

Plenary 1 Session Theme: Building on the evidence



Stephen Lord
Neuroscience Research Australia, Sydney, NSW, Australia

Professor Stephen Lord is a Principal Research Fellow at Neuroscience Research Australia in Sydney. He has published over 200 papers in the areas of applied physiology, instability, falls and fractures in older people and is acknowledged as a leading international researcher in his field. His research follows two main themes: the identification of physiological risk factors for falls and the development and evaluation of falls prevention strategies. He is also actively engaged in initiatives aimed at implementing falls prevention evidence into policy and practice. His methodology and approach to falls-risk assessment has been adopted by many researchers and clinicians across the world. He has co-written two editions of "Falls in Older People - risk factors and prevention strategies". Updated in 2007, this book comprehensively summarizes the research evidence base undertaken in this field.



John Campbell
Dunedin School of Medicine, University of Otago, Dunedin, New Zealand

Professor John Campbell is a Professor of Geriatric Medicine at the Dunedin School of Medicine, University of Otago and a consultant physician at Dunedin Hospital. His epidemiological studies of falls in older people in the 1980s were among the first to investigate this common problem and report the circumstances, consequences and factors related to falls. During the past 20 years he has led a series of clinical trials that tested effective strategies to prevent falls in older people living in the community. These include the Otago Exercise Programme for strength and balance retraining, now used nationwide in New Zealand and internationally, home safety and behaviour modification for elderly people registered blind, and psychotropic drug withdrawal for those 65 years and over who are taking these medications. The research has also shown a number of interventions, including some multifactorial interventions, do not work in certain populations.



Clare Robertson
Dunedin School of Medicine, University of Otago, Dunedin, New Zealand

Associate Professor Clare Robertson is a Research Associate Professor at the Dunedin School of Medicine. Her research experience spans the development of falls prevention programmes for older people and the design and execution of high standard clinical trials which include economic evaluations. She was a key investigator in the studies that developed and tested the Otago Exercise Programme (OEP) and has worked with health organisations to promote the OEP and other effective falls prevention programmes in the community. Clare is an author of several systematic reviews including two Cochrane reviews. Her research interests include the choice of statistical methods for evaluating efficacy in falls prevention trials and investigating which falls prevention strategies provide best value for money. This work highlights the effectiveness of single interventions such as exercise for preventing falls and the fact that falls prevention strategies can be cost saving.



Ngaire Kerse

School of Population Health, University of Auckland, Auckland, New Zealand

Professor Ngaire Kerse is a GP academic at the University of Auckland who runs a programme of research aimed at maximizing Health for Older People. Her PhD was from the University of Melbourne where she showed that a health promotion programme for GPs can improve outcomes for older patients. This followed a clinical fellowship in geriatric medicine at the University of Pennsylvania. In 2002 Ngaire was awarded a Harkness Fellowship in Health Care Policy and Practice from the Commonwealth Fund. She has been in Auckland for a decade building teams of researchers and working with the local and national bodies to improve the lot of the older person, including promoting strategies aimed at preventing falls in residential care facilities.

HORSE HAIRS, SMOKE PAPER, PULLEYS, SLIDE RULES AND MUSEUMS: THE HISTORY OF FALLS PREVENTION RESEARCH 1836–1960

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In 1960, Joseph Sheldon published his classic paper on the natural history of falls in old age, marking the commencement of research into risk factors for falls and fall prevention strategies. However, much previous research had been undertaken on the physiological systems that contribute to our ability to stand and walk, and the age-related changes that occur within these systems. This presentation will give an overview of the research that addressed age-related changes in vision, lower limb sensation, vestibular sense, muscle strength, reaction time, balance and gait that commenced in the 19th century and continued up until Sheldon's seminal paper. It will describe the technologies and procedures of assessing physiological functioning in this period and give a summary of the main findings that provided the framework for subsequent fall prevention research.

MODERN CONCEPTS AND MODELS FOR FALL PREVENTION

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Falls are a consequence. They are a consequence of ageing and disease, present and former lifestyle, demands and support, attitude and personality. As with the other complex consequences common in older people, such as delirium, incontinence and frailty, falls do not result from a demonstrable pathological process. It was not until the early 1950s that these complex age associated consequences were recognised as being of clinical importance and warranting scientific study.

Initial studies explored the epidemiology of falls – their frequency, times and place of occurrence and outcomes. The seminal study by Sheldon¹ provided a classification of falls based on the circumstances of the fall. A fall syndrome described in this early work is the “drop attack”. This is a term that has fallen into disuse but describes a particular type of fall that would warrant further investigation, particularly of knee stability and proximal lower limb muscle strength and response.

It was recognised that although the circumstances of the fall may be important the circumstances of the faller were even more important. In the 1970s initially retrospective and then prospective studies identified risk factors for falls.

Risk factors fell into two groups. There were risk factors that identified the person's future risk of falls, such as having had a previous fall, and risk factors that not only identified risk but were also considered to be causative. Clinical conditions, physiological functions, pharmaceuticals, home and social circumstances were

identified as potentially alterable, causative risk factors. Causative risk factors open up possibilities for interventions that lower the likelihood of falling.

Predictive risk factors should enable clinicians to identify those at risk for either preventive programmes or special supervision. The difficulty of identifying those at risk, especially in the complex settings of a nursing home or hospital ward, is that the fall risk is so high and the risk factors so common that there is always a very difficult trade off between sensitivity and specificity. Targeting interventions to those at particularly high risk will still result in many falls occurring in those at lower, but still considerable, risk.

Intervention trials based on identified and potentially remediable risk factors followed in the 1990s. Initially these were largely community based studies but more recently successful trials have been conducted in institutional settings. The successful interventions have been taken through to nationally funded fall prevention programmes. Those interventions which should have worked but didn't have often added to our understanding of those human factors which affect acceptability and participation.

