EXERCISE AND MOTOR TRAINING CAN IMPROVE BALANCE IN PARKINSON'S DISEASE: A SYSTEMATIC REVIEW

Allen NE[1], Sherrington C[2], Paul SS[1], Canning CG[1]
[1]*The University of Sydney, Lidcombe, NSW, Australia*
[2]*The George Institute for Global Health, The University of Sydney, Sydney, NSW, Australia*

Aim:
The aim of this systematic review with meta-analysis was to determine the effects of exercise and motor training on balance-related activity performance and falls in people with Parkinson's disease.

Methods:
Seven electronic data bases were systematically searched as well as the reference lists of relevant review articles. We included 16 randomised controlled trials with balance outcomes that compared exercise and/or motor training for people with Parkinson's disease with no intervention or a placebo intervention. The primary outcome measures were balance-related activity performance and falls. The balance-related activity performance measure involved pooling the most comprehensive balance measure from each trial. Pooled estimates were obtained using random-effects meta-analyses.

Results:
The balance-related activity performance meta-analysis included 15 trials with 747 participants and the falls meta-analysis included 2 trials with 250 participants. The pooled estimates of the effects showed that exercise and motor training significantly improved balance-related activity performance (Hedges' g = 0.34, 95% CI 0.11 to 0.57) but there was no evidence of an effect on the proportion of fallers (risk ratio 1.02, 95% CI 0.66 to 1.58). The greatest relative effects of exercise and motor training on balance-related activity performance tended to occur in programs with highly-challenging balance training (p = 0.158), but there was no evidence of an association with the total dose of exercise (p = 0.98).

Conclusion:
Exercise and motor training can improve the performance of balance-related activities in people with Parkinson's disease. However, further research is required to determine if falls can be prevented in this population.

EXERCISE FOR FALL RISK FACTORS IN PARKINSON'S DISEASE: A RANDOMISED CONTROLLED TRIAL

Allen NE[1], Canning CG[1], Sherrington C[2], Fung VSC[3], Murray SM[1], O'Rourke SD[1]
[1]*The University of Sydney, Lidcombe, NSW, Australia*
[2]*The George Institute for Global Health, The University of Sydney, Sydney, NSW, Australia*
[3]*Westmead Hospital, Westmead, NSW, Australia*

Aim:
This randomised controlled trial aimed to determine the effect of a six-month exercise program on potentially remediable fall risk factors (reduced muscle strength, reduced balance and freezing of gait) in people with Parkinson's disease.

Methods:
Forty-eight participants with Parkinson's disease who had fallen or were at risk of falling were randomised into exercise or control groups. The exercise group exercised three times per week, including a monthly exercise class and home exercise. The exercise program targeted leg muscle strength, balance and freezing of gait. The primary outcome measure was a Parkinson's disease fall risk score which consisted of weighted contributions from knee extensor muscle strength of the weaker leg, balance in standing and freezing of gait. Secondary outcome measures of fall risk included measures of these three fall risk factors. Physical abilities (fast walking speed, sit to stand time) and fear of falling were also measured.

Results:
The exercise group showed a greater but not statistically significant improvement in the Parkinson's disease fall risk score compared to the control group (between group mean difference -7%, 95% CI -20 to 5, p = 0.26). There were statistically significant improvements in the exercise group compared to the control group for two secondary outcomes: Freezing of Gait Questionnaire (p = 0.03) and sit to stand time (p = 0.03). There were trends toward greater improvements in the exercise group for measures of muscle strength, walking speed and fear of falling but not for the measures of standing balance. These results were achieved with no major adverse events.

Conclusion:
Further investigation of the effect of exercise on falls in people with Parkinson's disease is warranted.

TRIAL AND EVALUATION OF FALLS TOOLS ACROSS THE CONTINUUM

Atkins HS[1], Smith KM[1,2], Brauer S[3], O'Dwyer K[1]
[1]Queensland Health, Patient Safety and Quality Improvement Service a branch of Centre for Healthcare Improvement, Brisbane, QLD, Australia
[2]Queensland Health, Division of Chief Health Officer, Preventative Health, Brisbane, QLD, Australia
[3]University of Queensland, Division of Physiotherapy, Brisbane, QLD, Australia

Aim:
There is high demand from clinicians in Queensland to improve the prevention and management of falls. A recent statewide survey revealed a plethora of falls risk assessment tools are used within hospital settings and identified strong support for a standardised approach to the assessment of falls risk and post fall management across Queensland (87% of respondents, n = 353).

This project reports on the development and evaluation of the clinical utility of a Falls Assessment and Care Plan and a Post Fall Clinical Pathway across the continuum. This 3-month quality improvement initiative trials these new falls tools in 15 facilities across the continuum (acute, rehabilitation, community health, residential aged care) in Queensland (metropolitan, regional, rural).

Methods:
The falls tools were developed through an extensive consultation process with clinicians across the continuum, led by the Queensland Health Falls Injury Prevention Collaborative. The new documentation primarily involves nursing staff, with multi-disciplinary components. The assessment and care plan extends the traditional risk identification into a care-plan and documentation strategy. Local site-coordinators will conduct pre-implementation staff education.

Mixed evaluation methods will determine the clinical utility of the tools. The effectiveness of the tools will be measured using pre and post-project chart audits examining documented falls prevention strategies. Convenience sampling with self-administered pre and post-project surveys of staff perspectives and patients satisfaction will be conducted. Pre- and post-project analysis will be assessed using repeated measures analysis (ANOVAs).

Results:
The preliminary findings on the effectiveness of these falls tools will be presented, comprising pre and post-project results from chart audits (minimum 155 charts) and satisfaction surveys (minimum 165 clinicians and 370 patients).

Conclusion:
This pilot project will inform the statewide rollout of standardised falls assessment and management documentation. Improving consistency of care across the continuum statewide will assist in providing high quality and safe patient care.

GOOD VIBRATIONS: WHOLE-BODY VIBRATION TRAINING FOR FALL AND INJURY PREVENTION

Barker A[1], Patterson K[2]
[1]Centre for Research Excellence in Patient Safety, School of Public Health and Preventive Medicine, Monash University, Melbourne, VIC, Australia
[2]Power Plate, Brisbane, QLD, Australia

Aim:
Whole-body vibration training (WBVT) is an increasingly popular exercise modality. WBVT involves standing on a vibrating platform which is reported to produce neuromuscular adaptation and increase bone mineral density (BMD). Our objective was to review randomised controlled trials (RCTs) and meta-analyses examining WBVT's effect on balance and BMD to provide insight into fall and fracture prevention value.

Methods:
MEDLINE, EMBASE, Cochrane and CINAHL databases were searched using "vibration", "postural balance", "accidental falls", "bone density" and "osteoporosis" medical subject headings. Retrieved publication bibliographies were also searched. English language studies published between 1996 and June 2010 in healthy older adult populations were included. Athletic population studies were excluded. Two independent reviewers assessed study quality using the Physiotherapy Evidence Database (PEDro) scale. A best evidence synthesis is reported.

Results:
The search identified 58 studies; 13 met the inclusion criteria. Six examined WBVT's effect on balance; five, including one meta-analysis, examined the effect on BMD; one examined the effect on BMD and falls; and one examined the effect on BMD and balance. Controls received no vibration, sham vibration or non-vibration exercise. Seven RCTs (two in nursing home populations) found WBVT significantly improved balance compared to controls. The meta-analysis including five RCTs (one osteoporotic population) found WBVT significantly increased hip but not spine BMD compared to controls. One study reported significantly fewer falls in women receiving WBVT compared with light exercises. Study vibration and

exercise protocols varied considerably. Studies were of moderate quality (mean PEDro score = 6.86).

Conclusions:
We found evidence of improved balance and hip BMD with WBVT in healthy older adults. Few controls used sham vibration, so benefits could be due to the exercise not the vibration. WBVT is a promising new fall and injury prevention modality, but before clinical practice recommendations are made, further high-quality large-scale studies are needed to determine optimal training parameters.

FEAR OF FALLING IN PEOPLE WITH STROKE: FALLS MAKE NO DIFFERENCE

Batchelor FA[1,2], Hill KD[1,3], Mackintosh SF[4], Said CM[2,5], Vrantsidis F[1]
[1]*National Ageing Research Institute, Parkville, VIC, Australia*
[2]*University of Melbourne, Parkville, VIC, Australia*
[3]*LaTrobe University & Northern Health, Bundoora VIC, Australia*
[4]*University of South Australia, Adelaide, SA, Australia*
[5]*Austin Health, Heidelberg, VIC, Australia*

Aim:
Fear of falling is common in older people in general and in people with stroke. Most research has found associations between falls, fear of falling and function; however, the causality of this relationship has not been definitively established. There is a paucity of longitudinal studies examining fear of falling in the stroke population and a lack of studies evaluating fall-related efficacy shortly after a fall. The aims of this study were to determine the effects of falls and time on fall-related efficacy, gait, balance and activity in people with stroke at high risk of falls.

Methods:
A longitudinal study was undertaken over 12 months with repeated measures of fall-related efficacy, gait, balance and activity at four monthly intervals and following falls. Measures used included the Falls Efficacy Scale – Swedish Modification (FES-S),[1] gait speed, Step Test (ST), and Human Activity Profile (HAP). To examine the effects of falls and time, a multi-level modelling approach was used.

Results:
Participants were part of a randomised controlled trial evaluating a falls prevention program for people returning home after stroke rehabilitation. Forty-eight people (mean age 70 years) were included in the analysis. Falls had no significant effect on FES-S when included in the model as a binary variable (parameter estimate 0.11, p = 0.54) or as cumulative falls (parameter estimate 0.08, p = 0.37). The change in FES-S per week was also non-significant (parameter estimate 0.0007, p = 0.88). In contrast,

significant changes after falls were seen in gait speed, ST and HAP with these variables also improving significantly over time.

Conclusion:
In this sample of people at risk of falls, there was no effect of falls on fall-related efficacy. In addition, fear of falling did not change over time. Further research is needed to determine the characteristics of people with stroke who become more fearful after a fall.

Reference:
1. Hellström K, Lindmark B, Fugl-Meyer A. The Falls-Efficacy Scale, Swedish version: does it reflect clinically meaningful changes after stroke? Disabil Rehabil 2002;24(9):471-81.

"MAKE A MOVE / LA VITA BELLA"- A HOME-BASED FALLS PREVENTION PROGRAM FOR OLDER ITALIANS

Beirne NB, Forster M
Doutta Galla Community Health Centre, Moonee Ponds, VIC, Australia

Aim:
To promote health, independence and reduce falls risks of older people (75 and over) of Italian background by improving leg strength, balance and nutrition.

Background:
Older people living at home, often socially isolated, poorly nourished and not regularly active, are at great risk of falls. "Make a Move /La Vita Bella" (incorporating the Otago Exercise Programme) is a proactive, home-based, falls risk-reduction and nutrition program, lead by Doutta Galla Community Health Service (DGCHS) in collaboration with Moonee Valley City Council (MVCC). Developed as part of the Department of Human Services, Victoria, Australia, funded "Make a Move" program in response to an identified need and service gap.

Methods:
The following evidence-based and best-practice screening and assessment tools are used:
• the QuickScreen[©] Clinical Falls Risk Assessment;
• leg strength and balance measures from the Otago Exercise Programme;
• the Modified Falls Efficacy Scale (MFES);
• the Home Falls and Accidents Screening Tool (HOME FAST).

An initial home visit conducted by a physiotherapist assesses the client's falls risk and suitability for the program. A subsequent home visit by a dietitian assesses nutritional status. An individually tailored strength and balance retraining program is prescribed, nutritional recommendations and referrals are made as necessary.

Fitness instructors, trained in the Otago Exercise Programme attend home visits regularly early in the program, followed by telephone calls to the client at monthly intervals up to 12 months. A CD, "La Vita Bella" was produced and recorded in Italian; it combines music and comedy and was used to engage clients and promote sustainability. Qualitative data and quantitative data of leg strength, balance and falls efficacy were measured at baseline, 6 and 12 months.

Results:
Although sample numbers at 6-months (n = 10), and 12-months (n = 4) are low, outcome measures demonstrated a trend towards a reduction in number of client falls and increased strength, balance and confidence levels.

Conclusion:
"Make a Move /La Vita Bella" program intervention appears to have potential efficacy in supporting anticipated outcome objectives. Formal statistical analysis may provide more robust outcome data as greater sample measures become available.

CROSS-CONTINUUM FALLS AND INJURY DATA: PIECING THE PUZZLE TOGETHER IN QUEENSLAND

Bell R, Black A
Patient Safety and Quality Improvement Service, Queensland Health, QLD, Australia

Aim:
Falls among adults aged 65 years and over occur across the continuum: in community, residential aged care and hospital settings. There are various falls data sources in Queensland, although data are poorly disseminated to the wider falls prevention community. This project collected and compiled data from these sources, to better understand the extent and impact of falls among older adults throughout Queensland.

Methods:
Fall-related data occurring during 2007-08 were extracted from the following sources:
- *Pre-hospital services:* Emergency department presentations, Queensland Ambulance attendances;
- *Hospital admissions:* Admitted Patient Data Collection, Queensland Trauma Registry;
- *In-hospital falls:* Hospital incident reporting systems, Admitted Patient Data Collection;
- *Mortality records:* Queensland Health Statistics Centre.

Results:
During 2007-08, over 22,000 fall-related ambulance attendances were provided to older adults (44.5 per 1000 population), most occurring in private

residences or nursing homes. In the same period, there were 13,028 fall-related hospitalisations among older adults, estimated to cost around $106 million. Hip fracture injuries were the most common cause of hospitalisation with nearly 10 admissions per day (n = 3572). Over 2200 in-hospital falls resulting in injury were extracted from admitted coded data, of which 16% were fracture injuries. The rate of in-hospital falls resulting in injury among older adults was 3.17 per 1000 separations. Furthermore, 493 Queensland residents died due to a fall (11.7 per 100,000 population), most of whom were older adults (95%).

Conclusion:
The project advances our understanding of the burden of falls in Queensland and identifies the key falls data stakeholders. It provides a basis to inform future statewide falls injury prevention initiatives, particularly areas such as prevention of hip fractures in the community and falls in hospital. Further work is needed to improve the quality of some of these data sources, and explore the potential for data linkage projects.

RISK FACTORS FOR FALLS RESULTING IN SERIOUS HEAD INJURIES IN HOSPITAL IN-PATIENTS

Bell RAR [1,2], Chari S [2,3,5], Varghese P [2,4], Ferrar K [1], Haines T [5]
[1] *Queensland Health, Patient Safety Centre, Brisbane, QLD, Australia*
[2] *Queensland Falls Injury Prevention Collaborative. QLD, Australia*
[3] *Queensland Health, Royal Brisbane and Women's Hospital, Brisbane, QLD, Australia*
[4] *Queensland Health, Princess Alexandra Hospital, Brisbane, QLD, Australia*
[5] *Monash University, Melbourne, VIC, Australia*

Aim:
This study explored fall-related risk factors for serious head injury (HI) among adult hospital patients using routinely collected clinical incident data.

Method:
All adult falls in Queensland Health (QH) hospitals between January 2007 and November 2009 were included in the final dataset, which comprised of 24,218 falls with 140 serious HI. Logistic regression was undertaken to identify fall-related predictors for serious HI outcomes.

Results:
Univariate analyses identified the following significant factors ($p \geq 0.05$) which increased odds for serious HI: falls due to fainting (odds ratio (OR) 3.34, 95% confidence interval (CI) 1.83 to 6.06), falls while standing (OR 1.52, 95% CI 1.02 to 2.26), falls

while walking (OR 1.58, 95% CI 1.11 to 2.23), falls in the bedroom away from bed (OR 1.51, 95% CI 1.03 to 2.20), falls in seclusion rooms (OR 12.36, 95% CI 1.61 to 94.68), and falls between 12:00 hr and 13:00 hr (OR 1.97, 95% CI 1.09 to 3.58). Patient inability to recollect the type of fall (such as slip or trip) (OR 2.12, 95% CI 1.43 to 3.13), or activity attempted when fall occurred (OR 2.31, 95% CI 1.56 to 3.40), or function being undertaken at the time of fall (OR 2.81, 95% CI 2.00 to 3.93) all increased risk of serious HI. Male gender was found to be a protective factor (OR 0.59, 95% CI 0.41 to 0.84).

Conclusion:
This study has identified several themes which influence the likelihood of fall-related serious HI. Factors indicative of altered consciousness (falls due to fainting and impaired recollection post-fall) increased serious HI risk. While this could relate to retrograde amnesia after HI, it is plausible that people who faint sustain serious HI due to the absence of protective reactions. Secondly, falls during ambulatory or standing tasks were linked to increased head injury risk – which could be due to greater impact forces in falls from these postures. Thirdly, consistent with extant fracture literature, females were more at risk of sustaining serious head injuries upon falling. Implications of these findings, limitations of the study as well as directions for future research will be discussed.

BUILDING COMPETENT FALLS PREVENTION TEAMS IN HOSPITALS: THE FALLS SPECIALIST OFFICER PROJECT

Black A[1], Brauer S[2], Bell R[1], Haines T[3]
[1]*Patient Safety and Quality Improvement Service, Queensland Health, QLD, Australia*
[2]*School of Health and Rehabilitation Sciences, University of Queensland, QLD, Australia*
[3]*School of Primary Health Care, Monash University, VIC, Australia*

Aim:
In-hospital falls are a major cause of patient harm, and staff are a key factor in preventing falls. This pilot education project targeted frontline hospital staff, to improve their safety actions and attitudes towards falls prevention, and reduce the rate of in-hospital falls and falls injury.

Methods:
The 12-month project, led by Falls Specialist Officers, was conducted in eleven wards at three metropolitan Queensland hospitals. The program included the development and delivery of falls prevention resources, education sessions and a consultation service. A falls prevention team was also established at each hospital to assist in project implementation. Staff safety actions and attitudes were assessed pre- and post-project using compliance audits and a standardised safety climate survey. The rate of falls and falls injuries were examined during the 12-month periods pre-, during and post-project, collected from hospital incident reporting systems and coded admitted patient data.

Results:
Compliance with falls prevention safety actions improved post-project. There was a 19% to 57% increase in use of falls risk screening strategies (complete, correct, documented and completed within 24 hours; p < 0.05); and a 7% to 32% increase in use of environmental safety actions (appropriate bed height, bed-brakes locked, access to call bell, clutter-free environment; p < 0.05). Small improvements in safety attitudes were reported, particularly in the "Learning" dimension (p = 0.02). There was no reduction in the rate of falls or falls injury in the wards post-project.

Conclusion:
The pilot education program was effective in enhancing staff competencies in falls prevention by improving compliance behaviour and attitudes, but did not reduce the rate of falls or falls injury. This may be due to an increase in reporting rates among teams with stronger safety culture, or additional factors other than improving compliance with falls prevention procedures are associated with the incidence of falls.

ED PRESENTATIONS WITH FALLS – WHAT ARE THE LONG TERM OUTCOMES FOR OLDER PEOPLE?

Boyle NM[1,2], Naganathan V[1,2,3], Ng L[1, 2], Cumming RG[1,4]
[1]*Centre for Education and Research on Ageing, Concord, NSW, Australia*
[2]*Concord Repatriation General Hospital, Concord, NSW, Australia*
[3]*Sydney Medical School, University of Sydney, Sydney, NSW, Australia*
[4]*School of Public Health, University of Sydney, Sydney, NSW, Australia*

Aim:
The effectiveness of fall prevention interventions is dependent upon targeting those at greatest risk of further falls and injury, with potential functional decline in those who do not receive appropriate strategies.[1] We hypothesised that those who have further falls requiring an Emergency Department (ED) review or hospital admission have increased mortality and identifiable risk factors which predict future falls and assist in providing targeted interventions.

Methods:
We performed a 5 year retrospective cohort study of older people who presented to an ED with a fall or

syncope between March and June 2005. Data sources were medical records, data linkage with the department of health acute hospital and ED admissions databases, and the Australian Institute of Health and Welfare National Death Index. Regression analysis was performed to identify predictors of death and single or recurrent falls using parameters identified in the original descriptive study.

Results:
A total of 493 patients were identified in the original study with a mean age of 81.8 years (SD 7.8), of which 63% were female; 253 (51.3%) participants died in the follow-up period. Falls were classified as single or recurrent (2 or more falls) resulting in 194 falls from 184 fallers (range 1 to 9 falls). There were no significant differences in the proportions of males and females with single falls (male 36/181 vs female 74/312; p > 0.05) or recurrent falls (male 33/181 vs female 51/312; p > 0.05). A previous history of falls on the initial presentation showed a non-significant trend to shorter mean time to first new fall (39.7 months [95% CI 37.1 to 42.4] vs 47.0 months [95% CI 39.3 to 54.8]). Age, cognitive impairment, mobility issues, dependency for ADLs, cause of initial fall, and previous history of falls were all predictors of falls in the follow-up period.

Conclusion:
This study further highlights the risk of further falls in older people who present to the ED with a fall. Those with the predictors as outlined should be targeted for appropriate preventative interventions.

References:
1. Russell MA, Hill KD, Blackberry I et al. Falls risk and functional decline in older fallers discharged directly from emergency departments. J Gerontol A Biol Sci Med Sci 2006;61(10):1090-5.

RELATIONSHIP BETWEEN SARCOPENIA, FAT MASS AND BALANCE IN OLDER ADULTS

Brodie ML[1], Lo JC[1], Menant JC[1,2], Sturnieks DL[1,2], Lord SR[1,2]
[1]Neuroscience Research Australia, Randwick, NSW, Australia
[2]University of New South Wales, Kensington, NSW, Australia

Aim:
It has been recognised that low muscle mass combined with high percentage body fat leads to functional deficits and has implications for fall risk.[1] However the mechanisms behind this relationship are unclear. This study aims to investigate further the relationship between body composition and falls risk by examining balance and muscle strength in older people.

