Prevention correlates these two types of mobility analysis information (SMM & Exergame), and in turn provides sufficient data to perform a trend analysis of these entities, thus evidencing valid fall prediction & sustainable fall prevention in terms of tailored home based exercises for community-dwelling older adults. Our iTV component and the whole iStoppFalls system will be based on user-centered design and living-lab approaches, and thus provides advanced HCI adjusted to the capabilities of our elderly users (usability & accessibility). **Keywords:** Fall Risk Prediction; Balance Function; Technology; Fractures; Quality of Life.

Introduction to the iSTOPPFALLS project

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University Siegen, Germany.

In our ageing society, falls and their consequences cause tremendous problems as related to fractures, quality of life and health care costs. Due to the ongoing changes in the age structure of the population, this problem with all its consequences will further increase in the near future and innovative and cost effective solutions to avoid falls in community-dwelling older adults are urgently needed. Hereby active prevention plays an important role, especially in terms of fall-specific exercises and training programs. Modern information and communication technologies (ICT) in the field of home-based sensor technology, telemedicine and video games can support appropriate activities excellently as they are motivating and increasingly used by older people living at home. The aim of iStoppFalls is to develop and implement ICT-based technologies which can be easily integrated in daily life practices

of older people living at home, and which allow for continuous exercise training, reliable fall risk assessment, and appropriate feedback mechanisms, based on discreet measuring technologies and adaptive assistance functions. The Senior Mobility Monitor (SMM) as a component of the iStoppFalls system will unobtrusively and continuously monitor mobility in daily life. It will evaluate quantitative information on frequency, duration and type of mobility activities and qualitative information on balance function and muscle power. On the other hand, our Kinect based fall preventive exercise training game (Exergame) will facilitate real preventive exercise training at home (3 times a week), where data is acquired by unobtrusive sensing together with biomechanical modelling and optional heart rate data assessment. Our Knowledge Based System for Fall Prediction & Prevention correlates these two types of mobility analysis information (SMM & Exergame), and in turn provides sufficient data to perform a trend analysis of these entities, thus evidencing valid fall prediction & sustainable fall prevention in terms of tailored home based exercises for community-dwelling older adults. Our iTV component and the whole iStoppFalls system will be based on user-centered design and living-lab approaches, and thus provides advanced HCI adjusted to the capabilities of our elderly users (usability & accessibility). Our first iStoppFalls prototype will be evaluated and further enhanced based on the results of an initial pilot trial with 20 participants in Germany and Australia. The final iStoppFalls demonstrator will be evidenced by a randomized clinical trial with 360 participants which will be implemented in Germany (90), Finland (45), Spain (45), and Australia (180).

Home-based exergaming: An effective fall preventive measure for the elderly

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With the expected increase in the number of people living to an older age, fall-related injury threatens to place significant demands on our public health care system. Fall-related injuries are the leading cause of injury-related hospitalisation in old age and with at least one third of community dwelling adults aged 65 and over fall once or more per year, the health burden within the community associated with falls is enormous. Over the past few decades, there has been a wealth of published scientific evidence for the physical, cognitive and social health-related benefits of increased exercise, especially in older adults. In particular, improvements in strength, balance, coordination and aerobic capacity leading to reduced levels of disability and better mobility function, as well as reduced fall risk in older populations, have been shown following exercise interventions. Despite the clear evidence base demonstrating the health-related benefits of PA, uptake and adherence to PA programs is often disappointing. Barriers to adherence may include lack of interest in the program, low outcomes expectation, the weather or even a fear of falling during exercise. Yardley and colleagues [1] report that home-based exercise has the widest appeal to older adults, and is also most attractive to those more socially deprived people who have the greatest need for undertaking falls prevention measures. One method by which compliance with exercise programs could be improved involves the use of fun and engaging videogames. Interactive videogames that combine player movement, engaging recreation, immediate performance feedback and social connectivity via competition, have been shown to promote motivation for, and increase adherence to, physical exercise amongst children and young adults. In older adults, videogames have also been shown to improve cognitive abilities, to be a feasible alternative to more traditional aerobic exercise modalities for middle-aged and older adults [2] and can be used to train stepping ability in older adults to reduce the risk of falls [3].

We discuss the results of pilot data showing that exergames are an acceptable technology to older adults for home-based exercise and that a relatively short intervention period using Dance Dance Revolution significantly reduces some measures of fall risk. **References:** 1. Yardley L. et al. *Preventative Medicine*, 2008, 47, 554-558; 2. Guderian B. et al. *Journal of Sports Medicine and Physical Fitness*. 2010, 50(4):436-42; 3. Smith ST et al. *British Journal of Sports Medicine*. 2011. 45(5),441-5.

Fall preventive exercises: A tailored fall preventive exercise program for older adults

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It is well established that physical activity can decelerate age-related loss of physical function. Furthermore, exercise has a major role to play in the prevention of falls and fall-related risk factors among older people. In addition, active older people who exercise are less likely to develop physical disability, cardiovascular disease, hypertension, type 2 diabetes mellitus and osteoporosis. The iStoppFalls project aims to develop an innovative home-based exercise program for older adults using an information and communication technology (ICT) approach with a core component of both strength and balance exercises. The strength component is inspired on the Otago exercise program, which has proven effectiveness in the context of fall prevention and is also conducted in a home setting. The balance component will be incorporated into the exergame. The level of difficulty of the balance exercises will be increased within the exergame by (1) reducing hand support, (2) reducing base of support, and (3) weight shifting tasks through leaning, knee bending, and stepping. As the iStoppFalls exergame will be conducted in the comfort of people's own homes, built-in safety measures insight the exergame using algorithms to detect falls with the Microsoft Kinect camera will ensure the participants' safety during the exercises. This project provides an active translation of evidence-based approaches to falls prevention by using innovative ICT technologies. The iStoppFalls exergame has the potential to offer people a home-based individualized exercise program that might ultimately also be effective at reducing falls in older adults.

A Senior Mobility Monitor for regularly measuring and evaluating daily life activities and movements

Annegarn, Janneke

Philips Research Europe, Netherlands

The iStoppFalls consortium and project will develop an embedded AAL system that can predict and prevent falls by monitoring mobility-related activities and other risk factors of falls in real-life. The iStoppFalls Senior Mobility Monitor platform (SMM) bases on proven technological validity towards objective assessment of balance function and muscle power.¹ Beyond continuous Fall Risk monitoring, this enables tailoring individualized exercise programs coached by iStoppFalls. The SMM is an inertial sensor system which can be worn as a necklace without restrictions. The SMM has two modes: 1) the daily monitoring mode and 2) the exercise mode. During the daily monitoring mode, the SMM provides solutions for continuously monitoring relevant mobility features of the user. The SMM will detect and evaluate sit-to-stand transfers, which reflects balance function and muscle power. Moreover, the SMM will provide information on the activity profile of the elderly. The SMM reports these mobility features on a daily basis. During the exercise mode, the SMM will be used to improve the fall risk assessment by improving the estimations of body sway during quit

standing and power during sit-to-stand transfers. With the SMM, fall risk assessment and trend analysis of balance capabilities can be performed not only in clinical tests, but also in daily life. Furthermore, this trend analysis provides information on the effect of the training exercises for the daily life of the user, and can give feedback to the training system for user specific tailoring of the exercises. *Reference:* Zijlstra, W., et al., A body-fixed -sensor-based analysis of power during sit-to-stand movements. *Gait and Posture*, 2010. 31(2): p. 272-278.

Measurement of balance-related biomechanical variables with video game devices

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In recent years, the computer and video games industry has experienced an important technology push that has brought to the market devices for enabling new forms of human-machine interaction. This includes motion capture technologies, like accelerometers and markerless optical systems that have long been used in human movement science for research in biomechanics. The low cost of these technologies, and the possibility of integrating them in home-based systems, makes the combination of video games and biomechanical analysis a feasible reality. The iStoppFalls project takes advantage of this opportunity for measuring balance-related biomechanical variables with a Kinect sensor and the Senior Mobility Monitor that will be used for assessing the risk of falling during the interaction of users with the "exergame." One of the challenges of this approach is how to adapt the assessment criteria that depend on high-quality biomechanical measures, to a system that is originally designed for capturing gross movements, with fast and inexpensive resources, but lower precision than laboratory instruments. This problem is solved by a redefinition of the measurement protocols, plus advanced analysis of the variables captured by the video-game sensors, in order to reduce the distance between required and achieved precision. Fall risk assessment criteria that were previously validated in extensive field studies have been adapted to exercises that can be made at home, without supervision or additional instrumentation. A skeleton model with 10 joints has been tracked by Kinect, with joint angles corrected by an extended Kalman filter, in order to achieve kinematic parameters that can be compared with the results of a high-quality photogrammetry system.

Empirical analysis of end-user requirements: Designing ICT artifacts for the elderly exercising at home

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We want to present first insight of designing community-oriented exergames for elderlies to motivate them to use fall preventive exercise training at home over a longer period of time. Older adults are often reluctant to use ICT systems in their homes, but fall preventive exercises need to be performed at least 3 times a week for 6 months to be effective¹. Thus, motivation and compliance plays a crucial role in this setting and ICT systems can provide very good support, if they are adjusted to the needs of the elderly end-users. End-user needs assessments were performed by participatory design sessions with end-users for discussion and idea generation by using market available input/output devices in order to develop user settings and scenarios for primary (exercising older adults at home) and secondary (care givers and relatives) end users. Implications based on empirical interviews² and workshops were retrieved from 17 users from Germany and Spain so far. We build mock-ups that

illustrate our design idea of that elders might be interested in online communities while playing. Discussing the mock-up and the underlying assumptions with the elderly people in a participatory design workshop, however, showed that they have another perspective on this topic. For them, the design should focus on the necessary features to exercise fall preventive training in the most effective and efficient way instead of looking on nice-to-have community features. In this symposium, we want to discuss, how to deal with this different perspectives in participatory design and if and how community approaches could support motivation of older people to play fall preventive exergames. **References:** 1. Gillespie, L., Robertson, M., Gillespie, W., Lamb, S., Gates, S., Cumming, R. et al. (2010). Interventions for preventing falls in older people living in the community. *Cochrane Database of Systematic Reviews* (Online) (2), CD007146; 2. Mayring, P. 2007. *Qualitative Inhaltsanalyse. Grundlagen und Techniken* (9. Auflage, erste Auflage 1983). Weinheim: Deutscher Studien Verlag, 2007.

Modern fall prediction algorithms: Self-adaptive exercise training plans based on fall related data analysed over time

Drobics, Mario; Ejupi, Andreas; Kreiner, Karl

AIT Austrian Institute of Technology GmbH, Austria.

To provide individual fall-prevention training plans within the project iStoppFalls it is necessary to assess the individual fall risk and training progress of each user in frequent periods. In conventional approaches for fall risk prediction, assessments are conducted in a clinical environment, supervised by a physician. Regular repetitions of the assessments are necessary to monitor the progress of the patient and to adapt the intervention strategy. This is very time consuming (for the patient and the physician) and thus expensive. Additional information, such as the daily activity of a person, can normally not be considered. In the project iStoppFalls, the risk assessments are conducted at the beginning and in regular intervals further on. These assessments are automated and can be done by the older adults in their own homes. Based on these risk assessments, an individual training plan is provided. As a baseline progression of the exercises will be increased linearly, based on the individual performance of the user and the repeated assessments, which guarantee a constant and realistic judgment of the performance of the user. This baseline is further modified based on an automatic analysis of the risk assessment data as well as data captured during the training sessions (duration, quality of execution, etc.) and data on the daily activity of the users (activity level over time, sit-to-stand time, etc.). To derive the according optimization models the data is analysed by experts during a test phase. They can make suggestions for changing the individual training plans (e.g. if the strength of a person is below average, then he has to do more strengthening exercises) and comment on the reason for their decision. This information is then analysed using statistical and machine learning methods to automate the determination of the individual fall risk and the regular adaption of the training plan to the individual needs.

ISPAPOFF SPECIAL SYMPOSIA: EXERCISE FOR FALLS AND FRACTURES

Invited lecture: Which balance assessment tests are fit for purpose?

Masud, Tash

Nottingham University Hospitals NHS Trust, UK.

The two main basic balance conditions are static balance and dynamic balance and humans employ different strategies to keep the centre of mass between the base of support in order

to stop falling over: 1. Proactive (anticipation of a predictive disturbance); 2. Reactive (compensation of the disturbance); 3. Static and Dynamic Steady State (maintain a steady position on sitting, standing or walking). A number of balance assessment tools are used in clinical practice and research. In order to decide which balance test to use, it is important to consider the purpose of the test: screening, falls prediction, clinical decision making, elucidation of pathophysiology, assessment of disease progression, and detection change after an intervention. The intra-rater and inter-rater reliability and test-retest reliability are also important properties of the tests. Simple clinical test include the "on leg stand", "tandem walk", "sit to stand", "nudge test", and "number of steps taken to turn 180 degrees". "Gait speed" and "timed walk" (different versions) have a large associated literature and different cutoffs have been associated with falls risk, functional decline, hospitalisation, cognitive impairment and frailty. Many studies use the <1 m/s cutoff. Similarly the "timed up and go (TUG) test" has different versions (commonest is the 3m TUG) and assesses muscle power, dynamic steady state balance and turning ability. A >13 -15 seconds cut-off for the 3m TUG has been associated with falls risk and in several settings has been shown to have good test-retest reliability and ability to detect change. The "BERG Balance Scale" (BBS) is commonly used by physical therapists. It is composed of 14 items scoring 0-4 (max score 56). Scores of 21-40 are associated with medium falls risk and <21 is associated with high falls risk. An 8-point change in BBS is considered clinically relevant. Other tests include the "Dynamic Gait Index", "Elderly Mobility Scale", "Functional Reach", "Tinetti Performance Orientated Mobility Assessment" and "Functional Reach". More sophisticated biomechanical tests include measurement of body sway, use of force plates, computerised dynamic posturography, and the multidimensional "Physiological Profile Assessment." A popular recently developed tool is the "Gaitrite" mat which can measure gait variability. The latter parameter has been shown to be highly associated with falls risk. It is also a useful tool to research balance impairment in dual tasking conditions which have also been associated with increased falls risk. Measurements of confidence and "fear of falling" include different versions of the "Falls Efficacy Scale" and the "Activities Specific Balance Confidence (ABC) scale."

Invited lecture: What do we know about exercise and bone health?

Brooke-Wavell, Katherine

School of Sport, Exercise and Health Sciences, Loughborough University.

Loss in bone density and strength with age, combined with increased risk of falls, contributes to increasing risk of osteoporotic fracture. One in two women, and one in five men aged 50, will sustain a fracture in their lifetime. Exercise can increase bone gains during puberty, and these benefits may persist into adulthood. Starting exercise in adulthood has more modest effects on bone density, and in older adults (particularly postmenopausal women) benefits may be smaller still, although exercise interventions that are adequate in terms of type and intensity have been found to benefit bone density at all ages. The optimal types of exercise for increasing bone density exert high forces on bone at the skeletal sites susceptible to fracture; for instance impact exercise and high magnitude resistance exercise. The ideal frequency and duration of exercise are not yet known, although extremely high training volumes, particularly when associated with menstrual dysfunction, may adversely affect bone and animal studies suggest brief loading bouts separated by rest pauses are most effective at increasing bone mass. Mechanical loading can increase bone strength to a greater extent than bone density. This may be a consequence of adaptations in the distribution, as well as the quantity, of

bone. Recent research using computed tomography techniques has demonstrated changes in structural parameters in humans. Exercise interventions can also reduce fall incidence in older people, so exercise may reduce fracture risk to a greater extent than expected from bone density changes alone. Most observational studies have reported substantially lower fracture incidence in regular exercisers, although there have been no intervention studies large enough to evaluate changes in fracture risk. Exercise that adequately loads relevant skeletal sites can thus produce modest increases in bone density and could further reduce fracture risk through benefits to bone structure and fall risk.

Effectiveness of primary care physical activity interventions in older adults: A narrative review

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¹ University College London; ² University of Nottingham; ³ Nottingham University Hospitals NHS Trust and University of Derby; ⁴ Glasgow Caledonian University.

Background: Primary care is an important setting to promote physical activity to older adults. Current interventions provide counselling, advice, and exercise on prescription; their effectiveness is presently unknown. **Aim:** To review the effectiveness of physical activity interventions which have recruited older adults through primary care and/or were delivered through primary care. **Design:** Narrative review. **Method:** Studies published between 1998 to July 2011 were found in electronic databases. We searched for studies providing structured physical activity interventions, regardless of study design, to older adults (aged 50 plus) through primary care. The search and selection process was not restricted to any outcome measures or comparison groups. Full texts were obtained of eligible studies. Studies were selected by two reviewers who independently assessed for quality using Jüni et al.'s criteria and in accordance with the RE-AIM criteria. **Results:** Six out of 4170 studies met the inclusion criteria, with 1522 participants included. The interventions ranged from 12 weeks to one year. Three studies showed a statistically significant increase in activity in the intervention compared to the control group ($p \leq 0.05$). The three studies that measured quality of life and presented results from the SF-36 reported inconsistent results. **Conclusion:** Studies in this review show some evidence for the effectiveness of physical activity interventions in primary care for older people. More research in this area is needed to expand the evidence base for effective interventions in primary care for older adults, and make recommendations to primary care staff and settings. **Keywords:** Primary care, older adults, physical activity, exercise, general practice.

A comparison of the ground reaction forces of the pas de basque Scottish country dance step and three exercises used in osteoporosis exercise classes

Thow, Morag K; Stewart, Sabita; Rafferty, Danny

Glasgow Caledonian University, UK.

Background: It is acknowledged that impact forces are required for good bone health. However, few studies have measured impact force in postmenopausal women. Scottish country dancing (SCD) pas-de-basque step may be an appropriate activity although the specific ground reaction forces (GRF) are unknown. Kemmler et al., (2004) reported that activities which generated GRF ranging between 1.5 to 3.5 times bodyweight (\times BW) were sufficient to offset bone loss in this population. **Aims:** This study aimed to compare the GRF generated

during the pas de basque, to marching, sidestepping and walking weight bearing exercises that are often used in osteoporosis classes. **Methods:** A within subject study was carried out to measure ground-reaction force. Twenty one postmenopausal women aged 65.62 (\pm 7.45 years) who were regular Scottish country dancers provided the sample. After a five min warm up measurements of walking, left and right marching, left and right side stepping and left and right pas-de-basque were carried out on a Kistler force plate three times and the mean was established. **Results:** The median GRF for the pas-de-basque was $1.94 \times$ BW and significantly higher ($p < 0.001$) than the mean values for marching $1.39 \times$ BW, sidestepping $1.31 \times$ BW or walking $1.21 \times$ BW. **Conclusion:** These findings suggest that Scottish country dance that includes the pas de basque step may provide GRF that can offset bone loss and maintain bone health in postmenopausal women. **Keywords:** Postmenopause; Measurement of Walking; Osteoporosis; Bone Health; Scottish Country Dance.

Factors associated with initiation of weight-bearing activity in older men and women: Influence of osteoporosis screening and education intervention

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¹University of Regina, Canada; ²Saskatchewan Ministry of Health, Canada; ³Regina Qu'Appelle Health Region, Canada.

Objective: Weight-bearing physical activity has been shown to improve bone health and prevent osteoporosis; however many older men and women do not engage in such activity. This study determined the factors associated with men and women's decision to start or increase weight-bearing activity to prevent or manage osteoporosis. **Methods:** The study population consisted of men and women 50 years of age and older (range 50-80 years), enrolled in a 6-month randomized controlled trial assessing health behaviour change after screening alone or combined with a theory-based education program. Eligible men ($n = 25$, mean age 64.1 ± 7.3) and women ($n = 157$, mean age 59.1 ± 6.8) were referred by their healthcare provider to undergo dual energy x-ray absorptiometry (DXA) screening for the first time at the local hospital. All participants underwent screening and completed a series of measurements and questionnaires assessing osteoporosis health and lifestyle behaviours, including physical activity and dietary intake. The intervention group also received theory-based osteoporosis education. Six months after baseline, participants completed a series of follow-up measurements and questionnaires to determine change in health behaviours. **Results:** Based on World Health Organization criteria, 11.6% of men and women were newly diagnosed with osteoporosis and 48.1% with osteopenia. Only 25.8% of men and women reported change in weight-bearing physical activity at follow-up. After adjustment for confounding covariates in logistic regression analysis, factors associated with change were osteoporosis diagnosis (OR, 2.78; 95% CI, 1.01-7.61) and receiving recommendation from a healthcare provider (OR, 4.90; 95% CI, 2.17-11.04). **Conclusions:** This study provided evidence that osteoporosis diagnosis and healthcare provider recommendations influence decisions to initiate weight-bearing activity; however improvement in initiation rates are needed in order to prevent and manage osteoporosis. **Keywords:** Osteoporosis; Bone Health; Weight-Bearing Physical Activity; Healthcare Provider.

UPTAKE AND ADHERENCE TO EXERCISE AND PHYSICAL ACTIVITY IN DEVELOPED AND DEVELOPING COUNTRIES

Hawley, Helen¹; Home, Maria¹; Skemp, Lisa²

¹University of Manchester, UK; ²Our Lady of the Lake College, United States.

Encouraging older adults to become more active and maintain that activity is critical to the promotion of their health and well-being, maintaining social networks and independence. A variety of physical activity (PA) interventions are readily available for older adults. However, the uptake and adherence to these activities remains problematic with dropout rates from structured programs being high. This symposium explores uptake and adherence to physical activity with a range of older adults in different settings looking at both exercise instructor and older adults' perspectives. The symposium will conclude by drawing together issues of how to design programs that promote uptake and adherence to exercise and PA programmes. **Aim:** This workshop aims to provide an overview of 5 studies with an emphasis on key recommendations for policy, research and discussion on implication for practice. **Keywords:** Health; Wellbeing; Physical Activity; Developed and Developing Countries.

Older adults' uptake and adherence to exercise classes: The role of the instructor

Hawley, Helen

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Background: Leadership behaviour and quality of instruction is important in influencing engagement of older adults in exercise classes.^{1, 2} Little is known about the relationship between attitudes and characteristics of instructors and their delivery in relation to uptake and adherence of older adults to classes. **Methods:** We present the findings and recommendations from three studies: A survey of 731 United Kingdom exercise instructors with Level 3 older adults exercise qualifications which investigates instructors' characteristics and attitudes towards older-adults' participation in exercise.³ Interviews with 19 instructors to further explore their attitudes, experiences and beliefs in relation to their exercise classes for older adults and how these experiences and beliefs are influenced by training and characteristics. A longitudinal cohort study of 16 instructors and 193 class participants over 6 months to explore what characteristics of exercise instructors, the group and class participants influence adherence. **Findings:** The first study establishes that there is a relationship between instructors' training, experience, characteristics and their attitudes. The second study supports these findings and demonstrates how instructors' think that these factors and others not only influence how they deliver and promote their classes but also influence older adults' uptake and adherence to exercise classes. The final study enables us to look at the relationship between instructor variables and the participant within the exercise class setting. Class participants' mental well-being, education and housing were key factors related to their attendance. Having attended the class for more than six months at baseline was an important factor related to adherence. Individual factors such as participants' attitudes, beliefs about group cohesion and instructor variables such as personality traits and experience emerged in the final models both in relation to participant attendance and adherence. **Conclusion:** There are a series of complex interactions between the instructor, participant, the group and others which influence beliefs and attitudes and this needs to be acknowledge in future research, practice and policy. It is clear that the instructor can influence participants and they have an important role to play in creating an atmosphere and environment of which participants want to be a part of. **References:** 1. Dinan, S. (2001). Delivering an Exercise Prescription for Vulnerable Older Patients. In Young, A., Harries, M (Eds.), *Physical Activity for Patients: An Exercise Prescription* (pp.121–132). London: Royal College of Physicians; 2. Ecclestone, N.A., & Jones, J. (2004). International Curriculum Guidelines for Preparing Physical Activity Instructors of Older Adults, in collaboration with the Aging and Life Course.

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Older adults' perceptions of the influence of exercise instructors in the uptake and adherence of exercise

Horne, Maria

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Background: A variety of physical activity (PA) interventions are readily available for older adults, but uptake and adherence to these activities remains problematic with drop-out rates from structured programs being high.^{1,2} Exercise instructors have been found to influence older adult's attendance and adherence to general exercise classes.^{3,4} However, further exploration of older adult's perceptions and experience of how exercise instructors influence their exercise behaviour is needed to develop and deliver exercise services for older adults. **Aim:** To explore South Asian and European 60-70 year olds perceptions of how exercise and leisure instructors influence PA uptake and adherence to community based and leisure centre exercise classes. **Method:** An exploratory qualitative approach was utilized using 15 focus groups (n = 87) and 40 in-depth interviews were conducted to explore the motivational factors associated with initiating and maintaining exercise and PA among SA and European older adults. Data analysis followed the framework approach. **Findings:** Three themes were identified: [1] Personal attributes of the instructor; [2] Level of support; [3] Understanding. The personal attributes - 'pleasant' instructors, good interpersonal skills, were perceived to be a good motivator to continue with group based exercise and physical activity pursuits. Specific exercise and general social support received by exercise instructors before, during and after community-based and leisure-centre exercise classes was found to be important in motivating and encouraging older people to perform exercise and get through the activity, particularly when self-motivation and experience are low. Lack of instructor support to teach and lead older adults through routines safely resulted in terminating the activity. Understanding the needs of older people and the specific issues they may face in undertaking exercise was considered important in continuing to attend exercise groups. **Conclusion:** Exercise instructors are an important source of motivation for older adults, particularly when self-motivation and experience are low, and an important influencing factor in both uptake and subsequent adherence to exercise and PA among both South Asian and European 60-70yr olds. **References:** 1. Jancey, J., Lee, A., Howat, P., Clarke A., Wang, K. and Shilton, T. (2007). Reducing attrition in physical activity programs for older adults. *Journal of Aging and Physical Activity*, 15, 152-165; 2. Stiggelbout M, Hopman-Rock M, Crone M, Lechner L, van Mechelen W. (2006). Predicting older adults' maintenance in exercise participation using an integrated social psychological model. *Health Education Research*, 21 (1): 1-14; 3. Pentecost C. & Taket A. (2011). Understanding exercise uptake and adherence for people with chronic conditions: a new model demonstrating the importance of exercise identity, benefits of attending and support. *Health Education Research*, 26 (5): 908-922; 4. Hawley H., Skelton D, Campbell M & Todd C (2012) Are the Attitudes of Exercise Instructors Who Work With Older Adults Influenced by Training and Personal Characteristics? *Journal of Aging and Physical Activity*, 20: 47-63.

Developing culturally informed physical activity programs to increase the uptake and adherence of exercise and PA

Skemp, Lisa

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Background: A variety of physical activity (PA) interventions for older people are readily available; however, uptake and adherence to these interventions remains problematic. This is particularly true for older adults who not only have comorbid health conditions and various levels of physical abilities, but diverse cultural backgrounds. While Community Based Participatory Research (CBPR) aims to partner with communities as the unit of identity, problem identification, planning and implementation for sustainability,^{1,2} problem identification often is in the purview of the researchers, who bring their expertise to the community. **Project:** This presentation describes the Culturally Informed Healthy Aging (CIHA) model that is being used in preparation for CBPR on physical activity program development for older adults in two countries: a rural village on the island of St. Lucia, West Indies and a rural village in south India where there were no formally organised exercise programmes. Derived from the Culturally-Informed Community Nursing model³ we describe the process whereby we partner with community members, collectively identify their health needs and use “cultural capital” and evidenced based practice interventions in the development of culturally informed PA programs tailored for older adults, including those with advanced frailty. **Findings:** Grounded in principles from ethnography, epidemiology, and community based research, the CIHA is a stable systematic process whereby community members partnered with academics and students in the identification of healthy issues of importance in the community. Systematically assessing the environment, population and social organization facilitated the identification of groups of elders who were interested in addressing mobility issues and the community members interested in working with the academics and elders in developing and facilitating these programs. Identification of partnership readiness and research design for program implementation is underway. Challenges to program design and CBPR include community uncertainty associated with community disasters and resource scarcity. Community mechanisms for sustainability are grounded in member engagement and passion for the utility of the community program. **Conclusion:** Description and comparison of the programs informs understandings of how to design programs to promote CBPR uptake and adherence of PA in rural communities. **References:** 1. Israel, B., Schulz, A., Parker, E., & Becker, A. (1998). Review of community-based research: Assessing partnership approaches to improve public health. *Annual Review of Public Health*. 19, 173-202’ 2. Minkler, M., & Wallerstein, N. (Eds) (2008). Community-based participatory research in Health. (2nd ed.). San Francisco, CA: Jossey-Bass; 3. Dreher, M. & Skemp, L. (2011). *Healthy places, healthy people*. Sigma Theta Tau International: Indianapolis, IN.

GOING OUTDOORS, FALLS AND RESILIENCE

Goodwin, James¹ with contributions from the Universities of Bournemouth, Edinburgh, Glasgow Caledonian, Salford, Southampton, and Swansea.

