Systematic Review of Definitions and Methods of Measuring Falls in Randomized Controlled Fall Prevention Trials

REFERENCES

- Armstrong AL, Oborne J, Coupland CAC, Macpherson MB, Bassey EJ, Wallace WA. . Effects of hormone replacement therapy on muscle performance and balance in postmenopausal women. Clin Science 1996;91:685-690.
- Becker C, Kron M, Lindemann U, Sturm E, Eichner B, Walter-Jung B, Nikolaus T. Effectiveness of a multifaceted intervention on falls in nursing home residents. J Am Geriatr Soc 2003;51(3):306-313.
- Bischoff HA, Stähelin HB, Dick W, Akos R, Knecht M, Salis C et al. Effects of vitamin D and calcium supplementation on falls: A randomized controlled trial. J Bone Miner Res 2003;18(2):343-351.
- Buchner DM, Cress ME, de Lateur BJ, Esselman PC, Margherita AJ, Price R, Wagner EH. *et al.* The effect of strength and endurance training on gait, balance, fall risk, and health services use in community-living older adults. J Gerontol 1997;52(4):M218-224.
- Buettner LL. Focus on caregiving. Falls prevention in dementia populations: following a trial program of recreation therapy, falls were reduced by 164 percent. Provider 2002;28(2):41-43.
- Campbell AJ, Robertson MC, Gardner MM, Norton RN, Tilyard MW, Buchner DM. Randomised controlled trial of a general practice programme of home based exercise to prevent falls in elderly women. Br Med J 1997;315:1065-1069.
- Campbell AJ, Robertson MC, Gardner MM, Norton RN, Buchner DM. Psychotropic medication withdrawal and a home-based exercise program to prevent falls: a randomized, controlled trial. J Am Geriatr Soc 1999;47(7):850-853.

- Carpenter GI, Demopoulos GR. Screening the elderly in the community: controlled trial of dependency surveillance using a questionnaire administered by volunteers. Br Med J 1990;300:1253-1256.
- 9. Carter S, Campbell E, Sanson-Fisher R. A randomised controlled trial of two strategies aimed at reducing falls and other unintentional events through home modification and medication review [unpublished data].
- Carter ND, Khan KM, McKay HA, Petit MA, Waterman C, Heinonen A et al. Community-based exercise program reduces risk factors for falls in 65- to 75-year-old women with osteoporosis: Randomized controlled trial. Can Med Assoc J 2002;167(9):997-1004.
- Cerny K, Blanks R, Mohamed O. The effect of a multidimensional exercise program on strength, range of motion, balance and gait in the well elderly [abstract]. Gait Posture 1998;7(2):185-186.
- 12. Close J, Ellis M, Hooper R, Glucksman E, Jackson S, Swift C. Prevention of falls in the elderly trial (PROFET): a randomised controlled trial. Lancet 1999;353(9147):93-97.
- Coleman EA, Grothaus LC, Sandhu N, Wagner EH. Chronic care clinics: a randomized controlled trial of a new model of primary care for frail older adults. J Am Geriatr Soc 1999;47(7):775-783.
- 14. Cornillon E, Blanchon MA, Ramboatsisetraina P, Braize C, Beauchet O, Dubost V, et al. Effectiveness of falls prevention strategies for elderly subjects who live in the community with performance assessment of physical activities (before-after). Annales de Readaptation et de Medecine Physique 2002;45(9):493-504.
- 15. Crome P, Hill S, Mossman J, Stockdale P. A randomised controlled trial of a nurse led falls prevention clinic [abstract]. J Am Geriatr Soc 2000;48(8): supplement S78.
- 16. Cumming RG, Thomas M, Szonyi G, Salkeld G, O'Neill E, Westbury C et al. Home visits by an occupational therapist for assessment and modification of environmental

hazards: a randomized trial of falls prevention. J Am Geriatr Soc 1999;47(12):1397-1402.

- Dawson-Hughes B, Harris SS, Krall EA, Dallal GE. Effect of calcium and vitamin D supplementation on bone density in men and women 65 years of age or older. N Engl J Med 1997;337(10):670-676.
- Day L, Fildes B, Gordon I, Fitzharris M, Flamer H, Lord S.. Randomised factorial trial of falls prevention among older people living in their own homes. Br Med J 2002;325(7356): 128-131.
- Donald IP, Pitt K, Armstrong E, Shuttleworth H.. Preventing falls on an elderly care rehabilitation ward. Clin Rehab 2000;14(2):178-185.
- Ebrahim S, Thompson PW, Baskaran V, Evans K. Randomized placebo-controlled trial of brisk walking in the prevention of postmenopausal osteoporosis. Age and Ageing 1997;26(4):253-260.
- Fabacher D, Josephson K, Pietruszka F, Linderborn K, Morley JE, Rubenstein LZ. An in-home preventive assessment program for independent older adults: a randomized controlled trial. J Am Geriatr Soc 1994;42(6):630-638.
- 22. Gallagher EM, Brunt H. Head over heels: impact of a health promotion program to reduce falls in the elderly. Can J Aging 1996;15(1):84-96.
- Gray-Donald K, Payette H, Boutier V. Randomized clinical trial of nutritional supplementation shows little effect on functional status among free-living frail elderly. Journal of Nutrition 1995;125(12):2965-2971.
- 24. Hauer K, Rost B, Rutschle K, *et al.* Exercise training for rehabilitation and secondary prevention of falls in geriatric patients with a history of injurious falls. J Am Geriatr Soc 2001;49(1):10-20.
- 25. Hogan DB, MacDonald FA, Betts J, Bricker S, Ebly EM, Delarue B et al. A randomized controlled trial of a community-based consultation service to prevent falls. Can Med

Assoc J 2001;165(5):537-543.