Methods:
One hundred community-dwelling older adults (44 males, 56 females) aged 66 to 90 years undertook measurements of body composition (lean mass and fat mass) using dual energy x-ray absorptiometry. Participants also completed tests of quadriceps strength, postural sway, controlled leaning balance (coordinated stability test) and choice-stepping reaction time. The appendicular skeletal muscle mass (ASM) index was calculated as sum of lean arms mass plus lean legs mass divided by stature (m) squared.[1] Participants were then classified into four phenotypes including normal lean (n = 37), sarcopenic (n = 7), obese (n = 40) and sarcopenic obese (n = 16) according to the definition of sarcopenia as ASM index < 7.2 (males) and ASM index < 5.4 (females), and obesity as > 30% fat (males) and > 40% fat (females).[2]

Results:
This preliminary analysis showed a positive correlation between ASM index and quadriceps strength (r = 0.516; p < 0.001) suggesting quadriceps strength is a good marker for sarcopenia. Increased percentage body fat was associated with poorer coordinated stability (r = 0.241, p = 0.018), even after controlling for age. There was also a trend for increased postural sway in the sarcopenic obese group compared to the normal lean group (p = 0.093).

Conclusion:
These findings suggest that in addition to sarcopenia, excess adipose tissue contributes to increased fall risk in older people, by impairing balance control.

References:
1. Waters DL, Hale L, Grant AM et al. Osteoporosis and gait and balance disturbances in older sarcopenic obese New Zealanders. Osteoporos Int 2010;21(2):351-7.
2. Baumgartner RN, Koehler KM, Gallagher D et al. Epidemiology of sarcopenia among the elderly in New Mexico. Am J Epidemiol 1998;147(8):755-62.

BETTER BALANCE PROGRAM AT ANGLICAN RETIREMENT VILLAGES –PUTTING RESEARCH INTO PRACTICE

Butler S[1], Abela M[1,2]
[1]Anglican Retirement Villages, Sydney, NSW, Australia
[2]University of Technology, Sydney, NSW, Australia

Aim:
Falls among elderly people can result in serious consequences. As a result of this, a number of falls prevention programs have been developed. Anglican Retirement Villages offer care, services and accommodation to over 4000 people in some 24 locations across Sydney. In May 2008 the Better Balance program was established across Anglican

Retirement Villages implementing the evidenced-based Otago Exercise Programme to improve the strength and balance of participants and reduce the risk of falls and falls-related injuries.

Methods:
Participants were referred by their general practitioner to the Better Balance program. Initial consultation involved a comprehensive falls risk assessment using FallsScreen or QuickScreen.[1] Additional performance tests included the six-metre walk and sit-to-stand tests and qualitative assessments for cognition and confidence levels. Participants then engaged in various components of strength and balance exercises adapted from the best-practice model, the Otago Exercise Programme. An occupational therapy assessment was offered to each participant.

Results:
Two years after the Better Balance program's implementation, fourteen strength and balance classes are conducted per week with an average attendance rate of 8 to10 participants per class. Post-test performance results revealed decreased time to perform sit-to-stand and six-metre walk tests with 81% and 55% improvements respectively, indicating improvements to the strength and balance of participants.

Conclusion:
The Better Balance program has been shown to be beneficial and sustainable across Anglican Retirement Villages. It is a step in the right direction for the successful implementation of evidence-based practice for the prevention of falls among our elderly population.

Reference:
1. Lord S, Sherrington C, Menz H et al. Falls in Older people: Risk Factors and Strategies for Prevention. 2nd edition. Cambridge: Cambridge University Press, 2007.

ASSOCIATIONS BETWEEN FRAILTY AND FALLS

Cameron ID[1,2], Monaghan N[1], Sherrington C[3], Fairhall N[1,3], Langron C[1], Gill E[1], Kurrle S[2], Lord SR[4]
[1]Rehabilitation Studies Unit, Sydney Medical School, The University of Sydney, Sydney, NSW, Australia
[2]Division of Rehabilitation and Aged Care, Hornsby Ku-ring-gai Health Service, Sydney, NSW, Australia
[3]The George Institute for Global Health, The University of Sydney, Sydney, NSW, Australia
[4]Neuroscience Research Australia, University of NSW, Sydney, NSW, Australia

Aim:
In the context of a study of frailty, defined using the Cardiovascular Health Study (CHS) criteria, falls were investigated. This study aimed to examine whether the resolution of frailty was associated with a reduction of falls, and whether the severity of frailty was related to falls incidence.

Methods:
We conducted a cohort study of 134 community-living older people with data collection at baseline, 3 and 12 months. Two analyses were conducted. The first examined the association of resolution of frailty between baseline and 3 months, with falls in the following 9 months. The second assessed the association of the extent of frailty (comparing 'frail' defined as 3 CHS criteria and 'very frail' defined as 4 or 5 CHS criteria) with falls (number of falls classified as zero to 5 plus) over the 12 month study period.

Results:
Forty-one participants (30.6%) had resolution of frailty in the initial 3 months of follow-up and there was a trend towards a reduction in falls in this group (chi square 2.23, p = 0.188). The very frail participants had significantly more falls than frail participants over the 12-month follow-up period (chi square 11.9, p = 0.036).

Conclusion:
Severity of frailty is associated with falls and resolution of frailty might be associated with a reduction in falls. These associations should be confirmed with a larger sample and with adjustment for potential confounding factors.

FALL INJURY PREVENTION IN VICTORIA, AUSTRALIA – PROGRESS AGAINST PREDICTIONS

Cassell E, Clapperton A
Victorian Injury Surveillance Unit, Accident Research Centre, Monash University, Clayton, VIC, Australia

Aim:
To investigate the progress made in Victoria on fall injury and hip fracture prevention in older people aged 65 years and over in the decade from 1998/9 to 2009/10, against predictions made in 1999.[1]

Methods:
Trends in older persons' hospitalisation rates for fall injury (excluding same day admissions) and fall related hip fracture were examined by age, gender and location of injury event using injury data extracted from the Victorian Admitted Episodes Dataset (VAED). This dataset is held by the Victorian Injury Surveillance Unit and covers all admissions to public and private hospitals in Victoria.

Results:
Preliminary analysis of currently available years of data indicates that fall related admission rates have shown a significant 19% increase over the decade

from 1856/100000 in 1998/9 to 2164/100000 in 2007/8. Against predictions, fall related hip fracture rates have declined by 20% from 591/100000 in 1998/99 to 502/100000 in 2007/8.

Conclusion:
Possible explanations for the unforeseen decrease in hip fracture incidence in Victoria will be explored given the ageing of the Victorian population.

Reference:
1. Sanders KM, Nicholson GC Ugoni AM et al. Health burden of hip and other fractures in Australia beyond 2000. Projections based on the Geelong Osteoporosis Study. MJA 1999;170:467-70.

BASIC STEPS: SAFER PHYSICAL ACTIVITY TRAINING FOR THE INACTIVE AND FRAILER AGED

Castell S, Armstrong M
Northern Sydney Central Coast Area Health Service, Sydney, NSW, Australia

Aim:
'Basic Steps'[©] is a physical activity and falls prevention training program for staff providing activity classes for less active and frailer older people living in residential care facilities. It was developed by the Northern Sydney Central Coast Health (NSCCH) Health Promotion unit. The aim of the program was to train staff to acquire the underlying knowledge and skills to apply the most appropriate strength and balance 'exercise prescriptions' within current classes, or to facilitate more suitable new classes.

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. It comprised a theoretical base with accompanying practical exercise applications, to maintain the functional abilities required to reduce the risk of falls and related injuries. The training included elements from the 'Fall Proof'[©] training program and incorporates the NSCCH 'Staying Active - Staying Safe'[©] resource exercise format.

Results:
The training was conducted in 2009-2010 across 21 residential care settings in NSCCH, with 255 staff attending. Qualitative evaluations were conducted at initial training and after 3 months. A total of 82.4% found that the training was excellent to good, with 78% reporting they could apply the training to their work situation. Evaluation showed the training program was well accepted, informative and easy to implement. At follow-up, there was an increased uptake of appropriate exercise programs in all the facilities.

Conclusion:
This was a highly successful pilot project, with many facilities requesting further training to extend the program to more staff. As a result of these requests, and with no further staffing available for training, a CD/DVD resource and training manual has been developed to enable this program to continue without the need for face to face training and to extend the program to more facilities, including rural.

"REPORTER FALLS SHORT" - IMPROVING FALLS DATA, GETTING IT RIGHT FOR PATIENTS

Cave K, Smith B, Murphy S
MidCentral Health Hospital, Palmerston North, New Zealand

Aim:
The existing paper incident reporting form at MidCentral Health (MCH) allows for varying degrees of patient falls information to be captured. The resulting data are inconsistent, insufficient and often subjective. The aim of this project is to collect consistent, accurate data around circumstances and contributory factors relating to patient falls at MCH. Obtaining reliable information and determining trends will assist in the identification of appropriate falls reduction strategies, and aid direction of resources to the most vulnerable patients.

Methods:
A separate Falls Incident Report (FIR) form, incorporating standard categories, tick box options, and free text was devised by the Falls Action Group at MCH, and attached to the existing generic incident form. Three clinical areas were chosen to pilot the form over a three-month period (May to July 30th 2010), with prior education and resources provided to participants. Data collected from the FIR form will be compared with data from the generic incident report forms for the three months prior to the pilot commencing. Staff will complete a simple feedback form to evaluate the perceived usefulness of FIR, and ease of use.

Results:
One month's findings (May) have already confirmed that the FIR captures more consistent data, and identifies some reliable trends for staff to analyse.

Conclusion:
The specific Falls Incident Report form provides MCH with the opportunity to capture, and collate, high quality information related to patient falls. Communication to staff of reliable trends will assist in changing the management of falls practice, and reduce patient falls.

WHY DO SOME FALLS RESULT IN FRACTURES? ANALYSIS OF 33,000 INSTITUTIONAL FALLS

Chari S[1,2,3], McRae P[1,2], Varghese P[2,4,5], Ferrar K[6], Haines T[3,5]
[1]*Queensland Health, Royal Brisbane and Women's Hospital, Brisbane, QLD, Australia*
[2]*Queensland Falls Injury Prevention Collaborative, QLD, Australia*
[3]*Monash University, Melbourne, VIC, Australia*
[4]*Queensland Health, Princess Alexandra Hospital, Brisbane, QLD, Australia*
[5]*University of Queensland, Brisbane, QLD, Australia*
[6]*Queensland Health, Patient Safety Centre, Brisbane, QLD, Australia*

Aim:
This study aimed to identify incident characteristics associated with falls that result in fractures in institutions.

Methods:
A retrospective cohort design was employed in this epidemiological study. Data were extracted from the Queensland Health clinical incident reporting system (PRIME CI). In total 33,198 falls (containing 263 reported fractures) from public healthcare facilities were included. Hospital and residential care subsets were examined using logistic regression analysis.

Results:
Our study identified a number of significant (p < 0.05) fall-related fracture predictors. Male hospital patients who fell were almost three times less likely to sustain fractures compared with females (odds ratio (OR) 0.37, 95% confidence interval (CI) 0.28 to 0.50). Gender remained non-significant in the residential care cohort. While advance age (over 80) was not linked to fracture risk in the residential care cohort, it was a risk factor for hospital fractures (OR 1.51, 95% CI 1.16 to 1.96).

Variables linked to body positions associated with higher impact potential trended towards increased fracture odds across both groups. For example, in-hospital, falls while walking (OR1.96, 95% CI 1.50 to 2.56), falls in corridors (OR 2.39, 95% CI 1.58 to 3.62) and falls in bedroom areas other than bedside (OR1.36, 95% CI 1.00 to1.85) achieved significance. A similar alignment was also identified in the residential care data. Hospital patients reported as having been fall risk screened or risk assessed (OR 0.66, 95% CI 0.48 to 0.92) were half as likely to sustain fractures upon falling. Witnessed hospital falls were also linked to lower fracture odds (OR 0.79, 95% CI 0.56 to 1.09).

Conclusion:
In line with current biomechanical models our findings indicate that falls from vertical positions (higher impact potentials) are most likely to produce fractures. Further, our results suggest that hospital injury prevention programs should focus on older female patients and all those aged over 80. Finally, our results highlight patient supervision as a potential hospital fracture prevention strategy. Additional findings, differences between cohorts, limitations and implications for future research are discussed.

DEVELOPMENT AND IMPLEMENTATION OF A 'FALL WITH MAJOR HARM' PROTOCOL

Clayton DE
Peninsula Health, Mt Eliza, VIC, Australia

Aim:
Following the introduction of an inpatient falls prevention program it was noted that there was no process in place to target falls resulting in major harm for follow-up. It was felt that falls with major harm warranted a detailed investigation of the fall event which would include analysis of the fall event, identification of issues relating to the fall event and recommendations for quality improvements arising from the investigation

Methods:
The Falls Clinical Nurse Consultant in conjunction with the Falls Steering Committee developed a 'Fall with Major Harm' protocol. The development process identified the need for a pathway that outlined procedures for initial notification, multidisciplinary fall investigation and development of recommendations. The resulting discipline-specific reports are then collated into a de-identified report that is submitted to the Falls Steering Committee and Peninsula Health Board

Results:
While this protocol was rolled out in 2007 there were some initial issues with classification of a fall with major harm and the accuracy of data from 2007 is not included here. In 2008 there were 39 falls with major harm investigated resulting in 84 recommendations being actioned, and in 2009 there were 45 falls with major harm investigated with 82 recommendations actioned. From this initial protocol the need for a critical risk protocol and a post discharge follow-up protocol has been identified and these are currently being developed.

Conclusion:
This protocol has lead to a greater level of accountability for falls with major harm across the whole continuum of care as these are now identified and investigated. The issues identified for these falls are being addressed using a multidisciplinary approach.

HUNTINGTONS DISEASE PATIENTS HAVE HIGHEST FALLS RISK IN NEUROLOGICAL WARD: RETROSPECTIVE AUDIT

Connors KA, Belfrage J, Stewart A
Calvary Health Care Bethlehem, Melbourne, VIC, Australia

Aim:
People with neurological diseases are often at high risk of falls. The falls rate at the inpatient progressive neurological unit of Calvary Health Care Bethlehem (Melbourne) was indeed higher compared to falls rates at other sub-acute facilities in Australia. The aim of this study was to identify which patient groups were tending to fall, and also identify other factors which may have been contributing to the falls for these patients, to enable effective implementation of falls prevention measures.

Methods:
A twelve month retrospective audit was conducted of falls which had occurred on the progressive neurology inpatient unit and had been recorded on the hospital Riskman system. Additional information was obtained from each faller's medical record. The data obtained for each faller included diagnosis, age, number of falls, FIM transfer score, FIM cognition score, place and time of falls, number of injuries from the falls and the severity of injuries .

Results:
There were 65 falls over the 12 month period. These falls were sustained by 29 individuals. There were 16 people who sustained one fall and 13 had multiple falls. There were significant differences in the falls rates between diagnostic categories, with patients with Huntington's disease (HD) sustaining the most falls. Differences were also identified between single fallers and multiple fallers in terms of cognition scores and diagnostic categories. Unlike patients with motor neurone disease, who mostly sustained single falls, patients with HD who fell were very likely to fall more than once.

Conclusion:
Patients with HD in an inpatient setting are at a very high risk of falls which appears to be due to a combination of factors. These factors include impaired mobility, impaired cognition and behavioural patterns (such as restlessness) which often resulted in an inability by the HD patients to adhere to falls prevention recommendations.

AIMING FOR THE BEST: IMPROVING PATIENT SAFETY WITH HOURLY ROUNDS

Crogan P, Lawrence J
Counties Manukau District Health Board, Manukau City, New Zealand

Aim:
Following two clusters of patient falls in a medical inpatient ward, a review of the literature suggested hourly rounding may reduce the number of falls as well as improving the environment for both staff and patients.

Methods:
Champions and stakeholders across the organisation and division were engaged to ensure support for the nurse led change. Following exploration of ward data and discussion with the nursing team, implementation of nursing rounds was launched. The change was led by a partnership between Charge Nurse Manager and the Quality Improvement Unit.

Using a systematic approach and incorporating the 'plan do study act' cycle, the team moved from a reactive to a proactive approach to meet the needs of patients.

Results:
Quantitative results show a reduction in falls resulting in harm to the patient. In addition, there was a significant reduction in nurse call bells, and an improvement in both patient and staff satisfaction. Improved patient assessment has resulted in the appropriate allocation of resource.

Qualitatively, there has been a positive experience of change in relation to quality for the team which has meant that the team are 'change ready' and moving into a self governing framework.

Conclusion:
Overall, implementation has led to increased patient focused communication, improved clinical decision making based on the patient needs and robust teamwork. The framework of right patient, right bed, right care, right time has emerged.

Reference:
Meade CM, Bursell AL, Ketelsen L. Effects of nursing rounds on patients' call light use, satisfaction, and safety. Am J Nurs 2006;106(9):58-70.

SENSOR SYSTEMS FOR SURVEILLANCE OF COGNITIVELY IMPAIRED FALL RISK IN ACUTE CARE PATIENTS

Cumings R, Keast C, Gallant A
Christchurch Hospital, Medical Surgical Division, Canterbury District Health Board, Christchurch, New Zealand

Aim:
To outline a new surveillance method used in Christchurch Hospital (a 600 bed acute care facility) to alert staff of patient mobilisation in fall risk patients with cognitive deficits.

Background:
With the introduction of restraint minimisation and safe practice standards in 2001 our hospital responded by providing one to one care in the form of hospital aide specialling for cognitively impaired patients, to avoid restraint and reduce our fall incidences. The staff resource for this initiative proved to be unsustainable and we did not identify a reduction in our falls incidences. Canterbury's high elderly population and an increase in 'complex' patient admissions led to a million dollar budget blowout for specialling. Other 'surveillance' methods to manage patient risk were required and at the same time a review of the fall prevention programme was commenced.

Methods:
- Reviewed the use of hospital aide specialling and patient assessment criteria
- Reviewed the use of sensor mats and clips in other hospitals – nationally and internationally
- Reviewed fall incidences in wards where sensor system were instigated
- Performed staff surveys and comparison trials of different sensor systems over a three year period

Results:
- Fall incidences reduced in the four pilot areas where the sensor systems were implemented
- Staff surveys demonstrated attitudes towards using sensor systems for certain patient groups improved
- Quantitative data demonstrates sensor systems are used as an alternative to specialling
- Significant cost savings have been demonstrated with the alternative surveillance

Conclusions:
There has been identification for strict criteria for the use of sensor systems in relation to correct patient selection and awareness from all staff of their responsibilities when an alarm is activated. Sensor system use is now an integral part of the hospitals' Fall Prevention Programme.

References:

1. Rabadi MH, Rabadi FM, Peterson M. An analysis of falls occurring in patients with stroke on an acute rehabilitation unit. Rehabil Nurs 2008;33(3):104-9.
2. Tideiksaar R, Finer CF, Maby J. Falls prevention: the efficacy of a bed alarm system in an acute-care setting: Mt Sinai J Med 1993;60(6):522-7.

A COMMUNITY, COLLABORATIVE APPROACH TO PREVENT FALLS

Cummings L
Accident Compensation Corporation, Tauranga, New Zealand

Aim:
Many older people do not perceive the falls risk to be relevant to them, believing that a fall is only relevant to "other older people". This project aimed to: increase awareness of falls prevention, increase awareness of the associated services that are provided to older adults in the Tauranga and Rotorua communities, and reduce the incidence of falls.

Methods:
The New Zealand Accident Compensation Corporation (ACC) worked collaboratively with organisations in each of the communities to establish a working committee. These organisations included individuals from the Bay of Plenty District Health Board, the Bay of Plenty Polytechnic, Restart Home Rehabilitation (private provider), Age Concern, Treasure Rotorua (Rotorua WHO Internal Safe City) and the Rotorua Energy Trust. The committee worked together to plan presentations around falls prevention, healthy eating, healthy ageing, eye care, Tai Chi demonstrations, as well as a 90 year old lady who has proven that no matter what your age, anything is possible. They also invited providers within the community who were relevant to the event and who would set up stands and disseminate information about their organisations.

Results:
A total of 280 people from the two communities attended. Evaluation forms showed that people felt they were better prepared to prevent falls in the future, and felt that changes would be relatively simple to make in order to make a big difference to preventing falls.

Conclusion:
A community, collaborative approach to preventing falls is a positive, effective method to increase awareness of falls prevention, and community services available as well as to reduce the incidence of falls.

COLLABORATIVELY SPEAKING: TROUBLE WITH A GREAT REFERRAL IDEA

Currin M[1], Rogers A[1], Comans T[1,2], Quinn J[3]
[1]*Community Rehabilitation Service, Metro South HSD, Eight Mile Plains, QLD, Australia*
[2]*Griffith University, Logan Campus Meadowbrook QLD, Australia*
[3]*Australian Centre for Prehospital Research, Queensland Ambulance Service, QLD, Australia*

Aim:
The purpose of this project was to develop a referral pathway to the Community Rehabilitation (Allied Health) Service (CRS) for falls clients attended by Queensland Ambulance Service (QAS) who are not transported to hospital. Additionally, this project aimed to reduce falls-related ambulance call-outs, ED and hospital admissions.

Methods:
Working with the QAS, an education package, referral pathway and follow up procedures were developed. Endorsement of the program was from all levels of management in both services. The service providers from both services had regular meetings and work shadowing with the ambulance officers was also trialled to encourage more referrals.

Results:
From QAS data, there are approximately six falls per week by community dwelling older persons in the eligible service catchment area (south west Brisbane metropolitan area). Of the potential 468 referrals, CRS only received 15 (0.03%) over the 18 month period.
The referrals from the Queensland Ambulance Service were older; more debilitated and had had more falls over the past six months than those that were referred from the hospital emergency departments. Although this program had support from all levels of management within Queensland Health and QAS as well as from the service providers, there were only a few referrals.

Conclusion:
Further funding has allowed for the research team to investigate the barriers to success for this program. Although this program had strong support from all areas of management, it did not translate into actual referrals. The clients that were referred were of a greater falls risk when compared with the usual referrals from hospital emergency departments.

Falls prevention is critical in reducing morbidity, mortality and improving quality of life in older Australians. Identifying these patients before they experience a serious fall that does require hospitalisation allows an opportunity to intervene and has important injury prevention implications.