¹*AgeUK, London, UK.*

Going outdoors is a key factor in preserving good physical, mental and social health in all age groups, but particularly as people move into older age. Approximately one third of people aged 65+ living in the community fall at least once per year, with many suffering multiple falls which can lead to disability and decreased mobility. Also, fear of falling is a key inhibi-

tor of getting outdoors for older people. Many of the environmental risk factors associated with outdoor falls appear to be preventable through better design and maintenance. However, research to date has neglected *outdoor* falls and focused on the *indoor* environment. We report on a current 12-month pilot study structured around 4 work packages which brings together a multi-disciplinary group across 6 UK Universities, plus AgeUK, Toronto Rehab, Marshalls paving, and the Health and Safety Laboratory. These work packages involve mapping of geographical 'hotspots' where older people fall most often; focus groups with older people to identify key risk factors for falling; the development of a person-environment fit audit tool to identify environmental interventions; and the development of a pilot protocol to test surface slip of pavement materials. The synergy of knowledge generated by this pilot testing will allow for a greater understanding of the many factors involved in outdoor falls. There is potential for this to support the development of evidence-based practice which will significantly impact on older people's health and wellbeing. The study is funded through the Medical Research Council grant reference G1002782/1 as part of the Lifelong Health and Wellbeing Cross-Council Programme. Full details available at www.go-far.org.uk

Meet-the-Expert Sessions

SO YOU WANT TO RUN A GERI-OLYMPICS?

Muilenburg, Ted; Woodrum, Bill

West Virginia State University, United States

Geriatric Olympics Programs have promoted active living, wellness and quality of life through competitive sports for seniors residing in nursing homes for 25 years. Each year over 150 nursing home resident athletes gather from across our state to compete in various adapted sports. The program involves resident athlete training and practice as well as being a member of a nursing home team in preparation for competitions. Several of the events have been recommended by therapists as a means of improving motor coordination and pulmonary function. Come and have a discussion about the barriers, facilitators, successes and useful tips and of course, share your experiences and events!

SCOPE OF PRACTICE: WHEN IS FITNESS REALLY THERAPY FOR MATURE ADULTS?

Sipe CL.

Harding University, United States.

Mature adults represent the fastest growing segment of the population and of the fitness industry. They also represent the largest patient population (over 40% of all patient care) within physical therapy and physiotherapy. Aging is associated with an increase in disease prevalence such as cardiovascular disease, osteoporosis, musculoskeletal impairments and arthritis. Unfortunately, the line between exercise for fitness and exercise for therapy is often unclear. While the scope of practice for physical therapists and physiotherapists is well defined it is not equally so for fitness professionals. The fitness industry is a largely unregulated profession and currently there are no uniform standards of education or training that exist for exercise professionals. As the number of mature adults seeking exercise training rises the potential for trainers to infringe upon the duties of the therapist also rises. This leaves trainers potentially liable for medical malpractice lawsuits. Exacerbating this

problem is the recent proliferation of “corrective exercise” courses and certifications that teach trainers how to identify and resolve specific musculoskeletal imbalances and movement disorders. Since mature adults have a high prevalence of both of these, they are a prime population to target as potential clients of “corrective exercise specialists.” Recently, a joint working party between the European Health and Fitness Association and the Chartered Society of Physiotherapists published guidelines on when to refer clients/patients between the therapist and the trainer. These guidelines provide general recommendations and give examples for several health conditions. While these guidelines are an important step in the right direction much more needs to be done to ensure that mature adults are receiving the appropriate level of care that they need for their specific health concerns. Come and have a discussion about the scope of practice.

Oral Presentations

EXERCISE FOR FALLS, BALANCE AND BONE HEALTH

Invited lecture: Specific exercise for fall prevention

Campbell AJ.

University of Dunedin, Otago, New Zealand.

In people 70 years and over 20% of falls occur while participating in high-level activities, 20% of falls can be attributed to a single cause and the remainder of falls are due to multiple contributing factors. Impaired strength and balance are often key components or the final pathway of these multiple factors. The causes of the impaired strength and balance need to be sought but often increasing inactivity is the most important factor. In many older people, a specific, individualised programme is needed to restore function and stability. Falls are so common that it is beyond the capacity of most health systems to deal with the problem solely through the individual assessment and referral of all those at risk to a number of different health professionals. If the large problem of falls in frail older people is to be addressed, we need targeted community programmes that can address common causative factors such as impaired strength and balance in the most cost effective way. This should ensure maximum cover of those at risk. There is strong trial evidence to justify this approach.

Exercise for improving balance in older people

Howe, Tracey¹; Neil, Fiona²; Rochester, Lynn³; Ballinger, Claire⁴; Skelton, Dawn A¹

¹Glasgow Caledonian University, UK; ²Greater Glasgow & Clyde Health Board, UK; ³Newcastle University, UK; ⁴Southampton University, UK.

Background: In older adults, diminished balance is associated with reduced physical functioning and an increased risk of falling. **Objectives:** to examine the effects of exercise interventions on balance in older people, aged 60 and over, living in the community or in institutional care. **Results:** 94 randomised controlled studies with 9,917 participants were included. There were eight categories of exercise programmes. 1. Gait, balance, co-ordination and functional tasks. Positive effects of exercise were found for the Timed Up & Go test, walking speed, and the Berg Balance Scale. 2. Strengthening exercise (including resistance or power training). Positive effects were found for the Timed Up & Go Test; standing on one leg for as long as possible with eyes closed; and walking speed. 3. Three dimensional

exercise (including Tai Chi, qi gong, dance, yoga). Positive effects were found for the Timed Up & Go Test; standing on one leg for as long as possible with eyes open, and with eyes closed; and the Berg Balance Scale. 4. General physical activity (walking). 5. General physical activity (cycling). 6. Computerised balance training using visual feedback. 7. Vibration platform used as intervention. 8. Multiple exercise types (combinations of the above). Positive effects were found for the Timed Up & Go Test; standing on one leg for as long as possible with eyes open, and with eyes closed; walking speed; and the Berg Balance Scale. **Conclusions:** In general, effective programmes ran three times a week for three months and involved dynamic exercise in standing. There was weak evidence that some exercise types are moderately effective, immediately post intervention, in improving balance in older people. **Keywords:** Exercise; Balance; Interventions; Tai Chi; Yoga; Improvement.

Xbox Kinect training may improve balance measures in older adults

Bieryla, Kathleen; Balaban, Eric

Bucknell University, United States.

Training using Microsoft's Kinect for Xbox 360 may be a novel way to improve balance in older adults. The purpose of this study is to investigate the feasibility of training using the Kinect to improve clinical measures of balance in older adults. It is hypothesized that older adults who train with the Kinect will increase their Berg Balance Scale (BBS) score and Functional Reach (FR). Thirteen older adults (82.3 ± 5.1 years old) participated in the study. BBS and FR were completed before, one week, and one month after a three week training period. Six participants completed the training using the Kinect while seven subjects served as control and did not train. Three times each week, the training group was led through a custom routine that lasted approximately 30 min. The first 15 min was comprised of Your Shape: Fitness Evolved Zen sessions (Stream 1 and 2) followed by 15 min of games from Kinect Adventures. Clinical measures of balance before training were compared to one week and one month after training. An increase in BBS and FR would be considered an improvement in balance. Paired t-tests were conducted on the training and control group to determine if training influenced measures of balance. BBS scores significantly increased one week and one month after training when compared to before training for the experimental group ($p < 0.05$). There was no significant change in BBS for the control group ($p > 0.05$). FR was not significantly different from before training for either the control group or experimental group ($p > 0.05$). In conclusion, this pilot study provides some evidence that training using the Kinect can lead to improvements in some clinical measures of balance in older adults. A larger study is needed to confirm the efficacy of training using the Kinect as a method to improve balance. This training may be a fun, novel, and cost-effective way to improve balance in older adults. **Keywords:** Kinetic Training; Balance; Berg Balance Scale.

Looking for the right balance: Consideration of exercise approaches in the menopause transition, healthy ageing and early falls prevention

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Background: Poor balance has been identified as one of the main factors contributing to falls in the older person with studies demonstrating detrimental change in sensorimotor factors in adults after 40 years of age. This series of studies investigated the efficacy and long term benefits of a specific balance-strategy training (SBST) program for healthy but less active

women during menopause transition compared to other common exercise programs and whether participation led to adoption of a more active lifestyle. **Method:** 84 healthy women were admitted to the study and allocated to groups on the basis of their activity level. 50 Sedentary participants were assigned to RCT. Intervention group attended 24 SBST sessions were compared to controls at baseline and for 3, 9 and 24months assessments. The SBST group was also compared to 34 women who exercised at a moderate to high intensity level at baseline and 24 months. **Result:** RCT intervention group showed significant improvement in balance measures ($p < 0.003$), tactile acuity ($p = 0.027$), ankle flexibility ($p < 0.000$), lower limb strength ($p < 0.006$) compared to sedentary controls immediately after intervention. At 3-months, most improvement was maintained for the SBST group with continued significant improvement in balance ($p < 0.05$), somatosensory function ($p < 0.046$), muscle strength ($p < 0.046$) and cardiovascular endurance ($p = 0.000$). At 24months the SBST group had attained the same cardiovascular endurance level as the exercise control group, women in the SBST group showed sustained weight loss ($p < 0.017$) while exercising controls showed a steady weight gain (2.21 ± 3.90 kg). **Conclusion:** SBST program is comparable in effect to every-day exercise programs. It leads to adoption of a more active lifestyle for less active women aged 40 to 60 years. Verification of the SBST program outcome with 517 healthy older people aged over 65 produced a similar outcome regarding reduction of falls risk factors and for foster healthier ageing. **Keywords:** Balance; Fall Risk Factors; Intervention; Exercise.

The effects of a 12-week community based exercise programme on the prevention of falls in older people: The Liveability Programme

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Introduction: Falls are a main cause of morbidity in older adults. Preventive measures such as regular physical activity (PA) can be applied to avoid the adverse implications of falls and injuries on public health. Liveability programme aimed to reduce the risks of falls in people age 60+ through increased PA. **Methods:** Forty-two participants (71% female) aged (60+), were recruited (intervention group = 25, comparison group = 17) with measures taken pre and post programme. Twice weekly 1-hour classes were conducted in a leisure centre. A mixed method approach entailing: quantitative (questionnaire: Physical Activity Score for Elderly; PASE, Falls Risk Assessment Tool; FRAT, Confidence in Balance), qualitative (focus groups) and objective measurements (senior fitness test, SFT) were used. **Results:** There were significant interaction effects ($P < .05$) for PASE, FRAT, Confidence in Balance and SFT between the two groups before and after the intervention. In the treatment group PA increased by 34%, confidence in balance by 7%, falls risk reduced by 20% and improved functional mobility and flexibility increased by 59%. These compared to 3% increase in PA, 7.5% decrease in confidence in balance, 1.3% improvement in FRAT and 42% improvement in SFT in the comparison group. Qualitative data yield improvement in participants general well being and fitness. **Discussion:** A recently published systematic review stated that 2 hours of challenging exercise could reduce the risk of falls by 16% (Sherrington et al., 2011). The Liveability programme included 2-hour weekly challenging activities that included a mixture of strength, flexibility and balance exercises in a structured instructor led group session. This mixture of exercises not only increased habitual PA but also reduced the risk of falls, improved confidence in balance and increased functional mobility and fitness. **Keywords:** Falls Risk Assessment; Balance Exercises; Falls; Mobility.

Exercise for preventing and treating osteoporosis in postmenopausal women

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Background: Osteoporosis is a condition resulting in an increased risk of skeletal fractures due to a reduction in the density of bone tissue. Treatment of osteoporosis typically involves the use of pharmacological agents. In general it is thought that disuse (prolonged periods of inactivity) and unloading of the skeleton promotes reduced bone mass, whereas mechanical loading through exercise increases bone mass. **Objectives:** To examine the effectiveness of exercise interventions in preventing bone loss and fractures in postmenopausal women. **Results:** Forty-three RCTs with 4320 participants were included. The most effective type of exercise intervention on bone mineral density (BMD) for the neck of femur appears to be non-weight bearing high force exercise such as progressive resistance strength training for the lower limbs (MD 1.03; 95% confidence interval (CI) 0.24 to 1.82). The most effective intervention for BMD at the spine was combination exercise programmes (MD 3.22; 95% CI 1.80 to 4.64) compared with control groups. Fractures and falls were reported as adverse events in some studies. There was no effect on numbers of fractures (odds ratio (OR) 0.61; 95% CI 0.23 to 1.64). Overall, the quality of the reporting of studies in the meta-analyses was low, in particular in the areas of sequence generation, allocation concealment, blinding and loss to follow-up. **Conclusions:** results suggest a relatively small statistically significant, but possibly important, effect of exercise on bone density compared with control groups. Exercise has the potential to be a safe and effective way to avert bone loss in postmenopausal women. **Keywords:** Osteoporosis; Fractures; Bone Health; Falls Prevention.

ADHERENCE TO AND OUTCOMES OF FALLS EXERCISE IN FRAILER OLDER PEOPLE

Predictors of exercise dose during a 1-year home-based exercise intervention for older people recently discharged from hospital

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Background: A randomised controlled trial of a 12-month tailored home exercise program designed to minimise disability and prevent falls is being conducted among 340 older adults recently discharged from hospital. **Aim:** To describe exercise dosage and predictors of dosage in the first 150 intervention group participants. **Methods:** Exercise repetitions completed (number of agreed reps per session × number agreed weekly sessions × study physiotherapist's estimate of percentage agreed dose undertaken) were calculated for months 1, 3, 8 and 12. The total number of reps undertaken over these 4 months was estimated by adding the monthly totals. Possible predictors of exercise dose completed, including Physical Activity Stages of Change (Marcus, 1992) were investigated using univariate linear regression. **Results:** Participants: mean age = 82 years (SD = 7.9, range 62-100 years), 110 female (73%), 87 lived alone (58%), 51 used a walking aid indoors (34%). Total repetitions of lower

limb exercises over the 4 months: mean = 1185, SD = 1103, range = 0 to 4704. Predictors of fewer total reps were: increased age (B = -46, 95%CI = - 68 to -25, P < 0.001), living alone (B = -534, 95%CI = -886 to -183, P < 0.003), using a walking aid indoors (B = - 464, 95%CI = -834 to -95, P < 0.014), one or more falls in past 12 months (B = -273, 95%CI = -273 to 197, P < 0.169), greater number of co-morbidities (B = -87, 95%CI = -149 to -25, P < 0.006), and being in the precontemplation” or “contemplation” Stage of Change (rather than “preparation”, “action” or “maintenance” stage; B = -680, 95%CI = -1060 to -300, P < 0.001). **Conclusion:** Increased age, living alone, use of a walking aid indoors, one or more falls in the past 12 months, greater number of co-morbidities, and lower Stage of Change all predicted fewer repetitions completed. This information can be used in the design of future exercise programs. **Keywords:** Home Exercise; Walking; Exercise Dosage; Intervention.

Prevalence and correlates of older adults’ adherence to the fall prevention recommended exercise

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Background: Older adults’ compliance with recommendations for falls prevention is rarely reported. This study determines the prevalence and correlates of older adults’ participation in strength and balance training. **Methods:** A random sample of 5,681 older adults (>65yrs) took part in the New South Wales (Australia) Fall Prevention telephone survey (61% response-rate) in 2009. Participants reported doing specific balance exercise, dance, tai-chi and team sports (i.e., sailing, squash, golf and all team sports). An expanded definition for balance activities also included lawn bowls, golf and all team sports. Meeting the recommendations required at least twice weekly participation in any balance (expanded) or strength training. Multivariable logistic regressions were used to identify correlates of participation in any strength or the expanded balance-enhancing classification. **Results:** One in eight older adults participated in strength training (12.0%, 95% CI: 11.0-13.0) and 12.2% (95% CI: 11.2-13.1) or 21.8% (95% CI: 20.5-23.0) challenged their balance by ‘narrow’ or ‘expanded’ definitions, respectively. Less than a third (28.4%, 95% CI: 27.1-29.8) adhered to either strength or the expanded balance recommendations and only 3% adhered to both. Men, younger seniors (<75yrs), those with higher education (>high-school) and those who live in advantaged neighborhoods were significantly more likely to engage in strength or balance activities. Seniors who were obese, rated their health status below very good/excellent, had problems with walking or used a walking aid were significantly less likely to participate. Falling in the past 12 months was not associated with increased participation. **Conclusion:** There is low adherence to balance and strength recommendations among older adults. Efforts to increase seniors’ participation are urgently needed at the population level and in high-risk groups. Continuing research on activities that improve balance in old age is also warranted. **Keywords:** Balance, Strength; Falls Prevention; Telephone Survey; Tai-Chi.

Physical activity and falls benefits of medium term adherence to the home activity monitoring program (HAMP) for older adults

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HAMP (Home Activity Monitoring Program) a home based activity program for older adults was developed and implemented in 2005 by Active Ageing Australia®. The outcomes of this program (1) included increased physical activity (PA) and reduced incidence of falls (FI). HAMP ceased in September 2008 when participants were advised to continue independently. **Methods:** A previously surveyed group of HAMP participants (123) were contacted in 2009, to review current PA, self-rated health (HS) and FI in the previous 12 months. Telephone and posted questionnaires were used. **Results:** 76 (62%) replied of which 53 people were currently exercising (CE) and 23 non-exercising (NE). 65 were females and 11 males, average age was 81 years. 58 (76%) had two or more chronic medical conditions and the average number of medications taken was 5. Of CE respondents 30 (57%) were still using HAMP. 23 (43%) of CE respondents undertook other PA. 74% (17) of the NE group rated their health as poor to fair compared to 68% (36) of CE group. FI in the previous 12 months prior was 17% (5) for the NE group compared to 23% (12) for the CE group. 67% of all respondents indicated they would like further direct contact regarding HAMP. **Discussion:** Medium term PA status of HAMP participants supported its use. CE survey respondents indicated that they had support and recommendation to continue their HAMP participation. FI WAS lower than population based expectations regardless of PA or self reported HS. Further research into the benefits of HAMP has commenced including train the trainer for allied health assistants within various aged care services in South Australia. **Conclusion:** Adherence to PA and associated influence on FI supports the HAMP potential for wider implementation for older adults. **References:** 1. Penhall R, Barnard R. Home Activity Monitoring Project (HAMP) for Improving Functional Performance and Reducing Falls in Older Persons. *Journal of Nutrition, Health and Aging*, 13 (Suppl 1): S423-4, 2009. **Keywords:** Home Activity Monitoring Program; Questionnaires; Falls.

Preventing functional loss during immobilisation after osteoporotic wrist fractures in elderly patients: A randomised clinical trial

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Background: Therapy results after distal radius fracture especially of elderly patients are often suboptimal. The inevitable immobilization for several weeks leads to reduction in ROM, deterioration of muscle strength, malfunction of fine motor skills as well as changes of motor and sensory representations in the brain. Currently, there are no strategies to counteract these problems. The overall aim of the study is to investigate the therapeutic potential of a motor-cognitive therapy (Mental Practice [MP] or Mirror Therapy [MT]) on hand function after wrist fracture. The pilot should provide information about 1) the necessary recruitment rate and compliance for an adequate sample size, and 2) adequate measures. **Methods/Design:** Patients aged 60 years and older with a distal radius fracture participate in a double-blinded, randomized controlled trial. The experimental groups [EG] receive either MP or MT; the control group undergoes relaxation training. The EGs undertake a six-week, individually tailored therapy regime focused on improving hand function. All groups were visited at home for therapy sessions 5 times a week for the first 3 weeks and 3 times a week for week 4 to 6. Measurements will be taken at therapy onset, and after 3, 6 and 12 weeks. Primary outcome measures will assess upper extremity functioning (PRWE), while secondary outcome measures cover subjective wrist function, objective impairment (ROM, grip force) and quality of life (DASH, EQ5D). **Discussion.** Up to January 2012, 17 women were enrolled, of whom 15 participated successfully and showed a high compliance, only 2

resigned. The randomization process distributed participants equally to the groups, based on the variables age and motor imagery capacity. To test the effects of treatment, between-group differences will be examined with MANOVA with repeated measures. Intention-to-treat principle will be applied. We are planning to finish the intervention period in June 2012.

Keywords: Fractures; Relaxation Training; Motor-Cognitive Therapy.

Physical activity early after hip fracture: The Trondheim Hip Fracture Trial

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Objective: Early mobilisation after a hip fracture in older persons is important for reducing negative effects of bed rest and inactivity, and for regaining function. Data from our research group three months after a hip fracture have shown that activity level - measured as upright time - was close to 4.5 hours per day. The aim of the present study was to investigate daily physically activity on the fourth day after hip fracture surgery and to describe factors associated with this activity level. **Methods:** The Trondheim Hip Fracture Trial included 398 hip fracture patients that received treatment in either an orthopaedic (treatment arm 1) or orthogeriatric (treatment arm 2) hospital ward. In 317 of the patients, daily physical activity was monitored during 24 hours by a single axis accelerometer worn on the thigh the 4th day post surgery. Outcome measure was time spent in upright activities (i.e., standing and walking). **Results:** Preliminary analysis shows that mean upright activity time for the 317 patients (75% women) was 48.2 min (SD 1 hour and 2 min). Twelve participants were sedentary (sitting or lying) the entire day. **Conclusion:** Four days after hip fracture surgery, mean activity level was low, with large variations in upright time between patients. Further analyses will assess potential differences between patients in the two treatment arms and factors associated with different activity levels. **Keywords:** Fractures; Activity Level; Surgery; Bone Health.

Otago from 180 degrees: The older person's perspective

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NHS Forth Valley and local authority partners have been working collaboratively to deliver the OTAGO strength and balance programme since 2008. The clinical outcomes of a previous study indicated clear improvements in indoor and outdoor independence; walking aid use; timed up and go, 180-degree turn and chair rise ability. In addition, patient experience of those attending the programme was sought. **Methodology:** An anonymised pre and post programme questionnaire was completed by patients attending the day hospital. **Results:** There were 221 responses to the pre-programme questionnaire with a response rate of 65% (n = 143) to the post-programme questionnaire. Pre-programme questionnaire responses: 55% were aged 80+; Patients who don't exercise 40%; Patients who were afraid of falling 81%; Patients who feel their fear of falling limits their activity 40%; Patients with at least one fall in last 6 months 64%; Patients with at least one fall in last 6 months which resulted in a hospital admission 42%. Post programme questionnaire responses (n = 143): 52% were

aged 80+; Exercising more than previously 74%; Had a desire to continue exercising 87%; Less afraid of falling than previously 40%; Feel less likely to fall 67%; Feel more confident than previously 61%; Feel strength has improved 90%; Feel stamina has improved 60%; Feel posture has improved 79%; Feel balance has improved 76%; Reported fall since starting the programme 22%. What the participants said: "Confidence greatly improved, posture much better, balance much better" "Made me more aware of surroundings, more confidence, feel stronger, made me want to do more exercise..." "Feel less likely to fall because I am more aware" "Balance, posture, outlook in life, confidence, all much better." **Conclusion:** Participants in OTAGO report improvements in exercise participation, strength and stamina. These improvements may well contribute to the reduction in self-reported falls since starting OTAGO. **Keywords:** Otago Programme; Strength, Balance; Fear of Falling; Falls Prevention.

Implementation of the Living Longer Living Stronger community strength training program into a residential care environment

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Living Longer Living Stronger TM (LLLS) is an evidence based strength-training program that encourages and supports change in the health and fitness sectors to achieve improved health, quality of life and fitness for people aged over 50 years. The program is currently funded by the Western Australian State Department of Health in the area of falls prevention. This project aimed to identify the benefits and feasibility of delivering Living Longer Living Stronger (LLLS) within the environment of an aged care facility for residents who reside in a residential care environment, together with community residents, as historically the LLLS program had only been delivered in a general community environment in local gyms, recreation centers, physiotherapy practices and exercise physiology clinics. A partnership with Freemasons Western Australia was formed in June 2009 and planning began on a 12-week pilot program which eventually commenced in June 2010. Unlike the community LLLS program existing physiotherapy assistant (PTA) staff were recruited and provided with basic fitness leader training to ensure they were capable of leading and supervising basics exercise sessions. Clinical testing and qualitative assessments were completed pre and post pilot project and results showed drastic improvements across the board with 91% improving balance measures (Berg Balance), 82% improving flexibility, 55% improving leg strength and power and 45% improving cardiovascular function in only 12 weeks. Participants and staff reported improved mood, sleeping habits, energy and posture and the improved social engagement between participants from a residential setting and high care setting were noticeable. This innovation in care provided specialized strength and physical conditioning services to those most in need and has been recognized and further more funded into the future by the Western Australian State Department of Health. **Keywords:** Life Expectancy; Strength, Balance; Environment; Residential Care.

"PLEASE, DON'T FALL" COMMUNITY RESEARCH-ACTION PROJECT: AN AZOREAN REPORT

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Introduction: Por favor não caia” (Please don’t fall) is a community research-action project developed in the field of health promotion directed toward the aging population. It was implemented by an interdisciplinary team (Managers, Physiotherapists, Nurses, and Nutritionists) between October 2010 and August 2011 in Angra do Heroísmo (Island Terceira) and Santa Cruz da Graciosa (Island Graciosa). Counting with more than 1000 participants it was the biggest project of its kind ever to take place in the Azores (Portugal). This practical implementation report describes the objective results of the Physiotherapy team intervention. **Aim:** The aim of this research-action study was to explore the effects of a community-based physical exercise program on the balance, falls efficacy, and functional mobility of sedentary aging adults. **Methods:** 149 participants (146F, ± 70 years; 3M, ± 80 years) met the inclusion criteria and went through a low impact physical exercise program (45 min classes, twice a week, during 40 weeks). All were assessed (baseline and end of the program) using the Timed up and go (TUG) test, Modified Falls Efficacy Scale (MFES), and Footscan platform. Non-parametrical statistical tests were used to analyze the data. **Results:** The TUG score improved between the two assessments ($p = 0,000$), so did the MFES score ($p = 0,000$). The objective balance, measured with foot scan, also improved ($p = 0,001$). A greater adherence to the program was statistically associated to these improvements ($\rho = -4,96$). **Conclusions:** The physical exercise program seems to have contributed to the improvement of the balance, falls efficacy, and functional mobility of the participants. These positive results have decisively contributed to the renewal of the official government support to this project in 2012. It has also played an important role on highlighting the importance of investing in preventive measures to lower the public health burden associated to demographical aging in the Azores.

ASSESSMENT OF FALLS RISKS

Biomechanics of Locomotion in the Elderly Project: Procedures and determinant factors for falls in Portuguese older people

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Background: The “Biomechanics of locomotion in the elderly” is a research program conducted by Neuromechanics Research Group from CIPER-FMH/UTL (supported by the Portuguese Foundation for Science and Technology) that aims to develop a risk profile to identify Portuguese community-residing elderly at high risk of falling and to develop recommendations on the development of exercise programs aimed at reducing the risk of falls in this population. **Aims:** This study intends to describe the baseline processes followed on the aforementioned project by: (1) present preliminary results about the validation of the procedures (physical activity (PA) and functional fitness (FF) tests followed, (2) identify the parameters which are determinant to predict falls in Portuguese older adults. **Methods:** 647 subjects, aged $\geq 65y$, were randomly recruited in Lisbon and Tagus Valley area. Trained interviewers administered: (1) a standardized questionnaire that included sociodemographic, health perception and falls parameters (prevalence, circumstances and consequences); (2) YPAS PA questionnaire and (3) FF tests (30sec Chair-Stand and 8 foot Up & Go from SFT battery and items 4-7 from FAB Scale). Logistic regression analysis was used to model fall occurrence considering three different fall groups (non-fallers (NF 0 falls), fallers (F 1 fall) and recurrent fallers (RF 2 fall). **Results/Conclusion:** All tests showed very good validity and reproducibility, giving us confidence about the results obtained. Health and FF variables

are the most determinant factors to assess fall risk in Portuguese older adults. Furthermore, according to the results falls might be an inevitable consequence of ageing but are mainly associated with poor health and functionality. **References:** 1. Dipietro, L. et al (1993) *Med Sci Sports Exerc.* 25(5):628-42; 2. Jones, C. J. et al. (1999) *Res Q Exerc Sport*, 70(2): 113-119; 3. Hernandez, D. et al. (2008) *Arch of Phys Med & Rehab*, 89(12): 2309-231. **Keywords:** Falls; Functional Fitness; Locomotion.

Predictors of falls and fractures as women age past the menopause

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Background: Fall related fractures are a major problem for women as they age. Preventing falls is the goal of fall prevention interventions among known fallers. There is little evidence to support fall screening and intervention for younger women. This study aimed to identify potentially modifiable health-related factors predicting falls and fracture in women over 40.