A number of other areas of study have followed from the successful fall prevention strategies: studies of acceptability and adherence, cost benefit analysis, investigation of secondary gains in cognition and survival and psychosocial gains.

In his 1960 paper Sheldon considered that because falls were so commonplace and were considered an inevitable aspect of ageing they had been "deprived of the exercise of curiosity". The curiosity of the last 50 years has resulted in practical fall prevention programmes that decrease falls and injury and, most important, maintain independent living. In the next 10 years our energy is needed to establish community wide programmes acceptable to older people.

Reference

1. Sheldon JH. On the natural history of falls in old age. *BMJ* 1960;12:1685-90.

FALLS PREVENTION STRATEGIES FOR COMMUNITY LIVING OLDER PEOPLE

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It is now well established that falls can be prevented in older people living in the community. The first randomised controlled trial to show a significant reduction in falls was reported in 1994, using a home based multifactorial intervention. This trial was one of the eight Frailty and Injuries: Cooperative Studies of Intervention Techniques (FICSIT) trials in the US. A pre-planned meta-analysis showed that exercise was effective in reducing falls, particularly the exercise programmes that addressed balance.

These early messages have been endorsed and become clearer with the rapid growth of intervention trials. The latest Cochrane review of falls prevention interventions in the community published last year included 111 randomised controlled trials (with over 55,000 participants) and we have around 30 trials already to add for the next update. One gap in current research is that most trials have excluded those with cognitive impairment; this group of the older population is at high risk of falling.

Effective single factor interventions include:

- Exercise programmes (home based strength and balance retraining, multicomponent group exercise classes, tai chi)
- Gradual withdrawal of psychotropic medication
- A prescribing modification programme
- Pacemakers in people with carotid sinus hypersensitivity
- First eye cataract surgery
- Provision of single lens glasses for wearers of multifocal glasses who take part in regular outdoor activities
- Home safety assessment and modification in previous fallers recently discharged from hospital and people with impaired vision.

Assessment and multifactorial intervention using the appropriate combination of single interventions is the recommended approach for an individual patient at high risk of falling. However for widespread

dissemination, a single factor programme is likely to cost less to deliver and therefore make more efficient use of resources because the health outcomes are similar.

There is some evidence that falls prevention strategies can be cost saving to the health system, but only 10 controlled trials have reported a comprehensive economic evaluation as part of the trial. Information on the relative cost effectiveness of the effective falls prevention programmes is essential for decision making.

Much of the successful research has come from Australia and New Zealand and both countries have been enthusiastic about addressing falls prevention in the community. However barriers to widespread and coordinated dissemination of proven strategies remain an issue. We need to present decision makers with clear evidence of the size of the problem and the potential for reducing falls and injuries, and the clear message to restrict funding to proven strategies with clear protocols. For older people themselves we should stress the benefits in maintaining independence rather than the consequences of falling.

FALLS PREVENTION STRATEGIES IN NURSING CARE FACILITIES

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Background

Falls in nursing care facilities and hospitals are common events that cause considerable morbidity and mortality for older people.

Objectives

This presentation will discuss the many challenges of preventing falls in nursing care facilities and outline what has been found to work, and what does not based on a Cochrane review and experience from research in New Zealand.

Main results

The recent Cochrane review of 41 randomised controlled trials (25,422 participants) reported that vitamin D supplementation reduced the rate of falls (rate ratio (RaR) 0.72, 95% CI 0.55 to 0.95; 4 trials, 4512 participants), but not risk of falling (risk ratio (RR) 0.98, 95% CI 0.89 to 1.09; 5 trials, 5095 participants). The results from seven trials testing supervised exercise interventions were inconsistent. This was the case too for multifactorial interventions, which overall did not significantly reduce the rate of falls (RaR 0.82, 95% CI 0.62 to 1.08; 7 trials, 2997 participants) or risk of falling (RR 0.93, 95% CI 0.86 to 1.01; 8 trials, 3271 participants). A post hoc subgroup analysis, however, indicated that where provided by a multidisciplinary team, multifactorial interventions reduced the rate of falls (RaR 0.60, 95% CI 0.51 to 0.72; 4 trials, 1651 participants) and risk of falling (RR 0.85, 95% CI 0.77 to 0.95; 5 trials, 1925 participants). No trials in New Zealand have been successful in reducing falls in nursing care facilities; these will be presented.

Main conclusions

There is evidence vitamin D supplementation is effective and that multifactorial interventions may reduce falls and risk of falling in nursing care facilities. Staffing levels and health system related issues may mediate success in falls prevention in nursing care facilities.

FALLS AND FRACTURES IN MĀORI – TIME FOR RESEARCH

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Background

Little is known about prevalence of falls and fracture in older Māori.

Objectives

To describe risk factors related to falls, physical function, falls and fracture in older Māori gathered during a feasibility study and the methods for a cohort study of older Māori.

Main results

As part of a feasibility study, 33 Māori aged 75-79 years were recruited and underwent a comprehensive interview and physical assessment. While 60% of Māori had a BMI >30, 69% were at high nutrition risk. Around 25% reported vision problems interfering with daily living, and 19% scored in the mild to moderate depression range on the Geriatric Depression Scale. Physical measures showed that Māori were not disabled and 24% fell in the prior year. Vitamin D levels were low overall and lowest for Māori. This feasibility study is followed by Life and Living to Advanced Age: a cohort study in New Zealand: *Puāwaitanga O Nga Tapuwae Kia ora Tonu*.

Main conclusions

Māori were not at increased risk of falls, and ability levels were relatively good despite low vitamin D levels. Further research is needed and methodology for the main study will be presented.