EVOLUTION OF STEADY AS YOU GO PEER LED COMMUNITY FALLS PREVENTION PROGRAMME

Davidson S[1], Dando M[1], Waters DL[2], Hale B[3], Robertson L[4], Hale L[2]
[1]*Age Concern Otago, Dunedin, New Zealand*
[2]*University of Otago, Dunedin, New Zealand*
[3]*Independent researcher, Dunedin, New Zealand*
[4]*Otago Polytechnic, Dunedin, New Zealand*

Background and method:
Activities to market and develop resources were trialed by Age Concern Otago to develop the Steady As You Go falls prevention programme (SAYGO). A unique and successful aspect of the SAYGO are the peer led classes. Peer led classes began seven years ago and most continue today. The evolution of the marketing and development of a sustainable falls prevention programme are presented in this process evaluation.

Results:
Two primary attributes were identified: marketing and personnel. Marketing and branding were seen as essential to ensure a wide knowledge of the classes, in particular to medical and health practitioners. The first attempt to market SAYGO in 1999 was directed at established relationships between Age Concern and social groups/senior citizens clubs. This proved to be very successful. Church groups, community centres and Dunedin City Council flats also became venues for classes. Participants began to offer donations for attendance and it became SAYGO policy to accept donations.

Raising awareness of SAYGO with health practitioners began when it was decided that a medical clearance for strength and balance participants was required for safety. Marketing of classes remains low cost and now word of mouth has become a powerful promotional tool; medical professionals as well as friends and family recommend the programme.

Managing the programme for sustainability began by providing on-going classes led by self-selected members of the groups, who became peer-leaders. Training, resourcing and supporting the leaders are ongoing. Funding for the coordinator's role is fundamental to the sustainability of the programme. All other costs of peer led classes are met by the class through gold coin donations.

Conclusion:
This process evaluation shows a dynamic transition from the original, internationally accepted home-based falls research programme to the development of a new and flexible community based programme, with the innovative initiative of groups led by peer instructors.

ARE THE ECONOMIC BENEFITS OF RESISTANCE TRAINING SUSTAINED AMONG COMMUNITY DWELLING SENIOR WOMEN?

Davis JC[1,2], Marra CA[2,3], Robertson MC[2,4], Najafzadeh M[3], Liu-Ambrose T[2]
[1]*Centre for Clinical Epidemiology and Evaluation, University of British Columbia, Vancouver, Canada*
[2]*Centre for Hip Health and Mobility, University of British Columbia, Vancouver, Canada*
[3]*Faculty of Pharmaceutical Sciences, University of British Columbia, Vancouver, Canada*
[4]*Department of Medical & Surgical Sciences, Dunedin School of Medicine, University of Otago, Dunedin, New Zealand*

Aim:
Previously, we demonstrated that 12 months of once- or twice-weekly resistance training among senior women provided good value for money. We conducted a 12-month follow-up study to determine whether health benefits measured by falls prevented and quality adjusted life years (QALYs) gained, and the economic benefits of resistance training were sustained 12 months after formal cessation of the resistance training intervention. Thus, our primary objective was to estimate the incremental cost effectiveness and cost utility ratios for participants completing a once-weekly or twice-weekly resistance training intervention compared with participants completing balance and tone classes previously over a 12-month period in terms of falls prevented and quality adjusted life years gained or lost.

Methods:
One hundred and twenty three of the 155 community-dwelling women aged 65 to 75 years who originally were randomly allocated to once-weekly resistance training (n = 54), twice-weekly resistance training (n = 52), or to twice-weekly balance and tone training (i.e. control group) (n = 49) partook in the 12-month follow-up study. We estimated the incremental cost effectiveness ratios for the once- and twice-weekly resistance training programs compared with a balance and tone group. Measurements included number of falls for each participant, healthcare resource utilization and associated costs over nine months; health status was assessed using the Euro-Qol-5D (EQ-5D) to calculate QALYs.

Results:
In terms of falls prevented, our point estimates indicated that twice-weekly resistance training was less costly but less effective while once-weekly resistance training was less costly and more effective than balance and tone classes. Once- and twice-weekly resistance training were less costly than balance and tone classes with incremental costs of CAD$ -1857 and -1077, respectively. The incremental quality adjusted life years for once- and

twice-weekly resistance training were -0.051 and -0.081, respectively, compared with balance and tone classes.

Conclusion:
The economic benefits of participating in a 12-month resistance training intervention were sustained for the once-weekly resistance training group while these benefits were not sustained for the twice-weekly resistance training group.

WHY ARE PATIENT-REPORTED OUTCOMES NOT ROUTINELY MEASURED IN CANADA? A SYSTEMATIC REVIEW

Davis JC[1], Doyle-Waters M[1], Liu-Ambrose T[2], Bryan S[1]
[1]*Centre for Clinical Epidemiology and Evaluation, University of British Columbia, Vancouver, BC, Canada*
[2]*Department of Rehabilitation Sciences, University of British Columbia, Vancouver, BC, Canada*

Aim:
A recent significant shift in health research gives credence to outcomes as reported by patients themselves. In many countries there is increasing interest in routinely collecting patient reported outcome measures (PROMs) – assessments of health status. Intuitively, given that health care is primarily about improving health, this might be seen as a no-brainer. This research sought to understand the barriers and challenges to the routine collection and use of PROMs in a Falls Prevention Clinic for vulnerable seniors.

Methods:
We undertook a systematic review of published literature on application, implementation and evaluation of routine PROM use. We included EMBASE, MEDLINE and CINAHL and supplementary Web searches.

Using the Falls Prevention Clinic as a specific clinical study, we collected PROMs data using the EQ-5D and other standard clinical measures at first clinic attendance (post-fall) and at 6 and 12 months. Quantitative analyses, to explore predictors of outcomes, used a CLAD model. Through interviews with clinical staff, we gathered qualitative data on views of, and developments to, the PROM initiative.

Results:
Few studies report implementation or evaluation of routine PROMs use. Wright et al[1] used PROMs in elective surgery in Vancouver 'at a reasonable cost'. Browne et al[2] report UK pilot work on PROMs with feasibility demonstrated sufficiently to pave the way for national roll-out in England.

Falls Prevention Clinic analyses (n = 155) indicate that follow-up PROM scores are predicted by mobility, cognition and co-morbidities. Qualitative data suggest strong clinician enthusiasm to continue implementing PROMS and suggest exploration using PROMs as a surveillance tool.

Conclusions:
The introduction of routine PROMs use of outcome measures in Canadian health care will not be straightforward. However, the literature and clinical population study work reported here provide encouragement to move forward, suggesting that implementation is feasible when supported by key stakeholder groups, most notably local clinical teams.

References:
1. Wright CJ, Chalmers GK, Robens-Paradise Y. Evaluation of indications for and outcomes of elective surgery. CMAJ 2002;167(5):461-6.
2. Browne J, Jamieson L, Lewsey J et al. Patient Reported Outcome Measures (PROMs) in Elective Surgery. Report to the Department of Health. London, 2007. Available at: http://www.lshtm.ac.uk/hsru/research/PROMs-Report-12-Dec-07.pdf (accessed 18 October 2010).

FALLS-RELATED SELF-EFFICACY IS INDEPENDENTLY ASSOCIATED WITH HEALTH RELATED QUALITY OF LIFE IN OLDER WOMEN

Davis JC[1,2,3], Marra CA[1,2,4], Bryan S[3], Liu-Ambrose T[1,5]
[1]*Centre for Hip Health & Mobility, University of British Columbia & Vancouver Coastal Health Research Institute (VCHRI), Vancouver, BC, Canada* [2]*Collaboration for Outcomes Research and Evaluation, St Paul's Hospital, University of British Columbia, Vancouver, BC, Canada*
[3]*Centre for Clinical Epidemiology and Evaluation, University of British Columbia, Vancouver, BC, Canada*
[4]*Faculty of Pharmaceutical Sciences, University of British Columbia, Vancouver, BC, Canada*
[5]*Faculty of Rehabilitation Sciences, University of British Columbia, Vancouver, BC, Canada*

Aim:
Falls-related self-efficacy is associated with falls, falls-related injury and subsequent functional decline which may lead to poor health related quality of life. To our knowledge, no previous studies have examined the independent contribution of falls-related self-efficacy to health related quality of life. Our primary objective was to determine whether falls-related self-efficacy is independently associated with health related quality of life in older women after adjusting for known covariates.

Methods:
We conducted a secondary analysis of community-dwelling older women aged 65-75 years who participated in a 12-month randomized controlled trial of resistance training. We assessed falls-related self-efficacy using the Activities Specific Balance Confidence Scale and health related quality of life or (Quality Adjusted Life Years (QALYs)) calculated from the EuroQol EQ-5D (EQ-5D).

Results:
Our multivariate linear regression model demonstrated that falls-related self-efficacy as assessed using the Activities Specific Balance Confidence Scale was independently associated with QALYs after accounting for age, group, education, functional comorbidity index, general mobility, global cognition and physiological profile assessment. The final model explained 52% of the variation in QALYs.

Conclusion:
Our study highlights falls-related self-efficacy was independently associated with QALYs -- a measure of health related quality of life. Given that falls-related self-efficacy is modifiable, clinicians may need to consider targeting future intervention efforts at modifiable risk factors such as falls-related self-efficacy to improve overall health related quality of life.

IDENTIFYING PRIORITY GROUPS FOR IMPROVED TARGETING OF FALLS INTERVENTIONS

Day L, Finch CF, Cassell E
Monash University, Melbourne, VIC, Australia

Aim:
This study is one of four research components of a NHMRC Health Partnership Project, in collaboration with the Victorian Department of Health, to enable more effective policy responses to the falls prevention challenge in Victoria. The aim of this component is to identify sub-groups of older community dwelling people who utilize the greatest share of inpatient hospital services, so that falls prevention programs can be appropriately tailored.

Methods:
Using the Victorian Admitted Episodes Database, fall-related hospitalisations for community dwelling 65+ year olds are being defined by age, ICD-10-AM External Cause of Injury, primary diagnosis, and admission source. Previous approaches for accounting for repeat admissions for the same fall injury are being adopted.[1] The following characteristics are being analysed: age, gender, marital status, country of birth, discharge status, local government area (LGA) of usual residence, insurance status, length of stay, number and nature of the co-morbid conditions, and type of injury. Co-morbidities are being categorised with the Charlson Comorbidity Index. Differences across the state

according to socio-demographic profiles will be examined. Negative binomial regression models will be applied to understand the relationships between the variables and to identify those characteristics most associated with high bed day use and co-morbidity. Predictive models will be developed through generalised estimating equations to identify groups, or clusters, of patients with specific related characteristics and outcomes.

Results:
This analysis, which will be completed by November 2010, will identify those sub-groups of older people accounting for the largest proportion of fall-related hospital admissions, and identify those characteristics most associated with high bed day use and more serious co-morbidity.

Conclusion:
The results will guide other components of the partnership project, particularly the selection of priority sub-groups for a survey to identify acceptability of proven falls interventions, and the identification of opportunities to incorporate evidence based falls interventions within health department programs.

Reference:
1. Boufous S, Finch C. Estimating the incidence of hospitalized injurious falls: impact of varying case definitions. Inj Prev. 2005;11(6):334-6.

TAKING THE LEAP – A RADICAL REVIEW OF AN ACUTE CARE FALLS PREVENTION PROGRAMME

de Rooy I, Gallant A, Cumings R
Christchurch Hospital, Medical/Surgical Division, Canterbury District Health Board, Christchurch, New Zealand

Aim:
To outline the review and implementation of the Falls Prevention Programme at Christchurch Hospital, a 600 bed acute care hospital.

Methods:
The Falls Prevention Programme was reviewed by a multidisciplinary team based on:
- a literature search of falls assessment screening tools, injury prevention strategies and environmental risk factors for patients in a predominantly acute care setting;
- a review of Christchurch Hospital's fall incident data.

Results:
Several new interventions have been implemented since June 2008.[1]
- A Fall Risk Assessment and Management Plan was developed based on the Hendrich II

assessment tool,[2] the only validated fall risk model for an acute care setting.
- Sensor systems were reviewed and implemented.
- Hospital footwear bank with ward supply of non-slip socks has been set up.
- Multidisciplinary self-learning packages were developed.
- Patient and family/whanau education information has been reviewed including medication information associated with risk of falling.
- On discharge patients who are at risk of falling are referred to the Canterbury Community Falls Prevention Programme.
- An environmental audit to identify environmental falls risk factors was developed.

Conclusion:
The review and implementation of the Fall Prevention Programme in an acute care hospital has been challenging. Falls prevention strategies have been implemented. Fall and fall injury data is analyzed on a monthly basis and root cause analyses are conducted on all serious falls. Trends are monitored and the reduction in falls are encouraging and will be discussed.

References:
1. Australian Commission on Safety and Quality in Healthcare. Preventing Falls and Harm from Falls in Older people. Best Practice Guidelines for Australian Hospitals 2009.
2. Hendrich A. How to try this: predicting patient falls. Using the Hendrich II Fall Risk Model in clinical practice. Am J Nurs 2007;107(11):50-8.

NON-SLIP SOCKS: A FALL PREVENTION STRATEGY IN AN ACUTE CARE HOSPITAL

de Rooy I, Myers A, Cumings R
Christchurch Hospital, Medical/Surgical Division, Canterbury District Health Board, Christchurch, New Zealand

Aim:
To outline the review, implementation and evaluation of non-slip socks as a fall prevention strategy at Christchurch Hospital, a 600 bed acute care hospital.

Background:
Falls are the leading cause of injury during hospitalisation for aged 65 and over. The Medical Surgical Services incident data shows that around 60% of patient falls occur from bed, or around the bed area. Multifaceted interventions are required to reduce falls. Best practice literature findings recommend that patients have safe footwear when mobilising.[1,2] The acute care environment means that patients often present on admission without appropriate footwear. There was no system in place to supply patients with non-slip footwear required for

mobilisation until appropriate footwear was sourced from home.

Methods:
Providers of non-slip foot wear were sourced. Products were evaluated on cost and suitability. Following product trial and evaluation by ward physiotherapists, non-slip socks that met the criteria were chosen. The Falls Prevention Group obtained funding to provide an initial supply of non-slip socks for all inpatient wards. Education was provided for nursing and allied health staff on the use of non-slip socks, with the development of guidelines.

Results:
Initial feedback is positive. Patient and staff surveys are currently being conducted to evaluate the impact of non-slip socks. Staff can now order non-slip socks for the following patients:
- Acute admissions with no appropriate footwear and/or
  - at falls risk
  - suffering from confusion or wandering behaviours and likely to mobilise without footwear
  - wearing anti-embolism stockings and mobile
  - with oedematous feet or bandages that limit use of appropriate footwear

Conclusion:
The availability of non-slip socks is one of the many interventions of the Falls Prevention Management Programme and a basic safety aspect for patients in our care that allows for safe and timely mobilisation.

References:
1. National Health Service (UK). The' how to' Guide for Reducing harm from falls. Version 1, 2009.
www.patientsafetyfirst.nhs.uk/Content.aspx?path=/Campaign-news/current/Falls/ (accessed 14 Oct 2010).
2. Australian Commission on Safety and Quality in Health Care. Preventing Falls and Harm From Falls in Older People: Best Practice Guidelines for Australian Hospitals 2009.
www.health.gov.au/internet/safety/publishing.nsf/content/FallsGuidelines-AustHospitals/ (accessed 14 Oct 2010).

FACILITATING THE IMPLEMENTATION OF THE NATIONAL EVIDENCE BASED GUIDELINES IN SOUTH AUSTRALIA

Dean P[1], Johnston K[2]
[1]*Department of Health, Adelaide, SA, Australia*
[2]*University of South Australia, Adelaide, SA, Australia*

Background:
Within South Australia (SA) there was low and inconsistent uptake of the National Evidence Based Guidelines "Preventing falls and harm from falls in older people: Resource suite for Australian Hospitals and Residential Aged Care facilities" (the Guidelines) when they were first released in 2005. By 2007 it was evident that the implementation of these guidelines needed to be prompted in a more formal manner.

Methods:
The various approaches to promoting implementation across Australia were examined for their various benefits and suitability to the SA context. Following this examination, the Safety & Quality Unit of SA Health elected to adapt and build upon the Queensland approach which utilised a 'train the leader' methodology. SA determined that a 'train the leader' approach would be at the core of its strategies to facilitate the implementation of the Guidelines, but also identified the need to develop strategies targeting the four levels required for successful change (environment, organisation, group and individual) to aim for sustainability.

Results:
The resultant program is commonly known as the SA Green Box Falls Prevention Program, named after the green box the original guidelines were presented in. The program commenced being rolled out across SA in early 2009 utilising the 2005 edition of the Guidelines. The initial focus was on hospitals across SA, both metropolitan and country. At the end of 2009, with the release of the second edition of the Guidelines, the educational component of the program was updated to reflect the new guidelines. The program has also been delivered in the Northern Territory.

Conclusions:
Evaluation of the program, associated tools and sustainability strategies have shown encouraging results to date in relation to trainee satisfaction, organisational change, establishment of falls prevention networks and increased staff capacity.

Reference:
1. Ferlie EB, Shortell SM. Improving the quality of health care in the United Kingdom and the United States: a framework for change. Milbank Q 2001;79:281–315.

EVALUATION OF PARTICIPATION RESTRICTION IN FALLS TRIALS: A SYSTEMATIC REVIEW AND META-ANALYSIS

Fairhall N[1,2], Sherrington C[1], Cameron ID[2], Clemson L[3]
[1]*The George Institute for Global Health, The University of Sydney, Sydney, NSW, Australia*
[2]*Rehabilitation Studies Unit, Sydney Medical School, The University of Sydney, Sydney, NSW, Australia*
[3]*Faculty of Health Sciences, The University of Sydney, Sydney, NSW, Australia*

Aim:
Participation restriction, as defined by the International Classification of Functioning, Disability and Health (ICF),[1] reflects the societal

consequences of health conditions. Despite being a key component of disability and an important goal of rehabilitation, participation restriction is not measured consistently in ageing research. This study aimed to evaluate the extent to which measurement of participation has been reported in trials of fall prevention interventions and to determine the effect of interventions including exercise on participation.

Methods:
A systematic review with meta-analysis of randomised controlled trials of interventions including exercise which aimed to reduce falls in older people living in the community, aged care facilities or hospital. Measurement instruments used in the trials were linked to the ICF then were assessed against instrument classification criteria,[2] to determine whether they measured participation restriction. Trials with published participation data at baseline and follow-up were included in the meta-analysis.

Results:
Ninety-four trials met the review inclusion criteria. Participation was measured in 21% (20/94) of the trials. Eleven instruments were used to measure participation, most commonly the Frenchay Activities Index (5%), Lawton Instrumental Activities of Daily Living Scale (5%), Groningen Activity Restriction Scale (2%) and Falls Handicap Inventory (2%). Fifteen randomised controlled trials, involving 3105 participants, were included in the meta-analysis. The pooled estimate of the effect of interventions including exercise indicated improved participation (Hedges' g = 0.17, 95% confidence interval 0.05 to 0.28, p = 0.006). Multifactorial intervention with an exercise component had a bigger effect than exercise intervention alone, but the difference was not statistically significant (p = 0.24)

Conclusion:
Interventions including exercise can improve participation in life roles in older people. Evaluation of participation is not the primary aim of trials measuring falls outcomes, however the ICF may be a useful framework for understanding the broader impact of falls prevention interventions.

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ARE WE PRACTISING EVIDENCE-BASED FALLS PREVENTION IN RESIDENTIAL AGED CARE?

Fearn M[1], Moore K[1], Haralambous B[1], Haines T[2,3], Hill K[1,4,5], Nitz J[6], Robinson A[7]
[1]National Ageing Research Institute, Parkville, VIC, Australia
[2]Allied Health Clinical Research Unit, Southern Health, Melbourne, VIC, Australia
[3]Southern Physiotherapy School, Monash University, Melbourne, VIC, Australia
[4]Allied Health, LaTrobe University, Melbourne, VIC, Australia
[5]Northern Health, Melbourne, VIC, Australia
[6]School of Health and Rehabilitation Sciences, University of Queensland, Brisbane, QLD, Australia
[7]School of Nursing and Midwifery, University of Tasmania, Hobart, TAS, Australia

Aim:
There are numerous best practice guidelines addressing falls prevention, however, their uptake in residential aged care facilities (RACFs) is unknown. This poster aims to discuss whether evidence-based falls prevention activities are routinely practiced in nine RACFs across Victoria, Queensland and Tasmania, through their involvement in the Star Project.

Methods:
The project was funded by the Australian Government Department of Health and Ageing "Encouraging Best Practice in Residential Aged Care" program. The project involved implementation of common and site-specific interventions based on best practice audit findings. The findings and outcomes from the scoping audit are reported in this poster.

Results:
Anecdotally, staff in the facilities thought they were doing as much as they could in relation to falls prevention, however the scoping audit revealed that all facilities could be doing more. For example, the baseline scoping audit found that falls prevention training opportunities for staff were either unavailable or infrequent. The scoping audit also provided facilities with a review of their falls data, including the time of day falls occurred. A number of facilities were surprised to identify that the falls in their facility were occurring at different times to when they thought. Following the baseline scoping audit, interventions were implemented, with the support of external researchers, resulting in changes in falls prevention activities and a reduction in injurious falls.

Conclusion:
This project identified that the RACFs were not fully practising evidence-based falls prevention. Some of the suggestions from the project were that RACFs regularly scope their falls prevention activities (including falls incidents and the environment), and

falls incidents are evaluated and fed back to staff. Also that a learning culture be promoted in RACFs that links facility staff to external expertise in falls prevention as well as linking to other RACFs so they can share their experiences in falls prevention.

APPLIED TAI CHI - ACROSS THE CONTINUUM

Ferguson RI
Australian Academy of Tai Chi & Qigong, Brisbane, QLD, Australia

To pictorially show how sustainable, cost-effective, outcome-based "Applied Tai Chi for Balance & Stability" programs that are appropriate for all levels of ability have been implemented. These programs were easily adapted to suit healthy, independent, low risk community dwellers, to those less mobile and at higher risk, and right up to the frail residents in aged care. Hence the development of "Applied Tai Chi for Low Mobility" a safe seated program for those less mobile.

These "Applied Tai Chi" programs were developed by extracting the essential principles from Traditional Tai Chi. In this evidence based falls prevention program, exercises are modified to target specific desired outcomes.

Non-expert facilitators known as "practice leaders" were trained to implement the "Applied Tai Chi" sessions. Several "Train the Trainer" course models were designed to develop the competency of these group practice leaders. These courses vary in length and content depending on the experience of the participants e.g. allied health workers already have an understanding of the safety, and duty of care requirements for the elderly.