Method: 449 women aged 40 to 80 years from the Longitudinal Assessment of Women (LAW) study participated. Demographic information (age, BMI, Medications, medical conditions and activity level, balance assessment including Timed Up & Go and modified Clinical Test for Sensory Interaction of Balance and measurements of bone mineral density and body composition were collected in 2001 as baseline, follow-up data on Falls and fracture data were conducted regularly until 2010 to determine incidence. **Results:** Multinomial logistic regression revealed that single falls could be predicted by a history of previous falls (OR 3.08) and being unsteady in bipedal stance on foam with eyes closed (OR 1.99). Multiple falls were predicted by a history of falls at baseline (OR 4.69), low levels of activity (OR 2.17), greater number of medical conditions (OR 1.12) and being unsteady in bipedal stance on foam with eyes close (OR 4.21). Low bone mineral density (OR 3.13), greater number of medical conditions (OR 1.32) and a history of falls (OR 3.04) were predictive of fractures.

Conclusions: This study showed that a significant proportion of falls occurs in women in their 40s and 50s. Poor health, decreased balance and inactivity are predictive of falls and low bone mineral density, low activity level and poor health predictive of fractures. Failing the balance test, bipedal stance on foam with eyes closed in the presence of low activity and poor health is a valid quick screening tool for detecting potential fallers for referral for in-depth balance assessment and intervention. **Keywords:** Fall Predictions; Longitudinal Assessment; Demographics; Balance; Bone Health.

Can the Short Physical Performance Battery predict outcomes in very old age? 9 year data from 90 over-90-year-olds in the population-based CC75C Study

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Background: The Short Physical Performance Battery (SPPB; Guralnik 1994) comprises gait speed; chair stands and balance tests that together give well-validated risk estimates for a range of adverse outcomes. Although widely used in ageing research and practice, its use in very old age is reported rarely and usually only in care homes. We report norms for the oldest old from a population-based sample and explore whether the SPPB can be a useful predictor in this age group. **Methods:** Men and women aged at least 75 enrolled in Cambridge City over-75s Cohort (CC75C) study via general practices 25 years ago. All surviving participants were aged over 90 when re-interviewed for the CC75C falls study (n

= 110). Of these n = 90 completed SPPB assessments. All were followed-up with intensive prospective falls data collection with fall calendars, phone calls and visits. Hospital admissions were also monitored during this year. Moves into long-term care and deaths have been tracked ever since, giving 9.6 years follow-up 31 January 2012. **Results:** SPPB scores (scale 0-12) are skewed to lower scores: median 3, IQR 1-5. Tertiles give groups scoring 0-1, 2-4 and 5-10. Kaplan-Meier plots and Cox proportional hazard ratios show relative to highest SPPB group, mortality curves decline fastest with lowest scores: HR1.9 (95% C.I. 1.1-3.2) and 2.8 (1.5-5.0) in 2nd and 3rd group respectively. Both lower score tertiles have similarly increased risk of moving into care: HR3.2 (1.4-7.2) and 2.9 (1.1-7.3) but the middle group has shorter time than the lowest SPPB group both to hospital admissions: HR10.4 (2.4-44.9) vs 6.9 (1.4-34.0) and to falls: HR2.7 (1.4-5.5) vs 1.3 (0.5-2.9). HRs are adjusted for dementia; demographic confounders had minimal effect. **Conclusion:** Findings show SPPB groups identify different survival time trajectories (death, long-term care admission, hospitalisation, first fall), suggesting particular risk for older people with low but not the lowest functional ability. **Keywords:** Falls Calendar; Hospital Admissions; Functional Ability; Population Based Study.

Balance and fall risk in community-dwelling older adults from Madeira, Portugal

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Background: Numerous age-related changes in function, including balance declines, are associated to frailty in older adults and increased risk of falling. **Aims:** The present study aimed (1) to determine the prevalence of falls in community-dwelling older adults from Madeira, Portugal, (2) to identify the levels of balance/risk for falling, and (3) to determine the extent to which balance scores are associated with lifestyle and constitutive factors. **Methods:** This cross-sectional study included 127 subjects, 12 males and 115 females, aged 63-88 years, engaging in a balance program developed in Madeira (ProBalance). Balance was assessed using the Fullerton Advanced Balance (FAB) scale. Demographic information and health history were obtained using a modified version of the FallProof Program's questionnaire through a face-to-face interview. Cognitive function was assessed by the Mini-Mental State Test. Statistical analysis included descriptive statistics and multiple regression analysis (MRA). **Results:** The prevalence of falls, in the previous year, was 53.5%. From the total sample, 42.5% of the participants were identified as having increased risk for falling (FAB scores 25 or lower) and 57.5% presented a low-to-moderate risk for falling (FAB scores higher than 25). Mobility problems ($R^2 = -0.239$; $P = 0.029$), number of medications ($R^2 = -0.300$; $P = 0.006$), physical activity ($R^2 = 0.229$; $P = 0.033$), and cognitive function ($R^2 = 0.262$; $P = 0.017$) were the predictors of FAB scores. As a whole, these variables explained 28% of the variance of the FAB score. **Conclusions:** This study identified high prevalence of Portuguese fallers and older adults with increase risk for falling. Mobility problems, number of medications, physical activity and cognitive function explained about one third of the variance on FAB score. **Keywords:** Prevalence of Falls; Risk of Falling; Medications; Physical Activity; Cognitive function.

Is cognitive performance associated with balance in adults with and without fibromyalgia?

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Background: Persons with fibromyalgia (FM) exhibit balance impairments and higher-than-expected fall risk. Fallers with FM exhibited altered cognitive function. Understanding relationships among cognition/balance may aid development of balance/mobility interventions. Purpose: to determine relationships between balance and cognitive performance accounting for participant factors in persons 50+ with/without FM. **Methods:** After dementia screening, 115 participants were assessed for depression, symptoms, physical activity, Fullerton Advanced Balance (FAB) scale, and cognitive measures Stroop Color, Stroop Color/Word, Auditory Consonant Trigram (attention/executive function), Trails BminusA (inhibition), Digits Span F+B working memory), Digit Symbol Substitution, (DSST, processing speed), and Everyday Problems Test (EPT, problem solving). Separate hierarchical regression analyses with each cognitive measure (where a significant bivariate correlation with balance was found) were run to determine the relationships between cognitive performance and balance (total FAB score) taking into account the participant factors found to be significantly associated with balance. **Results:** Better balance was significantly associated with younger age, higher activity, less depression but not with gender, or having frequent falls, FM, neurological condition, numbness/tingling, or vision problems. Using only cognitive measures with significant correlations with balance, regression models predicted 35-41% of balance variance with independent contributions from age, activity, depression. No cognitive measure contributed to balance variance ($p > .05$). **Conclusions:** Having FM was not associated with balance. In multivariate models, cognitive measures did not contribute independently to balance while participant factors (age, activity level, depression) did. Further studies are needed to determine if cognitive measures offer significant contributions to individual balance dimensions. **Keywords:** Fibromyalgia; Balance Impairments; Cognitive Function; Mobility.

Can functional fitness and balance battery tests discriminate fallers in a group of active elderly?

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Background and Purpose: The aging process leads to a decline in functional fitness (FF) increasing falls prevalence in elderly. Decreased postural stability, strength and power in lower limbs are intrinsic predictors of such accidents. On the contrary, exercise programs may improve Functional Fitness (FF) and prevent falls among this population. The purpose of this study was to verify which items of a FF and Balance (B) battery tests could be better to discriminate fallers in a group of active elderly. **Subjects and Methods:** 629 active (exercise practice $\times 2$ times a week, ~ 45 min/session) older adults (72.5 ± 5.3 y) participated in this study. Trained examiners administered: 1) a fall questionnaire designed for this purpose; and 2) a FF and B battery test that included the UG, CS and 2min Step tests from SFT2, items 4-7 of FAB Scale3, and Calf Raise and Calf Stretch tests (in validation process) to assess ankle

strength and flexibility. A Logistic regression analysis (backward conditional) was used to determine the risk factors for fall in different groups: non-fallers (0 falls), fallers (1 fall) and recurrent fallers (>1 fall). **Results and Discussion:** In a bivariate logistic analysis, all FF and B tests have shown to be determinant for recurrent falling. However, multifactorial analysis revealed that only cardiorespiratory fitness (2-min Step) and, above all, dynamic balance (FAB5), were shown to be protective factors for recurrent falls (OR = 0.976; 95%CI 0.959-0.995). Moreover, the only variable that explained the episodic falls was static balance (FAB 6), also as a protective factor (OR = 0.847; 95%CI 0.728-0.986). **Conclusion:** In this battery of tests, balance assessments seem to be the key element to discriminate fallers in a group of active elderly. **References:** 1.Skelton, D.A. (2001). Age and Ageing,30; 2.Jones, C.J. (1999). Res Q Exerc Sport,70; 3.Hernandez, D. (2008) Arch of Phys Med,89. **Keywords:** Fitness and Balance; Strength, Flexibility; Postural Stability

Seniors' out-of-home trips and lower body strength

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Background: Falls are an important cause of morbidity and mortality in older people. Lower body strength is strongly associated with older adults' falls. Although abundant research has proved environmental characteristics to seniors subjective health perception, few studies have investigated the relationships between seniors motives for going out, environment use and objective measure of lower body strength. **Purpose:** To investigate the relationship between seniors neighbourhood out-of-home mobility and objective measure of lower body strength. **Methods:** 445 community dwelling older adults (age = 75.13 ± 6.54 yrs) were recruited for this study. Neighbourhood environment and seniors out-of-home mobility was measured by the questionnaire which includes their motives and the frequencies for going out, the destinations and the distances for their daily physical activity participation, the transportation methods adopted associated with seniors' out-of-home trips. All participants were instructed to perform chair stand test (mean: 13.66 ± 5.00) to assess their lower body strength. **Results:** Regression analysis was performed adjusted for age and gender. Seniors who go out for exercise at least once a day was a significant predictor of lower body strength ($\beta = 0.135$, $p < .05$). Park accessibility within 10 min transportation time was also a significant predictor of lower body strength ($\beta = 0.153$, $p < .05$). **Conclusion:** The frequencies of seniors' out-of-home trips and shorter travelling time to park are stronger predictors of seniors' objective measure of lower extremity function. The results provide implications for increasing seniors lower body strength from neighbourhood accessibility perspective which may assist the prevention of older adults falls. **Keywords:** Morbidity and Mortality; Falls; Strength.

FEAR OF FALLING, PHYSICAL ACTIVITY AND FALLS IN OLDER PEOPLE

Falls efficacy, executive function and functional performance in community dwelling older adults

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Introduction: Concern about falling and poor executive function cause deterioration in gait performance in older adults. The relationship between fear and gait and between execu-

tive function and gait has been established. However, the relationship between concern about falling and executive function requires further investigation. **Methods:** Ninety-three community-dwelling adults aged 65 years and older were assessed on the Falls Efficacy Scale-International (FES-I), the abbreviated Executive Interview (EXIT-15) and on functional tests including a 10 meter walk and the Timed Up & Go (TUG) test. The correlation between these variables was assessed using Spearman's rho. The strength of correlation was determined based on small = 0.1-0.29, medium = 0.30-0.49 and large = 0.50-1.0. **Results:** Subjects had high concern about falling (FES-I median = 23, Inter-Quartile Range (IQR) = 13.5) and normal executive function (EXIT-15 median = 4, IQR = 3). Subjects required a median of 9.3 seconds (IQR = 4.9) to complete the 10 meter walk and a median of 11.8 seconds (IQR = 6) to complete the TUG test. There was a high correlation between FES-I and 10 meter walking and TUG time ($\rho = 0.61$ and 0.64 respectively, $p < 0.001$). EXIT-15 was also moderately correlated 10 meter walking and TUG time ($\rho = 0.49$ and 0.48 respectively, $p < 0.001$). FES-I and EXIT-15 were moderately correlated ($\rho = 0.41$, $p < 0.001$). **Conclusion:** The results of this study confirmed the previous findings regarding the effect of concern about falling and executive function on walking performance, as greater concern and poorer executive function were related to longer walking and TUG performance. Despite the EXIT-15 scores being within the normal range, poorer EXIT-15 scores were related to greater concern about falling. This relationship might indicate that executive function has an impact on perceived concern or fear of falling. It also suggests that concern about falling is not just a simple measure of efficacy it can also be an indicator of the ability of older adults to plan and carry out goal directed behaviour. **Keywords:** Falls Efficacy; Executive Function; Functional Performance.

The relationship of physical activity to falls incidence in community-dwelling older adults: A review

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Background: Evidence supports participation in structured exercise programmes to reduce falls incidence among older adults. However, the influence of habitual physical activity (PA) on falls is not well understood. **Aims:** This study aims to synthesise the current evidence on PA and its relationship to falls incidence among community-dwelling older adults. **Methods:** Observational studies were sourced by searching the PubMed, Academic Search Complete, AMED, Biomedical Reference Collection, CINAHL, MEDLINE, Nursing and Allied Health Collection, SPORTDiscus and Cochrane databases with the key words 'falls', 'physical activity', 'community' and either 'older adults' or 'elderly', and via reference lists of relevant articles. Articles were excluded if they were not in English, did not measure PA and falls incidence, related to disease-specific populations only or populations other than community-dwelling adults of 60 years or over. **Results:** 23 papers dating from 1996 to 2011 were reviewed. Falls incidence was recorded retrospectively in 11 studies and prospectively in 12. Only 2 studies measured PA objectively. **Discussion:** Mixed evidence was found linking both high and low PA levels to falls incidence retrospectively and prospectively. However, a consistent U-shaped relationship between PA and falls was not observed. Evidence suggests that factors relating to the person (physical performance capacity), task (the type and amount of PA undertaken) and environment (environmental demands) may mediate the relationship between habitual PA and falls incidence among older adults. Considerable heterogeneity across studies was noted in falls reporting and PA measurement methods. **Conclusions:**

Personal, environmental and task-related factors appear to influence PA and falls incidence in this population. Future research using objective PA measures should consider these factors to determine their relative contributions and improve our understanding of how falls and PA are related. **Keywords:** Physical Activity; Falls Incidence; Measurement of Physical Activity; Environment.

Fear of falling: Can technology eliminate it?

Beckett, William

Hip Impact Protection Ltd, United Kingdom

The fear of falling is a well-established phenomenon amongst the elderly population with ample proof provided by the statistical drop in fractures of the hip during periods of severe weather, when exactly the opposite outcome would have been expected. Elderly people, many of whom will already have experienced a fall, tend to remain in their homes while such conditions persist in order to avoid the risk of a fall on slippery pavements or roads. The deleterious effects of such constricted movement include social isolation as well as some physical degeneration through lack of exercise. Within the home or care institution, special flooring, akin to that installed in children's playgrounds, can be provided, though it is not inexpensive and is hardly a decorative feature; outside the home, it is a different matter. The requirement is, therefore, for a medical device that protects individuals in the event of a fall, without requiring them to wear the equivalent of body armour. Hip protectors have been available in various guises since the early 2000s, however they have hitherto suffered from a number of drawbacks. These include minimal reduction in transmitted force, significant discomfort for the wearer through being too hot, too hard and/or too bulky to wear, as well as being too expensive. A new generation of hip protectors, as well as knee, shoulder and head protectors, is now available with non-Newtonian properties, and can provide proper protection with complete comfort, even in bed at night (a time when many falls occur) but at reasonable cost. The protectors use a remarkable new material called D3O whose molecules normally flow like a liquid but lock instantly on impact, relaxing thereafter. This material reduces an impact of 3,500 kNewtons, experienced at a hip in a fall, to approximately 1,000 kN, sufficient to prevent fracture in even an osteoporotic hip. This is between 30% and 50% better than any other hip protector. It is called Fall-Safe®. **Keywords:** Fear of Falling; Technology; Fractures; Falls Prevention.

How is objectively measured physical activity associated with falls and fear of falling in older community dwelling men?

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Aims: We study associations between objectively measured physical activity (PA) levels and falls and fear of falling (FOF) in community-dwelling older adults, as this is little studied. **Methods:** Men participating in a prospective, population-based cohort study in 24 British towns reported if they had fallen in the previous year and if they were fearful of falling. Men wore an Actigraph GT3X accelerometer over the hip for 7 days. Data were analysed in 60s epochs. **Results:** 1543 men with a mean age of 77(range 71-91y) wore the Actigraph,

1100 (72%) had >600 min wear time on 5-7 days (excluding bouts of >60 min of continuous zeros) and questionnaire data. 21% (n = 229) had fallen, 30% (n = 68) received medical attention. Men who fell took fewer steps/day than men who did not: mean difference (adjusted for age, day order, month, wear time and town) -504 (95%CI -216, -792) and spent more min sedentary 13(95%CI 4, 22), and less in light -10(95%CI -1, -19) and moderate to vigorous PA (MVPA) -3.5(95%CI -1.3, -5.8). In relative terms, the reduction in MVPA was greatest: 22% (95%CI 7, 37). Differences were explained by exercise self-efficacy and mobility limitations, but not by exercise outcome expectation. 13% (n = 141) men reported FOF, of which 53% (n = 74) had fallen in the past year. Men with FOF took fewer steps: -1325(95%CI -1646, -1005), spent more min in sedentary 29(95% 18, 40), and less in light activity -21(95%CI -32, -11) or MVPA -9(95%CI -11, -7). In relative terms, the reduction in MVPA was greatest: -72%(95%CI -93, -52). Differences were partly explained by exercise self-efficacy, mobility limitations, and to a lesser extent, exercise outcome expectation. There was no evidence that FOF had a greater impact on PA levels among men who had fallen compared to those who had not fallen. **Conclusions:** PA levels and in particular step counts and MVPA levels, were lower among men who had fallen in the past year, and even more markedly, among those who reported FOF. **Keywords:** Measurement of Physical Activity; Falls and Fear of Falling; Accelerometer.

Functional fitness protects the elderly from fear of falling

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Background: Fear of falling (FoF) is a common and potentially disabling problem among the elderly. It often results in a reduction of their activity, leading to a downward spiral, accelerating physical deconditioning and reducing social interaction. **Aims:** The purpose of this study was to determine factors underlying FoF and their consequences. **Methods:** A cross-sectional study was designed to determine factors that enhance FoF and the implications of this phobia in ADLs among 1084 Portuguese older adults (70.04±6.89 yrs; 79.9% women). FoF, Perception of Health (PH) and Fall Prevalence (FP) were assessed by a specific questionnaire. Physical Activity was calculated through YPAS1. Functional Fitness (FF) was evaluated by UG and CS tests from SFT2, and balance obtained through "item 4, 5, 6 and 7" of FAB3 Scale. Chi-Square and T'student test were done to identify differences among gender, age, FoF and how it affects the ADLs. Logistic regression analyzes (backward conditional) were performed to identify the determinant factors for FoF and ADLs avoidance. **Results:** FoF was reported by 53.9% subjects and associated avoidance of ADLs by 22.1%. Concerning FoF outcome, having a good score balance is a protective factor (OR = 0.911;95%CI 0.844-0.983) while being a woman (OR = 2.801;95%CI 1.635-4.799), poor hearing (OR = 1.709;95%CI 1.126-2.595), poor agility (OR = 1.229;95%CI 1.037-1.456) and FP (OR = 1.425;95%CI 1.122-1.808) are risk factors. Poor vision increases the ADLs avoidance (OR = 1.941;95%CI 1.196-3.151) while good balance (OR = 0.890;95%CI 0.831-0.953) enable them. The stratified analysis by gender showed that FoF in women is enhanced by poor perception of visual health (OR = 1.999;95%CI 1.220-3.276), and by FP (OR = 0.900;95%CI 0.839-0.966); again good balance is a protector. **Conclusion:** Having good FF, especially good balance is an effective way to protect elderly from the FoF and consequently the avoidance of ADLs. **References:** [1] Dipietro, et al (1993) MSSE 25(5), 628-642 ;[2] Rikli & Jones. **Keywords:** Fear of Falling; Balance; Physical Activity; Functional Fitness.

Dual task balance training in fall prevention of older adults

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Changes in DT performance and an increased fall risk in older adults have been shown in frail older adults or adults with a history of falls (Siu et al., 2008). Fallers performed more inefficient in DT situations, indicating that they have problems to shift attention, to prioritize gait (Springer et al., 2006) or balance control. It has been shown that motor (balance or strength) or cognitive training can improve older adults' DT performance (Piechierri et al., 2011). According to the inability of fallers to shift attention an intervention should include task prioritization and task switching elements to build up strategies for balance performance in DT situations. This RCT compared DT balance training with strength training to analyse if DT training will be 40 seniors were randomized into a DT balance training (n = 15,72.1 ± 5.2 y), a strength training (n = 13, 73 ± 5.8 y) and a control group (n = 12,70,2 ± 5,2 y). The programme started at January for 12 weeks. Questionnaires examined daily activities and fear of falling (FES-I). Data of balance were collected (pre-post and measurement after 6 weeks of training) with the short physical performance battery (SPPB), sit to stand transfer (SST) on a Kistler forceplate (power and time to stabilization), sway velocity while standing on a forceplate under single and DT conditions (Stroop-test; standing on foam) and walking on a Zebris treadmill (FDM-T,3,5 km/h) under single and DT conditions (obstacle avoidance; Stroop test). Force data were collected at 100 Hz. DT-costs will be calculated. There were no groups differences for the SPPB (DT training: 11.3 ± 0.9, strength training : 11,4 ± 0.6, 70.2 ± 5.2, control: 11,8 ± 5.2). The values of the SPPB showed a high fitness level of the included persons. We suppose the strength training will improve balance performance during the SST and while standing, whereas the DT training will improve balance under DT standing and walking conditions. All results will be analysed until June. **Keywords:** Dual Task; Balance Training; Falls Prevention; Falls Risk.

An evaluation of a falls prevention exercise pilot in Bradford

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Bradford District Care Trust, UK.

Background: Funding from the "Extra Time Project" (Football Foundation and Comic Relief) to run two 20-week courses. All sessions were led by 2 Postural Stability Instructors. **Assessments completed:** Home visits pre assessment, FRAT, Confidence in Maintaining Balance, Black Fracture Risk Assessment, Short FES-I Questionnaire Quality of Life Questionnaire, Functional Test – Tinetti. **Results:** 8 people completed the 20 week Falls Prevention Classes at The Ridge Medical Practice in 2011. Average Improvements: Sit to stand 1.75 (in 30 seconds); Timed up and go 12.4 sec (quicker at post than at pre); Upper body flexibility Average of 10.5cm more flexible; Lower body flexibility Average of 5.5cm more flexible; 360 degree turn Patients required an average of 2.6 less steps to complete the 360 degree turn; Standing balance (timed one foot in front of other not holding on) Right in front of left – 9.1 sec longer Left in front of right – 8.4secs longer; Anxiety fear of falling Patients on average 20% less anxious of falling; Environmental risk factors - The Westmead Home Safety Assessment (WeHSA) was 14 risk factors were identified. All patients have written plans 2 patients referred to Age Concern to have hand rails fitted 2 patients decided to uptake "Careline" for pendant and phone connection in case of fall or emergency. 4 walking aids were found to be defective, new ferules put on Summary (QUIPP analysis). **Conclu-**

sions: Quality - Measurable outcomes have been achieved in line with current policy and best practice. Innovation - An evidenced based approach incorporating home assessments, tailored exercise classes, post assessments and action plans. Productivity - A low cost and efficient intervention. Prevention - Preventing frailty, promoting bone health and reducing accidents. **Keywords**: Falls Prevention; Costs; Walking; Environment.

COMMUNITY WIDE PROGRAMMES

A comprehensive falls screening and intervention program among adults in the community setting

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Silver Chain Group, Australia.*

Falls in adults over the age of 65 are a common event with one in three older Australians expected to fall each year (Hendrie et al., 2004). The consequences for the older person can be significant, with many experiencing a subsequent decline in functioning and quality of life. The impact on the health system can also be considerable, accounting for 4% of hospital admissions in Western Australia for people aged over 65 (unpublished data, WA Health Dept.). Despite the evidence that falls are very common, falls in community dwelling adults often go unreported and subsequently falls management programs are not implemented. This is not surprising however as many older adults do not believe they are at risk of falling and therefore ignore the falls prevention messages and programs that are available. It is also interesting that health care providers often under-detect falls, with known falls often receiving inadequate evaluation and intervention to treat the cause of the falls (Rubenstein et al., 2004). With this in mind, Silver Chain Group identified a need to develop and implement a broad-based comprehensive falls screening program for all clients entering the organisations services. The screening program implemented at the commencement of services focuses on engaging clients in a proactive, wellness approach to their own falls risk and leads into an intervention program for those identified as being at risk of falls. This presentation will outline the screening tool developed for use by all levels of staff, the use of mobile technology to record assessment and report incidence and impact of falls, as well as the training developed for staff working with community dwelling adults. An outline of the interventions identified and integration into existing falls prevention programs will be included, as well as some preliminary outcome based results from the program. **Keywords**: Falls Screening; Quality of Life; Health; Hospital Admissions.

A community based approach to promote active ageing in Staffordshire

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Beth Johnson Foundation, UK.*

The Beth Johnson Foundation has developed a community based cascade model to improve the health and wellbeing of older people in Staffordshire by recruiting and training volunteers as peer health mentors primarily to deliver gentle exercise programmes and updated health messages. A recent impact assessment shows that as well as improving general health and well-being, the wider benefits to participants of getting involved in the groups also include building social networks and reducing loneliness and isolation with their consequent negative effects on quality of life. To take a preventative approach to falls, volunteer peer health mentors have also been trained in falls awareness to encourage the older people in their groups to take measures to reduce their risk of falling. Overall the Active in Age programme

is aimed at providing the information and support needed by older people for them to make informed choices about maintaining or improving their own health and well-being and quality of life as they are ageing. **Keywords:** Active Ageing; Wellbeing; Quality of Life; Social Networks; Falls Awareness.

“Upright and Able”: A community-based approach to falls prevention and active living

Grant, Bevan C

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Introduction: Translating the empirical data about the many factors associated with falls into a sustainable community-based program with limited resources is a challenge. This is accentuated knowing the desire to engage in physical activity decreases with age, and public health funding for such ventures is limited in spite of the personal, social and economic benefits. Nonetheless, measures should be taken to mitigate the risk of falling in later life. This paper reports on the day-to-day experiences when offering a self-managed falls prevention program in rural communities of New Zealand. **Methods:** Groups of adults ($n = 197$) ranging in age from 56 to 93 years ($xc = 77$ years) who satisfied the ‘high risk of falling’ criteria were invited to participate in a six-week community-based physical activity and educational program. Data included falls history, scores for the Four Test Balance Scale and Chair Stand Test in Week 1 and 6, and a follow-up telephone interview after 3 and 6 months on their progress, perceptions of the program and other changes in health status. **Results:** Half of the participants had fallen prior to commencing the program but this reduced to 16% (only four sustained injuries) after sixth months. Furthermore, 90% self-reported feeling more confident in their physical ability, regularly engaged in a range of self-chosen physical activities of mostly mild intensity, were more knowledgeable about falls, and claimed to have a better quality of life. There were some concerns about the availability of suitable staff in these communities to provide on-going support for this cohort. **Conclusions:** The findings indicate positive outcomes and reflect those reported in the literature but the process warrants further refinement. In essence, this means continuing to explore how best to translate the research into the everyday practice in multi-purpose community recreation programs, and ultimately the lives of greater numbers of older people. **Keywords:** Rural; Risk of Falling; Physical Activity; Balance; Falls History.

Fit as a fiddle: A lasting legacy for the health and wellbeing of older people

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“I can now brush my hair” epitomises the positive feedback from participants attending the Big Lottery Funded, five-year fit as a fiddle pilot programme hosted by AgeUK. The programme’s core outcomes include engaging older people throughout England into healthy eating, physical, social and mental wellbeing activities through local and national partnership working, promoting the voices and views of people in later life. Externally evaluated interim findings demonstrate fit as a fiddle’s effective approach to activity; 300,000+ older people have engaged, increased levels of physical activity e.g. 33% increase in the amount of walking, and 71% increase in min spent undertaking strength and balance exercises. fit as a fiddle has been successful in reaching socially marginalised older people. 13% of participants engaged were from BME and faith communities, 6636 older men were engaged and 25% of participants were aged 80 and above. “It beats staring at 4 walls all day.” Engaging new

older volunteers has been a key outcome from fit as a fiddle. Currently 3500 older people have become fit as a fiddle volunteers, and this is an integral feature of the programme's success. Every role, from befriending to Zumba instructing, have been vital. This innovative, committed and locally driven programme has delivered huge impacts on older people's health and wellbeing. Developed new, innovative resources and approaches to participation and activity, and especially to those at most need. This is an opportune moment to share and discuss fit as a fiddle's lessons, learning and legacy with the world. **Keywords:** Mental Wellbeing; Health; Fit as a Fiddle; Innovation; AgeUK.

Being active—Staying safe

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People 85+ are some of the most vulnerable members of society and are the fastest growing segment of the population. Frailty with associated decreased functional abilities can isolate people. Being Active - Staying Safe was a project undertaken by 2 councils working alongside Northern Sydney Health Promotion. The target group was the isolated, cognitively intact, frailer aged, living at home, identified as having high falls risks. Lack of an appropriate exercise program, problems of access, lack of transport and costs were factors also identified. Venues were found, transport provided and a program delivered bringing people together to exercise and socialise. 82 people were recruited in 7 sessions with a maximum of 12 people per group. The mean age was 80+ and 90% female. Participants were assessed at the beginning and end of the program. 57 participants completed the program and undertook assessments. Measures taken were the Quick screen; FES; QOL; transport and attendee numbers; falls and medical history. Volunteers were recruited and trained to assist where needed. The program comprised of two 8-week sessions with a 4-week home program break between sessions. The first 8 weeks consisted of progressive strengthening training, balance, co-ordination and reaction time exercises to challenge physical and cognitive processes. The last 8 weeks built on the basics improving functional abilities and confidence levels as far as possible. The exercises were based from the Staying Active Staying Safe DVD and used for the home program. Relevant information concerning falls risk factors were included in the sessions. Physical abilities improved and falls risk factors reduced but the FES and QOL did not. It was observed that participants "opened up" and became more sociable during the program. Transport was a crucial element of the intervention to enable people attend the sessions. **Keywords:** Ageing Population; Falls and Medical History; Intervention; Exercise.

Enabling independence: The impact of a whole systems approach to re-enablement in South Ayrshire

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Emerging data indicates that the impact of re-ablement ensures increased levels of independence, supporting people to remain within their own homes and communities, in many cases with medium to longer term reduced levels of support. To maximise the benefits of such an approach re-ablement must not be seen in isolation, rather be developed in the context of a continuum of support through a whole systems approach in design and implementation. In South Ayrshire, the process of designing the "enablement" programme has been preceded by remodelling of Care at Home services. There has been a fundamental shift from high levels

of in-house provision towards greater use of services provided through the independent and voluntary sectors, whilst in-house provision has been tailored to meeting the demands of enablement and support of those with complex social and healthcare needs. The relationship between health, social care services and service providers is crucial to meeting individual need regardless of whether this is from acute, chronic, complex or progressive illness. To ensure greater flexibility in enabling choice in the continuum of enablement and self-directed support options, as part of the reshaping of care for older people, an environment which supports ease of financial environment is essential. Within this context, South Ayrshire Council and partners are working closely with the independent and voluntary sectors. Traditionally providers have been responsible for determining and purchasing their own training, in line with service requirements. However to achieve a consistent and effective service provision, partners have invested in a programme of joint training across all stakeholder groups, to ensure a whole systems approach to service redesign. Enablement and ongoing support needs, an individual may have, requires focusing on individual outcomes and maximisation of skills to support independence, regardless of who provides the support systems. **Keywords:** Care Homes; Independence; Flexibility; Natural and Built Environment.

Establishment of the Perth & Kinross Care Home Activity Network

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¹Perth Royal Infirmary, UK; ²Live Active Leisure, UK.

Established in 2010, the Perth & Kinross Care Home Activity Network (CHAN) supports local care homes to drive up their standards of care around the provision of meaningful activity. Meeting quarterly, the CHAN provides a forum for staff of the 25 care homes registered to network and share activity ideas/examples of best practice/resources and training. Those attending take the information back to their care home and share it with colleagues. By supporting each other the CHAN can ensure they are providing the best possible outcomes for residents. Between meetings, CHAN members communicate and an electronic forum is developed. All CHAN members have contributed to the planning structure including identifying its purpose and how to achieve it, compiling "commitment" forms with responsibilities and expectations, exploring communication channels both internally and externally and identifying training needs. This has ensured the CHAN is built on a solid foundation and maintains longer term sustainability. The CHAN's ultimate aim is to benefit the physical and mental wellbeing of care home residents and improve their quality of life. Being engaged in meaningful activity promotes self worth and gives meaning, purpose and enjoyment to each day. The CHAN reinforces the personalised, individualised outcome approach for each and every resident and reinforces that meaningful activity is the responsibility of all care home staff and should happen all the time, everyday activities is meaningful activity. Through increasing activity potential, residents are naturally encouraged to increase their physical activity. A range of fun physical activities are promoted including chair-based exercise, indoor Kurling, the interactive Wii, walks and gardening. Care homes engaged in the CHAN now independently organise their own inter-care home competitive events and a large "Go4Gold" games challenge event is planned in Perth this year with 50 homes invited to participate. **Keywords:** Care Homes; Go4Gold; Walking; Activity Network.

FALLS AND PHYSICAL ACTIVITY IN DEVELOPING COUNTRIES AND MULTIPLE ETHNICITIES SYMPOSIA

Invited lecture: Functional capacity and falls research in the context of aging in developing countries

Johnson, Shanthi

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Falls are a major threat to the health of older adults. In addition, many older adults have compromised functional capacities marked by indicators such as mobility limitations associated with increased rates of falls. While it has been estimated that seventy% of the world's older adults are and will be in developing countries, most of the research in the area of functional capacity and falls emerge from developed countries. As a result, considerable research gap exists in the context of developing countries. This presentation will highlight several conceptual and methodological challenges and opportunities for functional capacity and falls research through the analysis of publications in this area including the functional capacity, frailty, and falls studies in India. Specific attention will be paid to issues related to study design, sampling issues, definitions of constructs, measures, and data collection. Opportunities to promote culturally appropriate innovative research and to develop evidence-based health promotion strategies such as exercise program as well as falls prevention programs for older adults are discussed. **Keywords:** Falls; Mobility Limitations; Deprivation; Falls Research.

Aging attitudes are a predictor of physical activity among ethnically diverse older adults

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Physical activity levels have been shown to significantly influence functional autonomy and the risk of developing chronic conditions. Aging attitudes are also associated with both of these outcomes. Unfortunately, there is a lack of data available on the relationship between physical activity and aging attitudes. **Purpose:** To determine whether aging attitudes are a predictor of physical activity among an ethnically diverse group of older adults living in an urban center in Canada and to examine sex differences in this relation. **Methods:** Data from an ongoing intervention study were used for purposes of the current analysis. Participants were men (n = 30) and women (n = 136) between the ages of 55-85 who lived in low-income urban neighbourhoods in Toronto, Ontario. Upon recruitment to the study, all participants completed the Expectations Regarding Aging-12 (ERA) questionnaire, the Healthy Physical Activity Participation Questionnaire and provided demographic information. Linear regression analyses were performed using physical activity as the main outcome variable and ERA as the main exposure variable. Age, sex, marital status and education were controlled for in fully adjusted models. **Results:** Fully adjusted models accounted for 11% of the variance in the model that contained the overall sample, 17% in the model with males alone and 13% in the model with females alone. A significant ($p < 0.05$) and positive association between physical activity and ERA score (beta overall: 0.02; Males: 0.02; Females: 0.02) was found such that those reporting better aging attitudes had higher levels of physical activity. **Conclusions:** Better aging attitudes positively influence physical activity levels among ethnically diverse older adults. As such, aging attitudes should be targeted in interventions aiming to increase physical activity levels among older populations. **Keywords:** Ethnically Diverse Group, Urban; Sex; Aging Attitudes.

Does social participation matter for the elderly? An analysis of an aging community in Khuzistan province in Iran

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Increasing aged population (3.1%) compared with natural growth of Iranian population (1.2%) is a problematic issue. The literatures acclaim that physical disabilities and health problems in end life have significant relationship with social participation of aged. This study illustrates social participation in Iranian background, its factors and obstacles especially among aged. The scale of aged participation (SAP) constructed according to selected theories in 4 basic items and its 35 sub items. The community of the study is aged people in four selected cities of Khuzistan province/Iran: Ahwaz, Behbahan, Mah-Shahr, Dezful, and Abadan in 2010, and sampled 768 urban and rural elders. Findings have mentioned that social participation is low. It has significant relationship with burgess, high literacy, ethnicity, living with children, feminine, growth of welfare, having chronic disease of respiratory disorder, social alienation, cost of participation, reduction in benefits of participation, growth of their child's income. **Keywords:** Physical Disabilities; Social Participation; Ethnicity; Respiratory Disorder.

Issues in Philippine aging population (with comparative notes on Japan)

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Introduction: In developing countries, like the Philippines, identifying present issues and problems among older persons (OPs) are of significance to better address their needs (specifically on physical activity promotion and leisure) and as bases for institutionalizing directions and strategies. Further, learning from the experiences of advanced countries like Japan could assist leaders on the nature and content of programs toward active aging. **Methods:** Research situ was Sariaya Quezon (rural) and Quezon City (urban) with data gathered in 2009 on policies, activities and services (interview, ethnographic observations, visitations); leisure activities (questionnaire); functional fitness tests. Comparative notes on Japan applied similar methods (in 8 districts). **Results:** As primary source of care is the home Filipino OPs generally engage in light PA around one's abode with few communities providing for the leisure time needs of the OPs (generally social in nature due to lack of physical activity leaders). More involved in ADL the rural OPs have higher levels of functional fitness. Community services are centered on primary medical needs. Day cares and homes are available only to those who are financially independent. These and a dearth on information regarding different aspects of healthy lifestyle maintenance, limitations in active aging organizational process and structure in the Philippines are notable. In contrast, Japan (with its institutionalized policies and guidelines), varied programs and services to maintain and improve the quality of life of older persons in communities are realized. **Conclusion:** Population aging demands a national policy that should specifically state in its service delivery the need to institutionalize leisure education and leadership towards active aging. A holistic OP program with basic benefits and services from medical to recreational needs, IEC campaign and a coalition of stakeholders (with PA specialists) is needed. **Keywords:** Rural; Urban; Philippines; Quality of Life; Active Aging.

Social support and health status in an elderly population in Tehran, Iran

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As Iran started to experience population ageing, it is of great significance to consider and address elderly people's social needs and relationship, which might have direct impacts on their health and well-being. Little research has been conducted about the association of social support and health among elderly in Iran. **Methods:** This descriptive study was conducted to determine correlation of social support and elderly health. 180 elderly people were selected by a purposive sampling method. A questionnaire was used for data collection. This questionnaire included 3 parts: 1- socio-demographic characteristics; 2- social support scale; 3- Short Form-36(SF-36) Health Survey. Content and face validity was used in this questionnaire and reliability of the instrument was determined by internal consistency ($\alpha = 0.91$) and test- retest method ($r = 0.88$) respectively. **Results:** Results showed that the highest and lowest aspects of the SF-36 were social function and physical function respectively. Most subjects (74.4%) had good health and just 4.4% of them had poor health. Both genders had good family support and the men had better friend and significant others support than women. Generally, there were significant correlations between social support and all of aspects of SF-36 and vitality was the highest aspect of health. **Conclusion:** Findings showed that having social support is associated with better health and well-being among older adults. Understanding how social support may influence the health and well-being of older adult can benefit health professionals by informing intervention efforts to enhance social relationships, thus improving on current strategies that have focused on increasing support availability. **Keywords:** Social Support; Health; Wellbeing; Quality of Life.

Health services utilization and health practices among the older adults in India

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The purpose of the study was to examine the patterns of health services utilization and health promotion practices of older adults in India. The Kerala Aging Survey, conducted among more than 5,000 elderly (2271 men and 2722 women) in 14 districts using population-based epidemiological design, was the keystone of the study. The survey had detailed modules on various determinants of health developed around the World Health Organization's Determinants of Healthy Aging framework. The results of the Kerala ageing survey have shown that the age of participants ranged from 60 to over 100 years of age with 54% being women. The study showed that common health problems include: diabetes, heart disease, high blood pressure, and arthritis. In addition, falls and fractures were common. For medical needs, close to 40% accessed public hospitals and 56% used private hospitals. Most accessed public hospital for the free service provided whereas those who accessed private hospitals did so for the availability of better services, good care, and attention. In the study, only about 30% had routine medical check-up and over 80% were under regular medication. Health practices of the older adult population were also examined. Self-reported participation in physical

activity decreased with age. Approximately 60% of the young old (less the 70) participated in physical activities mostly in the form of household activities. Dietary patterns showed that most elderly consume three meals a day with a greater tendency for the older age groups to skip or miss meals. Also, the type of food changed from non-vegetarian to vegetarian as people aged and approximately 30% were on special diet such as diabetic diet or low salt diet. The results highlight the need for evidence-based programs and policies are needed to address the growing health needs and issues faced by the elderly in India. **Keywords:** Health Services Utilization; Health Promotion Practices; India.

Practical Workshops

YOGA FOR FALL PREVENTION

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Yoga is under-valued as a fall prevention intervention for older adults with fall risk factors. The purpose of this session is to present Yoga as a unique option for older adults to engage in exercise activity (ACSM, 2003). Exercise has been established as an effective intervention for older adults to improve many fall risk factors, particularly musculoskeletal impairment implicated in balance impairment (Tatum et al., 2009; Morris, 2008). Yoga, defined by the American College of Sports Medicine (ACSM, 2003) as exercise, is easily adapted to aging populations and can reap the benefits gained by other types of exercise; increased muscular strength and endurance, muscle flexibility and functional ability in the form of increased ability to engage in activities of daily living (ADLs). Yoga may also be responsible for increased mood states, increased feelings of efficacy and personal control, and improved cognitive functioning, perhaps in the form of increased attention (Bethany-Bonura, 2007). Yoga may be considered a biopsychosocial intervention, successful at reducing multiple fall risks (Morris, 2008). Yoga benefits the whole body; slowing the aging process by increasing breathing capacity and improving the range of motion for muscles and joints, stretching the spine, lengthening ligaments and muscles, correcting posture, improving sleep quality and decreasing depression. The practice of yoga includes breathing techniques, meditation, asanas (physical poses) and progressive muscle relaxation. A more gentle form of yoga is catching on with older adults – Chair Yoga. The yoga mat is replaced by the chair, sometimes two. “The chair is there for safety,” she said. “As a result, I am encouraged to try things because I know I am not going to be hurt.” It is not possible to prevent all falls, but we can limit the number that happen. **Keywords:** Yoga; Fall Prevention; Fall Risk Factors; Muscular Strength; Wellbeing.

OBTAINING THE BENEFITS OF TAI CHI PRACTICE THROUGH SINGLE POSTURE TAI CHI CHUAN (TCC) HEALTH AND FITNESS ROUTINES

Pearl, Mirilee.

Fitness for a Certain Age, UK.

The effectiveness of TCC practice for falls prevention and improvement of balance and leg strength is well documented. Many people enjoy practicing TCC because it involves their mind and breathing as well as exercising their muscles. Barriers to TCC practice include that a reasonable level of fitness may be required to perform the sequences and learning

them may take a long time and can be a frustrating experience. These barriers can be overcome in a studio/class session delivering individual real TCC postures performed as drills or practice routines. This is an active workshop with two objectives: firstly, to clarify the underlying principles involved in effective TCC practice; and secondly to demonstrate a series of individual postures that can be taught in a group and enables participants to gain the benefits of TCC practice without learning long movement sequences. The method is based on practice routines trained by Wu style TCC practitioners to explore and improve the accuracy and energy work of each posture. All movement is low impact; some includes moderate cardiovascular exercise and breathing drills (qigong). Teaching stresses the importance of posture and employing conscious intention to execute complex movement, e.g. turns, and weight transfers. Adaptations and progressions will be shown (including seated work) to enable the exercises to be inclusive for a spectrum of fitness levels. By the end of the session, participants will learn the underlying principles of correct TCC practice and will be able to perform a series of individual postures suitable to incorporate in existing exercise classes. Learning principles of TCC exercise provides a valuable transferrable tool applicable to many western studio and individual exercise settings. Participants may leave the session feeling relaxed and refreshed. **Keywords:** Tai Chi; Cardiovascular Exercise; Health and Fitness; Relaxation.

HOW TO GIVE EXERCISE ADVICE TO EVERYONE, AT ANY TIME: A CALL TO ACTION FOR HEALTH PROFESSIONALS EVERYWHERE!

Gates, Ann

Exercise Works!, UK.

EVERY patient, EVERY CONSULT should involve exercise advice and support. The evidence for why ALL health professionals should do this is clear: each neighbourhood, community, clinic, hospital, city and nation is facing the biggest health epidemic from non-communicable diseases (NCDs) or 'lifestyle' diseases our health care systems have ever faced. Exercise advice consists of a simple discussion and direction with a patient, and/or their relatives and carers: 'Regular exercise works extremely well in your disease condition (...insert: obesity, diabetes, heart disease, cancer, mental health, Parkinson's disease, osteoporosis, fibromyalgia, peripheral arterial disease.... you get the idea!). I would like you to start an exercise programme that includes 30 min of cardiovascular exercise on at least five days of the week. Start with brisk walking for maybe 10 min each day. I also want you to try a series of fun, strength, flexibility and balance exercises. These have been shown to be more effective than many hospital appointments or referrals to other health care professionals (see <http://www.youtube.com/watch?v=aUaInS6HIGo>). Some GPs and MDs are actually showing Dr Mike Evans viral YouTube video at this point! ... But now the important bit! When I see you in a month's time to review your medication, I am hoping that you will start to see an improvement in your health problem and overall health as a result of regular exercise. Here is a leaflet explaining some of the exercises I would like you to try'. EVERY health professional has the skills to ensure that the Chief Medical Officer or the Surgeon Generals advice for public health and health promotion on exercise within our communities is delivered and professionally 'directed'. Exercise Works! have developed a variety of strategic and grass roots interventions that help health professionals and patients embrace the concept of 'Exercise as a medicine' and help promote excellence in delivering physical activity advice. The workshop will be an opportunity for attendees to share best practice and promote discussions around how we can do better on helping patients to exercise to health.

FALLS MANAGEMENT EXERCISE (FAME) AND THE OTAGO EXERCISE PROGRAMME

Gawler, Sheena; Done, Sheila

Later Life Training Ltd, UK.

There is good evidence that tailored, specific exercise can improve postural stability and reduce other risk factors for falls and injurious injuries including osteoporotic fracture. It is essential, therefore, that Primary Health Care Teams and Social Services, ideally placed to detect individuals with a risk or history of falling, recognise the benefits of, and promote, referral into an appropriate exercise programme. FAME and Otago are both evidence based, published exercise programmes which have been specifically designed to improve postural stability and reduce the risk of falls. This session will give a brief overview of the evidence base and then take participants through the exercises and delivery of these exercises, including the tailoring of the exercises to suit individuals' needs and preferences.

PNF-CHI®: THE ART OF BALANCE

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¹Pnf-Chi, Portugal; ²Pnf-Chi, School of Health -University of Algarve, Portugal.

The emergent global health needs lead to a change on the paradigm of health intervention. New concepts/techniques may provide a good way of addressing these issues. Pnf-Chi® is a global approach to physical exercise. It is a low impact exercise, inspired in some principles of tai chi chuan and PNF (Proprioceptive neuromuscular facilitation), following the normal pattern of human movement combined with breathing. Pnf-Chi® was created by physiotherapists experts in wellness and health promotion, having therefore a strong clinical input, and based on the available scientific evidence from areas such as kinesiology or exercise physiology. Strongly focusing on body awareness, balance and motor coordination, its characteristics make it very adaptable for the aging population. Since 2003, Pnf-Chi® classes have been gradually implemented in Portugal. After some successful pilot interventions with smaller groups of participants, Pnf-chi was the selected physical exercise form to be implemented in a major community research-action project developed in the field of health promotion directed toward the Azorian senior population. Counting with more than 1000 community-dwelling participants it was the biggest project of its kind ever to take place in the Azores (Portugal). The overall impact of the first edition was very positive which re-enforced the Azorean regional government commitment to support the second edition (starting on February 2012). Contents of the workshop: Part I: -General presentation of Pnf-Chi®; -Concept; -Principles; -Benefits; -Fields of intervention; -Research studies and community intervention projects. Part II - Practical Pnf-Chi® Session. **Keywords:** Physical Exercise; Health Promotion; Balance; Tai Chi; Neuromuscular.

INTRODUCTORY OSTEOFIT PROGRAM PROVIDES EFFECTIVE EXERCISE PROGRAM FOR SENIORS IN ADULT DAY PROGRAM SITES

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¹Fraser Health Authority, Canada; ²BC Women's Hospital & Health Centre, Canada.

Background: Adult Day Programs (ADP) present the perfect setting for providing exercise programs to improve the clients' functional ability. Yet, most ADP staff are not trained to deliver a safe and effective exercise program for frail seniors. As a consequence, exercise programs at ADP sites are seated and done without any progression or not designed to

safely manage frail seniors. Therefore, this project aimed to fill a gap by training ADP staff to deliver a specialized exercise program for frail seniors. Due to its falls prevention focus, education components, and safety, OSTEOFIT, a program of BC Women's Hospital & Health Centre was selected as a model to be adapted as a low level program for frail seniors. **Goal:** To educate staff to deliver a standardized, safe and effective physical activity program to clients attending Day Programs for Older Adults. **Implementation:** In order to be certified, staff had to complete an online theory fitness course and attend three days of in-classroom instructions. Subsequent to that, staff conducted a 10-week exercise program including pre and posttests (Timed Up and Go, 5X sit to stand, and 4-meter walk). **Results:** There were 12 staff trained from 11 ADP sites. Pre and post measurements were acquired from 129 participants. Results showed that 57% of participants improved and 26% remained the same on the TUG test, 52% improved and 24% remained the same on the 5X Sit to Stand test, and 70% improved and 14% remained the same on the 4 meters walk. All staff reported the program was useful to their job and recommended this program to other ADP sites. **Keywords:** Osteoporosis; Training of Professionals; Physical Activity; Measurement of Activity.

IMPLEMENTATION OF AN OTAGO EXERCISE PATHWAY FOR FALLS PREVENTION IN COMMUNITY/PRIMARY CARE

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Encouraging older adults to become more active and maintain that activity is critical to the promotion of their health and well-being. There is increasing evidence that exercise programmes including specific strength and balance exercises can significantly reduce the occurrence of falls (Sherrington et al., 2011). However, encouraging older adults who have experienced a major health issue to maintain exercise after rehabilitation is difficult. This workshop discusses the implementation and evaluation of a pathway from NHS delivered falls and fracture rehabilitation through to maintenance in community based exercise classes. It will also discuss a new initiative which places the pathway within GP practice. This evaluation aims to recruit all participants (N = 70) who will have attended NHS Rehabilitation and then Community Otago exercise programme over a 6 month period of time. Three programs in the community will run simultaneously for 3 months, followed by the second cohort of participants. Data collection: 1. Functional maintenance/improvement collected through validated assessment tools (Confbal, Timed Get up and Go) at baseline and 3 months (at the end of the intervention). 2. Long term adherence collated by asking older adults to keep home exercise diaries after the Otago program has been completed and by monitoring transition to the community Active Always program. Instructors delivering the Active Always program are those who deliver the Otago programme. 3. NHS records will be used to assess whether the programme has contributed to preventing patients re-accessing rehabilitation services and the patient journey after the Otago programme will be monitored (including hospital admission due to falls). 4. Focus groups/one to one interviews offered to assess satisfaction and experiences. The process of implementing the pathway and preliminary results and impact of results for commissioning and practice will be presented and discussed.

BALANCING YOUR BODY AND COGNITIVE FUNCTION

Furtado, Sofia; Silva, Celso

Archeopraxis, Portugal.

This workshop will cover exercises that stimulate the sensorimotor function and also a superior level of cortical integration. These exercises could contribute to fall prevention. The

use of unstable surfaces, as well as resistance training bands alongside oral information to stimulates the “neuromotorcognition” control. The exercises will be done individually, in pairs and as a group. The stimulation of postural control using anteroposterior and mediolateral oscillations, with open eyes and closed eyes, will be take part of this workshop. Factors such as coordination, body awareness, special orientation and velocity of reaction will be taken in account as important psychomotor stimulation. The workshop session will be divided into two parts: Oral introduction with the scientific fundamentals of the method, followed by warm up, specific exercises, cool down. **Keywords:** Balance; Cognition; Sensory-Motor Function; Fall Prevention.

ADVANCING WHOLE-PERSON WELLNESS FOR OPTIMAL AGING: EXAMPLES OF SUCCESSFUL INITIATIVES IN SENIOR LIVING AND COMMUNITY SETTINGS

Rose, Debra; Montague, Jan

California State University, Fullerton, United States.

To implement a whole-person wellness approach for optimal aging requires knowledge, understanding, a radical shift in thinking, operational planning and evaluation. During this workshop, we will define the whole-person wellness approach, describe the evolution of the whole-person wellness model’s intentional emphasis on proactive living, present research evidence that provides support for a whole-person wellness approach, and discuss behavior-specific attitudes, language, and techniques that support and enhance whole-person wellness. Participants will learn how to build a culture of wellness as it relates to the people, practices, and environments of different organizations. Finally, examples of whole-person wellness initiatives that have been successfully implemented in senior living and community settings will be described. Particular emphasis will be placed on providing workshop participants with strategies for marketing, developing appropriate program content, and tracking whole person wellness outcomes (i.e., individual and organizational) in both types of settings. **Keywords:** Wellbeing; Quality of Life; Optimal Ageing; Natural and Built Environment.

CHARACTERISATION AND STANDARDISATION OF EXERCISE INTERVENTIONS IN AN OLDER ADULT EXERCISE TRIAL (PROACT65+)

Gawler, Sheena¹; Skelton, Dawn A²; Dinan-Young, Susie¹; Morris, Richard¹; Iliffe, Steve¹.

¹ *University College London, UK;* ² *Glasgow Caledonian University, UK.*

Background: The ProAct65+ trial is a multicentre cluster RCT comparing 2 exercise interventions, the Otago Home Exercise Programme (OEP) and Falls Management Exercise (FaME), with usual care, in patients aged 65 and over. The study has recruited over 1200 participants through GP practices in London and Nottingham, 400 of whom are in each of the exercise arms. Both exercise interventions have a robust research background in falls rate reduction, reducing falls by 35% (OEP) and 65% (FaME) respectively. Trained staff are required for intervention delivery; Postural Stability Instructors (PSIs) for FaME and, in ProAct65+, Peer Mentors (PMs) for OEP. The use of PMs to support OEP participants is novel. **Aims:** To characterise the difference between the original interventions and those used in ProAct65+, as well as describing fluctuations in the standardisation of interventions in ProAct65+. This will be followed by a workshop allowing delegates to experience the specific ProAct65+ FaME progressions. **Methods:** A descriptive comparison of the intervention design and content was carried out between the original OEP and FaME trials and those used in ProAct65+. Additionally, an analysis of ProAct65+ OEP and FaME intervention

characteristics was carried out, including season, PSI/PM demographics such as gender and age, PSI/PM 'quality', exercise dose, dose of PM support (telephone calls and home visits) and exercise progression. **Results:** The differences in intervention length, progression, patient contact time and adherence support strategies between ProAct65+ OEP and FaME and original OEP and FaME are substantial. The specific ProAct65+ progressions will be experienced practically in the workshop. **Discussion:** Exercise interventions designed to reduce falls have been adapted to be used as interventions to increase activity in older people who are not necessarily fallers. Independently of this, exercise interventions are not easily amenable to standardisation. The potential implications of exercise standardisation challenges in both research and falls exercise services will be discussed as well as effective use of evidence-based progressions.

Posters

BASIC STEPS: A TRAINING AND RESOURCE FOR STAFF WORKING IN RESIDENTIAL CARE

Castell, Patricia S

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'Basic Steps'© is a falls prevention and physical activity training program for staff who provide activity programs for less active and frailer older people living in residential care facilities. It was developed by the Northern Sydney Health Promotion unit. The training program provides the underlying knowledge and skills to assist staff apply the appropriate strength and balance 'exercise prescription' within their classes and to assist with any new classes being developed. **Method:** 'Basic Steps' was presented as a 3 hour, face to face training session for residential care staff such as Diversional Therapists, Activity and Recreation Officers. 21 residential care settings received the training with 255 staff attending. It comprises of a theoretical base with accompanying practical exercise application to maintain the functional abilities required to reduce the risk of falls and related injuries. The training includes some falls prevention concepts from the 'Fall Proof'© training program and uses the NSCCH 'Staying Active - Staying Safe'© exercise resource format as the base for the exercises. **Results:** Evaluations were conducted at the initial training and after 3 months. 82.4% found that the training was excellent to good, with 78% reporting they could apply the information in their work situation. The training program was well accepted by the organisations involved. It was found to be informative and easy to implement and an increased uptake of appropriate exercise programs in the facilities was reported. Other facilities requested the training for their staff to upgrade their knowledge and skills. A CD/DVD resource and training manual has been developed as a result of these requests to enable this program to continue without the need for face-to-face training and to extend the program to more areas. **Keywords:** Residential Care; Health Promotion; Fall Risk; Training of Professionals.

IMPROVED INPATIENT FALL RISK ASSESSMENT IN ELDERLY ACUTE PSYCHIATRIC WARDS IN INSTITUTE OF MENTAL HEALTH, SINGAPORE

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Introduction: Falls are a common problem among older adults with higher prevalence in healthcare settings due to factors such as health conditions, medications and ward environ-

ment. In our Elderly Psychiatric wards patient's fall risk was being assessed using screening tools, administered by nurses on admission. This process lacked the required specificity to exclude patients not at risk of falls thus making the risk assessment less meaningful. **Methodology:** Accurate assessment of fall risk is crucial to offer person centred care. We observed that not incorporating functional mobility assessment was resulting in over inclusion of patients at fall risk. We enhanced the assessment process by including physiotherapy assessment of mobility and balance. **Results:** With the inclusion of Physiotherapy assessment, there is a reduction in the number of patients identified to be at fall risk by 40% compared to the previous nursing assessment alone. We believe that this is a fair representation of patients at fall risk given that the assessment is done by trained physiotherapists. 2. There was no difference in the average number of falls when compared to earlier screening. 3. With the improved detection of fall risk, nurses on average save 30-45 min of their total shift time due to reduction in unwanted observations and documentation practiced earlier. **Conclusion:** 1. The enhanced screening approach appears to be more accurate and safe in identifying patients at fall risk. 2. With enhanced physiotherapist input, patients are receiving education on falls risk management and benefiting from exercise and increased use of walking aids. 3. From a care delivery perspective, we optimized the utilization of skill resources such as of physiotherapist and nurses to improve quality of care and therefore patient and staff satisfaction. **Keywords:** Fall Risk; Screening; Assessment, Training of Professionals.