RISK FACTORS AND FALL RATES IN DEMENTIA-SPECIFIC RESIDENTIAL AGED CARE FACILITIES

Fitzgerald JM[1], Phillips BA[2,3], Hill KD[2,4,5]
[1]*St. Vincent's Hospital, Melbourne , VIC, Australia*
[2]*La Trobe University, Melbourne, VIC, Australia*
[3]*Ballarat Health Services, Ballarat, VIC, Australia*
[4]*Northern Health, Epping, VIC, Australia*
[5]*National Ageing Research Institute, Parkville, VIC, Australia*

Aim:
The study aim was to compare the risk profile and proportion of non-fallers, single fallers and recurrent fallers in two dementia-specific residential aged care settings.

Methods:
A retrospective audit was conducted from September 2007 to August 2008 at Ballarat Health Services (BHS). Seventy-eight resident files were audited from Jessie Gillett Court (JGC), a low-level residential care facility, and 43 files were audited from Bill Crawford Lodge (BCL), a high-level residential care facility. The audit incorporated data extracted from the RiskMan database and from resident's files. Descriptive statistics were used to describe the characteristics of the sample. Multinomial logistic regression was undertaken to determine risk factors predictive of faller status. Risk factors included previous fall history, impaired mobility, incontinence, use of psychotropic medications, impaired vision, number of medications and behaviour.

Results:
The falls rate reported in BCL was 12.7 falls/1000 bed days and in JGC 13.7 falls/1000 bed days. A large proportion of residents sustained recurrent falls, 72.5% in BCL and 52.5% in JGC. A history of falls in the past 12 months was reported in 82.5% of BCL residents and 59.2% of JGC residents. Most falls occurred between 0600 hours and 1200 hours (29.8% of falls in BCL and 28.4% in JGC). Most falls occurred in the residents' rooms (42.8% in BCL and 66.0% in JGC).

Univariate regression analysis indicated that two independent variables made a statistically significant contribution to the primary model (incontinence and psychoactive medications). The final step-wise regression analysis indicated that the strongest predictor, and only significant variable predicting being a recurrent faller was incontinence, (odds ratio 4.655, 95% Confidence Interval 1.044 to 20.749, $p = 0.044$).

Conclusion:
The majority of falls were attributable to recurrent fall, occurring in resident's room during the morning. Recurrent fallers were more likely to be incontinent than single or non-faller residents.

DOES A PERSON'S ENGLISH PROFICIENCY AFFECT THEIR FALLS RISK AFTER STROKE?

Fryer CE[1], Mackintosh SM[1], Batchelor FA[2,3,] Hill K[3,4], Said C[2,5], Whitehead C[6]
[1]*University of South Australia, Adelaide, SA, Australia*
[2]*University of Melbourne, Melbourne, VIC, Australia*
[3]*National Ageing Research Institute, Parkville, VIC, Australia*
[4]*Latrobe University and Northern Health, Bundoora, VIC, Australia*
[5]*Heidelberg Repatriation Hospital, Heidelberg, VIC, Australia*
[6]*Repatriation General Hospital, Daw Park, SA, Australia*

Aims:
To determine if having limited English proficiency affects overall falls risk, falls risk factors, falls prevention strategies, or planned health service use for Australian stroke survivors.

Methods:
Using baseline data from the 'FaLls prevention After Stroke Survivors go Home' (FLASSH) randomised controlled trial[1] participants were divided in two groups, those with limited English proficiency (LEP) and those who spoke English well (EP). Participants were considered to have LEP if they required an interpreter during their baseline assessment.

Results:
Twenty stroke survivors with LEP and 136 stroke survivors who spoke English well were assessed after discharge home. The majority of the LEP group (60%) lived with extended family compared with only 15% of the EP group.

Participants with LEP were at significantly higher overall falls risk[2] (FROP-Com mean: LEP 23.8, EP 21.4, p = 0.021) and were significantly slower on TUG and 5 m walk tests (TUG mean: LEP 38.0 sec, EP 26.1 sec, p = 0.006; 5 m walk mean: LEP 22.5 m/min, EP 33.4 m/min, p = 0.013). A significantly higher proportion of LEP participants reported falls risk factors of diabetes, chronic dizziness, marked weight loss and needing assistance with ADLs. Falls prevention strategies and community health service use were similar between groups however LEP participants accessed significantly less health services provided in the home (mean number of services: LEP 2.0, EP 2.7, p = 0.013).

Conclusion:
Limited English proficiency can increase a person's falls risk and affect their falls risk factors after stroke. Linguistic and cultural considerations when evaluating falls risk need to be considered and health professionals should ensure that people with limited English proficiency and their families are informed and able to access appropriate services after discharge.

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DONVALE REHABILITATION HOSPITAL - FALLS 2009. WHO? WHERE? WHY? WHEN? WHAT WE DID.

Galloway C, Dorevitch M, Jayalath V, Finn D
Donvale Rehabilitation Hospital, Donvale, VIC, Australia

Introduction:
Information on inpatient incident falls is being prospectively collected using Riskman™ and is being used to inform ongoing falls prevention policy and practice.

Methods:
A retrospective audit of information collected on inpatient falls at Donvale Rehabilitation Hospital between 1st January and 31st December 2009.

Results:
- Total number of falls was 99 and fallers 88
- 71% of the fallers were assessed as having a high falls risk
- 60% were female
- 53% were over 75 years
- 83% fell by the bed or in the bathroom
- 52% fell between 10am and 8pm
- 36% of falls were due to overbalancing
- 3% of falls resulted in significant injury
- Confusion was a factor in 4% of falls
- Non compliance to supervision was a factor in 28% of falls

Following analysis of the data, various initiatives to minimise the risk of falling were implemented:
- Rearranging ward furniture at night to improve access to the bathroom
- Encouraging patients to wear distance glasses, if prescribed
- Developing a prototype crutch holder that attaches to the bed to prevent mobility aids becoming a trip hazard
- Falls are discussed at case conference following the fall
- Purchasing whole body vibration equipment to facilitate balance retraining
- Commencing a group therapy session to improve static and dynamic balance in high risk patients

Conclusion:

Falls risk can be mitigated by:

- Using clinical judgement to assess falls risk
- Collecting data from each fall
- Putting preventative measures in place that are tailored to the falls risk profile of individual patients

FALLS PREVENTION: KEEP IT SIMPLE

Gettens S[1], Fulbrook P[1, 2]
[1]The Prince Charles Hospital, Brisbane, Queensland
[2]Australian Catholic University, Brisbane, QLD, Australia

Aims:

To explore falls practices and gather information to inform existing preventative strategies, and implement small but practical initiatives in wards with high falls rates.

Methods:

A pragmatic, mixed-methods approach gathered information in three areas: risk assessment/interventions; falls causes; complementary interventions. This enabled identification of 'simple', low-cost, quick and easy-to-implement adjunct initiatives.

We audited falls risk assessment tool (FRAT) compliance, identified risk, and interventions. FRAT was compared with a 4-question tool (FIRST). Falls were analysed using simple root cause analysis (RCA) and nursing activity observation was undertaken during peak falls periods. Focus groups were used to generate prevention ideas.

A 'falls fighter' project officer led the implementation and evaluation of 'simple' ward-based initiatives that were identified.

Results:

FRAT compliance was good but not perfect. Audit revealed it was virtually impossible for adults to be assessed 'low risk'; therefore this category was effectively redundant. Because low and medium risk interventions were only marginally different, they could be combined. This meant all patients should be considered at risk; receiving preventative interventions. Thus, assessment requires high risk categorisation only. FIRST was strongly correlated with FRAT, and tended to upgrade risk category. Exclusive use of FIRST reduces assessment time, and may increase compliance. RCA revealed patients' and nurses' perceptions of falls causes were not always congruent. However, common themes were identified, e.g. disorientation within 24-hours of admission. Observations demonstrated a 2-hour

nurse-patient contact pattern. Focus groups generated simple, effective interventions, e.g. glow-in-the-dark buzzers and signage, routine de-cluttering of bedsides, and strategic positioning of patient beds.

Conclusion:

Simple strategies were identified and implemented in a very short period, and were well received by nurses. The presence of a 'falls fighter' – identified by a bright orange shirt – working as a role model to implement and facilitate simple falls interventions helped considerably to raise falls prevention awareness.

ASSESSING AND IMPROVING SUSTAINABILITY OF COMMUNITY-BASED EXERCISE PROGRAMS IN RURAL NSW

Green S[1,2], Licata M[1,2], Hill M[2,3], Kingsland M[1,2], Gillham K[1,2]
[1]Hunter New England Population Health, Newcastle, NSW, Australia
[2]Hunter Medical Research Institute, Newcastle, NSW, Australia
[3]Hunter New England Population Health, Tamworth, NSW, Australia

Aim:

To assess community need and fitness providers' capacity to deliver appropriate fall preventive exercise programs in rural communities and address barriers to health staff referral of clients to available programs.

Methods:

Consultations were conducted with health staff, fitness providers and community members in two rural areas to identify current availability of physical activity programs and determine whether the existing programs adequately meet the needs of all people aged 50 plus. Providers' need for additional training in balance and strength exercises was assessed. Staff barriers to referral were determined using a computer assisted telephone interview with 185 nurse unit managers.

Results:

Consultations identified gaps in program availability, and the development of a comprehensive exercise class list. Strategies to address identified gaps included the up-skilling of existing providers to deliver appropriate balance and strength exercises, and supporting leaders to start up new classes to address community need. Local training options were developed in partnership with New England Institute of TAFE.

The most commonly reported barriers to referral were lack of 1) knowledge of available programs, 2) transport and 3) referral systems. Community health

managers (97%, n = 65) indicated that if a referral system was introduced, their staff would refer clients to programs. In response, routine screening of clients for falls risk (using Quickscreen) and participation in adequate levels of physical activity were incorporated into existing computerized community health systems.

Conclusion:
A model for identifying physical activity opportunities and incorporating more balance and strength elements into existing programs has been developed for use in rural areas of the Hunter New England area. Incorporating routine staff screening of clients into existing systems will improve the capacity of Hunter New England health staff to refer clients to appropriate falls preventive programs.

COMPARISON OF LIKELY UPTAKE BETWEEN FIVE EVIDENCE-BASED FALLS PREVENTION STRATEGIES

Haines T[1,2], Day L[1], Hill K[3,4,5], Clemson L[6], Finch C[7], Thomas M[8], Thompson C[8]
[1]Monash University, Clayton, VIC, Australia
[2]Southern Health, Cheltenham, VIC, Australia
[3]National Ageing Research Institute, Parkville, VIC, Australia
[4]LaTrobe University, Bundoora, VIC, Australia
[5]Northern Health, Epping, VIC, Australia
[6]University of Sydney, Lidcombe, NSW, Australia
[7]University of Ballarat, Ballarat, VIC, Australia
[8]Department of Health, VIC, Australia

Aim:
The real-life success of falls prevention strategies depends largely on the willingness of target groups to participate in these strategies. This study aims to contrast the likely uptake of evidence based falls prevention interventions and identify factors that enhance or inhibit this likely uptake. It is one of four research components of a NHMRC Health Research Partnership, with the Victorian Department of Health, to enable more effective policy responses to the falls prevention challenge in Victoria.

Methods:
This telephone survey of n=500 community dwelling people >65 years will examine likely uptake of evidence-based falls prevention strategies using an eclectic theoretical model drawn from previous research. The model encompasses elements of individual decision making (health-belief model, theory of reasoned action, theory of planned behaviour, protection motivation theory) but also considers the contribution external drivers (health professionals, family members), environmental and economic factors. Priority sub-groups identified in other components of the partnership project, such as those with a chronic disease, will be over-sampled using a quota sampling approach. Open-ended

questions will be employed to further explore factors that promote or inhibit likely uptake of each intervention. Participant demographics and previous exposure to each of the interventions will also be considered. The survey instrument will be applied with the support of visual aids to prompt respondents regarding the response categories and to aid the description of each of the interventions being investigated.

Results and conclusion:
Research of the acceptability and likely uptake of proven falls prevention measures among older people is limited, particularly in Australia. The findings of this project will be critical for maximising the reach and adoption of evidence-based falls prevention strategies that will ultimately be integrated into departmental policies and practices within Victoria.

PREVENTING FALLS, PROMOTING HEALTH, ENGAGING COMMUNITY

Hall SJ[1], Phillips CB[1], Pancaningtyas N[1], Dubois L[2], Follett N[2]
[1]Australian National University, ACT, Australia
[2]Greater Southern Area Health Service, NSW, Australia

Aims:
Population based falls prevention in the remote and relatively underserved rural elderly population is a significant issue.

We carried out a two year evaluation to determine the suitability of the Physical Activity Leader Network (PALN) model to provide a sustainable approach. The PALN provides training and ongoing support to deliver community based Tai Chi for Arthritis classes (TCA). Volunteers provide 40 weekly classes. There was a gold coin donation to attend a class.

Methods:
We used a Context, Input, Process, and Product Evaluation (CIPP) model of evaluation. Data were collected through secondary analysis, new data sets, mixed-method case studies, focus group analysis (participants, staff, volunteers), and satisfaction survey (n = 369, cluster randomised sampling).

Results:
Registration rates (standardised per 100 000 population) indicate 1.7% of the population over 65 years undertake TCA in 39 Local Government Areas. In 2010, 119 classes were operating in 49 sites. Participants' most common risk factor for falls was chronic illness (215/246; 87%). In 2008/2009 volunteer leaders contributed 7620 hours of direct teaching time valued at $AUD

350,000 per annum. The unit cost was $AUD 76 per participant per annum. The network was an important resource. Sustainability and class resilience was affected by recruitment, succession planning and leader development approaches.

Conclusion:
The PALN model may mitigate falls risk through a number of inter-related mechanisms: 1) it directly improves balance through the physical actions undertaken during the session, 2) it improves concentration through a focus on the present, and 3) it provides an avenue for isolated people to exercise in a safe and supportive arena. We advance the case that the PALN model is efficient, well-respected in communities and builds social capital.

CHANGING CARPET TO VINYL FLOORING: EFFECTS ON FALLS AND FRACTURES

Hanger HC
Older Persons Health, Canterbury District Health Board, Christchurch, New Zealand

Aim:
To review whether changing the type of flooring in our Older Persons Health wards altered the rate of falls or fall related serious injuries.

Methods:
The flooring surface in our older person health wards was changed to carpet tiles laid on concrete base approximately 12 years ago, to minimise falls. Effectiveness was not formally evaluated at introduction. Due to perceived ineffectiveness, infection control issues, and wear and tear, a decision was made to replace the carpet with vinyl. Carpet was replaced with vinyl in six wards, incrementally between November 2007 and June 2009. Fall rates, adjusted for bed days occupied, together with number of fall-related fractures, were collected for 12 months periods before and after the change in flooring (in each ward) and analysed using run charts to determine any significant changes.

Results:
Interim results are presented as post intervention data is ongoing for three wards. Fall rates/1000 bed days remain unchanged (mean 19.5 before vs 19.7 after). Run charts showed no significant effects when all wards were analysed together but one psychiatric ward had a reduction in falls after vinyl was laid. Fracture numbers are lower (23 vs 10) but data collection is ongoing.

Conclusion:
At this interim analysis, the total number of falls has not significantly altered, in either direction, with the change from carpet to vinyl. However injuries (fractures) may be reduced. This early data adds to the very limited data on flooring surfaces and falls risk. Potential reasons for the possible better performance of vinyl in injury prevention will be discussed.

BALANCE IMPAIRMENT – AN UNRECOGNISED CONTRIBUTOR TO FALL RISK IN ANTI-EPILEPTIC MEDICATION USERS: A TWIN–SIBLING STUDY

Hill K[1,2], Petty S[3], O'Brien T[3,4], El Haber N[3], Paton L[3], Lawrence K[5], Berkovic S[5], Wark J[3,6]
[1]*La Trobe University and Northern Health, Bundoora, VIC, Australia*
[2]*National Ageing Research Institute, Parkville, VIC, Australia*
[3]*The University of Melbourne, Parkville, VIC, Australia*
[4]*The Royal Melbourne Hospital Department of Neurology, Parkville, VIC, Australia*
[5]*Epilepsy Research Centre, The University of Melbourne, Austin Health, VIC, Australia*
[6]*The Royal Melbourne Hospital Bone and Mineral Service, Parkville, VIC, Australia*

Background:
Anti-epileptic drugs (AEDs) are used for common health problems including epilepsy, migraine, trigeminal neuralgia, neuropathic pain syndromes and psychiatric disorders, which all increase in prevalence with age. Patients taking AEDs have increased fracture risk. The contribution of balance impairment to increased fracture risk with AED use remains poorly explored.

Aim:
To determine the effect of AEDs on balance and related physical performance falls risk factors, using an AED-discordant twin/sibling pairs sample.

Methods:
58 participants were recruited (29 people taking AEDs, 12 male, mean age 45 years; and their twin [5 monozygous and 5 dizygous twins], or same gender sibling [±3 years, n = 19]). Balance and related measures were assessed using detailed laboratory and clinical assessment, including the Chattecx Balance Platform, Lord's Balance test, KinCom, muscle dynamometer, Step Test, Coordinated Stability Test, activity and gait measures. Falls, fractures and medical history data was collected. Mean within-pair differences were examined using paired t-tests; and independent t-tests to compare mean within-pair differences between sub-groups.

Results:
Significant mean within-pair differences were seen between AED users and non-users for several static and dynamic balance measures, with AED users having poorer performance ($p < 0.0125$). AED users

also had significantly lower activity, but there was no significant difference in leg strength or gait measures. Sub-group analyses indicated significant differences on several balance measures for those on AED polytherapy, longer duration therapy, and those with a fall in the previous year (p < 0.0125). Five AED users, and no AED non-users had a history of low-trauma fracture (McNemar's Chi Square p = 0.037).

Conclusion:
AED-users had impaired balance compared to their non AED-user twin/sibling. AED-users taking polytherapy, having longer therapy duration or with recent falls, had poorer balance performance. Practitioners need to consider options to manage balance impairment and falls risk when prescribing AEDs, particularly with older people with other falls risk factors.

USING DIGITAL VIDEO AND PHOTOGRAPHY AS A CLINICAL OBSERVATIONAL, FEEDBACK AND RECORDING TOOL

Langron CP, Fairhall NJ, Cameron ID, Kurrle SE
The University of Sydney, Sydney, NSW, Australia

Rationale:
Digital video and photography are valuable tools in geriatric physiotherapy, yet they are underutilised in the clinical and research settings. Observing a patient perform a simple task can be very challenging and research has shown that observers are surprisingly unaware of details when perceptual demands intensify and attention is focused.

Description:
In a current randomised controlled trial of frail, community dwelling, older people, digital video and photography is being used in conjunction with exercise intervention for individual participants. Digital video can enhance clinical observations and corrections of abnormal movement by providing an instant, visual record for the therapist and participant. The compact digital camera has many simple functions, such as slow motion and enlargement of single frames that facilitate a more detailed movement analysis when compared to therapist observation in the clinical setting. Replaying videos of their current and previous performances to participants provides immediate visual feedback and encourages participant involvement and self correction in the intervention. Images can be recorded in different mediums and are being used in the trial for weekly multidisciplinary case conferences and large audience presentations. Recordings can be transferred to CD for safe storage to enable retrieval in the future. This digital technology has other applications such as telemedicine in remote areas or providing patients

with videos of themselves to practice their home exercise program.

Conclusion:
Digital video and photography has been readily accepted by participants as part of the normal intervention in this trial and this technology has enhanced normal therapeutic intervention. Five cases will be presented to illustrate the use of this clinical tool.

FALLS RISK OF ELDERLY ADMITTED TO ACUTE AND SUB-ACUTE CARE PUBLIC HOSPITALS

Lee FS[1], Sararaks S[2], Yau WK[1], Zulkarnain AK[2], Mohamad Zaidan Z[2], Naing L[3], *Thillainathan K[4], Ng AT[5], Salimah S[1], Azman AB[2], Maimunah AH[6], Chu AR[7], Mohd Shahril A[1], NorhayatyS[8], Vicneas WV[1], Sangetavani M[9]*
[1]*Kuala Lumpur Hospital, Wilayah Persekutuan Kuala Lumpur, Malaysia*
[2]*Institute For Health Systems Research, Ministry of Health Malaysia, Malaysia*
[3]*Institute Of Medicine, University Brunei Darussalam, Brunei Darussalam*
[4]*Selayang Hospital, Selangor, Malaysia*
[5]*Penang Hospital, Penang, Malaysia*
[6]*Office of the Deputy Director-General Of Health Malaysia (Research & Technical Support), Ministry of Health Malaysia, Malaysia*
[7]*Tuanku Ja'afar Hospital, Seremban, Negeri Sembilan, Malaysia*
[8]*Gombak Health District Office, Selangor, Malaysia*
[9]*Alor Gajah Hospital, Melaka, Malaysia*

Aim:
To determine intrinsic and extrinsic factors of falls in older inpatients.

Methods:
All inpatients 60 years and above from randomly selected public hospitals in Malaysia were followed up until discharge or end of study period. Every faller/near faller was interviewed, and 10 controls identified per case. Univariate analyses was done using STATA v10.

Results:
There were 71 fallers and 10 near fallers, with 801 controls. Intrinsic risk factors for falls were longer duration of hospital stay (odds ratio (OR) 4.00, p = 0.021 for 2 to 3 days stay; OR 2.85, p = 0.027 for 8 to12 days stay), midrange for Barthel Index score (score of 7 to 9, OR 3.18, p = 0.016 and score of 10 to 13, OR 2.04, p = 0.04), previous history of fall (OR 2.47, p = 0.034) and patients diagnosed with diseases of circulatory system (OR 2.28, p = 0.027).

Extrinsic risks were wet washrooms (OR 3.72, p = 0.018), and call bells/light switches not within reach (OR 2.13, p = 0.034). Conversely, walking aid within

reach had higher risk (OR 1.94, p = 0.016). Protective factors included presence of toilet transfer bars (OR 0.54, p = 0.021) and beds with only a single raised bedrail (OR 0.29, p = 0.019). Interestingly, patients with an unsturdy chair were 3.5 times less likely to fall compared with those with a sturdy chair with an arm rest (OR 0.29, p = 0.034).