BALANCE AND MOBILITY IMPAIRMENTS IN INSTITUTIONALIZED ELDERLY: THE ROLE OF PHYSICAL EXERCISE FOR PREVENTING FALLS—AN ACT ON AGEING STUDY

Mulasso, Anna; Roppolo, Mattia; Magistro, Daniele; Liubicich, Monica Emma; Ciairano, Silvia; Girelli, Laura

University of Torino, Italy

Background: falls are considered one of the most common and serious problem for the elderly (American Geriatrics Society, 2001) resulting in a strong economic impact for community and society (WHO, 2007). A moderate physical exercise may reduce gait and balance impairments in older people lowering the risk of falls and falls-related injuries (Gregg et al., 2000). **Aims:** (1) To assess the effects of a physical exercise on mobility and balance; (2) To investigate the possible mediation role of balance in the relation between participation in a physical training and mobility. **Methods:** the study involved 77 subjects (16 men and 61 women, mean age of 83 ± 7 years) living in six residential care facilities in Piemonte. At baseline, the experimental (EG) and the control group (CG) were homogeneous for the variables under study. The EG participated to a biweekly aerobic training lasting 4 months. We collected baseline and post-test measurements for Tinetti Assessment Tool (Tinetti, 1986) and Timed Up and Go Test (TUG – Podsiadlo and Richardson, 1991). Data were analyzed with Mann Whitney U test, Effect Size (ES), linear regression and Sobel's formula. **Results:** (1) Physical exercise produced a statistically significant increase in balance ($p = .004$; $ES = .24$) and mobility ($p = .01$; $ES = .29$) in the EG. (2) The analysis showed a significant main effect between participation in a physical training and mobility ($p = .004$; $R^2 = .43$). Balance played a significant role as a mediator ($p = .00$; $R^2 = .58$), whereas the predictor lost of significance ($p = .06$; $R^2 = .24$). The R^2 changed from .18 to .49 after the introduction of the mediation variable. The model was fully mediated ($p = .01$; Sobel $z = 2.57$). **Conclusion:** our findings suggested, firstly, the positive effects of physical training on motor abilities such as balance and gait in frail elderly with consequent reduction of falls risk (Lin et al.,

2004) and, secondly, the mediation role of balance in the relationship between intervention and mobility. **Keywords:** Balance; Mobility; Physical Exercise; Gait; Intervention.

FEAR OF FALLING IN ACTIVE AND SEDENTARY ELDERLY

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¹Brazil; ²UNESP, Brazil

According to demographic projections, 33 million Brazilians will be older than 60 years in 2025. It has been suggested that elderly people present reduced ability to control their posture, which may predispose them to increased risk of falling. Fear of falling and avoidance of activity due to fear of falling are common in older people, both in fallers and non-fallers. Habitual exercise counteracts the restrictive effects of the fear of falling on activities. **Objective:** investigate the fear of falling in active and sedentary elderly. **Methods:** were evaluated 64 community-dwelling elderly of city of Marilia, São Paulo, Brazil, divided in two groups: the first group included elderly who performed regular physical activity (AG), and the second group, those who did not perform physical activity (SG). The fear of falling was assessed by Falls Efficacy Scale International (FES-I). The association among the parameters was done by Fisher's exact test and the comparison between groups was done by Mann-Whitney test. Significance was set at 5% level. **Results:** The averages ages of the participants were 71.6 ± 5.1 years and 71.1 ± 4.6 years for sedentary and active groups, respectively (p = 0.69). FES-I values were found to be 29.47 ± 10.4 for the active group and 27.36 ± 10.6 for sedentary group (p = 0.31). When compared the values of FES-I among the groups considering the cut-points to differentiate between low and high concern (16–22 and 23–64, respectively), was not found significant difference (p = 0.07). **Conclusion:** the practice of exercises didn't interfere in the fear of falling in elderly, probably because the fear for falling is associated with psychological and behavior factors and not only with physical factors. **Keywords:** Fear of Falling; Sedentary; Active; Elderly; Psychological Factors.

ASSESSMENT OF FUNCTIONALLY ORIENTED EXERCISE REGIMENS AIMING TO REDUCE OVERALL RISK OF INCIDENTAL FALLS

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Background: Swelling proportion of the elderly in society requires adequate medical care and complex assistance in multiple functional deficits of daily living, consequently overstraining public health service resources, which prompts a quest for easy-to-apply and cost-effective systemic solutions. **Aim:** To determine whether specifically structured, intensive exercise regimens, might improve and help sustain individual muscle strength and mobility, with a view to reducing risk for incidental falls and ultimately preventing an uncontrolled slide into care-dependency. **Methods:** The randomised, 6-month clinical trial embraced 112 elderly nursing home residents with a history of recurrent falls (F 82, M 30; mean age 81 years), randomly split into three equal-sized groups: Group I - progressive resistance exercises (PRE) + functionally-oriented exercises (FOE), Group II standard exercises (SE) + FOE, Group III - SE + PRE. The subjects' muscle strength was assessed with a dynamometer, whereas their individual functional capabilities with the 6MW and Tinetti's POMA tests, respectively. **Results:** Despite short duration of the study significant differences in muscle strength were noted both in favour of Group I and Group III (p = 0.02; p = 0.05; respectively), although not

translating directly into perceptible improvement in individual functional capabilities. Notable improvements in individual mobility were reported in Group II and Group III ($p = 0.005$), although with no impact on individual muscle strength. **Conclusion:** Only a multi-factorial intervention, i.e. functionally oriented exercise regimens, may appreciably improve overall functional status in the elderly in terms of reducing overall risk for sustaining incidental falls. **Keywords:** Muscle Strength; Mobility; Functionally Oriented Exercise; Fall Risk.

THE ASSESSMENT OF FUNCTIONAL CAPABILITIES AND INDIVIDUAL PROPENSITY FOR FALLS IN ELDERLY WOMEN UNDERGOING BREAST CANCER TREATMENT

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Background: The swelling proportion of women in an aging population, accompanied by an increased incidence of breast cancer and its successful treatment, prompts the need for assessing individual post-treatment functional capabilities and overall risk of sustaining incidental falls in this subgroup. **Aim:** The assessment of functional capabilities and individual propensity for incidental falls in the women over 65 years of age undergoing breast cancer treatment. **Methods:** The study embraced 107 women aged 65 - 84 (mean age 71 years) undergoing breast cancer treatment in the Holycross Cancer Centre, Kielce, Poland. Individual functional capabilities were assessed with the aid of the "Eight foot up & go test" and Tinetti POMA test, whereas a potential risk of fall was probed with a questionnaire addressing in detail the number of recently sustained falls and all attendant circumstances. **Results:** The scores achieved by the subjects in the "Eight foot up & go test" exceeded by 3.90 sec. - 1.90 sec. the reference values of the Senior Fitness Test for all respective age categories. The Tinetti POMA test results revealed that ca. 10% of the subjects scored below 19 points. Depending on the respective age categories, within one year of concluding the cancer treatment ca. 20% - 30% of women sustained incidental falls. **Conclusions:** The functional capability scores achieved by the elderly women undergoing breast cancer treatment failed to match the respective reference values for their age categories. They also proved equally prone to sustaining incidental falls as their non-treated peers. **Keywords:** Breast Cancer; Fall Risk; Functional Capability.

DANCE AS THERAPEUTIC INTERVENTION FOR FALL PREVENTION AMONG COMMUNITY DWELLING OLDER ADULTS

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Purpose of the study: The main purpose of the current study is to examine effects of dance as therapeutic intervention on the risk of falls among community dwelling elderly living in Minneapolis, Minnesota. **Methods:** Participants A total of nine subjects were recruited by the primary researcher and dance instructors at Karios Dance Theatre for the present study from the adult care center of the Walker Senior Care Services located in Minneapolis city in Minnesota. Instrument SAFFE (Survey of Activities and Fear of Falling in the Elderly) was employed to assess fear of falling and avoidance of physical activity for quantitative analysis. In addition, interview questions were developed for qualitative analysis of data and

one on one guided interview was conducted by primary researcher. **Findings:** Analysis of MANOVA reveals that there was no significant difference across all areas of SAFFE. This may be due to the small samples and more importantly, possibly due to nature of dementia which most of the participants exhibit to some degree. However, the study analysis did find some positive effects of the program by conducting qualitative analysis of interview data collected in multiple repetitions of the program. A primary researcher reviewed the interview data isolating meaning units of text. One member of the research team then reviewed all data to ensure all individual meaning units were identified. To categorize responses into themes, the data were then analyzed by employing thematic content analysis (Smith, 1992). The data were categorized into the following three themes: functional improvement (physical and cognitive), decreased fear of falling, and increased socialization. **Keywords:** Dance; Intervention; Dementia; Functional Improvement; Falls.

MULTIFACTORIAL INTERVENTION TO REDUCE FEAR OF FALLING AFTER A HIP OR PELVIC FRACTURE: MODULES, MANUAL AND WORKSHEETS

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Hip fractures are one of the most serious consequences of a fall amongst older people. Fear of falling, self-efficacy and perceived control may be important factors in the recovery from hip fracture. While there is some evidence for cognitive-behavioural interventions in community-dwelling older people (e.g. "A matter of balance"; Tennstedt et al., 1998), there is little evidence about FoF interventions in patients after hip fracture. The presented ongoing intervention is one of the very first interventions that evaluate the combination of exercises and cognitive behavioural elements across settings. Within 8 additional face-to-face sessions during rehabilitation, one home visit, and 4 telephone calls after discharge the multifactorial intervention comprises the following modules: *Relaxation techniques*-Depending on his preference the patient is taught in one out of two relaxation techniques. Each patient is provided with a MP3 player and a headphone to listen to the instructions between the sessions himself. *Mobility goals*-The early sessions focus on identifying meaningful areas of life and related mobility goals. *Fall-related cognitions and emotions, critical situations*-This module focuses on the evaluation of attitudes regarding falls, strategies to prevent falling and fear of falling. *Individual physical exercise programme for home-based training* - Based on the mobility goals an individual strength and balance exercise programme is being built up during intervention. *Implementing physical exercise programme and activities in daily life*- Individual motivation strategies are developed to encourage subjects to continue with exercising independently after discharge as well as to reuptake activities in daily life. *Fall hazards* - At the home visit the patients are supported to identify and encouraged to eliminate fall hazards. The modules, manual and worksheets of the ongoing randomized controlled trial will be presented. **Keywords:** Fractures; Falls Prevention; Fear of Falling; Mobility.

MOTOR LEARNING TRAINING IMPROVES DUAL TASK PERFORMANCE IN PEOPLE WHO HAVE THE FEAR OF FALLING

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Background: fear of falling make us to concentrate focus of attention in body movements (an internal focus) and as a result walking is not automatic anymore. Several reports suggested

that only an external focus of attention (directed at the movement effect) facilitate automatically in motor control, which promotes movement efficiency and gives us the possibility to perform a second task during the walk. The dual-task test is specific tool that estimate walking performance under a concurrent cognitive activity. It is possible to assume that it can be used as training instead of a more complex intervention. We took into consideration the verifying effectiveness of dual task and our motor learning training method to improve gait and balance in people who have the experience of falling and the fear of falling. **Methods:** in order to carry out our research we have created two different groups: control group (CG) and experimental group (EG) with the same standard of age, gender, number of previous falls. 32 subjects aged 67-85years were recruited in each group. The (CG) to have one hour of ordinary gymnastics twice a week for 3 months, using a dual task. The (EG) also had been submitted to the same hour of special experimental gymnastics twice a week. **Results:** all participants showed an improvement in all tests. We present the average values obtained after our work: (EG): Tinetti test - 1.53, TUG - 11.2%, the speed of the normal path - 8.6%, the walking speed during the execution of the cognitive task (dual task1) - 16.9%, the walking speed during execution of the motor task (task2 dual)- 14.5%. (CG): Tinetti test - 1.1, TUG- 7.4%, the speed of the normal path - 5.7% , the walking speed during the execution of the cognitive task (dual task1) - 9.7%, the walking speed during execution of the motor task (task2 dual) -9.5%. **Conclusion:** our method is demonstrated to be more effective than dual task in improving walking performance under a concurrent cognitive activity. **Keywords:** Dual Task; Walking; Cognition; Fear of Falling; Intervention.

FALLS PREVENTION STRATEGIES IN PLACE IN CANADIAN LONG TERM CARE FACILITIES

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Falls are a major threat to the health of older adults. Compared to older adults who live in the community, residents of long-term care (LTC) facilities fall 2 to 4 times more often, and are twice as likely to injure themselves. While many LTC facilities are located in rural areas, falls and injury prevention literature is predominantly urban-centric. As such, this study examined the rural-urban differences in the falls prevention strategies involving 79 LTC facilities (of a possible 118 facilities) in Saskatchewan and using key informant telephone interviews of the Director of Care or alternate. The interview guide encompassed facility information, profiles of interviewees, and fall- intervention strategies currently in place in the facilities. Approximately 65% of the participating facilities were located in rural areas, while the remaining facilities in urban locations (approximately 35%) and the size of the facilities ranged from four to 270 residents (ave = 54). The majority of interviewees were female (90%) and had a nursing background (67%). The facilities were generally similar except for statistically significant differences in the size of the facility (ave = 35 beds in rural vs. 90 in urban areas) and length of operation (ave = 29 years in rural vs. 36 urban). In total, 84% of all facilities surveyed stated that falling was a concern and there were no statistically significant regional differences. Several falls prevention strategies were adopted by the facilities with the use of assistive devices, environmental modification, medication review and clinical assessments being the most common. Exercise as a falls prevention intervention showed the greatest rural-urban differences. However, there were no statistically significant regional differences in the falls prevention strategies in place in LTC facilities. The study highlights the need to promote promising and effective falls prevention strategies in rural as well as urban contexts. **Keywords:** Falls Prevention; Care Facilities; Rural; Urban; Canada.

COMPREHENSIVE CARE ENHANCES SELF-CARE ABILITY AND DECREASES EMERGENCY ROOM VISITS FOR OLDER TAIWANESE PATIENTS

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Background: Little evidence is available on the effects of intervention models containing both hip fracture-specific care and management of malnutrition, depression, and falls. Whether a comprehensive approach is more beneficial to older patients with hip fracture is still unknown. **Objectives:** To explore the 2-year effects of an interdisciplinary, comprehensive care program for elderly patients with hip fracture. **Methods:** A Randomized experimental design was used. A 3000-bed medical center in northern Taiwan. Patients with hip fracture (N = 299), randomized to three groups: comprehensive care (n = 99), interdisciplinary care (n = 101), usual care (control) (n = 99). Usual care included only 1 to 2 in-hospital rehabilitation sessions without in-home rehabilitation, discharge planning, geriatric assessment or consultation. Comprehensive care integrated interdisciplinary care, which included geriatric consultation, continuous rehabilitation, and discharge planning, with nutrition consultation, fall prevention, and depression management. Patients' self-care ability was measured as performance of activities of daily living (ADLs) and instrumental ADLs (IADLs) using the Chinese Barthel Index and Chinese version of Lawton and Brody's (1969) IADL scale, respectively. Outcomes were assessed at 1, 3, 6, 12, 18, and 24 months following hip fracture. **Results:** During the first 2 years following hip fracture, patients in the comprehensive care group had better performance trajectories for ADLs and IADLs, and fewer emergency room visits than patients in the usual care group. Comprehensive care did not significantly affect patients' mortality rates and hospital readmissions. **Conclusion:** Comprehensive care may improve self-care ability and decrease emergency room visits for elders up to 2 years after hip-fracture surgery. Our results may provide a reference for health care providers in countries using similar programs with Chinese/Taiwanese immigrant populations. **Keywords:** Fractures; Health Care Professionals; Comprehensive Care.

ANTICIPATORY AND COMPENSATORY POSTURAL ADJUSTMENTS IN THE ACTIVE ELDERLY SUBMITTED TO DISTURBANCE OF THE LATERAL POSTURE

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With advancing age, the human body suffers functional changes, which lead the postural instability in elderly people. And an important factor in this, are linked to the inappropriate uses of postural adjustments strategies: anticipatory postural adjustment (APA) and compensatory postural adjustments (CPA). Therefore, the aim of this study was to investigate the APAs and PCAs and their inter-relationships in groups of elderly (20 and 20 with and without falls) and 20 young subjects. The electromyography activity (EMG) of lateral ventral and dorsal postural muscles by recording, in four time windows (APA1, APA2, APC1 and APC2) typical for these reactions, and displacement of body center of pressure (COP). The postural disturbance occurred in the medial-lateral direction, through the impact of a pendulum on the right shoulder of individuals under two conditions: unpredictable and predictable. The results showed significant differences between time windows APAs and CPAs. During the

unpredictable condition, the activity of APAs did not occur, with the extensive activity of APCs. In the predictable condition, occurred APA activity with less activity APCs to the trunk and leg muscles. The elderly groups with and without falls had, in general, smaller amplitude activation (JEMG) of the PCAs to the studied muscles in both conditions. The elderly showed changes in the pattern of synergistic lateral muscles compared to the group of young individuals. There were wide movement of the COPy and COPx in the elderly with falls and young groups respectively. In general, the elderly showed changes only in the compensatory adjustments, mainly to the muscle (gluteus medius) which may make the elderly susceptible to falls. Based on the results, research and training programs/training or treatment designed to restoring balance in the elderly enhancing the activation of the gluteal muscle should be developed. **Keywords:** Postural Instability; Compensatory Adjustments; Anticipatory Adjustments; Disturbances.

INSTITUTIONALIZED ELDERLY: FALLS AND FEARS

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Introduction: Institutionalized elderly falls 30 to 50% per year (Tinetti, 1987). Fear of falling (FoF) -ptophobia- seems to be associated with previous falls history, however this is multifactorial (Legers, 2002; Zilstra, et al., 2007). Physical activity (PA) was basal in FoF and falls decrease, yet FoF can be seen as a barrier to PA and consequently induce more independence. **Objectives:** This study has the following objectives: to quantify FoF; relate FoF with other variables (sex; number of falls; participation in PA programs and institution) and identify if FoF is a barrier to PA practice. **Methodology:** The sample is composed by 13 institutionalized elderly (32 men and 81 women) with aged between 65 and 97 years-old. Is a quantitative study and questionnaire was used to collect the sample. The FoF evaluation was performed by fitting Falls Efficacy Scale 'C Portuguese version by Melo (2003). Data were analyzed by SPSS, version 13.0 and was used descriptive statistics and study of the mean difference. **Results:** Elderly people have on mean between 'same' and 'little' FoF in 10 daily situations (6.82 ± 2.94). FoF was only considered by one person as a barrier to PA practice. The variable 'Evaluation scale of FoF' has statistically significant differences ($p > 0.01$) for the variables, 'Sex', 'Fall' and 'Institution'. **Discussion/Conclusion:** Such as Tinetti (1994) our results showed that although elderly has FoF in daily activities, this doesn't extend to PA practice. FoF is superior in female, proven by others studies and corroborated by this. Elderly with previous falls seem to have more probability to have FoF. This relationship was identified by many studies too. FoF seems to be influenced also by institution but not influenced by participation in PA, that wasn't expected, because PA practice is associated with more balance and less FoF. **Keywords:** Fear of falling; Falls; Elderly; Institutionalization; Physical Activity.

TELEHEALTHCARE IN CARE HOMES TO REDUCE FALLS

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It is estimated that 20% of unscheduled admissions to hospital with hip fracture are from care homes. Our aim was to utilise appropriate telehealthcare equipment to reduce the number of falls. Telecare products are not new but the range of telecare equipment available has been extended and is smarter. Telecare products monitor people at risk, improving their safety

and helping them to stay independent for longer. A fractured hip costs the National Health Service between £15,000 and £25,000, a bed monitor costs around £300. This feasibility study evolved as it was felt that traditional methods of falls reduction were not effective i.e. visiting care homes and doing education sessions. This was not effective due to the transient nature of care home staff and difficulties of engaging them in a short session. Telehealthcare would be effective as the care home staff would recognise the equipment as easing their workload. Care Home residents are changing and they have increased care requirements, dementia problems are more prevalent and they have more co morbidities. The results show on average a 37% reduction in falls. This represents a significant cost reduction to the NHS. Quality of care provided is improved as staff can intervene more quickly. Residents and staff also report increased confidence with mobility for those residents with falls detectors as they feel safer and reassured knowing they will be found quickly if they have a fall. This supports Releasing Time to Care as routine checks are no longer required. This has proved particularly valuable overnight as residents are no longer disturbed by two hourly checks and staffs are freed up for other tasks. Residents also value the increased privacy as there is less routine monitoring required. Telecare can be an effective way to assist in the overall management of falls for care home residents. Its use should be considered as part of residents overall care needs and as part of a multi-factorial falls risk assessment. **Keywords:** Fall Risk; Hospital Admission; Technology; Fractures; Care Home.

THE INFLUENCE OF PERSISTENT PAIN ON FALLS IN OLDER PEOPLE

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It is known that older people with persistent pain are more likely to fall if they have pain in two or more joints. The reasons for this appear complex so this study explored what older people themselves thought about the link between pain and falls and their experiences of them. People over the age of 65 years living in the wider community who have had persistent pain for at least 3 months and who have fallen at least once in that time, have been invited to take part. A phenomenological approach to gain insight into older people's experiences has been adopted. **Keywords:** Pain; Joints; Falls; Older People.

EFFECT OF STRONTIUM RANELATE ON VERTEBRAL PAIN SYNDROME AND FUNCTIONAL ABILITIES IN POSTMENOPAUSAL WOMEN WITH OSTEOPOROSIS

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Aim: To evaluate the effect of strontium ranelate in treatment of systemic osteoporosis in postmenopausal women. **Materials and methods:** There were examined 894 postmenopausal women with systemic osteoporosis (average age $59,97 \pm 10,57$ years, average height $161,82 \pm 7,09$ cm, average weight $71,32 \pm 13,44$ kg). Evaluation of pain syndrome and level of physical activity was carried out with visual analogue scale (VAS). Examination was performed before onset of treatment and after a four, eight and twelve month treatment course. Strontium ranelate (Bivalos, «Servier») was taken in a dose of one 2 g sachet as a

suspension in water once a day and 1 tablet of Calcemin-advance (Calcium – 500 mg, Vit. D – 400 IU) 2 times a day during 12 months. **Results:** The patients had the risk factors of osteoporosis: 28% of patients had osteoporotic fractures in their anamnesis; 17% – hip fractures in mother or father of patients, 12% – smoking, 8% – alcohol abuse, 27% of patients have taken corticosteroid tablets for more than 3 month. We observed a reliable decrease of vertebral pain syndrome (after treatment – 2.97 ± 0.77 , after four months – 2.24 ± 0.85 , after eight months – 1.61 ± 0.94 ; after twelve months – 1.24 ± 1.04 ; $p < 0.00001$) and increase of functional abilities of patients (after treatment – 1.50 ± 0.67 , after four months – 2.08 ± 0.52 , after eight months – 2.67 ± 0.53 ; after twelve months – 2.88 ± 0.63 ; $p < 0.00001$). **Conclusion:** It has been demonstrated that strontium ranelate treatment significantly decreases pronounced vertebral pain syndrome and improves functional abilities of patients in the postmenopausal women. **Keywords:** Osteoporosis; Postmenopausal Women; Physical Activity; Strontium Ranelate.

SENSE OF COHERENCE AFFECTS COMPLIANCE AND RESPONSE TO RESISTANCE TRAINING IN OLDER PEOPLE WITH HIP FRACTURE HISTORY

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Objectives: To study effects of sense of coherence (SOC) on training compliance and inter-individual changes in muscle strength, mobility and balance after resistance training in older people with hip fracture. Strong SOC enables a person to identify and use their resources to overcome stressors and improve wellbeing. **Methods:** Secondary analyses of 12-week randomized controlled trial of progressive resistance training in over 60-years-old community-dwelling people 0.5-7 years after hip fracture ($n = 45$; ISRCTN34271567). (2) Pre- and post-trial assessments included SOC (1), isometric knee extension strength, maximal walking speed, timed get-up-and-go (TUG) and Berg balance scale. **Results:** Baseline characteristics of the training and control group were similar (Table 1). In the training group, those with weaker pre-trial SOC had no improved or slightly reduced performance at post-trial in TUG ($r = -0.74$) and Berg balance ($r = 0.38$; Figure 1). In the control group, no association between SOC and change in performance was found. In repeated measures ANOVA, significant group \times SOC interaction effects were found for TUG ($p = 0.006$) and Berg balance ($p = 0.042$), but not for muscle strength or walking speed. Weaker SOC was associated with poorer training compliance (mixed model; $p = 0.009$). **Conclusions:** Older people with hip fracture history and weaker SOC may not benefit as much from resistance training as those with stronger SOC. Those with weaker SOC had poorer training compliance, although training improved muscle strength regardless of SOC. More complicated mobility and balance tasks did not improve in those with weaker SOC. It may be possible to design training programs in a way that those with poorer SOC may benefit more, even without a necessary change in SOC. To optimize participation in rehabilitation or physical exercise programs and its effect in older people more research is needed. **References:** 1) Feldt et al. Qual Life Res 2006; 16: 483. 2) Portegijs et al. Arch Phys Med Rehabil 2008; 89: 1667. **Keywords:** Muscle Strength; Training Compliance; Fractures; Balance; Mobility.

EXTENDED HOME SECURITY SYSTEM CAPABLE OF DETECTING IRREGULAR MOVEMENTS/FALL FOR ELDERLY PERSONS

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This paper describes functional extension of the existing home security system gSHA-5000h in order to create much more ease, safe, comfortable, reliable, secure home environments especially for elderly with active. The current SHA-5000 can detect fire, gas leakage, intrusion, and doors/windows' open or shook by using each dedicated sensors, and a user alert sent from a wireless pendant-style module that is worn by inhabitants. Real-time status can be remotely sent via a telephone or IP line to either a security company or customer's mobile phone. Email message indicating the status to mobile phone are also available. It can accommodate 8 wired and 32 wireless sensors in total. In order to create such home environments that are able to aware inhabitant's condition especially for elderly with active, the system is being extended its function with wearable sensor(s) detecting body movements captured by both 3-axis acceleration and 3-axis angle speed. By compiling an individual's data over long periods, the current movement can be ascertained relative to the baseline to find irregular state, especially a state lead to fall. The movement pattern is interpreted by a pattern recognition technology to predict the dangerous or irregular states. Major one is a fall beforehand that will reduce additional cost for injury/bedridden. In the functional extension, several type of hardware is under experiment; they are a pendant-style module, wristwatch type sensors, and sensors attached to a waist and/or a shoulder. Major specifications for wireless transmission of pendant-style module are; unidirectional transmission at 426.4375 MHz by MSK (Minimum Shift Keying) modulation with 1200 bps over 100 m distance. By using this system, inhabitants are able to enjoy his/her life with secure environments for not only home-related items, but proactive physical activities of themselves. Family/relatives living in a remote location can feel safe as well. **Keywords:** Home Security; Technology; Falls; Movement.

FATIGUE RECOGNITION: FOOT PRESSURE CAPTURE BY WEARABLE SENSOR

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Introduction: Fall-related injuries are a serious problem for the elderly in developed countries. When an elderly person falls, social costs will be high since they can yield bone fractures and even death. People at high risk of falls tend to show high gait variability, but most, especially the elderly, cannot easily discern physical fatigue, a key determiner of this variability. **Methods:** We target the distribution of the COP (Center of Pressure) of the foot as a fatigue metric. Experiments measure normal and fatigued gait. The foot pressure distributions of 10 subjects were measured as they walked normally for 30 m. Next, the subjects ran on a treadmill. Treadmill speed was gradually increased until each could run easily at a comfortable speed. The RPE (Rate of Perceived Exertion) of each subject was continuously monitored. Running was continued at rank 14 (Very, very light to somewhat hard) or under, and RPE was determined every min. If the RPE reached rank 15 (hard), running was halted. Immediately after the exercise, each subject walked 30 m. **Analysis:** COP was extracted from the right foot (270 steps) and subjected to gait analysis yielding time-sequential two-dimensional coordinate data. X-axis is the lateral direction of the right foot and y-axis is the

longitudinal direction. The subjects were classified as exhibiting either normal or fatigued walk. **Discussion:** COP analysis clearly demonstrated the changes that occur when fatigued. This demonstrates the possibility of estimating the fatigue currently experienced by the user. By using a wearable foot pressure sensor, gait data can be continuously gathered in everyday life, and the risk of a fall can be fed back to the user. The full paper will clarify the relationship between COP and fatigue level using more measurements for each subject. In addition, it will identify how to best use the data to prevent falls. **Keywords:** Fatigue; Fall-Related Injuries; Gait Variability; Foot Pressure Sensor.