Conclusion:
It would be prudent to pay special attention to patients who had previous falls, those who are in the middle range of Barthel Index and those with circulatory disease. Prevention measures include keeping floors dry, installing washroom grab bars and ensuring call bells are within reach. Additionally, bed rails if required to be raised, need special consideration as they are a form of restraint and contribute to falls if both sides are raised. These findings could be used in identifying and prioritizing patients for falls prevention measures, especially in busy public hospitals.

KNEE OSTEOARTHRITIS PATIENTS MAY BE AT INCREASED RISK OF FALLS FOLLOWING SURGERY

Levinger P[1], Menz HB[1], Wee E[1], Feller JH[1], Bartlett J[2], Bergman N[2]
[1]La Trobe University, Musculoskeletal Research Centre, Bundoora, VIC, Australia
[2]Warringal Private Medical Centre, Heidelberg, VIC, Australia

Aim:
Knee osteoarthritis (OA) is a major cause of disability and a risk factor for falls in older people with more than 50% of people with knee OA reporting falling in the past year. Knee replacement surgery is a common surgical procedure used for the management of knee OA which generally provides pain relief and improves physical function. However, persistent pain and disability may be present after knee replacement surgery which may place these patients at risk of falls post-operatively. The purpose of this study was to assess the falls risk of people with knee OA before surgery and at four months following surgery and to compare this to a control group.

Methods:
Thirty-five patients with knee OA prior to undergoing knee replacement surgery and 27 asymptomatic age-matched controls participated in the study. The surgical group were tested prior to their surgery and at four months post-surgery. The short form of the Physiological Profile Assessment was used to assess falls risk and included tests of vision, lower limb proprioception, knee extension strength, reaction time, and postural sway. Physical activity, quality of life, fear of falls and disability before and after surgery were also documented.

Results:
Forty-eight percent of the surgical group reported at least one fall in the previous 12 months compared to 30% of the control group. Following surgery, there was a reduction in fear of falling and pain, and improvements in function for the surgical group. However, compared to the control group, the surgical group exhibited a greater fear of falling, and reduced lower limb proprioception and knee extension strength both pre- and post-surgery.

Conclusion:
People who undergo knee replacement surgery may be at increased risk of falls both prior to and four months following their surgery, primarily due to deficits in knee extension strength and lower limb proprioception.

FALLS HISTORY, PAIN, FUNCTION AND FALLS-EFFICACY IN PATIENTS AWAITING JOINT REPLACEMENT SURGERY

Levinger P[1], Hill K[1,2], Wee E[1], Stewart A[3], Bartlett J[4], Bergman N[4], Hare D[3]
[1]La Trobe University, Musculoskeletal Research Centre, Bundoora, VIC, Australia
[2]Allied Health Division, Northern Health, Epping, VIC, Australia
[3]Austin Hospital, Heidelberg; Melbourne University, VIC, Australia
[4]Warringal Private Medical Centre, Heidelberg, VIC, Australia

Aim:
Arthritis is a leading cause of disability among older people, and is associated with moderate increase in falls risk. More than 60,000 hip and knee replacements are performed in Australia annually, primarily to treat arthritis. The purpose of this study was to assess differences in pain, function and fall efficacy between fallers and non-faller patients with knee and hip osteoarthritis awaiting joint replacement surgery.

Methods:
Thirty-six patients [mean age 67.4 (SD = 10.6), 66% females] were recruited, 86.1% awaiting total knee and 13.9% awaiting total hip replacement. Falls history and circumstances were recorded. Independent t tests were used to analyse differences in physical activity, fear of falling (FES-I) and the Activities and Balance Confidence (ABC) scale, and pain, stiffness and function (WOMAC) between fallers and non-fallers.

Results:
Forty-one percent (n = 15) reported one or more falls (range 0 to 6) in the preceding twelve months, with 46% of fallers reporting multiple falls. Fifty-five percent of falls occurred at home, and 25% of falls

were considered to be related to their painful joint awaiting surgery. Falls were most commonly due to trips (n = 14, 50%) and slips (n = 7, 25%). Only two participants attended the doctor after their fall. Fallers had significantly higher falls efficacy (p < 0.01; ABC Scale: fallers 79.7 (15.9); non-fallers 60.4 (23.1)) and lower fear of falls (p = 0.04; fallers 10.2 (3.7); non-fallers 12.9 (4.1)). There was no significant difference in WOMAC pain, stiffness or function scores and physical activity between fallers and non-fallers (p>0.05), though moderate levels of impairment on these domains was evident.

Conclusion:
People with knee and hip osteoarthritis awaiting surgery have a high falls rate, with a moderate portion of falls related to their painful joint. Interestingly, fallers reported only mild loss of falls efficacy and less fear of falling than the non-fallers.

FALLS EFFICACY AND DYSFUNCTIONAL BREATHING AMONG COMMUNITY-DWELLING OLDER PERSONS

Lim BH[1,2], Hofheinz M[1], Mibs M[1], van Dixhoorn JJ[3]
[1]*NTZ-Dresden, Germany*
[2]*Nanyang Polytechnic, Singapore*
[3]*The Center for Breathing Therapy, The Netherlands*

Aim:
The prevalence of fear of falling (FOF) has been commonly reported. Anxiety, balance and postural impairments are known conditions which are involved in developing FOF and dysfunctional breathing (DB). Therefore this study aimed to explore the association between falls efficacy, altered breathing pattern and functional respiratory symptoms. No prior study has looked into the association between FOF and DB.

Methods:
Community-dwelling older persons were recruited through volunteer sampling for a validation study of Timed Up & Go Test with Dual Task. Eighty-four participants were included for this study. Fear of falling was measured by Falls Efficacy Scale-International (FES-I). Dysfunctional breathing was measured by the presence of functional respiratory symptoms using the Nijmegen Questionnaire (NQ) and subject-blinded observation of altered breathing pattern. A three stage multivariate regression analysis was adopted. The first stage consisted of evaluating the multivariate regression model with the common predictors for FES-I. In the second stage and third stage, the respiratory components were included.

Results:
The mean age of the participants was 71.5 (SD = 7) years. The percentage of female gender was 81%. The median FES-I score was 20 (range 16 to 39)

and the median of NQ was 9 (range 0 to 46). The adjusted R^2 accounted by the common predictors of falls efficacy was 35%. Inclusion of both NQ and the presence of upper chest breathing pattern in the model explained 48% of the total variance of falls efficacy. The respiratory components explained an additional 13% of total variance.

Conclusion:
Upper chest breathing pattern and functional respiratory symptoms were independently associated with falls efficacy after accounting for its commonly known predictors. The possible contribution of the diaphragm as a respiratory and postural muscle in falls prevention should be further explored in future studies.

DOES THE COGNITIVE BENEFIT OF RESISTANCE TRAINING PERSIST?

Liu-Ambrose T, Katarynych LA, Nagamatsu LS, Graf P, Beattie BL
University of British Columbia, Vancouver, Canada

Aim:
To determine whether the cognitive benefit of resistance training persists one year after formal cessation among community-dwelling senior women aged 65 to 75 years.

Methods:
This was a 12-month follow-up study of a randomized controlled trial of resistance training (once-weekly or twice weekly). The primary outcome measure for cognitive function was the executive process of selective attention and conflict resolution as measured by the Stroop Test.

Results:
Twelve months after formal cessation of resistance training, improved cognitive performance of selective attention and conflict resolution was still evident among those senior women who were originally randomized to the once-weekly resistance training group.

Conclusion:
Our findings suggest that the cognitive benefit of once-weekly resistance training persists one year after formal cessation. A key factor contributing to this observed maintenance may be the perceived feasibility or motivation of sustaining once-weekly resistance training compared with that of twice-weekly resistance training.

IS SELF-EFFICACY ESSENTIAL FOR HEALTHY AGING?

Liu-Ambrose T, Nagamatsu LS, Hsu CL, Katarynych LA, Davis JC
University of British Columbia, Vancouver, Canada

Aim:
Falls-related self-efficacy has been shown to be associated with measures of mobility and falls. Whether it is associated with brain volume has not been previously explored.

Methods:
A cross-sectional analysis of whether falls-related falls efficacy is independently associated with brain volumes (total and gray matter). Two multivariate regression models were constructed. Covariates included in both models were age, global cognition, systolic blood pressure, functional comorbidity index, and current physical activity level. MRI scans were acquired from 79 community-dwelling senior women aged 65 to 75 years old. Falls-related self-efficacy was assessed by the ABC Scale.

Results:
In both models, after accounting for the five covariates, falls-related self-efficacy was independently associated with both total brain volume and gray matter volume. The final model for total brain volume accounted for 17.2% of the variance, with the ABC score accounting for 8.3%. For gray matter volume, the final 24.4% of the variance, with the ABC score accounting for 10%.

Conclusion:
Our findings extend previous investigations that highlight the importance of falls-related self-efficacy for healthy aging. We provide novel evidence that falls-related self-efficacy is positively related and independently contributes to both total brain volume and gray matter volume.

PHYSIOLOGICAL FACTORS ASSOCIATED WITH FRACTURE RISK IN OLDER PEOPLE

Lo JC[1], Brodie ML[1], Menant JC[1,2], Sturnieks DL[1,2], Lord SR[1,2]
[1]*Neuroscience Research Australia, Randwick, NSW, Australia*
[2]*University of New South Wales, Kensington, NSW, Australia*

Introduction:
Muscle mass declines with age and is associated with muscle weakness and decreased physical functioning in older age. Current fracture risk calculators, however, do not include body composition or physiological function measures.[1] The aim of this study was to determine if body composition and physiological function measures can discriminate between people with and without a history of fracture.

Methods:
One-hundred community dwelling older adults from an on-going study, aged 65 and over undertook assessments of quadriceps strength, postural sway, dynamic balance, reaction time, choice stepping reaction time and proprioception. Appendicular skeletal muscle mass (ASM) index (sum of lean mass in arms and legs, divided by height squared),[2] percentage body fat, and bone mineral density (BMD) at the femoral neck were assessed by dual energy X-ray absorptiometry. Fracture incidence due to falls after the age of 60 was documented by questionnaire, and used to determine those with (n = 25) and without (n = 75) a history of non-vertebral fracture.

Results:
Older people with a history of non-vertebral fracture had weaker quadriceps muscle strength (p = 0.03), decreased hip BMD (p = 0.012) and a lower ASM index, indicating less muscle mass (p = 0.001). A stepwise discriminant analysis revealed that ASM index (canonical correlation coefficient of 0.696) was the most important discriminator between those with and without a history of fracture (Wilks' lambda of 0.907, χ^2 = 9.492, p = 0.002). Overall, the discriminant function correctly classified 68% of cases, with 80% sensitivity and 64% specificity with respect to fracture outcome.

Conclusions:
These preliminary findings show that the ASM (lean body mass) index can discriminate between older people with or without a history of fracture. If confirmed in a larger study with prospective follow-up, this measure may provide additional insight into fracture risk in old age, and possible fracture prevention strategies.

References:
1. Hippisley-Cox J, Coupland C. Predicting risk of osteoporotic fracture in men and women in England and Wales: prospective derivation and validation of QFractureScores. BMJ 2009;339:b4229.
2. Baumgartner RN, Koehler KM, Gallagher D, et al. Epidemiology of sarcopenia among the elderly in New Mexico. Am J Epidemiol 1998;147(8):755-63.

SUSTAINABILITY OF COMMUNITY-BASED FALLS PREVENTION INTERVENTIONS: A SYSTEMATIC REVIEW

Lovarini M, Clemson, L, Mathews, M, Dean, C
The University of Sydney, Lidcombe, NSW, Australia

Aim:
A variety of interventions are known to be effective in preventing falls among community dwelling older adults. The challenge now is how to translate and

sustain these interventions in routine practice. We are conducting a systematic review to determine: 1) What theories, models or frameworks have been developed to guide the sustainability of falls prevention interventions for older adults living in the community; 2) What factors affect sustainability and 3) What strategies are effective for promoting, enhancing and achieving sustainability.

Methods:
Review methods were developed in accordance with the PRISMA statement.[1] Comprehensive searches of Medline, Embase, PubMed, Cinahl, PsycINFO, Amed, Ageline, PEDro and OTseeker are currently underway to identify relevant studies. Two reviewers working independently will screen and select studies that match the inclusion criteria. Data extraction and quality assessment processes will also be performed independently by two reviewers. Quality assessment of studies included in this review will be conducted according to the methodology used in each study.

Results:
Key characteristics of each study will be presented including: study type, size and methods, participant details, types of interventions and any outcome measure related to sustainability. Quality measures for each study will be provided. Key results for each study and any combined data from evaluation studies will be presented.

Conclusion:
Despite the importance, little is known about how community-based falls prevention interventions can be sustained. The results of this review will provide practitioners and researchers with an understanding of what is currently known on this topic.

References:
1. Liberati A, Altman DG, Tetzlaff J et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. PLoS Med 2009;6(7):e1000100.

STAYING ACTIVE AND ON YOUR FEET: A CONSUMER RESOURCE

Lovitt L[1], Vance E[2]
[1]*Clinical Excellence Commission, Sydney, NSW, Australia*
[2]*Neuroscience Research Australia, Randwick, NSW, Australia*

Background:
The Clinical Excellence Commission (CEC) completed a project funded by NSW Department of Health in early 2009, to review consumer falls prevention information and resources in NSW. An audit tool was developed based on falls prevention best-practice[1,2] to provide a systematic and objective way to compare the resources which included brochures, posters, fact sheets, toolkits and websites. The review found that a suitable resource that provides both falls information and a safety checklist for community dwelling consumers was required for NSW.

Description:
A project to develop a consumer falls prevention resource for NSW was commenced in late 2009. This falls prevention resource was to be comprehensive, evidence based and consumer focused and to include key falls prevention messages, a home safety checklist and simple exercises. This resource is to target older people, their families and carers living in the community.

Consultation with key experts A/Professor Lindy Clemson and Dr Cathie Sherrington guided the development of the proposed content. A draft *Staying Active and Healthy* was focus tested with people from the community to ensure its suitability and acceptability to the audience. This led to a number of changes and redesign of the resource. These included removal of *Healthy* in the title, less detailed information, an emphasis on falls prevention, and changes to the order of information in the document. The selection of appropriate images was important reflecting the diversity of ageing and including active images of older people on the cover.

Conclusion:
This community resource is for distribution by health professionals as they meet the general community whether that be in hospital, on discharge, contact in community health services and through April Falls Day/Month initiatives, raising awareness about falls prevention. Non-government community organisations are keen to distribute this to their members and general public.

References:
1. Australian Council on Safety and Quality in Health Care. Preventing falls and harm from falls in older people: best practice guidelines, 2005.
2. Daly J, Kellehear A, Gliksman M. The public health researcher: a methodological guide, Oxford University Press, Melbourne, 1997.

PROFILE AND IMPACT OF A CENTRAL NORTHERN ADELAIDE HEALTH SERVICE FALLS CLINIC

Lucero K[1], Pignata D[2], Woodford L[2]
[1]*Royal Adelaide Hospital and University of Adelaide, Adelaide, SA, Australia*
[2]*CNAHS Falls Prevention Team, Adelaide, SA, Australia*

Aim:
A new falls clinic was established in 2008 in the Central Northern Adelaide Health Service (CNAHS),

based at Hampstead Rehabilitation Centre. This multi-disciplinary service focuses on community dwelling individuals with multiple falls risk factors. We set out to quantify the impact of this falls clinic on health service utilisation.

Methods:
Data from the Hampstead Centre Falls Clinic was collated from January to September 2009 including waiting time, clinic attendance, referral source, emergency department (ED) presentations, hospital admissions and hospital length of stay (LOS) following a fall. The impact of the falls clinic was measured by comparing hospital utilisation patterns for six months prior to and after the clinic appointment, including ED presentations, hospital admission rates and LOS.

Results:
The total number of referrals received was 159, of these 22% declined attending the clinic. Referral sources were: hospitals (including ED) 65%, community programs 23.5% and general practitioners 11.5%. Falls related hospital utilisation showed a reduction in ED admissions by 70%, hospital admissions by 53% and hospital bed days by 73.5%.

Conclusion:
Early results show a beneficial impact of the Hampstead Centre Falls Clinic on falls related health service utilisation. Further evaluation is required to assess the impact of the clinic over a longer period, the effect on the number of falls and fallers, compliance with recommendations and reasons for clinic non-attendance. We are continuing to develop the Hampstead Centre Falls Clinic to increase community awareness of falls and falls services, and expand referral sources, including the ambulance service.

FALLS PREVENTION AFTER STROKE: A SYSTEMATIC REVIEW AND META-ANALYSIS

Mackintosh SF[1], Batchelor FA[2,3], Hill KD[2,4], Said CM [3,5]
[1]*University of South Australia, Adelaide, SA, Australia*
[2]*National Ageing Research Institute, Parkville, VIC, Australia*
[3]*University of Melbourne, Parkville, VIC, Australia*
[4]*LaTrobe University & Northern Health, Bundoora, VIC, Australia*
[5]*Austin Health, Heidelberg, VIC, Australia*

Aim:
It has been established that falls are common after stroke and that effective falls prevention in this population may prevent injury, improve quality of life and decrease the likelihood of activity restriction. This review aimed to integrate the research evidence relating to interventions that reduce falls after stroke.

Methods:
Published studies evaluating interventions to reduce falls in stroke survivors were retrieved and screened according to pre-determined criteria. No restrictions were placed on setting or intervention type. Included studies were independently assessed and the study bias was assessed using the Physiotherapy Evidence Database (PEDro) score. Pooling of results was undertaken for similar interventions with comparable outcomes using the inverse variance method.

Results:
Thirteen randomized controlled trials met the inclusion criteria, with pooling of results possible for only two types of intervention (exercise and bisphosphonate medication). Methodological quality of the included studies was variable with the main bias due to lack of blinding of participants and those administering the intervention. Falls data reporting was variable across the studies. The only intervention shown to be effective in reducing falls was vitamin D for female stroke survivors in an institutional setting (Risk Ratio 0.33, 95% CI 0.19 to 0.56). Other interventions (exercise, bisphosphonate medication, early mobilization, sunlight exposure, Fresnel prisms) were no more effective than usual care.

Conclusion:
Few studies have investigated falls prevention after stroke and the only intervention shown to be effective in reducing falls in this review was vitamin D supplementation. Consistency in outcome measurement would enable comparisons across studies. Additionally, further research evaluating a range of single and multi-factorial interventions for falls prevention in the stroke population is required.

References:
1. Batchelor FA, Hill KD, Mackintosh SF et al. What works in falls prevention after stroke? A systematic review and meta-analysis. Stroke 2010;41(8):1715-22.

THE BENEFIT OF FALLS RELATED ASSISTIVE TECHNOLOGY FOR PROVIDING ONGOING INDEPENDENCE

McFarlane L, Capamagian L
Tunstall Healthcare, QLD, Australia

Aim:
To demonstrate the benefit of using assistive technology to provide ongoing independence for people at risk of falls in and around the home.

Problem:
At present, the use of health related assistive technology is not widely accepted, implemented and used in Australia and New Zealand. Consumers and health care professionals are generally unaware of its existence and Government offers little financial support to assist people to better their quality of life and reduce pressure on the healthcare system via this means.

Solution:
Tunstall Healthcare, the world's leading provider of assistive technology, undertakes extensive research into health issues that can be better supported with the use of assistive technology. Fostering this research, Tunstall develops technologies that assist people to maintain their independence, confidence and dignity.

Tunstall also conducts pilot projects on the products in situ to determine their effectiveness for assisting people with certain conditions, such as tendency to fall. In the extensive West Lothian Pilot Project conducted by Tunstall Healthcare, assistive technology was found to improve confidence and state of mind of residents. Additionally, the technologies improved nursing efficiency and reduce hospital admission and duration of stay, all of which reduced cost of care.

Falls specific solutions:
Tunstall has created falls specific technology that can be interfaced with other technology to provide a complete solution for providing assistance or care. This includes the fall detector that monitors falls, personal alarm for notifying the response centre when the wearer has fallen, pager to notify onsite carers that the fall detector has been activated, PIR for monitoring movement or lack of, in the home, and more.

Tunstall Healthcare is committed to assisting older people and people with special needs to maintain their independence, confidence and dignity in the home, and provide peace of mind to their loved ones.

ABLE AND STABLE: A COMMUNITY-BASED INTERDISCIPLINARY FALLS PREVENTION PROGRAM

McManus FJ[1], McCarthy RN[1], Bramley RE[2,3], Walsh W[1,4]
[1]*Western Health, Melbourne, VIC, Australia*
[2]*La Trobe University, Bundoora, VIC, Australia*
[3]*Peter MacCallum Cancer Centre, East Melbourne, VIC, Australia*
[4]*University of Melbourne, Parkville, VIC, Australia*

Aim:
To meet the increasing numbers of clients referred for falls prevention, the Williamstown Community Based Rehabilitation (CBR) Service developed the 'Able and Stable' Program. The aim was to reduce the number of client falls in the community by targeting clients who had fallen in the last six months, whilst optimising therapists' time.

Methods:
Physiotherapists, in collaboration with the CBR team, developed an interdisciplinary eight-week group exercise and education program. The exercise component is based on the Otago Exercise Programme[1] and focuses on improving strength and balance. Minimal equipment is used, promoting self-management and ensuring the exercises are easily performed at home. Health professionals from different disciplines deliver the education component ensuring a consolidated team approach. Rate of falls pre and post intervention and balance outcome measures are used to determine the program's efficacy.[2] 'Client focus' is strong with regular feedback through confidential client surveys.

Results:
Phone surveys six months following discharge demonstrated a reduction in falls rates with 37 falls reported by 78 contactable clients, compared with 199 falls in the six months prior to program commencement. Sixty percent of contactable clients reported continuing their exercises on average four times a week.

At completion of the program, 100% of clients completing the satisfaction survey were satisfied with the program. Analysis of change in balance measures demonstrated clinically significant improvements. Clients who attended Able and Stable showed greater improvements in balance than similar clients treated with individually tailored programs, though no statistical analysis was conducted.

Running the program as a group reduced the time commitments of therapists involved, allowing more 'falls' clients to be assessed and referred to the group or treated individually. Able and Stable now runs four groups each week across two Western Health sites.

Conclusion:
Able and Stable is an effective program for preventing falls and optimising balance for older adults in the community while being an efficient use of therapists' time.

References:
1. ACC. Otago exercise programme to prevent falls in older adults. A home-based, individually tailored strength and balance retraining programme. Wellington: ACC, 2003.
2. Hill K, Denisenko S, Miller K et al. Clinical outcome measurement in adult neurological physiotherapy. 3rd edition.

CAN BALANCE TRAINING REVERSE RECENT ONSET MILD BALANCE DYSFUNCTION IN OLDER PEOPLE?

Meyer C[1], Hill K[1,2], Yang X[1,3], Moore K[1], Williams S[1], Borschmann K[1], Dowson L[1], Dharmage S[3]
[1]*National Ageing Research Institute, Parkville, VIC, Australia*
[2]*La Trobe University and Northern Health, Bundoora, VIC, Australia*
[3]*University of Melbourne, Parkville, VIC, Australia*

Aim:
To evaluate the effectiveness of a home based exercise program in reversing older people's mild balance dysfunction that was identified within six months of onset.

Methods:
Sixty older people (mean age 77.2 years; 26 (43%) female) with self-reported concerns about their balance were screened with laboratory and clinical tests, and were identified as being within normative limits based on a predetermined algorithm. On reassessment six months later, 19 (36%) of the 53 who returned for reassessment had deteriorated balance performance to be classified as outside of normative range. These participants were offered a home based balance training program (Otago Exercise Programme with the HPR Balance and Vestibular exercise program), with exercises prescribed by a physiotherapist, and monitored with three additional visits during the six-month exercise program. Sixteen participants agreed to undertake the program.

Results:
Thirteen of the 16 participants (81%) (mean age 79.9 years, 7 (54%) female) completed the six-month exercise program. Participants achieved significant improvements on a number of laboratory (NeuroCom) and clinical tests of balance and muscle strength (p < 0.05) (significant changes ranged from 7% to 23% improvement). Nine participants (69.2%) regained sufficient balance performance across the tests to be classified within normative limits again, using the predetermined algorithm.

Conclusion:
Older people expressing concerns about their balance may benefit from intermittent reviews to monitor for decline in performance, which occurred in over a third of this sample of people with balance performance classified as within normative ranges six months previously. For those whose balance performance deteriorates to be outside of normative ranges, a balance and strength training home

exercise program is likely to achieve positive outcomes. Further research should evaluate the feasibility of a simplified balance screening protocol, and a randomised trial of this exercise approach to reduce risk of progression of recent onset mild balance dysfunction.

BALANCE SCREENING AND HOME EXERCISES: TRANSLATING RESEARCH INTO PRACTICE

Meyer C[1], Williams S[1], Hill K[1,2,3], Yang X[1,4], Renehan E[1], Cortes N[1]
[1]*National Ageing Research Institute, Parkville, VIC, Australia*
[2]*LaTrobe University, Bundoora, VIC, Australia*
[3]*Northern Health, Bundoora, VIC, Australia*
[4]*University of Melbourne, Parkville, VIC, Australia*

Aim:
To develop, implement and evaluate the feasibility of translating findings from a previously successful randomised controlled trial of a balance screening and home exercise program[1] through existing community health services (CHSs).

Methods:
Protocols for balance screening, and home exercise program prescription were developed. CHSs were recruited and were responsible for attending training sessions, and recruiting participants (those who had fallen less than twice in previous 12 months, were over 65 years of age, concerned about balance, and were community ambulant using either a stick or no gait aid). Participants underwent a balance screening assessment. CHS physiotherapists provided home balance exercises to participants considered to have abnormal balance, following up with two home visits at 4 and 10 weeks. Implementation issues were recorded and the details of physiotherapists' perception on the process were collected. Participants will be reassessed following six months of exercise.

Results:
Six Melbourne CHSs participated, with 55 participants recruited to date both within and outside the CHS population. Based on previous trial data, two clinical tests were used to classify presence of balance dysfunction – Step Test and Functional Reach Test. Eighty-four percent of participants had balance performance classified as outside of normative limits, and commenced the home exercise program. Physiotherapists report direct personal contacts (either by physiotherapists or peer groups) have been most successful in recruiting participants, that exercise prescription is occurring slightly differently to that of other clinical groups, with program structure and follow-up protocols considered favourably.

Conclusion:
Balance screening and providing home balance exercises for older people who have mild balance dysfunction is feasible through existing community health services. Physiotherapists have responded well to providing a new service.

Reference:
1. Yang XJ, Hill KD, Moore K et al. Effectiveness of a targetted exercise intervention in reversing older people's mild balance dysfunction: A randomised controlled trial. Paper submitted for publication.

USING GREEN PRESCRIPTION TO PROVIDE EXERCISE CONTINUATION FOLLOWING FALL PREVENTION PROGRAMMES

Miller N
Accident Compensation Corporation, Invercargill, New Zealand

Background:
The Accident Compensation Corporation (ACC) in New Zealand has nationally funded two exercise programmes for fall prevention in older adults for over 10 years. Research has shown that if an older adult stops exercising or drops out of a fall prevention programme, any gains in muscle strength and balance they have made will be lost, and their falls risk will revert to baseline levels.

Aims:
The programme has two aims:
1) To ensure that general practitioners, practice nurses, providers and health professionals in Southland have a streamlined referral system to fall prevention programmes, and
2) To use Green Prescription to support participants in continued exercising for three months following a fall prevention programme.

Methods:
This poster will show the referral pathway to a Green Prescription and progressions available for participants of ACC funded falls prevention programmes.

The Green Prescription programme offers participants support for three months following discharge from an ACC fall prevention programme. In consultation, the participant is encouraged to continue with the exercises provided, move onto a higher level of class, or move onto another form of exercise and maintain the gains they have already made.

Results:
Two hundred and sixty older adults were referred to Green Prescription from an ACC falls programme in 2009. Of these participants, most were referred onto Graduate or Tai Chi classes. Other activities referred to included Cyclofit, walking groups, YMCA seniors group, aqua jogging and other recreational activities.

Conclusion:
The Green Prescription programme gives older adults in Southland the opportunity to continue exercising for a further three months following a fall prevention programme. It is likely the continued exercise will help participants maintain their muscle strength and balance. The Green Prescription programme is currently offered in all New Zealand centres and referral after a fall prevention programme could be replicated.

TRENDS IN FALL INJURY HOSPITALISATION RATES BY INJURY TYPE: IMPLICATIONS FOR INJURY PREVENTION

Mitchell RJ, Watson WL
University of New South Wales, Sydney, NSW, Australia

Aim:
Despite considerable advances in falls prevention research and practice, the rate of fall-related injury hospitalisations among older individuals continues to increase. Yet, there is some evidence that hip fracture rates, a major cause of fall-related hospitalised morbidity, are declining. An examination of trends in types of injuries that contribute to the overall fall injury hospitalisation rate is required to understand these conflicting trends. The aim of this study was to examine the trends in fall-related hospital admissions by injury type in New South Wales (NSW), Australia.

Methods:
A retrospective review of fall-related injury hospitalisations in NSW among individuals aged 65+ years, by injury type, was conducted from 1 July 1998 to 30 June 2009. Incident cases were identified using the 'referral source' field and direct age standardardised admission rates were calculated. Negative binomial regression was used to examine the statistical significance of changes in the trend over time of hospitalised fall-related injuries by injury type.

Results:
The overall fall-related injury hospitalisation rate increased by 1.7% each year (p < 0.0001; 95% CI 1.3 to 2.1%). However, the fracture rate declined by -0.4% (p < 0.03; 95% CI -0.8 to 0%) and the rate of non-fractures increased by 6.1% (p < 0.0001; 95% CI 5.5 to 6.7%) each year. In particular, severe head injuries, rib(s) and pelvic fracture hospitalisation rates appear to be increasing while hip and forearm fracture rates appear to be declining.

Conclusion:
It appears that, while fall injury prevention efforts in NSW are not yet affecting fall injury hospitalisation

rates, efforts in relation to bone health may be having a preventive effect in terms of fractures. It is likely that the increase in severe head injuries is due to changes in diagnostic practices.

A THREE-ITEM TOOL TO PREDICT FALLS IN AGED CARE INPATIENT REHABILITATION

O'Rourke S[1,2], Sherrington C[1,2,3], Lord SR[2], Close JCT[2,4], Barraclough E[1,2], Taylor M[2,4], Tiedemann A[1,2], Cumming RG[3], Herbert RD[1]
[1]The George Institute for Global Health, Sydney, NSW, Australia
[2]Neuroscience Research Australia, University of New South Wales, Sydney, NSW, Australia
[3]School of Public Health, University of Sydney, Sydney, NSW, Australia
[4]Prince of Wales Hospital Clinical School, University of New South Wales, Sydney, NSW, Australia

Aim:
We previously developed the 5-item Predict_FIRST tool to predict falls during inpatient aged care rehabilitation stays.[1] In response to clinician feedback that a shorter tool would be of greater use, we aimed to design a 3-item version of the tool and compare its predictive ability to that of the full Predict_FIRST tool and the STRATIFY tool.

Methods:
This prospective cohort study included 553 people aged 50 years and older admitted to aged care rehabilitation units at two Sydney hospitals. Data were collected from medical records, interviews with staff and participants and from physical assessments by physiotherapists. The number of falls during the admission was extracted from hospital incident reports. We used multivariate logistic regression models on 1000 bootstrapped samples to establish which three items from the Predict_FIRST tool (male gender, CNS medication use, a fall in the past 12 months, frequent toileting and tandem stance inability) were the strongest predictors of falls.

Results:
The 3-item version included male gender, CNS medications and a fall in the past 12 months. The area under the ROC curve (AUC) for this tool was 0.68 (95% CI 0.63 to 0.74; bootstrap adjusted AUC was 0.69). This represents poorer predictive ability than the 5-item Predict_FIRST tool (AUC 0.73, 95% CI 0.67 to 0.79, p = 0.028 for comparison between 3- and 5-item tool) but a better predictive ability than the original STRATIFY score (AUC 0.62, 95% CI 0.56 to 0.69, p = 0.186 for comparison between 3-item tool and STRATIFY).

Conclusion:
We found that three items (male gender, CNS medications and a fall in the past 12 months) could be used to predict falling during the aged care rehabilitation stay with reasonable accuracy but that the addition of frequent toileting and tandem stance inability provide additional predictive information.

Reference:
1. Sherrington C, Lord SR, Close JC et al. Development of a tool for prediction of falls in rehabilitation settings (Predict_FIRST): a prospective cohort study. J Rehabil Med 2010;42(5):482-8.

RECOVERY EXERCISES AND STEPPING ON AFTER FRACTURE (RESTORE): STUDY PROTOCOL

Orr T[1], Sherrington C[1], Lord SR[2], Close JCT[2,3], Vogler C[4,5], Sonnabend D[4], Clemson L[5], Howard K[5], Moseley A[1], Cameron ID[6], Fairhall N[1], Kirkham C[1]
[1]The George Institute for Global Health, Sydney, NSW, Australia
[2]Neuroscience Research Australia, University of New South Wales, NSW, Australia
[3]Prince of Wales Hospital Clinical School, University of New South Wales, NSW, Australia
[4]Royal North Shore Hospital, Sydney, NSW, Australia
[5]University of Sydney, Sydney, NSW, Australia
[6]Royal Rehabilitation Centre, Sydney, NSW, Australia

Aim:
To determine if a novel program of exercise self-management training will reduce mobility-related disability, enhance life role participation and prevent falls for people who have suffered a fall-related lower limb or pelvic fracture, and have completed usual care.

Methods:
Three hundred and fifty community dwelling participants with lower limb or pelvic fracture due to a fall who are 60 years or over will be randomly allocated into control or intervention groups. Participants will have no medical condition precluding exercise, be physically and cognitively able to complete the assessments and exercise programme, and understand conversational English. The intervention group will receive an individualised home exercise program prescribed by a physiotherapist in 10 home visits, and complete an eight group-session "Stepping On" programme. Motivational interviewing and goal setting, to encourage behaviour changes in exercise and safe community mobility, will be incorporated. The control group will receive usual care.

Results:
Primary outcomes measured will be mobility-related disability, life role participation and falls. Cost-effectiveness analysis will be undertaken for the primary outcomes. Secondary outcomes measured will be hospital readmission, risk of falling, frailty,

balance and mobility, body mass index, physical activity, pain, falls efficacy, mood and quality of life. Predictors of adherence to the program and of outcome after fall-related lower limb or pelvic fracture will be established.

Conclusion:
This study addresses an increasingly important health care problem in a systematic manner using a novel intervention program. We anticipate that the study results will be implemented into clinical practice and public health fall-prevention strategies.

IMPLEMENTING THE NATIONAL FALLS PREVENTION STRATEGY AT REGIONAL LEVEL – OPPORTUNITIES AND CHALLENGES

Perry C[1], Forde K[1,2]
[1]New Plymouth injury Safe Trust, New Plymouth, New Zealand
[2]Accident Compensation Corporation (ACC), New Plymouth, New Zealand

Introduction:
New Plymouth injury Safe (NPiS) is a Charitable Trust with links to a range of New Plymouth District organisations, businesses and groups with an interest in injury prevention and community safety. NPiS began as an informal coalition in 2001, when representatives from local agencies agreed to meet together on a regular basis to better align and co-ordinate their injury prevention priorities and activities. The Trust membership includes health, emergency services, district council, ACC, Department of Labour and a Maori development organisation.

Strategic co-ordination:
The independence of NPiS and the existing presence of key partners on the group, has enabled the Trust to play a lead role in strategic co-ordination of local injury prevention activities and networks, particularly in those areas where this was previously lacking (such as falls prevention). The multi-agency Taranaki Falls Strategy Group was established in 2007 to improve coordination of local falls prevention services and to support local implementation of the National Falls Prevention Strategy 2005-2015.

Opportunities and challenges:
The creation of the Taranaki Falls Strategy Group, and the subsequent development of the Taranaki Falls Prevention Strategy, have played a vital role in raising the profile of falls prevention in Taranaki. In particular, the group has encouraged a greater number of local organisations to recognise the role that they have to play in falls prevention through identifying those at risk of falls or by taking an active role in prevention. However, the journey has not always been easy and the current political and financial climate has placed an additional set of challenges on the ongoing delivery of falls prevention in the region.
This presentation will focus on the achievements of the Taranaki Falls Strategy Group over the last two years and outline how the group is responding to the current challenges that local falls prevention service providers now face.

HOW WELL ARE FALLS RECORDED IN THE HOSPITAL? RESULTS OF AN AIMS REVIEW

Png F[1], Carr N[2]
[1]Bentley Health Service, Bentley, WA, Australia
[2]Armadale Health Service, Armadale, WA, Australia

Aim:
We audited two WA Health campuses to compare reporting of falls in the patient's progress notes with the completion of an Advanced Incident Management System (AIMS) form. The AIMS form is completed after every fall and provides data on fall incidence and main causative factors. Under reporting can reduce the capacity of staff to learn from preventable incidents, and effectively monitor intervention strategies.

Methods:
The audit included General Medical ward in-patients admitted from 1st to 14th July 2009, and Rehabilitation ward in-patients admitted from 1st to 30th June 2009 to Armadale Health Service, and all Rehabilitation ward in-patients admitted from 1st to 30th June 2009 to Bentley Health Service.

A total of 124 patients' medical records were reviewed. Admitted patients' integrated notes were read from admission to discharge to identify recorded falls or near falls incidents.

Results:
In both health campuses most falls recorded in patients' progress notes were followed up with an AIMS form (16 out of 16 falls (100%) in Armadale Health Service, and 8 out of 11 falls (73%) in Bentley Health Service). At Bentley Health Service, completion of an AIMS form for all incidents that staff considered to be a fall was documented in the patients' progress notes. However, one of the AIMS forms could not be found when searched for and two out of the eleven falls were not classified as falls by the clinical staff and as such the post fall protocol was not undertaken.

The audit identified the need for an improvement in staff documentation of post-fall recommendations and action plans, and a greater need for medical officer documentation after a fall.

Conclusion:
There were marked differences between sites on what incidents were classified as a fall, and the

characteristics of the patients who fell. Further discussion between all WA Health sites is required to reach a consensus definition of a fall so that there is consistency in reporting across sites.

ACC AND NELSON BAYS PRIMARY HEALTH – WORKING IN PARTNERSHIP TO PREVENT FALLS

Preston-Thomas MG
Accident Compensation Corporation, Nelson, New Zealand

Aim:
This programme was developed to increase community participation in falls prevention activities. In the Nelson region, 8% of the over 65s have a fall requiring medical treatment which increases to 28% for the over 80 age group annually. To reduce this, ACC funded Tai Chi and the Otago Exercise Programmes to 350 people annually; however this was only reaching 2% of the older population. While these programmes had a strong evidence base, an additional limitation was that the improvement was often not sustained at programme completion.

Methods:
To address this, ACC and Nelson Bays Primary Health developed a falls prevention partnership. It involved increasing falls awareness with GPs, promoting and education on falls risk assessments and developing a referral pathway so that older adults are connected with suitable community programmes. The reach and co-ordination of community programmes are also being substantially improved. Older adults identified as a falls risk receive an introduction to a 'smorgasbord' of community activities and are connected to a suitable activity or service.

Results:
Early results are encouraging, with significant numbers of falls risk assessments being undertaken and increasing numbers entering the programme. Existing community activity hubs are being strengthened and are linking older adults with a wide variety of structured and unstructured activities. Participants are followed up via Green Prescription.

Conclusion:
If the increasing falls rate is to be reversed, the numbers participating in community activities must increase. As fully funded programmes are not viable to reach these numbers, the emphasis must shift to community programmes that have the capacity to provide stimulating and beneficial activities to participants. This initiative is proving successful in creating the infrastructure allowing this to occur.

'WALKING THE TALK'- AGENCIES WORKING TOGETHER TO CONNECT OLDER ADULTS TO COMMUNITY SERVICES

Preston-Thomas MG
Accident Compensation Corporation, Nelson, New Zealand

Aim:
In 2007 ACC and the Tasman Regional Sports Trust identified an opportunity to co-ordinate older adults' services and held a community workshop attracting 32 organisations. The aim was to improve participation, communication and access to community programmes and services.

Methods:
To address this, the Older Adults Working Group was created involving the Nelson Marlborough DHB, ACC, the three local authorities, Sports Trust, Primary Health Organisation and organisations representing older adults. Chaired by ACC, a feature of this group was continuing consultation directly with those representing older adults.

Results:
Strong commitment has been demonstrated by the organisations involved. In 2009 the group consulted with the community and commissioned an in-depth review of community needs and opportunities to improve nutrition and activity. This research found that while there are ample existing programmes the need is to support and connect older adults at times of life changing events.

An action plan has been agreed to enhance the network of professional and community support workers. A communication plan is currently being developed with information tools and older adult expos also being enhanced. Work is also under way to review agency polices to ensure that services are focusing on areas of need and opportunities for collaboration are maximised.

Conclusion:
This group is successfully addressing local barriers and opportunities and is undertaking co-ordinated action to improve participation of at-risk older adults in existing community activities. As funding becomes more difficult, it is only through greater co-ordination that the shared vision of improved participation resulting in improved health and reduced falls across the at-risk community can be reached.

EVALUATION OF PATIENT AND CARER FALLS PREVENTION EDUCATION RESOURCES

Richardson KT
South East Sydney Illawarra Area Health Service, NSW, Australia

Aims:
To seek consumer and staff feedback on newly developed patient and carer falls prevention resources for inpatients and hospital emergency department (ED) patients aged 65 years and over and assess changes in consumer awareness of falls preventative actions.

Methods:
The inpatient and carer booklet was piloted in three hospitals for four weeks. Eligible patients were either: i) admitted to hospital with a fall related injury or ii) identified as falls risk on admission screening or iii) had a fall in hospital. Patients exhibiting confusion or delirium; not able to speak/read English; or with significant visual impairment were excluded. Patients were interviewed by consumer representatives. Carers were interviewed by the Carers' Coordinator. Staff voluntarily completed an anonymous staff survey.

The hospital ED patient pamphlet was piloted for six weeks with patients discharged home from a regional hospital. Eligible patients either: i) had a fall at home in the last year, ii) disclosed recent history of falls, or iii) were at risk of falls on screening. Inpatient exclusion criteria were applied. Patients were interviewed by phone 2–4 weeks after hospital ED discharge.

Results:
Of 54 inpatients and 17 carers interviewed and 18 nursing staff completing a staff survey on the inpatient booklet, 80% gave it positive evaluation with minor changes suggested. The majority of consumers planned actions in response to reading the booklet. Of 46 patients discharged from hospital ED with a falls injury, four of 10 patients consenting to survey met the pilot inclusion criteria. They found the ED brochure useful, but their recall was variable.

Conclusion:
Providing inpatient and carer falls prevention education booklets was useful from consumer, carer and staff perspectives. Providing pamphlets to patients in hospital ED prior to discharge was not found to be optimal. Hospital ED clinical referral pathways for patient falls risk need to be investigated.

PEER LEAD EXERCISE GROUPS FOR OLDER ADULTS: WELLBEING AND SOCIAL EFFECTS

Robertson L[1], Hale B[2], Waters DL[3], Hale L[3]
[1]*Otago Polytechnic, Dunedin, New Zealand*
[2]*Independent Researcher, Dunedin, New Zealand*
[3]*University of Otago, Dunedin, New Zealand*

Aim:
In Dunedin, New Zealand, peer-led exercise classes have been running for six years. However, the determinants that contributed to class sustainability were largely unknown. Therefore a study using qualitative methods was undertaken to investigate from the perspective of the participants and organizers, the factors that contributed to the value and maintenance of these peer-led strength and balance programs

Methods:
Qualitative methods were used and semi-structured interview schedules developed by the research team. Seven focus groups were conducted, six with members of the exercise groups, and one with peer leaders. Two organisers were interviewed individually.

Results:
Effective communication between organisers and peer leaders was essential to the ongoing development of the groups and was characterised by trust and mutual expectations of high standards. Benefits reported by the group members included not only physical aspects (such as strength and balance), functional abilities (such as gardening, managing to climb stairs, reaching), increased awareness of posture and movement, but also a greater sense of wellbeing and self-confidence, as well as social opportunities.