YOGA AND TAI CHI FOR FALL PREVENTION IN RESIDENTIAL CARE: A FEASIBILITY STUDY

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Background: Higher vulnerability to injurious falls (1), disability and pain have a profound effect on the quality of life of older adults in residential care facilities (RCF). Tai Chi and Yoga are two forms of complementary alternative medicine that are emerging as having positive influence on balance, pain and quality of life (2,3). **Aim:** 1. To determine the feasibility of conducting a 14-week Tai Chi or Yoga program in a RCF. 2. To determine the feasibility of detecting changes in balance, pain experience and quality of life in older residents by comparing the intervention and control groups. **Methods:** The ethics approved feasibility study involved a randomised controlled trial with two intervention groups, where each group received 14 weeks of either Yoga or Tai Chi. The control group received usual care provided by the facility. Focus groups were conducted post intervention for all groups. **Results:** The comparison between the intervention and control groups on outcome measures from: Berg balance scale, verbal descriptor pain scale, Dementia quality of life questionnaire will be presented. **Conclusion:** The feasibility study would enable determining the appropriate forms of both Tai Chi and Yoga for RCF population and inform residential care providers and policy makers on practical issues in provision of similar programmes. **References:** 1. Sherrington, C., Lord, S. R., & Finch, C. F. (2004). Physical activity interventions to prevent falls among older people: update of the evidence. *Journal of Science & Medicine in Sport*, 7(1), 43-51. 2. Brown K, K. J., Lotz M. (2008). A yoga-based exercise program to reduce the risk of falls in seniors: a pilot and feasibility study. *Journal of Alternative and Complementary Medicine*, 14(5), 454-457. 3. Lee, L. Y. K., Lee, D. T. F., & Woo, J. (2009). Tai chi and health-related quality of life in nursing home residents. *Journal of Nursing Scholarship*, 41(1), 35-43. **Keywords:** Yoga; Tai Chi; Falls Prevention; Dementia; Balance.

THE PROFILE OF POSTURAL CONTROL IN ELDERLY THROUGH TRADITIONAL METHODS

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This study's main objective was to characterize the profile of postural control in elderly through traditional methods. A sample of 75 people aged 68 years mean \pm 6 years, according to the WHO considered old youth. 40 elements in the sample are regular practitioners of a structured physical activity programs and 35 elements are not engaged in structured physical activity. Data were collected on a platform of forces, through the CoP, in accordance with guidance from the volunteer. Signs of the platform and formula CoP anteroposterior (AP)

and mediolateral (ML), calculated and transformed the data into action, observable in stabilogram using formulas in MATLAB. The variables analyzed were the total displacement of the oscillation (DOT), root mean square (RMS) amplitude of displacement (ACP), Average Speed (VM), Total Average Speed (VMT), Area, Average Frequency (FM) and analysis of frequency spectral peak frequency, frequency at 50% of the power spectrum and 80% of the power spectrum. After data analysis it is concluded that significant differences exist between Eyes open / Eyes closed, in measures of mediolateral oscillation between practice and not structured in the practice of PA in total displacement of oscillation-DOT, the amplitude of the displacement ACP ml, in Area in the ml plane, the VM EC (Eyes Closed), VMT EC (Eyes Closed) at Frequency Average EC at FPico EC and F80 EC. The practice of Tai Chi on uneven surfaces and level of PA appear to influence the profile of postural control in the elderly. **Keywords:** Postural Control; Force Platform; Eyes Open/Eyes Closed; Physical Activity.

SEASONAL VARIATION IN PHYSICAL ACTIVITY, SKIN PROTECTION BEHAVIOUR AND VITAMIN D: MAKE VITAMIN D WHILE THE SUN SHINES

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Background: Vitamin D levels in older adults at higher latitudes vary seasonally. Age-related changes to cutaneous production of vitamin D, as well as insufficient ambient UVB for 3 months of the year in Tasmania (latitude 41 degrees south) have detrimental impacts on serum levels of vitamin D in winter. Skin protection behaviours, especially avoidance of sun in summer, have the ability to negatively impact vitamin D production. **Study Design:** Longitudinal study design, measuring over 15 months. Participants: Adults over 60 years dwelling in their own home. Outcomes: Serum vitamin D, physical activity, time spent outside, skin protection behaviour and ambient UVB were measured at 5 time points, at the end of each season. Analysis: Annual cyclic trends were investigated by fitting a sine wave formula to data for each outcome measure. The amplitude of the seasonal variation (in percentage change), the timing of the peak values and the annual mean values (mesor) were estimated using repeated measures non-linear regression, adjusted for age and gender. **Results:** Vitamin D ($\pm 15\%$; $P < 0.001$), time spent outside ($\pm 20\%$; $P < 0.001$) and physical activity ($\pm 13\%$; $P < 0.001$) vary seasonally, with highest levels in summer. The highest values for activity and hours spent outside recorded in January (mid-summer) and occurred 4 weeks before the peak value in serum vitamin D. Skin protection is greatest at the end of summer, when ambient UVB is highest. Although 76% of participants were insufficient in Vitamin D during winter, 50% were still insufficient in summer. **Conclusion:** Many older adults do not have sufficient levels of vitamin D in summer. Participants who were more active outside had higher levels of serum vitamin D. Older adults at high latitudes should be encouraged maximizing their outdoor activity in summer, with frequent shorter bursts of skin exposure to maximize vitamin D production without increasing skin cancer risk, so as to build up reserves for winter. **Keywords:** Seasonal Physical Activity; Vitamin D; Skin Protection.

THE FEASIBILITY AND BENEFITS OF A STRUCTURED GYM PROGRAM FOR ASSISTED LIVING RESIDENTS AT A CONTINUING CARE RETIREMENT COMMUNITY

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The purpose of this study was to determine the feasibility and actual and perceived benefits of a strength and conditioning program for assisted living (AL) residents, 80 years of age and older, who are at risk for falls. A mixed-methods research design was employed to determine improvements in upper and lower body strength (quantitative) and to identify perceived program benefits (qualitative). Twelve (12) residents participated in the yearlong 'open gym' program (2 sessions per week) with supervision from a Senior Fitness Specialist and university student interns. The study took place at the continuing care retirement community (CCRC) where the participants reside. Pre-post measures of upper and lower body strength and endurance yielded individual and mean group increases. Findings indicated that AL residents, when provided the opportunity and support, will regularly participate in a gym program; take pride in their accomplishments; ultimately identify as "an exerciser;" make gym time a priority in their lives; promote the program to other residents; and, initiate increasing workloads. The conclusion of this study is that even the 'old-old' who live managing multiple chronic conditions and are identified as a "fall risk" will adhere to and benefit from a strength and conditioning program if we build it with their needs in mind. **Keywords:** Gym Programme; Feasibility; Care Home; Fall Risk.

THE LONG-TERM EFFECTS OF CONTINUED PILATES EXERCISE IN OLDER, COMMUNITY DWELLING MEN AND WOMEN

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Background: Poor balance and reduced strength remain important physical fall risk factors for older adults. Long-term balance benefits have been reported in older adults after short-term resistance training and Tai Chi interventions. Pilates a popular but the long-term benefits of Pilates have not been reported. **Methods:** 40 people (68±7yrs) participated in Pilates classes for 5 weeks, with measurement of balance and strength pre (T1) and post intervention (T2). At 12 months participants were invited to attend again (T3). Postural sway, four square step test (FSST), Timed Up and Go (TUG) and strength were measured. T3 participants were split into those who had continued Pilates classes and those who ceased. Within group changes were compared using a one-way ANOVA. Comparison between T3 groups was performed via independent t tests. **Results:** 30 people attended at 12 months. Dynamic balance and function improved after the initial Pilates training (T1-T2), and was maintained at T3. No strength improvements were recorded at T2. There were significant differences at T3 for FSST (0.5 sec; P = 0.025) and TUG (0.5 sec; P = 0.022) between participants who continued performing Pilates (N = 14) and those who had ceased. Participants who continued Pilates were significantly stronger at T3 (6.6 kg; P = 0.006). Postural sway improved (T1-T3; 2.6 cm) but was not significantly different between groups at T3 (P = 0.300). **Discussion:** Balance and function benefits are apparent after a short Pilates intervention at one year after the program. Increased benefits, including strength, exist for those who continue Pilates for a year compared to those who ceased after 5 weeks. **Conclusion:** Pilates has been shown longer-term to provide benefits to strength and balance. **Keywords:** Pilates; Strength; Balance; Tai Chi; Postural Sway.

MORPHOFUNCTIONAL CHARACTERISTICS AND RISK OF OSTEOPENIA AND OSTEOPOROSIS IN ELDERLY MALES AND FEMALES

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Bone mass, strength and quality in the elderly have been associated with morphofunctional characteristics and environmental factors, namely, physical activity (PA). **Objective:** The present study aimed (1) to determine the prevalence of osteopenia and osteoporosis in elderly males and females, and (2) to examine their association with lower-body strength (LBS), aerobic endurance (AE), PA, and legs lean tissue mass (LLTM). **Design:** This cross-sectional study included 802 subjects, 401 males and 401 females, aged 60-79 years, from Autonomous Region of Madeira, Portugal. LBS and AE was assessed by the chair stand and 6-min walk tests from the Senior Fitness Test. Bone mineral density (BMD) at the femoral neck (FN) and LLTM were determined by dual-energy x-ray absorptiometry-DXA. FN BMD (g/cm²) was used to define osteopenia and osteoporosis according to the criterion proposed by the World Health Organization. PA was assessed through the Baecke questionnaire. Statistical analysis included descriptive statistics, Pearson product-moment correlation coefficient and logistic regression analysis (LRA). **Results:** The prevalence of osteopenia was 39.4% and 49.5% in males and females, respectively. Osteoporosis reached 5.0% in males and 8.2% in females. The FN BMD (g/cm²) was positively related to LBS ($p < 0.002$ and $p < 0.001$) and, AE ($p < 0.026$ and $p < 0.001$) in males and females, respectively. A similar result was found with total PA, but only in females. The strongest predictor of osteoporosis or osteopenia was LLTM [odds ratios of 3.8 (95% CI: 0.23-0.63) and 4.1 (95% CI: 0.26-0.65) in males and females, respectively]. **Conclusion:** This study demonstrated that total PA, LBS and AE were positively associated with FN BMD (g/cm²). The strongest predictor of osteopenia and osteoporosis in Portuguese elderly was LLTM. **Keywords:** Osteoporosis; Osteopenia; Strength.

CLINICAL ASSESSMENT OF REACTIVE BALANCE CONTROL: PRACTICE PATTERNS AMONG ONTARIO PHYSIOTHERAPISTS

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Introduction: Reactive balance control, the ability to generate rapid postural responses when external instability threatens to move the center of mass outside the base of support, ultimately determines whether or not an individual will fall following a loss of balance. As reactive control is related to fall risk and amenable to treatment, it should be routinely incorporated in balance assessment. The purpose of this study was to determine how physiotherapists assess reactive control in clinical practice. **Methods:** A cross-sectional survey was conducted. A questionnaire was mailed to 1000 physiotherapists in Ontario, Canada who treated adults with balance impairments. The questionnaire asked respondents about the components of balance they assess and standardized measures used (reported in Sibley et al. 2011 Phys Ther), and specifically probed how they assess reactive control. **Results:** Three hundred sixty nine individuals completed the questionnaire. Of the 277 respondents who assessed reactive control at least some of the time in their practice, 14.0% used a standardized measure, 82.3% used a non-standardized approach, and 17.3% used both. Thirty-three methods of assessing reactive control were reported. The most common methods used were non-standardized perturbations (43.1% of 239 respondents who answered an open-ended question) and movement observation (19.7%). The remaining 31 methods were each used by less than 8% of respondents. **Conclusions:** Despite the availability of instrumented technology and valid standardized measures to evaluate reactive control, respondents relied primarily on non-standardized approaches and observational assessment. Furthermore, many of the standard measures respondents used to assess reactive control do not contain a specific test

evaluating reactive control. Future work should examine the factors influencing choice of reactive control assessment tools and promote awareness about standardized measures for reactive balance control. **Keywords:** Balance Control; Physiotherapists; Clinical Practice; Measurement of Balance.

ASSOCIATION OF FALL WITH EXERCISE AND FARMING WORK AMONG CHINESE NONAGENARIANS AND CENTENARIANS

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Objectives: Previous studies show that exercise can prevent the occurrence of fall. However, less is known about the relationship between falls and exercise and farming working in Nonagenarians/Centenarians. Due to lots of old people in China are still working in farmland. This study was conducted to observe the association of fall with habits of exercise and farming work among very old people. **Methods:** In the present cross-sectional study, we observed the association of fall with habits (current and former) of farming work and exercise among very old people using a Chinese cohort aged 90-108 years. **Results:** The population included 805 unrelated Chinese nonagenarians and centenarians (68.94% women, mean age 93.70 years). In women, subjects with current habit of farming work had significantly higher prevalence fall than those without this habit ($p = 0.032$); but subjects with current habit of exercise had significantly lower prevalence fall than those without this habit ($p = 0.009$). However, in men, there was no significant difference in prevalence of these habits between subjects with and without fall. After adjust for age, gender, body mass index, educational levels, Living styles, vision levels and temperament, we found that current habit of farming work and exercise had a significant odds ratio (OR = 1.527 95% CI (1.142, 2.042) and OR = 0.631 95% CI (0.429, 0.928), respectively) for fall. **Conclusions:** In summary, among nonagenarians and centenarians, among habits (current and former) of farming work and exercise, there seems to be significant association of fall only with current habits of farming work and exercise. The habit of farming work might be positively associated with fall, but the habit of exercise might be negatively associated with fall in Chinese longevity old people. **Keywords:** Rural, Urban; Falls; Exercise; Habits; China.

IMPACT OF A THEORY-BASED OSTEOPOROSIS EDUCATION INTERVENTION ON PHYSICAL ACTIVITY IN OLDER ADULTS: A RANDOMIZED CONTROLLED TRIAL

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Objective: Whether dual energy X-ray absorptiometry (DXA) screening alone or combined with a theory-based education intervention, results in an increase in habitual physical activity and the decision to start or increase weight-bearing activity to prevent or manage osteoporosis. **Materials and Methods:** Men and women 50 years of age and older (age range 50-80 years), were referred by their healthcare provider to undergo DXA screening for the first time at the local hospital. Participants ($n = 182$) were randomly assigned to an intervention group ($n = 91$) or control group ($n = 91$). Both groups underwent DXA screening and completed Voorrip's physical activity questionnaire to assess habitual activity. The intervention group also received theory-based osteoporosis education. Six months after baseline, participants completed Voorrip's questionnaire again and a follow-up questionnaire evaluating change

in weight-bearing activity. Group differences and differences based on DXA results (osteoporosis, osteopenia, normal) were compared using chi-square, paired/independent t-tests, and contingency tables/ANOVA. **Results:** At follow-up, 25.8% of participants reported starting or increasing weight-bearing activity, but there was no significant difference between groups. Habitual physical activity decreased from baseline to follow-up in both groups. At follow-up, the intervention group had slightly increased activity scores ($M = 11.93$, $SE = .68$) compared to control group ($M = 10.43$, $SE = .59$); however this difference was not significant ($t(171) = -1.72$, $p > .05$). Osteoporosis diagnosis was associated with significant increase in weight-bearing activity ($p = .05$), but not habitual activity. **Conclusions:** This study provided evidence that a theory-based education intervention was unsuccessful in increasing weight-bearing or habitual physical activity. More research is needed in using a theory-based approach for improving physical activity to promote bone health in this population. **Keywords:** Osteoporosis; Bone Health; Physical Activity; Intervention; Questionnaires.

RELIABILITY OF TEMPORAL AND SPATIAL GAIT PARAMETERS DURING TREADMILL WALKING IN COMMUNITY-DWELLING HEALTHY SENIORS

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The present study focused on between- and within-day-variability of temporal and spatial gait characteristics during treadmill walking in healthy seniors. In 20 active seniors (10 women, 10 men, age: 64.8 (SD 3.2) years, height: 1.70 (0.10) m, weight: 69.7 (10.9) kg, physical activity: 11 (6) h/week-1), gait characteristics were assessed on three days in weekly intervals (between-day variability). Either on day 2 or 3 testing was repeated 30 min after the initial trial (within-day variability). Spatiotemporal gait parameters as well as gait variability were determined during 400 steps at a normal walking speed (5.0 (0.4) km/h-1) on a one-dimensional ground reaction force measuring treadmill. No significant mean differences were observed in any parameter for between- and within-day comparisons. Between-day ICC were high ($ICC \geq 0.86$) for most parameters despite for temporal ($ICC = 0.44$) and spatial ($ICC = 0.22$) gait variability. Coefficients of variation (CoV) were also high in the latter parameters (CoV = 30.2 - 36.1%), whereas all other variables showed clearly lower values (CoV < 7%). CoV were still lower between days 2 and 3 (CoV < 5%). Compared to between-day comparisons within-day variability was comparable in spatiotemporal gait parameters (CoV < 5%, $ICC \geq 0.97$) and lower in gait variability parameters (CoV < 18%, $ICC \geq 0.72 - 0.74$). In conclusion, most gait parameters were highly reliable during treadmill walking. Changes of less than 10% can be detected with sufficient confidence. Gait variability parameters were less reliable and, thus, should be carefully interpreted. **Keywords:** Gait Parameters; Treadmill Walking; Physical Activity.

THE EFFECTS OF 12 WEEKS PILATES-INSPIRED EXERCISE TRAINING ON FUNCTIONAL PERFORMANCE IN OLDER WOMEN

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Background: Lower-extremity weakness and balance impairment are considered independent predictors for future falls. So, falls prevention exercise, including strength, balance and walking training, should be recommended to the general community as well as those

at high risk for falls. Pilates inspired-exercise claims to improve muscular strength, balance, flexibility and cardiorespiratory fitness in old age, however, its benefits are still under investigation. This study investigates the effects of 12-week Pilates-inspired exercise on functional performance in community-dwelling older women. **Methods:** Forty community-dwelling older women were randomly allocated to Pilates-inspired exercise training (PG, n = 21, 66.0 ± 1.4yrs) or control group (CG; n = 19, 63.3 ± 0.9yrs). The functional performance on one-leg stance (OLS), timed-up and go (TUG), 5-repetition sit-to-stand (STS) and six-min walk (6MW) tests were evaluated before and after Pilates training (2x/week, 60 min/session) or control period. Each exercise session was divided in warm-up (10 min), Pilates inspired-exercises (40 min) and cool-down period (10 min). The exercises were performed on mats, using accessories such as exercise rubber bands, Swiss and exercise balls. Group and time effects on functional performance were assessed by repeated measures ANOVA. Intragroup differences were evaluated by paired t-test. The level of significance was set at $p \leq 0.05$. **Results:** After 12-weeks, time effects were observed for STS ($p = 0.03$) and 6MW tests ($p < 0.01$). Only PG decreased significantly the time spent to rise from a chair and return to seated position (2.0s faster, $p = 0.02$) and increased the distance walked in six min (~30m, $p < 0.01$). OLS and TUG performance remained unaltered in both groups. **Conclusion:** Pilates inspired-exercise improved lower-extremity strength and cardiovascular fitness in community-dwelling older women. Therefore, it may be a potential exercise regime to prevent falls in old age. **Keywords:** Balance Impairment; Pilates; Cardiovascular Fitness; Falls Prevention.

THE INFLUENCE OF ABDOMINAL FAT ON BONE MINERAL DENSITY

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Obesity and osteoporosis, two disorders that become more prevalent with advancing age, are becoming increasingly deleterious public health concerns in Europe and throughout the world. While excessive fat mass was previously thought to have a protective role on bone health, recent publications have documented a negative relationship between abdominal fat and bone mineral density (BMD) in adults (Katzmarzyk et al 2012). The aim of this study was to assess whether increased abdominal fat is associated with poor bone health. A cross-sectional analysis was conducted. Total BMD and abdominal fat (L1-L4 region) was measured using dual-energy x-ray absorptiometry (Lunar iDXA™, GE Healthcare, Chalfont St Giles, Bucks., UK) on 1,303 Irish adults (females n = 770, males n = 534) aged 18-81y. Using a linear regression model that adjusted for body mass, gender and age and accounted for 63.2% of the variance in BMD, abdominal fat was found to be negatively related ($\beta = -0.234$) to BMD. Being female and older ($p < .0001$) were also associated with a lower BMD. As indicated by variance inflation factor (VIF) analysis there was no influence of multi co-linearity in the regression analysis. These data provide supportive evidence for an influence of increasing abdominal fat mass on bone health that is particularly relevant to the ageing population. **Reference:** Katzmarzyk, P. T., Barreira, T. V., Harrington, D. M., Staiano, A. E., Heymsfield, S. B. and Gimble, J. M. (2012) 'Relationship between abdominal fat and bone mineral density in white and African American adults', *Bone*, 50(2), 576-579. **Keywords:** Obesity; Osteoporosis; Bone Health; Ageing.

PECULIARITIES OF RELATIONSHIP BETWEEN STRUCTURAL-FUNCTIONAL STATE OF BONE TISSUE AND KNEE OSTEOARTHRITIS IN POSTMENOPAUSAL WOMEN

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The aim was to study the age-related particularity of relationship between structural-functional state of bone tissue and development of knee osteoarthritis (KO) in women of postmenopausal period. **Material and Methods:** 175 postmenopausal women aged 50-79 years old with KO were examined, the control group consisted of 60 healthy women. Bone state was measured by Dual-energy X-ray absorptiometry "Prodigy"(DXA), calcaneus quantitative ultrasound (QUS) densitometry "Sahara," digital X-ray radiogrammetry (DXR) of the II-IV metacarpal bones (OSTIM+). **Results:** We found the significant correlation between indices of QUS and presence and stage of KO. In patients with I stage of KO densitometry data were significantly higher compared with healthy women, but in patient with III stage of KOA they were significantly lower (Stiffness index: 0 st. KO - 76.5 ± 16.4 ; I - 83.6 ± 15.9 ; II - 71.0 ± 13.6 ; III - 67.8 ± 14.1 ; $F = 4.33$, $p = 0.005$). Analysis of aging particularities showed that significant differences ultrasound densitometry data were in postmenopausal women aged 50-59 and 60-69 years old with knee osteoarthritis but were not in patients 70-79 years old. In postmenopausal women we did not found significant relationship between indices of DXA (lumbar spine, neck, total femur) and digital X-ray absorptiometry and presence/stage knee osteoarthritis, except bone mineral density (BMD) of total body and total spine. The indices of BMD of total spine were significantly higher in postmenopausal women with III stage of KO compared with healthy patients and women with early stages of osteoarthritis (0 st. KO - 0.90 ± 0.12 ; I - 1.00 ± 0.10 ; II - 1.01 ± 0.15 ; III - 1.08 ± 0.12 g/cm²; $F = 7.31$, $p = 0.0001$). **Conclusion:** Presence and stage of knee osteoarthritis had significantly influence on QUS data, but not on DXA indices (lumbar spine, neck, total femur) and digital X-ray absorptiometry. **Keywords:** Knee Osteoarthritis; Bone Tissue; Postmenopause; Ultrasound.

QUANTITATIVE ULTRASOUND DENSITOMETRY AND FRAX® IN EVALUATION OF STRUCTURAL-FUNCTIONAL STATE OF BONE IN POSTMENOPAUSAL WOMEN

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The aim of the study was to estimate the informative value of quantitative ultrasound and its combination with FRAX® in evaluation of structural-functional state of bone in Ukrainian postmenopausal women. **Material and Method.:** 363 postmenopausal women aged 45-87 years were examined, average age 65.1 ± 0.5 years, duration of postmenopausal period 16.5 ± 0.5 years. Bone mineral density (BMD) was measured by Dual-energy X-ray absorptiometry (DXA) "Prodigy" and calcaneus quantitative ultrasound (QUS) "Sahara." The ten years probability of major osteoporotic fracture calculated with FRAX® tool. **Results:** There is difference in distribution of bone indexes in depending of used methods. Among women which had osteoporosis of femoral neck by DXA, 34% had osteoporosis, 57% - osteopenia, 9% - norma data by QUS. Sensitivity of QUS indexes ranging was from low to moderate, but specificity was low (with femoral neck - 38% and 39%, total hip - 63% and 34%, lumbar spine - 45% and 34%, total body - 56% and 34% accordingly). Such sensitivity and speci-

ficity increased when combining QUS with the ten years probability of major osteoporotic fracture without BMD (FRAX®) (with femoral neck – 71% and 87%, total hip – 90% and 100%, lumbar spine – 72% and 83%, total body – 79% and 91% accordingly). **Conclusions:** QUS of is informative method in evaluation of structural-functional state of bone in postmenopausal women. Sensitivity and specificity increased when combining QUS with FRAX® from 38% and 34% up to 90% and 100% accordingly. **Keywords:** Postmenopause; Ultrasound; Bone Health; Fractures; Ukraine.

IMPACT OF EDUCATION ON NURSING KNOWLEDGE TO IMPROVE INPATIENT CARE IN ELDERLY PSYCHIATRIC WARDS

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Introduction: At institute of Mental Health (IMH), Department of geriatric psychiatry, patient's safety is one of our top priorities. Among several strategies to minimize falls, physical form of restraint has been historically in practice as a fall prevention strategy as a last resort. Research evidence shows no significant benefit of using restraints for fall prevention. Instead they may actually lead to unwanted consequences. Restraint use can also be stigmatizing to the overall image of psychiatric care. As use of restraints is primarily an aspect of nursing care, we conducted a survey among ward staff of their knowledge of restraint use and preference for restraint free policy. **Methodology:** Our survey included questions on safety and efficacy of restraints, the most preferred and the least preferred method of restraint and preference of a restraint free policy. A preliminary survey was followed by small group teaching sessions attended once by nursing staff who have participated in the survey. We conducted a post-teaching survey using the same questionnaire on those who attended the teaching and those who have not attended the teaching. **Results:** 1. The pre-education survey included 37 ward staff. 78% did not prefer restraint free policy and 45% believed that restraints were not at all harmful. 2. Those staff who did not attend the teaching sessions (17) maintained their views as before with 82% still not in favour of restraint free policy and 52% believing that restraints are not at all harmful. 3. The group who attended teaching session (16) showed a significant change in their views with now only 50% not favouring restraint free policy and only 18% believing that restraints are not at all harmful. **Conclusion:** 1. Ongoing education plays a crucial role in continuous professional development and improved patient care. 2. Education of ward staff should be objective and based on research evidence to improve acceptability by minimizing potential bias of views expressed. **Keywords:** Training of Professionals; Inpatient Care; Psychiatry; Mental Health.

TEST-RETEST RELIABILITY OF SIT-TO-STAND PERFORMANCE MEASURES WITH A PENDANT-WORN ACCELEROMETER

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Introduction: Measures of performance of mobility related activities in daily life, like sit-to-stand (STS), are important indicators of overall functioning and fall risk of old people. Recent advances of on-body sensors brought new insights in measuring STS performance in an unobtrusive way. In many studies, STS measures require fixation of sensors on trunk or

thigh to ensure conformity of measurement results. However, fixed body location is to some extent inconvenient for long-term monitoring. Hence, the usability in daily life applications is limited. Therefore, we investigate the test-retest reliability of various STS performance measures with a pendant-worn 3D accelerometer. **Methods:** 10 young adults (age: 21.9 ± 1.2) volunteered to complete two sessions of an experiment with 1 week time in between. In each session, they performed standing up with 3 trials in normal speed and 3 trials as fast as possible. The 3D accelerometer sampling at 50Hz was worn with a necklace belt pendant at the chest location. Maximum vertical acceleration, maximum jerk, scaled duration and scaled peak power of STS were analyzed. The intraclass correlation coefficient (ICC) of averaged measures, computed with two-way-mixed model and 95% confidence interval in consistency, is used to assess the test-retest reliability. **Results:** Excellent reliability ($ICC \geq 0.75$) was seen with measures of maximum vertical acceleration (fast: 0.88/normal:0.94), maximum jerk (fast:0.95/normal:0.94) and scaled peak power (fast:0.84/normal:0.79). Scaled duration was found with excellent reliability in measures of fast STSs (0.93) and good reliability in normal STSs (0.72). **Conclusions:** In this preliminary study, the pendant-worn accelerometer showed good to excellent relative test-retest reliability in averaged measures of STS parameters in young adults. The results indicate the feasibility of using pendant-worn 3D accelerometer in assessment of STS performance. A similar study is ongoing in older people. **Keywords:** Pendant-Worn Accelerometer; Mobility; Sit-To-Stand; Assessment; Reliability.