Conclusion:
The physical benefits promoted by attendance at the group acts as a catalyst to bring people together but the social capital, i.e. the norms and networks that enable people to act collectively, resulted in older adults enjoying their weekly group sessions and ensured sustainability.

SLEEP AND FALLING IN OLDER PEOPLE – A PILOT STUDY

Russell M[1], Dow B[2], Batchelor F[2], Berlowitz D[3], Borschmann K[2], Crowley K[3], Hill K[1,4], Lin X[2], Wilkinson V[3], Williams S[2]
[1]*University of Melbourne, Melbourne, VIC, Australia*
[2]*National Ageing Research Institute, Melbourne, VIC, Australia*
[3]*Institute of Breathing and Sleep. Austin Hospital, Melbourne, VIC, Australia*
[4]*LaTrobe University and Northern Health, Melbourne, VIC, Australia*

Aim:
Sleep difficulties are common but under diagnosed in older people, and often wrongly attributed to be an inevitable part of ageing. The aim of the study was to investigate what specific sleep difficulties are associated with falling in older people and the feasibility of undertaking a larger study investigating the association between sleep difficulties and falls.

Methods:
Veterans or war widows over 70 years of age who had fallen at least once in the previous year underwent two assessments: (1) an at-home assessment of falls risk (Falls Risk for Older People in the Community [FROP-Com]), self reported daytime sleepiness (Karolinska Sleepiness Score [KSS]) and other assessments, and (2) a sleep assessment (polysomnography) at a sleep laboratory.

Results:
The mean age of the 35 participants was 82.8 years (95% CI 81.5 to 84.1). Thirteen (25.7%) participants reported experiencing one fall in the previous 12 months and twenty two (74.3%) participants reported two or more falls in the previous year. An association between daytime sleepiness and the number of falls over the past year was found (KSS, t = 2.2, p = 0.033) and an association between daytime sleepiness and FROP-Com score was found (t = 2.5, p = 0.019). The somewhat demanding data collection strategy was feasible and acceptable to older people, with no adverse consequences.

Conclusion:
Consistent with previous studies of residential care dwelling older people,[1] there seems to be a relationship between daytime sleepiness and falls risk in a community-dwelling population. Further research is needed to determine whether interventions to prevent sleepiness can impact upon falls risk.

References:
1. St George RJ, Delbaere K, Williams P et al. Sleep quality and falls in older people living in self- and assisted-care villages. Gerontology 2009;55(2):162-8.

TAI CHI AND YOGA FOR FALL PREVENTION IN RESIDENTIAL CARE

Saravanakumar P, Higgins I, Sibbritt D, VanDer Riet P, Marquez J
University of Newcastle, NSW, Australia

Aim:
The aim is to present the findings of a critical review of the literature on the usefulness of Tai Chi and Yoga in improving balance function, in reducing incidence of falls, reducing pain and improving quality of life among older adults in residential care facilities.

Methods:
Electronic databases such as CINAHL, EMBASE, MEDLINE, MOSBY'S INDEX, PROQUEST Nursing Journals and Cochrane Database were searched using the following keywords: Aged, older person, elderly, fall*, accidental falls, residential facilities, homes for the aged, residential care, Yoga and Tai Chi.

Results:
Older adults in residential care facilities are at high risk for falls and suffer highest mortality, greatest degree of disability and dysfunction and reduced quality of life. Two forms of complementary and alternative medicines (CAMs) have recently emerged as being potentially beneficial in improving balance and thus reducing falls: Tai Chi and Yoga.

Tai Chi is a system of slow meditative physical exercise designed for relaxation, balance and health. Recent studies demonstrate Tai Chi is effective in improving balance function, muscle strength, range of movement, flexibility, and falls prevention.[1] Yoga, with its origins in India, is well recognised as a mind body therapy that promotes physical, psychological and spiritual well being. Yoga has also been shown to improve balance and gait function by using postures combined with breathing techniques.[2] Other studies suggest that yoga may improve hip extension, increase stride length, and decrease anterior pelvic tilt and that programs tailored to older people may be an effective means of preventing age-related changes to balance and gait function.

Conclusions:
It is evident that Tai Chi and Yoga are significant in improving balance function in older adults. However, further research is needed in residential care facilities.

References:
1. Harling A, Simpson JP. A systematic review to determine the effectiveness of Tai Chi in reducing falls and fear of falling in older adults. *Physical Therapy Reviews* 2008;13(4):237-48.

2. Brown KD, Koziol JA, Lotz M. A yoga-based exercise program to reduce the risk of falls in seniors: a pilot and feasibility study. *Journal of Alternative & Complementary Medicine* 2008;14(5):454-7.

VALIDATION OF A VIDEO GAME SYSTEM FOR MEASURING FALL RISK

Schoene D, Smith ST, Lord SR
Neuroscience Research Australia, Sydney, NSW, Australia

Aim:
Choice Stepping Reaction Time (CSRT) has shown to be predictive for falls in older people.[1] We conducted a study to validate a videogame device for measurement of CSRT that is able to detect differences in fall risk in older adults.

Methods:
We have developed a novel videogame-based system[2] for measuring stepping performance based on dance-pad games. CSRT was assessed in 47 older (65 to 90 years) and 20 younger people (22 to 43 years). All participants were assessed using a well-validated, laboratory-based measure of CSRT. Test-retest reliability of the videogame system was assessed after one week. Older participants were assessed on measures of cognitive function (Trail Making Test Parts A and B, Digit Symbol Substitution Test), physiological fall risk (Physiological Profile Assessment (PPA)), fear of falling (Falls Efficacy Scale-International (FES-I); Activities-Specific Balance Confidence (ABC)).

Results:
The CSRT scores from our videogame were significantly correlated with the existing laboratory-based measure (Pearson r = 0.94, p < 0.01). Test-retest reliability of the system was high (ICC(2,1) = 0.93, p < 0.01) and correlated significantly with measures of cognitive function (Pearson correlations Trail A: 0.61**, Trail B: 0.57**, DSST: -0.53**), fall risk (PPA score: 0.42**) and fear of falling (FES-I: 0.42*, ABC: -0.57**) [*p < 0.05, **p < 0.01]. High fall risk older adults (PPA ≥ 0.6) were slower (1109 msec ± 39.8 msec, n = 25) than low risk adults (1010 msec ± 24.7 msec, n = 22; t_{45} = 2.2, p = 0.035).

Conclusions:
Using a videogame device it is possible to assess stepping ability and fall risk. This study showed that the mat-based measure of CSRT has excellent psychometric properties and is congruent with a well-validated laboratory-based measure. Our system was also able to discriminate high from low fall risk older adults and suggests a novel way of tracking fall risk on a regular basis from the homes of old adults.

References:
1. Lord SR, Fitzpatrick RC. Choice stepping reaction time: a composite measure of falls risk in older people. J Gerontol A Biol Sci Med Sci 2001;56(10):M627-32.
2. Smith ST, Sherrington C, Studenski S et al. A novel Dance Dance Revolution (DDR) system for in-home training of stepping ability: basic parameters of system use by older adults. Br J Sports Med 2010. epub ahead of print.

REDUCTION IN INPATIENT FALLS THROUGH A LOCAL, EVIDENCE-BASED CLINICAL PRACTICE IMPROVEMENT PROGRAM

Slawomirski L[1], Waldron N[2], Seymour H[2], David L[1]
[1]*Office of Safety and Quality in Healthcare, Department of Health, Perth, WA, Australia*
[2]*Falls Prevention Health Network, Clinical Networks, Perth, WA, Australia*

Aim:
To evaluate the effect of a Clinical Practice Improvement (CPI) Program in reducing inpatient falls in public hospitals in Western Australia (WA).

Methods:
A structured Falls Prevention CPI Program was rolled out across WA public hospitals in June 2006 as part of the Safety and Quality Investment for Reform (SQuIRe) Initiative. The Program was designed to drive evidence-based patient safety and quality improvement activity at local (hospital) level. In March 2009, all "falls" reported to the WA Advanced Incident Management System (AIMS), a voluntary clinical incident reporting database, for the period 1 July 2005 to 30 June 2008 were extracted. To calculate rate data, the number of bed days for each year was obtained from the Information Management and Reporting Division of the WA Department of Health.

Results:
The number of falls reported to AIMS decreased by 9.1% and 4.2% for 2005-06 to 2006-07 and 2006-07 to 2007-08 respectively with an overall three-year decrease of 12.9% (p < 0.01). The rate of reported falls per 1000 bed days also decreased over the three years (5.2, 4.7, and 4.3). The number and rate of reported falls for the 0 to 64 age group remained stable, but the 65 to 79 and over 80 age groups showed statistically significant decreases. Overall rates of reported clinical incidents were stable over the three years.

Conclusion:
Data from AIMS (a voluntary reporting system) indicates that the CPI Program had a positive effect on reducing inpatient falls in the 65 and over age group. A statewide program using local quality improvement cycles, change champions, ward level staff engagement and evidence-based practice appears effective in reducing inpatient falls.

CHANGING FALLS CULTURE THROUGH TRANSFORMATIVE LEARNING

Smith KM[1], Sachse D[1]
[1]*Patient Safety and Quality Improvement Service, Queensland Health, QLD, Australia*

Aim:
The primary goal of the Queensland Health Patient Safety and Quality Improvement Service (PSQ) is to introduce patient safety initiatives to minimize patient harm within Queensland. To address the 3396 inpatient-falls experienced during 2006-2007, three falls prevention e-learning packages have been developed that target, nurses, doctors and pharmacists and clinical leaders. The aim of these packages is to improve patient care and change staff attitudes to preventing falls; the most commonly reported clinical incident resulting in patient harm.

Methods:
The PSQ engaged an extensive range of key stakeholders through the Fall Injury Prevention Collaborative to assist with providing expert and real-world feedback. An external education provider was also contracted to assist with the development of the education packages.

The evidence-based packages have been developed according to the Australian National Guidelines and a multidisciplinary approach. They aim to challenge the beliefs that falls prevention is not a core nursing duty but "extra work", that falls are inevitable rather than preventable and to address knowledge gaps.

The key teaching method used is transformative learning. Using questioning and critical reflection, participants reflect on their practice and evaluate their own understanding of how they view falls and falls prevention in their own work. This can lead to a revision of value beliefs and a broader perspective.

Results:
Qualitative comments indicate that participants have refreshed their knowledge, changed their perspective, have a heightened importance of preventing falls and completed the course feeling motivated. An overview of all three education packages, participant numbers and qualitative comments regarding their experience will be presented.

Conclusion:
The e-learning packages are a cost effective way to provide ongoing education and an avenue to disseminate best practice guidelines to a large workforce. These packages provide a process for cultural change which empowers the participants to think and act differently –using the power of one (each participant).

VIRTUAL REALITY AND FALL RISK IN OLDER PEOPLE – A SYSTEMATIC REVIEW

Smith ST[1], Schoene D[1], Verhoef P[1,2] Lord SR[1]
[1]*Neuroscience Research Australia, NSW, Australia*
[2]*Radboud University, Nijmegen, Netherlands*

Aim:
Human-computer interaction in a real-time simulation of an environment, scenario or activity can be defined as Virtual Reality (VR).[1] Little is known about the effectiveness of this technology for preventing falls in older people. The purpose of this systematic review is to determine the effects of VR on fall risk factors.

Methods:
A literature search covering relevant databases using content-related keywords was conducted (4/5/2010). Reference lists of identified trials and reviews were also searched. Studies were eligible if they a) were randomised controlled trials, b) used VR as at least one treatment arm, and c) investigated the effect on a known fall risk factor. Presuming a similar response to exercise in younger adults, and a lack of research done in older populations, age was not an inclusion criterion. Two independent reviewers decided on study inclusion, extracted data and assessed methodological quality.

Results:
Sixteen studies met the inclusion criteria. Only one trial focused on older people (> 65 yrs). A range of VR systems were used from commercially available video gaming consoles, through to high-cost systems. Overall methodological quality of the trials was low.

VR training led to improvements in measures of dynamic balance that were comparable or higher than traditional balance programs. It also improved gait performance (walking speed, step length, stride length, obstacles) in people with stroke and osteoarthritis. The Joint Position Sense as a measure of peripheral sensation was also better compared to the control group as well as neuromuscular outcomes (leg power, knee extensor strength) of the lower limbs. Inconsistent results were achieved regarding effects on Activities of Daily Living and physical activity behavior.

Conclusions:
VR systems improve important fall risk factors and may therefore be effective in reducing falls in older people. Methodological quality must be improved and more studies with aged populations are needed.

References:
1. Adamovich SV, Fluet GG, Tunik E et al. Sensorimotor training in virtual reality: a review. NeuroRehabilitation 2009;25(1):29-44.

PERSPECTIVES ON THE USE OF PERSONAL ALARMS BY USERS AND POTENTIAL USERS

Sutherland M[1], Grimmer-Somers K[2], Johnston, K[2]
[1]*SA Department of Health, Adelaide, SA, Australia*
[2]*International Centre of Allied Health Evidence, University of South Australia, Adelaide, SA, Australia*

Aim:
Personal alarm devices are proposed as a reliable mechanism for older people to obtain assistance after a fall. However, little is known about how older people feel about owning and using personal alarms in the event of a fall. This poster reports on the experiences of independently-living older people who have recently fallen, whether or not they own an alarm, and their perspectives on using it to seek assistance.

Methods:
Volunteers who had sustained a fall in the previous six months were sought via community invitations. Semi-structured telephone interviews were conducted to gain information about participant's experience of the fall, and perspectives on personal alarm use. Interviews were transcribed and content analysed to identify key concepts and themes.

Results:
Thirty-one interviews were conducted. All callers had recently fallen and 20 callers owned personal alarm devices. Four subgroups of older fallers were identified. The first uses personal alarms effectively and are advocates for their benefits. The second group has alarms but do not use them effectively because they are unfamiliar with alarm capabilities, and do not have sufficient training or insights to use the alarm properly. A third group does not have an alarm mostly because of cost, although they would be appropriate and positive users should an alarm be provided. A fourth group does not have an alarm and would not use it even if it was provided.

Conclusion:
Personal alarm use is a positive experience in an emergency when used effectively by the right person. The cost of personal alarms prohibits a subgroup of older people who have experienced a fall, from having an alarm. Other elderly fallers remain unwilling to consider alarm use. In view of the cost of personal alarm devices, their use should be targeted to those who will benefit most, and other strategies implemented in situations where alarms are currently unacceptable.

BALANCE AND MOBILITY DYSFUNCTION IN OLDER PEOPLE WITH MILD-MODERATE ALZHEIMER'S DISEASE

Suttanon P[1,2,3], Dodd KJ[1,4], Said CM[5,6], LoGiudice D[7], Lautenschlager NT[8], Hill KD[1,2,79]
[1]*La Trobe University, Bundoora, VIC, Australia*
[2]*The National Ageing Research Institute, Parkville, VIC, Australia*
[3]*Faculty of Allied Health Sciences, Thammasat University, Thailand*
[4]*Musculoskeletal Research Centre, Bundoora, VIC, Australia*
[5]*The University of Melbourne, Kew, VIC, Australia*
[6]*Heidelberg Repatriation Hospital, Heidelberg West, VIC, Australia*
[7]*Aged Care Division, Royal Melbourne Hospital, VIC, Australia*
[8]*Department of Psychiatry, The University of Melbourne, VIC, Australia*
[9]*Allied Health Division, Northern Health, Bundoora, VIC, Australia*

Aim:
To identify differences in mobility and balance performance between people with mild to moderate severity Alzheimer's disease and healthy age and gender matched older people.

Methods:
Twenty-eight community dwelling participants (mean age 81, 37% males) with mild to moderate severity Alzheimer's disease (AD) and 28 cognitively intact age and gender matched controls were recruited. A comprehensive balance and mobility assessment involved computerised posturography measures of static and dynamic balance under various conditions; clinical measures included simple functional balance and mobility tests, and measures of falls and falls risk (Physiological Profile Assessment (PPA), and the Falls Risk for Older People in the Community assessment tool (FROP-Com)).

Results:
Forty-three percent of the AD group had fallen at least once in the past 12 months, compared with 32% of the healthy group (p = 0.582). The AD group had a greater risk of falling measured by the PPA (p = 0.006) and the FROP-Com (p < 0.001). In the AD group also had significantly reduced balance performance, particularly when controlling balance with limited sensory information and in dynamic balance conditions where they demonstrated slower, shorter and less coordinated movement of the centre of gravity. They also had significantly poorer gait and mobility performance, presenting as slower speed in either general walking or walking involving turning tasks, with a marked deterioration found during dual task measure. There was no difference in any muscle strength measures between the two groups.

Conclusion:
Balance dysfunction is common and affects various domains of balance performance in patients with mild to moderate severity AD. Balance screening should be routine in patients with mild to moderate severity AD, at a stage of the dementia pathway when these patients are more likely to be able to safely undertake a balance training exercise program, which may have benefits that extend into later stages of the disease progression.

STAYING UPRIGHT IN REST HOME CARE TRIAL

Taylor D[1], Kerse NM[2], Robertson MC[3], Parsons J[4], Calder M[5], Binns E[1], Mace J[6], Rosie J[1], Woodley SJ[7], Shaw L[2], Walker D[2], Campbell AJ[3]
[1]Health & Rehabilitation Research Institute, AUT University, Auckland, New Zealand
[2]School of Population Health, University of Auckland, Auckland, New Zealand
[3]Dunedin School of Medicine, University of Otago, Dunedin, New Zealand
[4]School of Nursing, University of Auckland, Auckland, New Zealand
[5]Waitemata District Health Board, Auckland, New Zealand
[6]School of Rehabilitation & Occupation Studies, AUT University, Auckland, New Zealand
[7]Otago School of Medical Sciences, University of Otago, Dunedin, New Zealand

Aims:
The aims of this study were to a) refine an exercise programme aimed at preventing falls in residential care and test its effect on strength and balance, and b) to establish feasibility for a large 2x2 factorial randomised controlled trial to test whether a multifactorial programme or an exercise programme alone similarly reduces falls in New Zealand rest homes.

Methods:
A 2x2 factorial design was piloted to determine whether it was possible to recruit facilities and residents to a study where the facility was randomised to 1) a multifactorial intervention or 2) usual care, and the residents were randomised to 1) an Upright exercise programme aimed to improve balance and lower leg strength (intervention group) or to 2) a seated exercise programme (acting as a control).

Results:
Overall, 70 residents greater than 65 years of age, not in a palliative care or respite programme, agreed to participate in four rest homes located in Auckland, New Zealand. Average attendance at the Upright exercise classes and seated exercise classes was 60% and 55% of the available classes respectively. Fifty-three people were able to complete the follow-up measures. After six months there were no between group differences in physical performance measures or falls.

Conclusion:
The study showed that residents and homes could be recruited, enrolled and complete all parts of the study protocol. The interventions tested were acceptable. Greater staff encouragement could potentially have increased resident participation in the exercise classes.

BALANCING THE OPTIONS: PREVENTING FALLS AMONG OLDER VICTORIANS

Thomas ML, Thompson C
Department of Health, Melbourne, VIC, Australia

Aims:
Victoria aims to develop a falls prevention framework and action plan that use mainstream health and related programs to reduce falls and related injuries among older people.

Background:
The Victorian government has provided recurrent funding for more than 13 years for falls prevention programs and centre- and home-based rehabilitation. Projects funded through Primary Care Partnerships (PCPs) have shown working collaboratively with others improves service performance; reduces health inequalities and results in a more responsive health service system. Sustainable programs such as Home and Community Care, Active Service Model provide opportunities for mainstream integration and a reduction in falls.
Recently reported data show that although hospitalizations for falls are increasing there has been a 20% downward trend in overall rate of unintentional fall-related hip fracture hospital admissions among Victorians aged 65 years and older between 1998-09 and 2007-08.[1] The reducing rate of hip fractures provides positive outcomes to build on.

Methods:
Much is known about the effectiveness of key falls prevention interventions but little about acceptability and preparedness of older people to make necessary lifestyle changes. To determine how falls and related injuries can be reduced through policy and practice change the Aged Care Branch:
- sought input from older people, community agencies and workforce;
- reviewed 'whole of community' projects funded through PCPs 2001-07 to identify sustainable strategies and best practice models of delivery;
- is evaluating 'multistrategy' projects funded 2009-2010;
- works with National Injury Prevention Working Group; and

- is participating in a partnership project between government, Monash University and National Health and Medical Research Council (NHMRC) to prioritise investments, strategies and target groups.

Conclusion:
Input from the community, data and evidence from previous falls prevention activities and the NHMRC partnership project will guide funding allocation, and policy development. Identifying acceptable person-centred interventions acknowledging the person themselves, changing community expectations and attitudes to prevention can bring about sustainable policy and practice change.

Reference:
1. Victorian Admitted Episodes Dataset (Injury Subset) held by the Victorian Injury Surveillance Unit.

CLINICAL REVIEW OF WALKING AID PRESCRIPTION AND USE FOLLOWING HIP FRACTURE

Thomas S[1], Halbert J[2], Mackintosh S[2], Cameron ID[3], Kurrle S[3], Whitehead C[1], Miller M[1], Crotty M[1]
[1]*Flinders University, Adelaide, SA, Australia*
[2]*University of South Australia, Adelaide, SA, Australia*
[3]*University of Sydney, Sydney, NSW, Australia*

Aim:
To describe the pattern of walking aid prescription and use in older community dwelling patients in the first six months following hip fracture.

Methods:
Observational data were collected via questionnaires and clinical assessment by a physiotherapist on a sub-set of 95 older adults recruited for the INTERACTIVE trial. They were ≥70 years, had undergone surgical treatment for a hip fracture and were community dwelling prior to their fracture. Descriptive analyses were used to detail the key components of walking aid prescription and use.

Results:
Eighty-seven participants (91.6%) were discharged from their final inpatient setting with a wheeled frame. Eighty-two participants (86.3%) were not aware of any goals set by the physiotherapist for the first six months and 89 (93.7%) stated that a review time had not been set. Despite this, 78 (82.1%) participants changed their walking aid, on average 8.2 weeks (SD 6.1) post-operatively; however, 31.6% of those who changed their walking aids were using an inappropriate aid or using it incorrectly. At six months post fracture 40% and 50% of participants had not returned to using their pre-morbid indoor or outdoor aid, respectively.