PECULIARITY OF FUNCTIONAL TESTS IN PATIENTS WITH VERTEBRAL FRACTURES

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The purpose of the study was to examine the functional activity in patients with vertebral fractures. We examined 153 postmenopausal women (60-89 years old), divided into two groups: the first – without osteoporotic fractures, the second – with vertebral fractures. Methods of research - questionnaires (to assess life style), functional tests (dynamometry, static balancing, 15-meter test), Thomayer's, Schober's, Ott's tests, orthopedic examination (range of movement assessment in the thoracic/lumbar spine, determination of the chest excursion and breath holding spell), dual-energy X-ray absorptiometry (DXA). Bone mineral density (BMD) of lumbar spine and femoral neck in patients with vertebral fractures was significantly lower than appropriate data in control group. Indexes of daily activity in patients with vertebral fractures were considerably lower compared to the control group. It was found significant differences in Schober's test and parameters of movement of the thoracic and lumbar spine. Others functional tests were without significant difference. In patients without vertebral fractures it was found the significant positive correlation between BMD of the femoral neck and lumbar spine and data of functional tests indexes (dynamometry, Thomayer's, Schober's tests, maximum and average chest excursion). In contrast, in patients with fractures we didn't found significant correlation between BMD data and indexes of functional tests. In patients with vertebral fractures was determined significant correlation between Schober's tests and breath holding spell in contrast to patients without vertebral fractures. Vertebral fractures leads to reducing of functional ability. **Keywords:** Fractures; Functional Test; Postmenopause; Vertebrae.

BARRIERS AND ENABLERS TO PHYSICAL ACTIVITY AMONG OLDER AUSTRALIANS WHO THINK THEY ARE INSUFFICIENTLY ACTIVE

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Background: Older adults' participation in physical activity is essential for prevention and treatment of cardiovascular, metabolic and bone diseases yet less than half of older adults are sufficiently active. Physical activity interventions targeting older adults can be optimised if barriers and enablers are better understood. This study examined whether associations between barriers and enablers of physical activity differ by demographic and health characteristics and which were associated with meeting physical activity recommendations.

Methods: Participants were 2,225 adults aged 65 years and above who perceived themselves to be insufficiently active and self-reported their barriers and enablers to physical activity in the 2009 New South Wales Falls Prevention Survey (Australia). Binary logistic regression analyses examined associations between barriers and enablers and meeting physical activity recommendations. **Results:** Forty five% of respondents met physical activity recommendations, participating in at least 150 min a week. After adjusting for gender, age, BMI, and education, people who listed ill health (51%) as a barrier (OR = 0.53, 95%CI 0.43-0.65) and people who listed having no one to exercise with (4%; OR = 0.48, 95%CI 0.27-0.85) were significantly less likely to meet recommendations. Those citing too expensive (3%) as a barrier (OR = 2.33, 95%CI 1.27-4.29) and those who listed nothing will help (33%; OR = 1.39, 95%CI 1.12-1.73) and making time to be active (8%; OR = 1.76, 95%CI 1.23-2.53) as enablers were significantly more likely to meet physical activity recommendations.

Conclusions: These findings give insights into older adults' perceptions of factors that influence their physical activity, which could assist physical activity program planning in this population. In particular, the study highlights the importance of consideration issues related to health status and social support when developing physical activity programs for older people. **Keywords:** Physical Activity; Barriers and Enablers; Social Support.

PHYSICAL ACTIVITY, ADIPOSITY, AND MUSCLE QUALITY: IMPACTS ON PHYSICAL FUNCTION IN BMI AND AGE- MATCHED OLDER MEN AND WOMEN

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Older men typically have more physical activity (PA), more muscle mass, strength and power, less adiposity (%Fat), and better lower extremity physical function (LEPF), and relatedly, less risk for physical disability compared to older females. Much contemporary research is exploring the interactive relations among PA, leg strength and power, %Fat, and LEPF in older adults. Muscle quality (MQ), defined here as power per unit of lower body lean mass, may allow a novel exploration of this health disparity between the sexes as it accounts for differences in muscle mass. The aim of this study was to assess the influence of MQ and %Fat on LEPF in older men and women matched in age and BMI. Older adults (n = 80, 76.0±5.8 years, 27.1±3.8 kg/m²) were assessed for PA via questionnaire, body composition via DXA, leg power via Nottingham power rig, and LEPF using a Physical Performance Test (PPT, score range = 0 to 36), 30s chair rise (CHR), and 8 foot up and go (UpGo) tasks.

PA was not related to %Fat ($r = -.17, p = .14$) or MQ ($r = .16, p = .17$); %Fat was related to CHR and UpGo ($r = -.29$ and $.22$, respectively, $p < .05$) and MQ was related to all measures of LEPF (r range = $.38-.49, p < .05$). Men and women did not differ in PA, %Fat, PPT, or UpGo (all $p < .05$). Men performed 11% more CHR ($p = .03$) and had 25% greater MQ ($p = .01$) than women. When grouped via PPT performance [low (≤ 30), moderate (31-33), or high (>33)], better function was associated with greater MQ in a similar and sequential manner ($p < .05$) in males and females ($p = .05$); however, PPT groups did not differ in %Fat ($p > 0.05$). Greater MQ did not translate into higher PPT in males. This relation between MQ and PPT, although similar in pattern but different in magnitude, may be partially explained by the higher relative load (body mass) to be carried during the PPT for males. More work is needed to explore the relations among MQ, body composition and LEPF to elucidate interventions to reduce risk for disability in both sexes. **Keywords:** Physical Activity; Muscle Quality; BMI; Adiposity.

IMPACT OF PHYSICAL ACTIVITY, MUSCLE QUALITY AND ADIPOSITY ON PHYSICAL FUNCTION IN OLDER WOMEN VARYING IN FUNCTIONAL STATUS

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Relations exist among physical activity (PA), leg strength and power, adiposity, and lower extremity physical function (LEPF) in older women. The primary predictor of LEPF appears to depend on physical functional status with muscle strength and power being a primary contributor in low functioning individuals and adiposity being more important in higher functioning women. Our own lab has also determined that muscle quality (MQ), defined as leg strength per unit of leg lean mass, plays a major role in LEPF. This study aimed to explore the utility of a novel expression of MQ (leg power per unit of lower body lean mass) to determine how MQ and adiposity (%Fat) differentially influence LEPF in older women across levels of functionality. Women ($n = 101, 74.1 \pm 5.8$ yrs, range 65–93 yrs) were assessed for PA via questionnaire, body composition via DXA, leg power via Nottingham power rig, and LEPF using a Physical Performance Test (PPT, score range = 0 to 36), 30 s chair rise (CHR), and 8 foot up and go (UpGo) tasks. As expected, age was associated with variables of interest, thus statistically controlled. PA was not related to MQ or %Fat ($p > .05$). MQ and %Fat were significantly related ($r = -.20, p = .04$). Controlling for age and %Fat, MQ was related to all three measures of LEPF (r range = $.44$ to $.40$, all $p < .05$). Controlling for age and MQ, %Fat was related to UpGo and CHR ($r = .30$ and $-.33$, respectively, both $p < .05$). When grouped via PPT performance [low (≤ 30), moderate (31-33), or high (>33)], better function was associated with greater MQ in a sequential manner (all $p < .05$); however, PPT group did not differ in %Fat ($p > 0.05$). We conclude that both MQ and %Fat contribute to LEPF in older women, independent of habitual PA. However, MQ has a stronger relationship to LEPF across functional levels whereas %Fat does not appear to influence LEPF in a graded manner; thus, MQ may be a more important target for exercise interventions than adiposity to preserve LEPF in older women. **Keywords:** Physical Activity; Muscle Quality; BMI; Adiposity; Functional Status.

COMPREHENSIVE CARE ENHANCES SELF-CARE ABILITY AND DECREASES EMERGENCY ROOM VISITS FOR OLDER TAIWANESE PATIENTS

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Background: Little evidence is available on the effects of intervention models containing both hip fracture-specific care and management of malnutrition, depression, and falls. Whether a comprehensive approach is more beneficial to older patients with hip fracture is still unknown. **Objectives:** To explore the 2-year effects of an interdisciplinary, comprehensive care program for elderly patients with hip fracture. **Methods:** A Randomized experimental design was used. A 3000-bed medical center in northern Taiwan. Patients with hip fracture (N = 299), randomized to three groups: comprehensive care (n = 99), interdisciplinary care (n = 101), usual care (control) (n = 99). Usual care included only 1 to 2 in-hospital rehabilitation sessions without in-home rehabilitation, discharge planning, geriatric assessment or consultation. Comprehensive care integrated interdisciplinary care, which included geriatric consultation, continuous rehabilitation, and discharge planning, with nutrition consultation, fall prevention, and depression management. Patients' self-care ability was measured as performance of activities of daily living (ADLs) and instrumental ADLs (IADLs) using the Chinese Barthel Index and Chinese version of Lawton and Brody's (1969) IADL scale, respectively. Outcomes were assessed at 1, 3, 6, 12, 18, and 24 months following hip fracture. **Results:** During the first 2 years following hip fracture, patients in the comprehensive care group had better performance trajectories for ADLs and IADLs, and fewer emergency room visits than patients in the usual care group. Comprehensive care did not significantly affect patients' mortality rates and hospital readmissions. **Conclusion:** Comprehensive care may improve self-care ability and decrease emergency room visits for elders up to 2 years after hip-fracture surgery. Our results may provide a reference for health care providers in countries using similar programs with Chinese/Taiwanese immigrant populations. **Keywords:** Fractures; Health Care Professionals; Comprehensive Care.

PERCEIVED ENVIRONMENTAL BARRIERS IN OLDER PATIENTS RECOVERING FROM HIP FRACTURE

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Objectives: To study effects of a multidisciplinary intervention, aiming to improve mobility and function in hip fracture patients, on perceived environmental barriers. **Methods:** Secondary analyses of a randomized controlled trial of physical rehabilitation in community-dwelling hip fracture patients (ISRCTN53680197).(1) Assessments at baseline (on average 70 days after trauma), 3 and 6 months later included perceived housing-related barriers (indoor/outdoor stairs, steps, lighting, floor surfaces and storage for mobility devices) and perceived barriers in the outdoor environment (streets in poor condition, hilly terrain, long-distances, lack of resting places, noisy traffic, and dangerous crossroads). Sum scores (range 0-6) for housing-related and outdoor barriers were computed and analyzed using mixed methods. **Results:** The intervention (n = 39) and control (n = 39) group did not differ on baseline characteristics (Table1). Patients in the intervention group perceived more barriers related to housing and outdoor environment at baseline than the control group. Preliminary analyses did not show a significant effect of the intervention on sum scores of perceived barriers related to housing (p = 0.865) or outdoor environment (p = 0.602; Figure1). **Conclusion:** Preliminary analyses did not show a significant intervention effect on sum scores of perceived housing-

related and outdoor barriers. Hip fracture patients experience large improvements in mobility in the first months after hip fracture, also when not exposed to an intervention. Improved mobility will theoretically reduce perceived barriers, while moving outdoors more frequently may predispose people to environmental barriers. In addition, the seasons in Finland may affect perceived barriers (e.g. related to terrain) as well as frequency of moving outdoors. Intervention effects on separate items as well as confounding effects of aforementioned factors will be further studied. **References:** 1) Sipilä et al. *BMC Musculoskelet Disord* 2011;12:27. **Keywords:** Hip Fracture; Intervention; Environment; Barriers; Mobility.

PHYSICAL ACTIVITY, FITNESS AND FATNESS: INTERACTIVE IMPLICATIONS FOR PHYSICAL FUNCTION AND QUALITY OF LIFE IN OLDER ADULTS

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Aging and concurrent declines in physical activity are associated with increased risks for obesity and physical disability. In the United States, individuals aged 60 and over are more likely to be obese than younger adults with ~ 42% of older women being obese. Management of obesity in older adults is challenging as weight loss also causes bone and muscle mass loss, thereby increasing risks for osteoporosis and sarcopenia. Beyond physical health, obesity can also compromise psychosocial health status reducing vigor and quality of life. Physical activity is an established key to weight management, enhances physical function, and positively impacts psychosocial health in older adults. However, the interactive effects of physical activity, body composition (fat and muscle mass), fitness (musculoskeletal and neuromotor), and physical and psychosocial function are not clearly delineated. Moreover, health status may alter the relations among the aforementioned variables in that physical function may be most impacted by musculoskeletal and neuromotor fitness in frail individuals whereas adiposity may be the primary predictor in higher functioning older adults. The objective of this symposium is to highlight the contemporary literature regarding: a) weight management guidelines for older adults, b) the interactions among physical activity, fitness (muscle strength, endurance and power; neuromotor control), body composition (fat and skeletal muscle mass), and physical function within the context of health status; c) the negative implications of obesity on psycho-social health and the utility of physical activity to enhance quality of life even in the presence of excess adiposity; and, d) statistical considerations when conducting research in this area to isolate the physical activity, fitness and body composition effects on physical function. Our symposium, similar to the disease of obesity, is multi-faceted and will use an integrated and interdisciplinary approach. **Keywords:** Sarcopenia; Physical Activity; Fitness; Obesity; Musculoskeletal.

HIGH VEGETABLE INTAKE IS ASSOCIATED WITH LOWER FRAGILITY FRACTURE RATE IN POSTMENOPAUSAL ELDERLY TAIWANESE WOMEN

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Objectives: Osteoporosis-related fragility fracture is a major health issue in older adults. This study was developed to investigate the relationship of lifestyle factors with fragility fracture prevalence in postmenopausal Taiwanese women. **Methodology:** A cross-sectional study, conducted during September 2008 and December 2009 in the community in western Chiayi

County in Taiwan. Postmenopausal women in the community with a mean age of 66.7 ± 8.6 years, ($n = 1050$). A structured questionnaire collected personal data, lifestyle information and fracture history. Fragility fractures were defined as those resulting from low energy impact. Laboratory examinations provided biochemistry data. The relationship between fragility fracture prevalence and other variables was analyzed. **Results:** The overall prevalence of fractures of all etiologies and fragility fracture were 18.7% and 9.7%, respectively. Wrist was the most common site of fragility fracture (48 cases). Fragility fracture prevalence in subjects who rarely or did not consumed deep-colored vegetables was significant higher than that of those who often consumed deep-colored vegetables: 17.6% versus 9.0%, with an odds ratio of 1.96 (95% CI: 1.05-3.68) by multivariate logistic regression analysis. **Discussion and Conclusion:** Intake of deep-colored vegetables was significantly associated with a decreased risk of fragility fracture. Long-term intake of deep-colored vegetables should be encouraged in populations at risk for fragility fractures. **Key words:** Osteoporosis, Fragility Fracture, Nutrition, Taiwan.

DISTRACTION AS CAUSE FOR FALLS: DIFFERENCES BETWEEN SUBGROUPS OF OLDER ADULTS

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Background: Subgroups of older people (i.e. single vs. recurrent fallers, indoor vs. outdoor fallers) have been identified which differ with respect to physical and cognitive capacities. However, it is unknown whether self-reported dual tasking at the time of a fall is associated with cognitive and physical function in older people. **Methods:** Independent living older adults ($n = 105$, 79.5 ± 4.8 years) underwent a series of physical and cognitive function tests. Fallers (≥ 1 falls in past 12 months) were categorised as “distracted” fallers when they reported a dual task/distraction as the dominant cause of the fall or as “not distracted” fallers when they did not. **Results:** Thirty participants (28.6%) fell in the year prior to assessment, 10 distracted and 20 not distracted fallers. ANOVA with Tukey post-hoc tests and multiple regression analysis (adjusting for education as appropriate) showed significant differences ($p < 0.05$) or trends ($p < 0.10$) indicating the not distracted participants performed worse than the distracted fallers in tests of physical performance (Physiological Profile Assessment ($p = .009$), sway ($p = .091$), Timed-up & go ($p = .014$)) and cognitive function (Trail making B-A test ($p = .049$)). These differences could not be explained by differing proportions of recurrent fallers between groups. There were no differences between the non-fallers and distracted fallers in any test. In contrast, the not distracted fallers differed from the non-fallers in nearly every measure. **Conclusions:** The findings indicate different characteristics between distracted and not distracted fallers categorised by a self-report measure of dual tasking at the time of falling. The use of these subgroups may improve diagnostic accuracy of assessments and provide direction for fall prevention strategies. **Keywords:** Dual Tasking; Cognitive Function; Faller; Distraction.

POOR PERFORMANCE IN A TEST OF SELECTIVE ATTENTION, RESPONSE INHIBITION AND STEPPING IS ASSOCIATED WITH FALLS IN OLDER PEOPLE

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Background: Previous studies have shown that older fallers have poorer cognitive function than non-fallers. We developed a test that combines stepping with selective attention

and response inhibition to provide a functional measure that reflects complex real life scenarios. We aimed to determine whether this test discriminates between older fallers and non-fallers. **Methods:** 102 older adults (79.4±4.9years) without cognitive impairment (MMSE 28.9±1.1) completed an inhibitive step task (INHIB) using an exergame device. In the centre of a computer screen (58cm) an arrow was presented pointing in one of four directions (up, down, left, right). Inside the arrow was a written word indicating a different direction. In 20 trials, participants had to step according to the word and inhibit the response indicated by the arrow's shape. Participants also underwent a range of tests of physical and functional performance (timed up & go (TUG), alternate step (AS), 5 Sit-to-Stand (5STS), choice stepping reaction time (CSRT)) and cognitive function (Color Word Stroop test (CW-Stroop), Trails A&B, digit symbol (DS)). Participants who reported one or more falls in the past 12 months were classified as fallers. **Results:** Participants who took longer to complete INHIB had fewer correct items in the CW-Stroop test ($r = -0.337$) and performed poorly in the other cognitive tests. (DS $r = -0.393$, Trails A $r = 0.344$, Trails B $r = 0.370$). These participants also had worse functional performance (TUG $r = -0.457$, AS $r = 0.480$, 5STS $r = 0.438$, CSRT $r = 0.620$). Univariate logistic regression indicated that participants who performed poorly in the INHIB were at increased odds of falls (OR = 2.90 (1.12-7.49), $p = 0.028$) with an overall correct classification of 73%. **Conclusions:** INHIB, a test that combines stepping with selective attention and response inhibition, was able distinguish fallers from non-fallers, providing further evidence for cognitive mechanisms on fall risk in older people. **Keywords:** Faller; Non-Faller; Cognition; Attention; Response Inhibition.

“HELP THE HELPERS”: PERCEPTIONS OF LOCAL VOLUNTARY WORKERS TEAMS ABOUT A COMPREHENSIVE HEALTH PROMOTION PROGRAM

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Introduction: “Please don’t fall” is the biggest community intervention project directed towards the health promotion of the Azorean aging population. Its first edition lasted 11 months and relied on the clinical expertise of an interdisciplinary healthcare team (physiotherapists, nutritionists and nurses) that monitored 45 min physical exercise classes twice a week and monthly health educational workshops. These actions took place in community-based centers. Teams of voluntaries work in those centers to help their fellow elderly citizens. **Aim:** The aim of this survey was to explore the voluntary workers’ perception and satisfaction with a comprehensive health promotion program. This survey was planned to assess self-perceived benefit and perceived benefit for the elderly population, not objective benefits. **Methods:** 87 voluntary female workers of the participating community centers (Angra do Heroismo, Portugal) were asked to participate in a interview in order to verify their satisfaction with the project, as well as their perceptions of the impact it had on the elderly population. **Results:** 50,6% (44) agreed that the program met the needs of the elderly; 63,5% (54) said it contributed to the good functioning of the centers; 50% (43) agreed that it helped their voluntary work. 49,4% (42) scored the organization of the project as “very good”; 53,4% (43) scored the work developed by the physiotherapy team as “very good.” The intervention of the nutrition team was “good” for 51,9% (43), while 44,6% (37) thought the nurses’ work was also “good.” 54,4% (43) believed that the program had contributed to the old people’s wellness. 55% (46) agreed that the elderly were more motivated than before to play an active role on the regular activities of the center. The majority of the voluntary workers 42,68% had the opinion that this comprehensive program was “good.” **Conclusion:** The

interviewees perceived benefit from and are overall satisfied with the program. **Keywords:** Health Promotion; Volunteering; Benefits; Community Intervention.

AN AZORIAN OPINION SURVEY OF THE SELF-PERCEIVED IMPACT OF A COMPREHENSIVE HEALTH PROMOTION PROGRAM

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“Please don’t fall” is the biggest community intervention project directed towards the health promotion of the Azorean aging population. Its first edition lasted 11 months and relied on the clinical expertise of an interdisciplinary healthcare team (physiotherapists, nutritionists and nurses) that monitored 45 min physical exercise classes twice a week and monthly health educational workshops. **Aim:** The aim of this survey was to explore Azorean old people’s perception and satisfaction with a comprehensive health promotion program. This survey was planned to assess self-perceived benefit and not objective benefits. **Methods:** 675 aging citizens of Angra do Heroísmo (Azores, Portugal) who participate in a major health promotion program were contacted through their local community center and asked to participate in a interview in order to verify their satisfaction with the project, as well as its impact on their daily life. **Results:** 342 participants were lost to follow up. 333 participants were interviewed. Among the reasons for participating in the program 55,58%(120)referred the Pnf-Chi exercise sessions .Most participants enjoyed the health activities a lot[53,6% (177) Pnf-chi classes, 66,1%(119)water physical exercise sessions, 54,5% (165)health education sessions, 49,8% (154) nutritional education sessions].72,5% (166) said the same about the parallel social activities. When asked about their overall status after participating on the program, 91,5%(292) participants felt more interested about life, 90,3%(288) were happier . 40,3% (131) were moving better and 70,2% (239)were more satisfied with life. A majority of 46,3% (161) participants reported that the program was overall “very good” whilst “40,5%” (141) classified it as “good. **Conclusion:** The interviewees perceive benefit from and are overall satisfied with the comprehensive “please don’t fall” program. This may represent a positive impact on a biopsychological level. **Keywords:** Health Promotion; Volunteering; Benefits; Community Intervention.

A COMMUNITY EXERCISE GROUP FOR OLDER PEOPLE WITH MENTAL HEALTH CONDITIONS TO PROMOTE PHYSICAL ACTIVITY, FALLS PREVENTION AND SELF-MANAGEMENT

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Purpose: To provide an opportunity for older people with a mental health illness to experience the positive effect of exercise in a community-based environment, in order to improve fitness; reduce long term risk of falls and help maintain/improve mental health and wellbeing. At the end of the programme, individuals were then supported in accessing and attending ‘main-stream’ community exercise groups. **Relevance:** Research states this patient group significantly benefits from taking regular exercise to help reduce risk of falling, increase confidence, encourage social inclusion and maintain independence at home by promoting self-management. However, clinical experience has shown that patients rarely access ‘main-stream’ community exercise groups due to low confidence, poor physical functioning and

anxiety. This evidence-based programme was designed to bridge the gap in service and provide a time-limited community-based exercise group to improve physical fitness and increase the uptake of mainstream community exercise groups for these patients. **Description:** 12-week exercise group incorporating resistance, aerobic and balance exercises and Tai Chi. Home exercises including strengthening and walking three times a week. At the end of the programme, participants met individually and suitable follow-on mainstream community exercise groups discussed with initial support provided in attending the groups. **Conclusions:** Attendance/completion rate high with the majority of participants moving on to mainstream exercise groups. Outcome measures showed improved confidence, balance and physical activity levels. **Implications:** This self-management model enables older people with mental health problems to receive increased support in improving their physical fitness/confidence to then be able to access mainstream exercise groups and maintain a level of independence and social inclusion. **Keywords:** Mental Health; Physical Activity; Falls Prevention; Self-Management.

THE FUNCTIONAL MOVEMENT CIRCLE FOR ELDERLY (FUMOC-E): A MULTIFACTORIAL INTERVENTION TO AFFECT FALL-RELATED RISK FACTORS

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Introduction: Loss of muscle strength and power, gait and balance disturbances are well known as risk factors for falls in the elderly. Especially in everyday movement situations (uneven surface, stumbling on carpets or stair climbing) fall risk arises. The FuMoC-E involves everyday movement routines inside a track embedded in a balance and strength training. The goal of this study was to determine the effects of this new training concept for elderly on fall-related risk factors. **Methods:** Eighteen healthy, community-dwelling older adults aged 61 to 81 years participated in the FuMoC-E pilot study. They trained twice a week for 60 min each training session for 12 weeks using two balance, six strength exercises and the everyday life movement track. Isometric and dynamic strength, gait velocity, balance, and several functional performance tasks were assessed before and after the 12 weeks of training. **Results:** Dynamic strength for chest press (15%; $p < .001$) and timed-up-and-go (8%; $p < .001$) improved significantly. Furthermore, habitual gait velocity (9%; $p = .011$) and maximum step length (right: 6%; $p = .014$; left: 7%; $p = .011$) increased significantly with training. 12 weeks training with FuMoC-E improved also maximum gait velocity, balance, chair stand performance, isometric and dynamic strength. **Conclusions:** FuMoC-E positively influences fall-related risk factors of elderly subjects. The improvements observed in this study could be enlarged by longer intervention duration (6 months). This pilot study was feasible in recruitment, assessment, and training implementation. However, a larger randomized controlled trial is needed to investigate mechanisms of benefit and long-term efficacy of this new training program. **Keywords:** Falls; Risk Factors; Intervention; Balance; Strength.

THE EFFECT OF PHYSICAL ACTIVITY AND NON-PHYSICAL LEISURE ACTIVITY ON AGING WELL

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Aging well is defined as “positive, person-centered process in which the promotion and protection of physical, mental, social, economic, and daily life styles are paramount for achieving a sense of satisfaction, health, dignity, and well-being in old age” (Hawkins, 2000). It is well established that physical and non-physical leisure activity are related to positive outcome including health outcomes, well-being, successful aging and mortality risk for older adults. A little researches, however, has been done about which activities more contribute to aging well or successful aging. The purpose of the study was to examine the difference in aging well among older adults who participate in both physical and non-physical leisure activities, only physical activities, only non-physical activities, and no activity. The study used secondary data from Aging Well: A Study of Adult Well-Being, which was part of the Global Aging Initiative (2004). Data includes individuals ranging in age from 50-92 years. This study used ANOVA analysis with a post-hoc test to examine the difference in aging well among older adults participating in different type of activities. The study found that older adults who actively participated in physical activity or non-physical leisure activity had high level of aging well. Especially, those who participate in both physical and non-physical activity showed higher aging well scores. The study confirms the importance of physical activity as well as non-physical activity to aging well for older adults. Older adults who participate in both physical and non-physical leisure activities were more likely to be aging well. **Keywords:** Wellbeing; Physical Activity; Leisure Activity; Aging Well.

DIFFERENT MODES OF EXERCISING, FITNESS, MOOD AND FATNESS IN OLDER ADULTS

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Aim: Physical independence and positive mood states contribute to successful aging. The purpose of the present study is to analyze the effects of aerobic and strength-based training programs on functional fitness and mood states in older adults, and to assess the relationship between adiposity and mood. **Methods:** Seventy-eight older adults (age 65 to 95 years old) were randomly assigned to a control group (C), aerobic training (AT), or strength training group (ST). Functional fitness was assessed with the Senior Fitness Test battery relating to lower and upper body strength and flexibility, velocity, agility and dynamic balance, and aerobic endurance. Mood states (depression, tension, fatigue, vigour, anger, and confusion) were determined using the POMS-SF questionnaire. Participants were evaluated at the baseline and at the end of a 16-week exercise programme. **Results:** Both the ST and AT groups improved their functional fitness following the 16 week training. Body mass index (BMI) was positively associated with tension ($r = 0.30$; $p < 0.01$), fatigue ($r = 0.31$; $p < 0.01$) and confusion ($r = 0.24$; $p < 0.05$). At 16-week evaluation, control group reported increased levels of confusion, and the ST group reported increases in vigour ($p < 0.05$). **Conclusions:** Results support the idea that strength-based training can be as effective as aerobic-based training in improving physical skills that contribute to functional mobility in later years. Positive associations between increased BMI and mood disturbance were also found. Physical training also contributed to some improvements in mood. **Keywords:** Strength; Training; Obesity; Physical Activity; Mobility.

DISABILITY AMONG OLDER ADULTS IN SPAIN: THE SIZE OF THE POPULATION

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The aim of this study was to determine the relationship of population size with functional disability in activities of daily living (ADLs). This cross-sectional study used data from The Survey of Older Adults by "the Institute Of Aging And Social Services" (IMSERSO) in 2010. 2,535 individuals, 50.5% men and 49.5% women, aged ≥ 65 years, distributed in 17 regions of Spain, were interviewed by phone. The ADLs were measured by questions related to the difficulties in carrying out household chores and personal care (use of ladders, bathing, toilet use, pick up objects in the kitchen, washing clothes and extending). The sum of the responses was categorized into three levels of dependence. The size of the municipality was classified in extracts ($<10,000$, $\geq 10,000$ and $<100,000$, and $>100,000$ inhabitants). In the data analysis we used the chi-square, $p < 0.05$. The prevalence of independent people or with mild dependence was 13.6% ($n = 346$) and severe dependence was 66.8% ($n = 1694$). In relation to the size of the municipality, 39.4% ($n = 1000$) lived in cities with population $< 10,000$ and 21% ($n = 532$) in cities with population $> 100,000$. There is a relationship between the variables ($\chi^2 = 29.07$ $p < 0.0001$), The smaller cities had a higher prevalence of independent elderly ($n = 167$), while the larger municipalities had a population prevalence of approximately 50% less severe dependence when compared to other groups. Furthermore, it is concluded that there is a high prevalence of functional dependence in elderly Hispanics. Implementation of interventions in population and the size of the municipality must be observed so that the assistance and intervention mode meet the needs and characteristics of residents. **Keywords:** Functional Disability; Measurement of Activity; Independent Living; Population; Spain.