Conclusion:
A lack of walking aid review by a trained health professional within the first six months following hip fracture can lead to a high number of older people making their own decisions about what walking aid is most appropriate for their use. This has safety implications in a group already identified to be at high risk of falls.

USING THE OTAGO EXERCISE PROGRAMME AFTER HIP FRACTURE: ADHERENCE AND FEASIBILITY

Thomas S[1], Mackintosh S[2], Miller M[1], Cameron ID[3], Kurrle S[3], Whitehead C[1], Crotty M[1]
[1]*Flinders University, Adelaide, SA, Australia*
[2]*University of South Australia, Adelaide, SA, Australia*
[3]*University of Sydney, Sydney, NSW, Australia*

Aim:
To describe the use (adherence and feasibility) of the Otago Exercise Programme (OEP) with older adults in the first six months following hip fracture.

Methods:
Between June 2007 and December 2009, 77 participants were recruited for the INTERACTIVE trial and randomised into the intervention group. They were ≥70 years, had undergone surgical treatment for a hip fracture and were community dwelling prior to the fracture. In addition to individualised nutrition therapy, the aim of the intervention was to initiate the OEP within 14 days of surgery. Exercise sessions were supervised by a physiotherapist during the participant's inpatient admission; and on discharge they were reviewed and progressed on a fortnightly basis, for a total of 24 weeks. Recommended 'adherence' to the programme was participation in the programme at least three times per week. Complete adherence was considered participation in a total of 72 sessions over 24 weeks. Descriptive analyses were used to detail the key components of exercise adherence and feasibility.

Results:
Fifty-three per cent (41/77) of participants adhered to the OEP at the recommended level or more. Adherence was greatest when participants were located in their own home (76.4%), compared to an inpatient (34.3%) or residential care facility (43.8%). It was possible to progress the difficulty of the programme, with 45 participants using ankle cuff weights to provide resistance of up to three kilograms by week 24, and to deliver the programme in a variety of settings (acute, rehabilitation and community).

Conclusion:
It was feasible to commence the OEP with older adults after hip fracture within three weeks of fracture, moderate adherence to an intensely supervised OEP was achieved, it was possible to progress the programme over the first six months and deliver the OEP in a variety of settings. The OEP may be a suitable rehabilitation approach for hip fracture patients.

A SCREENING TOOL TO PREDICT FALLERS IN HOSPITAL EMERGENCY DEPARTMENTS

Tiedemann A[1,2], Sherrington C[1,2,3], Close JCT[2,4], Lord SR[2], Orr T[1], Hallen J[4], Kelly A[4]
[1]*The George Institute for Global Health, Sydney, NSW, Australia*
[2]*Neuroscience Research Australia, University of New South Wales, Sydney, NSW, Australia*
[3]*School of Public Health, University of Sydney, Sydney, NSW, Australia*
[4]*Prince of Wales Hospital, Sydney, NSW, Australia*

Aim:
People aged over 65 years represent a high proportion of hospital Emergency Department (ED) attendees in Australia and around 18% present to the ED as a direct consequence of a fall.[1] Older ED attendees often have their fall-related injuries treated, followed by discharge from the ED without consideration of the probability of future falls or provision of prevention strategies.[2] We aimed to develop a falls prediction tool for use in the ED and to compare its predictive ability to a measure of previous falls, as recommended by clinical guidelines.

Methods:
This prospective cohort study included 178 people aged 70 years and older (mean = 80.7, SD = 6.2), attending and discharged from a Sydney hospital ED. Data were collected by ED staff and included medical, fall and fracture history, medications, usual level of function and balance/mobility. Participants were followed up for falls over six months using monthly falls diaries. We used a multivariate logistic regression model to determine the strongest predictors of fallers. We compared the multivariable model to a single question of falls experienced in the past year.

Results:
Logistic regression analysis identified previous multiple falls (OR 4.26, 95% CI 2.11 to 8.61), taking seven or more medications (OR 2.14, 95% CI 1.05 to 4.36) and walking aid use outdoors (OR 2.02, 95% CI 1.00 to 4.09) as independent predictors of falling. The area under the ROC curve (AUC) for this tool was 0.72 (95% CI 0.64 to 0.80). This represents significantly better predictive ability than the measure of previous multiple falls alone (AUC = 0.66 (95% CI 0.59 to 0.74), p = 0.023.

Conclusion:
A three-item screening tool discriminated between fallers and non-fallers with good accuracy. After external validation, this simple tool could be used to identify high risk individuals who may benefit from onward referral or intervention after discharge from a hospital ED. An external validation study is currently underway.

References:
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DEVELOPMENT AND EVALUATION OF FALLS PREVENTION PROGRAM SUSTAINABILITY GUIDELINES AND TRAINING PROGRAM

Vrantsidis F[1], Hill K[1,2], Clemson L[3], Lovarini M[3], Russell M[4], Day L[5]

[1]*National Ageing Research Institute, Parkville, VIC, Australia*
[2]*La Trobe University and Northern Health, Bundoora, VIC, Australia*
[3]*University of Sydney, Lidcombe, NSW, Australia*
[4]*University of Melbourne, Parkville, VIC, Australia*
[5]*Monash University, Clayton, VIC, Australia*

Aim:
This project is one of four components of a larger NHMRC Partnership grant program aimed at reducing falls in Victoria, co-funded by the Victorian Government Department of Health. This component aims to develop and trial best practice sustainability guidelines, and training program, for community-based falls prevention programs.

Methods:
To inform the development of the guidelines and training program a literature review was conducted to identify factors associated with the sustainability of community-based falls prevention and other general health programs, and to identify any existing sustainability guidelines/training programs.

The guidelines/training program will be trialled in eight regions in Victoria. Agencies will be asked to review their current falls interventions using the guidelines and develop and implement a sustainability work plan. Focus groups will be conducted with agencies four months later to determine achievements, facilitators and barriers to

embedding changes in their organisation and to provide feedback on the guidelines/training program.

Results:
There is little literature specifically looking at falls prevention program sustainability. Key factors associated with falls prevention and general health program sustainability include having: a credible, motivated, proactive and skilled program champion/s; evidence of program benefits; compatibility with the organisation's goals and values; establishing partnerships and networks; ability to adapt to changes in the environment/organisation; staff, management and stakeholder input and engagement; adequate funding and resources, and supports that are timely and tailored; clearly defined roles for all stakeholders; planning sustainability and evaluation from the outset; and clearly defining what will be sustained and how this will be measured.

Several organisations have shown interest in trialling the guidelines when they become available in September 2010.

Conclusion:
Sustainability may be a latent outcome that is not reliably achieved. The guidelines/training program will assist agencies to plan sustainability from the outset thereby improving the likelihood of program/activity sustainability.

TRACKING PROGRESS OF INPATIENTS FALLS IN NEW ZEALAND

Weststrate JTM, Wensley CJ
Graduate School of Nursing Midwifery and Health, Victoria University, Wellington, New Zealand

Aim:
In the time period of 2008-2009, 27% of all reported serious and sentinel events in New Zealand were fall related.[1] This percentage can be regarded as the tip of the iceberg. Conducting a annual national survey among all inpatients provides more in-depth knowledge about what health care professionals can do and is the first step towards creating a fall preventive environment for our patients.

Methods:
Since 1998 the University of Maastricht, (NL) has been running a validated program[2] (LPZ, National Prevalence Care problems) that measures the prevalence of falls and the use of restraints, continence, malnutrition, and pressure ulcers. The Graduate School of Nursing Midwifery and Health has marketed this program for New Zealand (NSCI-NZ). In the program, assessment takes place at three levels. In addition to the patient, the ward and the institution itself are also reviewed as to the extent they facilitate evidence-based guidelines.

Results:
The NSCI-NZ was carried out in 2009 and 2010 in five hospitals and 14 nursing homes. Table 1 provides a brief overview of some of its results.

Characteristics	Hospital	Nursing Home
Participants (n)	640	389
Female (%)	56.5	75.5
Age participants (years	65.7 (Range 17-97)	85.0 (Range 36-103)
Fall incidents (<30 days) %	25.8%	16.2%
Nosocomial %	22.5%	89%
Documented%	83.6%	100%
Health problems%	69.5%	18.5%

Table 1: Overview of patient characteristics and the falls prevalence for each type of institution

Conclusion:
The results of our survey show the majority of fall incidents occur in a hospital environment and produce the most health problems. Surprisingly over 16% of those are not documented in the patient clinical record. Taking part in the survey is therefore a useful exercise to find out what's really happening in your own institution and in New Zealand.

References:
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CARDIOVASCULAR RISK FACTORS FOR FALLS AMONG COMMUNITY LIVING OLDER AUSTRALIANS

Wong KWA[1], Lord SR[1], Close JCT[1,2], Trollor J[3], Smith S[1]
[1]*Falls and Balance Research Group, Neuroscience Research Australia, University of New South Wales, Sydney, NSW, Australia*
[2]*Prince of Wales Clinical School, University of New South Wales, Sydney, NSW, Australia*
[3]*Brain and Ageing Program, School of Psychiatry, University of New South Wales, Sydney, NSW, Australia*

Aim:
To explore the relationships between arterial stiffness, medication use, balance and falls risk in community living older Australians.

Methods:
Five hundred and thirty one community dwelling older participants (mean age 79.8 ± 4.4 years) were recruited from the longitudinal Memory and Ageing Study. All participants underwent a detailed

cardiovascular assessment including arterial stiffness (carotid-femoral pulse wave velocity (PWV)) and assessments of postural stability and fall risk using the Physiological Profile Assessment (PPA). Demographic, medical and fall history information was also collected.

Results:
Fifty-nine percent of participants reported having hypertension. The percentage of participants taking central acting medications, cardiovascular medications and statins were 22.7%, 69.9% and 54.4% respectively. Thirty-six percent of participants reported falling in the previous year and fourteen percent reported two or more falls.

In the men, high PWV was associated with impaired co-ordinated stability (r = 0.132, p = 0.049), reduced maximum balance range (r = -0.195, p = 0.004) and increased PPA fall risk scores (r = 0.186, p = 0.005), and a higher incidence of falls in the past year (p < 0.05). In the women, high PWV was associated with reduced maximum balance range (r = -0.139, p = 0.029). Cardiovascular medication prescription was not associated with balance, fall risk scores or past falls in either gender.

Conclusion:
Our findings suggest that increased arterial stiffness is adversely associated with balance in both older men and women. The finding that high PWV is associated with increased PPA fall risk scores and falls in the men only may be due to the greater prevalence of arterial stiffness evident in this gender. Future planned analysis will determine prospectively whether carotid-femoral PWV and related medication use is associated with falls in this population.

COMMUNITY AMBULATION TRAINING (CAT) PROGRAM

Wong WM, Heung HM
Tuen Mun Hospital, Tuen Mun, New Territories, Hong Kong

Introduction:
Community ambulation has been broadly defined as locomotion outdoors to encompass activities such as visits to the supermarket, shopping mall, and bank; social outings; vacations; and pursuit of leisure activities. It is not only important for achieving active ageing but also an important mobility and social outcome in the rehabilitation process.

Objective:
To observe the frequency of subjects resuming community ambulation, number of falls and road accidents after the Community Ambulation Training (CAT) Program.

Methods:
We recruited 24 subjects from April 2008 to January 2009, referred to Geriatric Day Hospital for rehabilitation, who were pre-morbid outdoor walkers and were planning to resume outdoor activity. We used a community ambulation training room to provide an environment simulating different community terrain characteristics (ie mud, brick, concrete path, curb, stair, ramp, travelator and road crossing) for assessment and training. We used Balance Master to identify vestibular dysfunction in patients with dizziness and potential fallers. Then we targeted our training at skill transfer, accurate self awareness in terms of outdoor capability, road crossing ability, travelator usage ability and vestibular rehabilitation. Finally, we telephoned the subjects to obtain mobility status, number of falls and accident related to road crossing after discharge.

Results:
There was a remarkable overall increase in the post training self awareness of outdoor capability, road crossing ability, and travelator usage ability (Table 1). A total of 96% of subjects could resume outdoor activity which was mainly for leisure activity. Only 8.7% of subjects had a fall after discharge. There was no road accident reported. Balance Master could identify 26% of subjects with vestibular dysfunction of which only 17% had a fall subsequently.

Table 1 Training outcome (n = 24)

	Pre-training	Post-training
Self awareness (outdoor capability)	5 (21%)	23 (96%)
Self awareness (road crossing	19 (83%)	23 (96%)
Travelator (independent)	12 (52%)	20 (87%)

Conclusion:
The CAT Program is a service with the potential to benefit the facilitation of community ambulation, reduction of fall risk, and promotion of road safety.

FALL RISK FACTORS FOR RECURRENT FALLERS IN A SUB-ACUTE SETTING

Wong Shee A[1], Phillips B[1,2], Hill K[2,3,4]
[1]*Ballarat Health Services, VIC, Australia*
[2]*La Trobe University, VIC, Australia*
[3]*Northern Health, Epping, VIC, Australia*
[4]*National Ageing Research Institute, Parkville, VIC, Australia*

Aim:
Recurrent fallers are responsible for a substantial proportion of total falls in sub-acute hospital settings. Distinguishing recurrent faller characteristics may be useful in trying to reduce falls and fall-related injury. This study aimed to investigate falls risk factors associated with single and recurrent faller status in patients in a sub-acute setting.

Methods:
This project was conducted at Ballarat Health Services sub-acute inpatient facilities (30 bed rehabilitation ward, 23 bed complex care ward). Participants were designated as fallers if they had ≥ 1 falls in a specific six month period, and a non-faller matched on age, gender and unit was randomly selected for each faller. Demographic, medical and fall-related data were collected in a retrospective audit of medical records and incident reports. Multivariate logistic regression analyses were used to determine risk factors predictive of faller status, using all data for fallers and non-fallers. Risk factors included in analyses were cognition, number of medications, use of psychotropic medications, continence, mobility, previous fall history, Barthel scores and vision.

Results:
The audit included 186 participants (42 single fallers, 51 recurrent fallers, 93 non-fallers), average age 79 years. Barthel score was the only significant predictor of single falls compared to no falls ($p = 0.022$). Cognitive impairment ($p = 0.001$), Barthel score ($p = 0.003$) and ≥ 2 psychotropic medications ($p = 0.009$) were significant predictors for multiple falls compared with no falls. Incontinence ($p = 0.025$) and cognitive impairment ($p = 0.019$) were significant risk factors for multiple falls compared with single falls. A considerable proportion of injuries were sustained by recurrent fallers, however there was no significant association between injury rates and faller status.

Conclusion:
A large proportion of falls and fall-related injuries were attributable to recurrent fallers. Cognitive impairment and incontinence were significantly associated with recurrent faller status. These factors warrant strong focus on developing interventions aimed at reducing multiple falls in sub-acute hospital patients.

RISK OF FALLS IN OLDER ADULTS WITH AGE-RELATED MACULAR DEGENERATION

Wood JM[1,2], Lacherez P[1,2], Black A[1,2], Cole MH[2,3], Boon M[1,2,4], Kerr G[2,3]
[1]*School of Optometry, Queensland University of Technology, Brisbane, QLD, Australia*
[2]*Institute of Health & Biomedical Innovation, Queensland University of Technology, Brisbane, QLD, Australia*
[3]*School of Human Movement Studies, Queensland University of Technology, Brisbane, QLD, Australia*
[4]*School of Optometry and Vision Science, University of New South Wales, Sydney, NSW, Australia*

Aim:
Age-related macular degeneration (AMD) is the leading cause of irreversible visual impairment among older adults and affects a range of visual functions, many of which have been associated with increased falls risk. Despite these associations, there have been very few studies that have explored the relationship between AMD and falls risk and none that have identified the visual risk factors for falls in this population.

Methods:
Participants included 80 community-dwelling individuals with a range of severity of AMD (mean age 77.2 ± 6.9 years). Baseline assessment included binocular measures of visual acuity, contrast sensitivity, and merged binocular visual fields; postural sway was also measured on a force plate on a firm and on a compliant surface with eyes open and closed. Participants completed monthly falls diaries for a year following the baseline assessment.

Results:
Sixty-three percent of participants reported a fall and 31% reported more than one fall. Of the 102 falls reported, most occurred outdoors (52%) between late morning and early afternoon (68%) and when navigating on level ground (61%). Reduced contrast sensitivity and visual acuity, and greater sway area on a firm surface with eyes open and closed were associated with increased fall rate, after controlling for age, gender, cataract severity and self-reported physical function. The type of spectacle correction worn did not affect falls risk in this sample.

Conclusions:
Among older adults with AMD, increased visual impairment was significantly associated with an increased incidence of falls. Of the visual function measures assessed, reduced contrast sensitivity and visual acuity were significantly associated with an increased rate of falling. These findings have important implications for the visual assessment of visually impaired older adults.

INJURIES IN ELDERLY PATIENTS SEEN AT AN EMERGENCY DEPARTMENT IN SINGAPORE

Yong D, Ngeow I
Division of Community Geriatrics, Changi General Hospital, Singapore

Aim:
To determine the incidence, types and outcomes of elderly patients presenting with injuries at the emergency department (ED) of a regional acute hospital.

Methods:
A retrospective survey from January to March 2009 (3 months) of patients >65 years.

Results:
There were a total 33,060 attendances, with 7,486 admissions; 4,257 were attendances by elderly people with 2,706 admitted. A total of 550 of attendances by elderly people were injury-related (358 women, 192 men) of which 252 (46%) were admitted. The most common injury was soft tissue (50%) followed by fractures (259, 43.6% of all injuries); the most common fractures were hip (40%), upper limbs (22.8%), vertebral (18%), head injury (37%), subdural (4.5%) and multiple (10%).

About half of the elderly patients with injuries were admitted. The main admission wards and respective average lengths of stay were orthopaedics (46%, 19 days), surgery (32%, 4 days) and geriatric (15%, 12 days). Almost all (95%) of these injuries had been associated with falls. Mortality was 3.2 deaths per 100 admissions; main causes were medical related 60% (sepsis and vascular events) rather than injury related.

A total of 298 (54%) of elderly ED cases were treated as outpatients and discharged for review by their GP (28%) or referred to an orthopaedic (25%) or general surgery (13%) outpatient clinic.

Conclusion:
Those aged >65 years comprise a significant workload for ED: 13% of attendances (or 1 in every 8) and 36% of all admissions (or 1 in 3). Injuries are the reason for about 13% of elderly attendances with 46% of these patients being admitted. Besides treatment for injuries, the ED of an acute hospital is also strategically positioned to channel these cases for interventions to reduce falls and fractures in this at risk population.

REDUCING FALLS AND FRACTURES IN A NURSING HOME IN SINGAPORE

Yong D[1], Monica J[1], Ariva V[1], Zimadar T[1], Ma L[2]
[1]*Division of Community Geriatrics, Changi General Hospital, Singapore*
[2]*Department of Nursing Lions Nursing Home, Toa Payoh*

Background:
Falls are serious events in nursing homes.[1] A previous survey in our nursing home had shown high fall and injury rates.[2] Overseas studies had shown the effectiveness of fall reducing interventions in the nursing home. This is the first in a Singapore nursing home.

Aim:
To reduce falls and fall related injuries in a nursing home in Singapore with 200 residents.

Methods:
A multidisciplinary team that was nurse led (fall champions) and supported by administration delivered the intervention. The role of fall champions included leadership of the teams, staff education, implementing fall reduction strategies, developing a post-fall assessment protocol, on-site case consults, acting as a resource person, monitoring fall data and giving periodic feedback to the staff.

This multifactorial approach included creating staff awareness, identifying high risk and recurrent fallers for closer supervision, environmental assessment (and modification if necessary) of high falls areas, equipment maintenance, regular exercise programmes, identifying and treating osteoporosis and promoting the wearing of hip protectors.

Fall events and ED presentations were determined by reviewing the case notes.

Results:
Results were analysed one year after the programme started. There was no significant reduction in the number of falls from the previous year (60 versus 62, p = 0.85). However there was a significant reduction in the number of injuries (29 versus 40, -28%, p = 0.005), hip fractures (2 versus 5, -60%, p = 0.002) and postfall cases referred to ED (11 versus 17, -35%, p = 0.003).

Conclusion:
A multidisciplinary team led by nurse champions and using a multifactorial approach was effective in reducing fall related injuries including hip fractures in a nursing home.

References:
1. Rubenstein LZ, Josephson KR, Robbins AS. Falls in the nursing home. Ann Int Med 1994;121(6):442-51.
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WHITE MATTER HYPERINTENSITIES AND IMPAIRED CHOICE STEPPING REACTION TIME IN OLDER PEOPLE

Zheng J[1], Delbaere K[1,2,3], Close JCT[1,4], Sachdev P[5,6], Wen W[5,6], Lord SR[1]
[1]Neuroscience Research Australia, University of New South Wales, Sydney, NSW, Australia
[2]Faculty of Psychology and Educational Sciences, Ghent University, Belgium
[3]Faculty of Medicine and Health Sciences, Ghent University, Belgium
[4]Prince of Wales Clinical School, University of New South Wales, Sydney, NSW, Australia
[5]School of Psychiatry, University of New South Wales, Sydney, NSW, Australia
[6]Neuropsychiatric Institute, Prince of Wales Hospital, Sydney, NSW, Australia

Aim:
White matter hyperintensities are associated with impaired mobility in older people, but no studies have identified neuropsychological and sensorimotor mediating factors for this association. The aim of this study was to determine whether neuropsychological and sensorimotor functions mediate the association of white matter hyperintensities and choice stepping reaction time (CSRT) under standard and dual-task conditions using path analysis modelling.

Methods:
Two hundred and fifty four older community dwellers (mean age 77.8 years ± 4.5) underwent structural Magnetic Resonance Imaging, CSRT tests, neuropsychological and sensorimotor assessments. White matter hyperintensity volumes were quantified using an automated method.

Results:
White matter hyperintensity volumes were significantly associated with neuropsychological tests and dual task CSRT performance. All neuropsychological and sensorimotor variables were also significantly associated with standard and dual task CSRT. The path analysis modelling revealed that impaired sensorimotor function was the only factor influencing impaired stepping performances in the standard condition. In the dual task condition, the association between white matter hyperintensity volumes and CSRT was mediated through slowed cognitive processing and not through reduced sensorimotor functioning.

Conclusion:
White matter hyperintensities are associated with slowed performance on a dual task CSRT task and this relationship is explained primarily by underlying neuropsychological impairments.