PERCEIVED STRESS AND PHYSICAL ACTIVITY LEVELS IN ETHNOCULTURAL LOW INCOME OLDER ADULT POPULATIONS IN TORONTO, CANADA

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Background: little is known about the influence of stress levels on physical activity among ethnically diverse older adults. **Purpose:** The objective of the present study was to determine whether perceived stress is a determinant of physical activity among an ethnically diverse group of older adults living in an urban center in Canada. **Methods:** Data from an ongoing intervention study was used for purposes of the current analysis. Participants were men ($n = 29$) and women ($n = 127$) between the age of 55-87 who lived in low-income urban neighbourhoods. Upon recruitment in the study, all participants completed the Perceived Stress Scale (PSS), the Healthy Physical Activity Participation Questionnaire (HPAP-Q) and provided relevant demographic information. Multiple linear regression models were performed using physical activity as the dependent variable and PSS as the main independent variable. Age, sex, marital status and education were included as covariates in the regression model. **Results:** Variables in the full model were able to explain 10% of the variation in physical activity levels. A significant and negative association between perceived stress level and physical activity was obtained ($\beta = -0.1$, $p < 0.01$). **Conclusion:** Perceived stress

is a determinant of physical activity levels among ethnically diverse older adults. As such, focusing on decreasing stress level in this population may be essential for lifestyle change.

Keywords: Stress; Physical Activity; Ethnoculture; Income; Urban.

WHAT DOES SOCIAL PARTICIPATION MEAN FOR HEALTHY HOMEBOUND OLDER ADULTS?

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Introduction: Active engagement with life is one of factors of the theory of successful aging. Social participation is also a significant strategy proposed by WHO to facilitate people's good old age and active aging. However, is participation the only way to promote a good old age? To raise the low rates of social participation of older adults in Taiwan and to better facilitate people's successful aging, the purpose of the study was to explore the perceptions of social participation for older adults who were healthy and preferred to be homebound and to find their own strategies of aging well. **Methods:** A qualitative design was adopted to explore the subjective perspectives of the older adults. By means of in-depth interviews, the participants were 12 older adults who were (1)60 or more, (2) never participated in volunteering in their life and have no employment and no learning one year before the interviews. **Results:** The findings showed that older adults perceived social participation as a good thing for senior to kill time easily as well as a symbol of being healthy. Their not participating might result from personality, feeling no need, previous impressions of social participation, and other things occupying their time. Also, those healthy homebound seniors regarded different kinds of social participations differently. Among being employed again, doing volunteerism, and participating in learning, most of the interviewees perceived being employed as the most favorite one of social participations. **Discussion:** The findings also point out that older adults' low social participation was influenced by negative stereotypes of older adults and old age. **Keywords:** Aging well; Social Activities; Active Engagement; Homebound.

CHANGES IN PHYSICAL ACTIVITY IN THE RETIREMENT WINDOW: A THEORY-BASED INTERVIEW STUDY

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Older adults are the most sedentary segment of the population. The retirement window may provide an important opportunity to deliver interventions to increase physical activity however little is known about the determinants of physical activity in the retirement window and how physical activity and its determinants may change during the retirement transition. The study aimed to identify theoretically linked facilitators and barriers to physical activity behaviour perceived by participants by participants who were within 18 months pre or post retirement. Participants were interviewed using a theory-based interview designed to elicit perceptions of physical activity. The interview covered the 11 behavioural domains identified within the Theory Domain Framework (Michie et al., 2005) that have potential to explain to explain physical activity behaviour. Interviews were audio-recorded, transcribed verbatim and coded to identify core beliefs about physical activity. The most frequently reported facilitators for physical activity were within the behavioural domains 'beliefs about consequences', 'motivation & goals' and 'environmental context'. The most frequently reported barriers to physical activity were within the domains 'beliefs about capabilities'

and 'emotions'. Retired and non-retired participants reported actual or anticipated changes in physical activity which were most frequently related to having more time ('beliefs about capabilities') to do physical activity after retirement. The findings from this study suggest that future interventions designed to increase physical activity targeting individuals within the peri-retirement window should focus on these theory-based determinants of physical activity behaviour. **Keywords:** Retirement; Physical Activity; Barriers; Behaviour.

LIFESTYLE REDESIGN: CAN A PREVENTIVE OCCUPATIONAL THERAPY APPROACH IMPROVE THE HOSPITAL TO HOME INTERFACE FOR OLDER PEOPLE?

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Increasing pressure on health and social care services due to the changing population demographic has resulted in development of policy that emphasises wellness, prevention of illness and delivery of community based services. Reducing hospital admissions, length of stay and improved outcomes for older people are key factors. Lifestyle Redesign®, an innovative approach developed in the USA, has produced convincing evidence through randomised controlled trials that occupational therapy (OT) can provide sustained, cost effective improvements in the health and wellbeing of older people that reduce use of health and social care services. A Winston Churchill Memorial Trust travel award provided the opportunity for an OT from NHS Dumfries & Galloway, Scotland to spend 8 weeks at the University of Southern California, USA with Dr Florence Clark and the research team who designed and continue to develop the Lifestyle Redesign® approach. The aim of the visit was to investigate how Lifestyle Redesign® could be used to improve outcomes for older people at the hospital/home interface. OTs view occupation- all that an individual needs and wants to do in their life- as central to the achievement and maintenance of health and wellbeing at every stage of life. The skills of OTs have traditionally been used in rehabilitation or recovery work. OTs trained in Lifestyle Redesign® facilitate clients through a process of making self-directed changes to their lifestyle and daily routines that are personally meaningful, health promoting, sustainable and enhance quality of life. The presentation will discuss the findings of the study visit and examine the case for the use of the approach by OTs to improve the hospital/home interface. Use of this OT intervention has the potential to make a significant contribution to the national healthcare agenda and to significantly improve outcomes for older people at a vulnerable time in their lives. **Keywords:** Occupational Therapy; Prevention; Home Interface; Wellbeing.

ASSOCIATION BETWEEN BONE MINERAL AND FUNCTIONAL CAPACITY IN BRAZILIAN SUBJECTS AGED 80 YEARS OR OLDER

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Introduction: Aging is a gradual and progressive process that is accompanied by decrease in bone mineral content (BMC), bone mineral density (BMD) and functional capacity. **Objective:** To analyze the association between bone mineral content and bone mineral density with functional capacity in subjects aged 80 years or older. **Methods:** The sample was composed by 93 subjects aged 80-91 years (83.2±2.5y), being 61 women (83.3±2.7years) and 32 men

(83.1±2.2 years) living in Presidente Prudente-Sao Paulo/Brazil. The Dual-energy X-ray Absorptiometry (DEXA) was used to assess the BMC and BMD of the femur and spine(T1-T4). The functional capacity was assessed by walking speed tests, static equilibrium and strength of lower limbs, according recommendation contained in the Wellness Health and Aging questionnaire. The BMC and BMD and functional capacity were categorized according to the median values and score tests, respectively. The association between variables was carried out by chi-square test, the software used was SPSS, version 17.0($p < 0.05$). **Results:** The femur BMC was the only variable that presents significant correlation with all performance tests ($p < 0.0001$). The other correlations did not showed statistical significance with performance tests. **Conclusion:** The femur bone mineral content in the male subjects was the most associated with the functional capacity. **Keywords:** Bone Mineral; Functional Capacity; Bone Mineral Density; Brazil.

EFFECT OF CONCURRENT TRAINING ON BODY COMPOSITION AND BONE MINERAL DENSITY IN POSTMENOPAUSAL WOMEN

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Introduction: Aging and menopause are independent risk factors for the development of obesity and osteoporosis, and these risks increase when associated with sedentary lifestyle. **Objective:** To investigate the effect of concurrent training on body composition and bone density in postmenopausal women. **Methods:** Sample consisted of 94 postmenopausal women, aged 50-75 (61.4±6.9) years, from Presidente Prudente, Sao Paulo-Brazil. The participants were distributed in three groups: training group (TG): performed only concurrent training during eight weeks, three times/week; training+diet group (TDG): performed the same concurrent training with supervised food ingestion, and control group (CG): did not train or diet. Total fat mass (FM), % of body fat (%BF), fat-free mass (FFM), trunk fat mass (TFM) and bone mineral density (BMD) were estimated by Dual Energy X-ray Absorptiometry (GE Lunar DPX-NT). The intervention period lasted eight weeks, and consisted by the combination of 50-min strength training followed by 30-min aerobic exercise. The training prescription followed the recommendations of the ACSM (2002). The caloric intake followed the recommendations of the AHA (2000). The comparison between periods, before and after training, was made using the Student's t test for paired variables. All statistical analysis was performed using SPSS, version 17.0 ($p < 0,05$). **Results:** The comparisons between both moments, before and after intervention, showed that the TG presented significant decrease in the FM ($p = 0.043$), %BF ($p = 0.010$), and improvement in the FFM ($p = 0.003$). The CG presented significant decrease in the BMD ($p = 0.001$). No significant differences were observed in the TDG. **Conclusion:** Concurrent training without diet was effective to decrease fat mass and % of body fat, and increase fat-free mass. These results were not observed in the other two groups. **Keywords:** Bone Mineral Density; Postmenopausal Women; Diet; Body Fat.

COMPARISON OF TWO DOSES OF AN EXERCISE INTERVENTION ON MOBILITY AND FUNCTION IN OLDER ADULTS

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Purpose: The purpose of the present study was to compare the effect of varying frequency of the FallProof™ intervention on function and mobility. **Methods:** Participants ($n = 23$; mean age = 79.1, one male) with mild-moderate mobility impairment were recruited from a local residential retirement community and randomly assigned to one of two intervention groups, 1 day group (1D, $n = 12$), or 2 day group (2D, $n = 11$), utilizing the FallProof™ program. The exercise program was conducted for 16 weeks, with baseline, 8 week and 16 week assessments of the Berg Balance Scale (BBS), 8 foot Up and Go (UG), 50-foot walk test and 30-sec chair stands. The Motor Fitness Scale (MFS) and Late Life Function and Disability Instrument (LLFDI) questionnaires were administered pre and post intervention. **Results:** Of the 23 participants that began the intervention, 19 completed 8 weeks and 14 completed all 16 weeks. There was no difference in adherence to the protocols between groups for either those that completed 8 weeks ($p = .45$) or 16 weeks ($p = .92$). Significant improvements were observed on the BBS and UG, respectively, for both the 1D (49.9 to 52.4, $p < .05$; 8.7sec to 6.9sec, $p < .05$) and 2D (45.1 to 48.7, $p < .05$; 10.9sec to 8.9 sec, $p < .05$) groups from baseline to 16 weeks. A significant difference was observed between the groups on the Motor Fitness Scale at 16 weeks (1D = 9.7 + 2.1, 2D = 6.0 + 2.4; $p < .01$). **Conclusion:** These results suggest that the FallProof™ exercise program, offered one day per week, can achieve improvements in the BBS and UG similar to two days per week. Small sample sizes prevent broad generalization of the effectiveness of the FallProof™ program offered 1 day per week, so further research is needed, utilizing larger and more diverse samples. Nevertheless, these results support the potential for cost effective adoption of the FallProof™ program, offered one time per week, among retirement communities and senior centers. **Keywords:** Exercise; Intervention; Technology; Mobility.

THE RELATIONSHIP BETWEEN THE LATE LIFE FUNCTION AND DISABILITY INSTRUMENT AND BERG BALANCE SCALE

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Introduction: The Berg Balance Scale (BBS) has been shown to be reliable for predicting fallers, however a limitation of the BBS is that it requires significant training and one on one supervision to administer the test which consists of 14 tasks that are scored from 0-4 for a total of 56. The Late Life Function and Disability Instrument (LLFDI), developed to predict who is at risk for disability, provides a composite score of basic lower extremity function and advanced lower extremity function. Since it is a questionnaire, it requires less training and can be administered in a one to four ratio in most settings. For many retirement communities the cost to administer the BBS would prohibit its use, whereas the LLFDI could be administered at a much lower cost per resident. **Purpose:** To compare the baseline results of the BBS and LLFDI which were both utilized in an intervention study aimed at improving mobility and balance in older adults. **METHODS:** The BBS and the LLFDI were administered, by researchers appropriately trained to use both approaches, at baseline. Subjects ($n = 20$: 1 male, 19 female) were residents of an independent living retirement community (age 67-91, mean 78). **Results:** The mean score for the BBS at baseline was 46.3 (SD 7.9). The baseline LLFDI basic lower extremity function mean score was 57.95 (SD 8.6). The advanced lower extremity function mean score was 35.3 (SD 16.4). A moderate relationship was observed between the BBS and the basic lower extremity score from the LLFDI ($r = .65$, $p = .002$). The relationship was also moderate ($r = .71$, $p = .0001$), when comparing

the BBS to the advanced lower extremity score for the LLFDI. **Conclusion:** These results suggest that the LLFDI may provide an alternative screening approach to the BBS, which can be more costly and time consuming to administer, for those considered at high fall risk and in need of a fall prevention program. **Keywords:** Berg Balance Scale; Falls Prediction; Screening; Disability.

THE EFFECT OF A WITHOUT-WEIGHT-BEARING WALKING INTERVENTION ON BONE MINERAL DENSITY

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Background: Previous studies have found that walking could have positive effects on maintaining Bone Mineral Density among postmenopausal women. However the majority of this group tends to be sedentary. Barriers to maintaining regular physical activity among postmenopausal women are found to be the lack of accessibility of physical activity facilities and the convenience and safety of the mode of physical activity. Walking is viewed as an easy, less costly physical activity and could be adopted with limited time and location. **Objective:** Aims to examine the effect of a 12-week walking intervention, without weight bearing, on maintaining BMD among postmenopausal women. **Methods:** A randomized controlled trial design was used to test the effect of the walking intervention. Participants were recruited from an east township of Taiwan. A total of 57 participants was randomized to either a control (n = 28) or intervention group (n = 29). Control group participants received a usual care when needed. Participants in intervention group received a 12-week, without-weight-bearing walking intervention. **Results:** At 12th week follow up, mean change of BMD was similar in two groups (p = .5). Aerobic steps were increased in intervention group. Scores of exercise self-efficacy and exercise outcome expectation were also improved significantly. **Conclusions:** A 12-week, without-weight-bearing walking intervention may increase postmenopausal women's physical activity, exercise self-efficacy and exercise outcome expectation but the effect on maintaining BMD was not found. Future study testing the effect of longer period, without-weight-bearing walking intervention or vice-versa on maintaining BMD is warranted. Only then maintaining or improving BMD through walking activity among postmenopausal women could be feasible. **Keywords:** Bone Mineral Density; Walking; Intervention; Self-Efficacy.

DELIVERING ON PREVENTION AND ANTICIPATORY CARE: A REVIEW OF THE REGISTRATION SYSTEM FOR BLIND AND PARTIALLY SIGHTED PEOPLE IN SCOTLAND

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Introduction: Research has predicted that the impact of an ageing population on the prevalence of sight loss could see the number of people with serious sight loss in Scotland rising to almost 400,000 by 2031. Despite an ageing population and increasing incidence of sight loss, new registrations fell by 7%, suggesting that the current registration system is not fit for purpose and fails to connect with people at the right stage. **Methods:** A review of the literature and evidence on the current registration process in Scotland was conducted. The views of service providers within the hospital eye services (HES); Local Authorities and Local Sight Loss Societies were sought across Scotland. In addition, two focus groups were

held with service users in Edinburgh and Glasgow. **Conclusions:** There is a clear case to modernise the current system. The proposed changes would significantly improve anticipatory care through initiating early access to assessment, information and support services. This would also enable people, particularly older people, to live more active and independent lives. The changes would also prevent unnecessary or avoidable health and social care interventions in line with current Scottish Government policy. Through shifting the focus from Ophthalmology to Optometry, it would represent a shift in the balance of care from acute to community, ensuring that the process was more efficient and would automate the distribution, storage and recovery of the information collated. **Recommendations:** 1. Review the clinical criteria currently used to register people as blind or partially sighted 2. View visual impairment as a long-term condition, moving away from a 'register' 3. Implement a system of notification and indexing built into an electronic referral process. **Keywords:** Prevention; Visual Impairment; Active Life; Scotland.

PERCEPTIONS AND BEHAVIORS OF ROMANIAN ELDERLY CONCERNING HEALTHY AND ACTIVE AGEING

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The aim of our presentation is to reflect perceptions and personal behaviors of Romanian elderly concerning a healthy lifestyle and a healthy and active ageing. Older people are one of the segments of the European population who are more likely to define themselves as in poor health, or long-term ill. Their life quality is affected and much more resources are needed. Life expectancy at birth for the general population of Romania has a slightly increasing trend, reaching 72.7 years. However this is considerably lower than in other countries of Central and Eastern Europe. Among the main causes of death in Romania, cardiovascular diseases are followed by malignant tumors digestive diseases and also some infectious and parasitic diseases from external causes. This is an explorative research focused on the concerns of the Romanian elderly throughout their life-course for a healthy lifestyle and an active and healthy ageing. 28 narrative interviews have been used for data collecting. Perceptions, concerns, habits, options for a treatment in poor health situations, access to health care system, personal and social responsibility, preparedness for a healthy and active ageing were the major topics followed in our dialogs. The narrative and constructivist approaches were been used for analyze and interpreting. Triangulation has been also assured. Promoting and living a healthy lifestyle was not the main concern of all elderly we interviewed. For some of the interviewed people, linking levels of their actual health status with quality of personal ageing becomes surprising. Across their youth and economic active live, a healthy lifestyle has not a major personal choice or topic. As various dimensions of frailty appeared, a much more healthy behavior becomes their main concern. On the bases of the individual ageing process and experiences, a sum of hints for a healthy and active ageing are collected and interpreted. **Keywords:** Behaviour; Perception; Health; Active Ageing; Romania.

ACTIVE AGEING POLICY DEPLOYMENT IN BISCAY

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Introduction: On its Plan for the Elderly 2006-2011, Bizkaia Provincial Council stressed that the fostering of Active Ageing was its key priority. The emphasis was on the institutions and society in general working to ensure that "Ageing Actively" was something intrinsic

to lifelong “living actively” as part of a diverse, intercultural and intergenerational society where seniors are treated fairly. **Deployment:** This political undertaking was embodied in the “Bizkaia Manifesto for Active Ageing,” which was an initial resource to raise awareness of a new life model for seniors. In 2010, a Plan of Action for Active Ageing in Bizkaia was designed to create the optimum conditions to encourage AGE AGEING. Three specific mechanisms were introduced: a) surveying the opinion of political representatives and public sector technicians, b) analysing the development of public policies in terms of their capacity to foster Active Ageing processes and c) setting up a commission within the Seniors Board, a deliberative body with an advisory and consultation role, answering to the Department and which is made up by representatives both from Seniors associations and from institutions. The work pinpointed the challenges to be met: 1) Changing the negative stereotypes about old age 2) Fostering an integral concept of seniors 3) Achieving understanding of the Active Ageing concept 4) Trying to change the integration and participation systems for seniors 5) Encouraging progressive access and getting ready for retirement 6) Fostering socio-economic situations that enable decent ageing To conclude, the Action Plan for Active Ageing with specific actions is currently being assessed. **Conclusions:** Key factors for success are: 1. Institutional undertaking (top-down approach) 2. Civic society’s involvement in the diagnostic process and plan of action (bottom-up approach) 3. The transversal approach being included in all the policies (inter-disciplinary) 4. Institutional leadership. **Keywords:** Active Ageing; Health Promotion; Public Sector.

BALANCE EXERCISE CLASS PATIENT QUESTIONNAIRE

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Background: The purpose of the investigation was to quantify patient reported outcomes following participation in balance groups. Balance groups provide targeted exercise to people with a history of falling, a fear of falling, unsteadiness on their feet or osteoporosis. **Methods:** All patients attending Balance Exercise Programme were asked to complete a questionnaire at the final session and on completion place in a sealed box at reception. All completed questionnaires were sent to the audit department to collate and produce this report on the results. The audit lasted one year. **Results:** 47 patients in total submitted a questionnaire out of a possible 60. 96% of patients enjoyed attending the group. The patient’s comments were very positive. After attending the group:- 83% of patients felt more flexible; 77% felt more confident when carrying out their daily activities; 70% of patients felt stronger; 66% felt their balance had improved; 53% were happy to do all the exercises at home after discharge; 96% found the challenge of the exercises “just right”; 98% were happy to do at least some of the exercises at home. **Discussion:** 66% of patients felt their balance had improved. 34% of patients, however, reported no change in their balance. Previous small audits showed objective improvement in patient’s balance following balance groups. The multi factorial nature of balance may make improvements in balance more difficult for patients to notice than for example muscle strength or flexibility. Patients may benefit from more targeted verbal feedback to reinforce their progress in balance exercises. It is important, in future, to obtain qualitative data about patients’ confidence in continuing with the balance component of home exercises in order to ensure they are exercising at an optimal level when unsupervised. **Conclusion:** The questionnaire provided patient reported evidence of physical improvement following exercise in balance groups Future questionnaires need to ask more specific questions in order to inform further improvements as outlined in the discussion. **Keywords:** Physical Improvement; Exercise; Intervention; Balance; Strength.

FALL REDUCTION TECHNIQUES IN WATER EXERCISE

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Bone density is known to respond best to loading and impact in gravity but those with movement challenges may be advised to exercise in water for cardiovascular conditioning. Swimming requires a skill set; vertical water exercise does not and can be offered to a wide range of fitness levels and age groups. The physiological benefits of vertical water exercise are known but the opportunity to train for fall reduction is rarely considered. Studies have demonstrated improvement in lateral hip stabilisers and core strength when lateral motion is incorporated in upright water exercise. Muscle power, speed, and strength can all be improved using water resistance. Quick direction changes demanding eccentric loading on legs promotes agility and is safer done in the supportive buoyancy of water since falls during practice are unlikely to result in more than wet hair. Reaction speed, arm reach, hand grasp, turning speed, and peripheral visual quickness are all aspects that can be integrated into programs while also promoting heart health and social wellness. There is a need for instructor education specific to fall reduction techniques with methods that can be incorporated into classes at all levels of ability. There is also a need for further water based research investigating ideal approaches for reducing fall risks.

REFINE: REDUCING FALLS IN IN-PATIENT ELDERLY

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Background: In patient falls are an important cause of patient morbidity and a source of additional costs to health care providers and burden to staff. **Aim:** To reduce in-patient falls.

Method: Individual patient computer randomised control trial recruiting patients admitted to five acute elderly medical care wards in an UK teaching hospital between January 2009 and March 2011. Exclusion criteria were permanently bed bound prior to admission, moribund or unconscious, in receipt of terminal care or previous inclusion in the trial. In addition to usual fall prevention measures, for the intervention group a battery-operated bed and bedside chair pressure sensor was fitted that caused an alert on a handheld battery-operated radio-pager carried by nursing staff when the subject left the bed or bedside chair. The control group had usual care only. The primary outcome measure was the number of in-patient bedside falls ascertained from incident reporting forms per 1,000 bed days from time of randomisation to date of discharge, death, or study withdrawal, whichever occurred soonest. A concurrent qualitative study recorded the process of implementation. **Analysis:** The falls rate was calculated as the total number of falls divided by the total number of days post randomisation to give the number of falls per 1000 bed days. **Results:** 1,839 patients were randomised (921 to the control and 918 to the intervention arm). The mean age was 84.6 years (range 61 to 103), with a slight predominance of females (55% of total). Treatment arms appeared comparable in terms of baseline characteristics. There were no significant differences, adjusted or unadjusted between groups: the rate of falls in the control group was 9.84 per 1,000 bed days compared to 8.71 per 1,000 bed days in the intervention group. **Conclusion:** The addition of pressure sensors to usual fall prevention did not reduce the number of bedside falls.

IMPACT OF A THEORY-BASED OSTEOPOROSIS EDUCATION INTERVENTION ON PHYSICAL ACTIVITY IN OLDER ADULTS: A RANDOMIZED CONTROLLED TRIAL

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Objective: Whether dual energy X-ray absorptiometry (DXA) screening alone or combined with a theory-based education intervention, results in an increase in habitual physical activity and the decision to start or increase weight-bearing activity to prevent or manage osteoporosis. **Materials and Methods:** Men and women 50 years of age and older (age range 50-80 years), were referred by their healthcare provider to undergo DXA screening for the first time at the local hospital. Participants (n = 182) were randomly assigned to an intervention group (n = 91) or control group (n = 91). Both groups underwent DXA screening and completed Voorrip's physical activity questionnaire to assess habitual activity. The intervention group also received theory-based osteoporosis education. Six months after baseline, participants completed Voorrip's questionnaire again and a follow-up questionnaire evaluating change in weight-bearing activity. Group differences and differences based on DXA results (osteoporosis, osteopenia, normal) were compared using chi-square, paired/independent t-tests, and contingency tables/ANOVA. **Results:** At follow-up, 25.8% of participants reported starting or increasing weight-bearing activity, but there was no significant difference between groups. Habitual physical activity decreased from baseline to follow-up in both groups. At follow-up, the intervention group had slightly increased activity scores (M = 11.93, SE = .68) compared to control group (M = 10.43, SE = .59); however this difference was not significant (t(171) = -1.72, p > .05). Osteoporosis diagnosis was associated with significant increase in weight-bearing activity (p = .05), but not habitual activity. **Conclusions:** This study provided evidence that a theory-based education intervention was unsuccessful in increasing weight-bearing or habitual physical activity. More research is needed in using a theory-based approach for improving physical activity to promote bone health in this population.

FALL PREDICTION IN ELDERLY POPULATION THROUGH ISOKINETIC ASSESSMENT OF THE LOWER EXTREMITIES AND STATIC AND DYNAMIC BALANCE FIELD TESTS

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Objective – To investigate for predictive factors for falls in the elderly population after lower extremity strength assessment in an isokinetic dynamometer and after performing in two static and dynamic balance field test and to construct a discrimination model for the classification of the elderly in a fallers and non-fallers group. **Methods** - 59 community dwelling elderly men and women aged 60 years and older with or without a history of falls all in good health were selected. We used six concentric and two eccentric speeds isokinetically (60°, 90°, 120°, 180°, 240°, 300°/sec and 60°, 120°/sec respectively) and four different angular positions isometrically (75°, 60°, 45°, 30° of knee flexion, 0° = anatomical zero) in the knee joint for both legs in flexion and extension. We also used two field tests of static and dynamic balance, the Timed Up & Go (TUG) test and the Functional Reach (FR) test. T-test was used in order to identify differences between fallers and non-fallers. Stepwise discriminant analysis performed in order to reveal the factors for classification of the elderly in fallers/

non-fallers group. **Results** –The results revealed that from the total 62 variances entered in the discriminant analysis, three predictive variables occurred: the mean total work ratio in 60°/sec., the TUG, and the mean eccentric peak torque in 120°/sec., classifying correctly the 94.6% of the elderly in the fallers-non fallers group. The predictive equation that derived was $z = 19.699$ (mean total work ratio in 60°/sec.) + 0.255 (TUG) + 0.323 (mean eccentric peak torque in 120°/sec.) – 99.091. **Conclusions**- Isokinetic and isometric assessment of the lower extremities strength in the elderly population in combination with simple field tests of static and dynamic balance (TUG and FR tests) can discriminate fallers and non fallers. As a result we can therefore classify older people in prevention programs according to their probability for falls. Key Words: fall prediction, elderly, isokinetic assessment, static balance, lower extremities

POSTURAL CONTROL AND MUSCLE ACTIVITY DURING SQUAT-TO-STAND IN OLDER ADULTS

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Squat-to-stand after ground activity is one important body weight transfer movement of daily activities. The purpose of this study was to compare the postural stability, kinematic and muscle activity during squat-to-stand between older and young adults. Twenty-four old adults (OA) and 24 young adults (YA) squatted on a platform to perform the rising up and the stability index during movement was measured. Surface EMG data were recorded on selected trunk and the lower extremity muscles. An electrogoniometer was fixed over the knee joint, and an inclinometer was fastened on the head to record kinematic data. The task was split into six movement phases based on the angular displacement and velocities of the knee joint. The OA had larger stability index in anterior-posterior direction than the YA. The maximal angle displacements and angular velocity of the knee joint were significantly ($p < 0.05$) lower in OA than YA. In addition, old adults use more head flexion in first half movement cycle but less lateral flexion in later half cycle than young ones. To cope with the motor pattern, the old adults need to increase activation of adductor magnus, gluteus medius, biceps femoris, rectus femoris, and gastrocnemius to stand up. The erector spinae was active earlier in the OA than the YA, while the gluteus medius and gastrocnemius muscles were active later. Older subjects and young subjects had different kinematic patterns of knee and head. Older subjects rise up with more posture sway and effort that implies loss of balance during this task easily.

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