- Hornbrook MC, Stevens VJ, Wingfield DJ, Hollis JF, Greenlick MR, Ory MG.
 Preventing falls among community-dwelling older persons: results from a randomized trial. Gerontologist 1994;34(1):16-23.
- Jensen J, Lundin-Olsson L, Nyberg L, Gustafson Y. Fall and injury prevention in older people living in residential care facilities: A cluster randomized trial. Ann Intern Med 2002;136(10):733-741.
- Jitapunkul S. A randomised controlled trial of regular surveillance in Thai elderly using a simple questionnaire administered by non-professional personnel. J Med Assoc Thailand 1998;81(5):352-356.
- 29. Kenny RA, Richardson DA, Steen N, Bexton RS, Shaw FE, Bond J. Carotid sinus syndrome: a modifiable risk factor for nonaccidental falls in older adults (SAFE PACE).
 J Am Cardiol C 2001;38(5):1491-1496.
- Kingston P, Jones M, Lally F. Older people and falls: A randomized controlled trial of a health visitor (HV) intervention. Rev Clin Geront 2001;11(3):209-214.
- 31. Latham NK, Anderson CS, Lee A, Bennett DA, Moseley A, Cameron ID; Fitness Collaborative Group A randomized, controlled trial of quadriceps resistance exercise and vitamin D in frail older people: The Frailty Interventions Trial in Elderly Subjects (FITNESS). J Am Geriatr Soc 2003;51:291-299.
- 32. Lehtola S, Hanninen L, Paatalo M. The incidence of falls during a six-month exercise trial and four-month followup among home dwelling persons aged 70-75 years.
 Liikunta & Tiede 2000;6:41-46.
- Lightbody E, Watkins C, Leathley M, Sharma A, Lye M. Evaluation of a nurse-led falls prevention programme versus usual care: a randomized controlled trial. Age Ageing 2002;31(3):203-210.
- 34. Lord SR, Ward JA, Williams P, Strudwick M .The effect of a 12-month exercise trial on

balance, strength, and falls in older women: a randomized controlled trial. J Am Geriatr Soc 1995;43:1198-1206.

- 35. Mayo NE, Gloutney L, Levy AR. A randomized trial of identification bracelets to prevent falls among patients in a rehabilitation hospital. Arch Phys Med Rehabil 1994;75:1302-1308.
- 36. McMurdo ME, Mole PA, Paterson CR. Controlled trial of weight bearing exercise in older women in relation to bone density and falls. Br Med J 1997;314:596-599.
- McMurdo ME, Millar AM, Daly F. A randomized controlled trial of fall prevention strategies in old peoples' homes. Gerontology 2000;46(2):83-87.
- Means KM, Rodell DE, O'Sullivan PS, Cranford LA. Rehabilitation of elderly fallers: pilot study of a low to moderate intensity exercise program. Arch Phys Med Rehabil 1996;77:1030-1036.
- Mulrow CD, Gerety MB, Kanten D, Cornell JE, DeNino LA, Chiodo L, et al. A randomized trial of physical rehabilitation for very frail nursing home residents. J Am Med Assoc 1994;271(7):519-524.
- 40. Newbury JW, Marley JE, Beilby J. A randomised controlled trial of the outcome of health assessment of people aged 75 years and over. M J A 2001;175:104-7.
- Nikolaus T, Bach M. Preventing falls in community-dwelling frail older people using a home intervention team (HIT): Results from the randomized falls-HIT trial. J Am Geriatr Soc 2003;51:300-305.
- 42. Nowalk MP, Prendergast JM, Bayles CM, D'Amico FJ, Colvin GC. A randomized trial of exercise programs among older individuals living in two long-term care facilities: the FallsFREE program. J Am Geriatr Soc 2001;49(7):859-865.
- 43. Pardessus V, Puisieux F, Di P. Benefits of home visits for falls and autonomy in the elderly: A randomized trial study. Am J Physic Med Rehab 2002; 81(4):247-252.
- 44. Pereira MA, Kriska AM, Day RD, Cauley JA, LaPorte RE, Kuller LH. A randomized

walking trial in postmenopausal women: effects on physical activity and health 10 years later. Arch Intern Med 1998;158(15):1695-1701.

- 45. Pfeifer M, Begerow B, Minne HW, Nachtigall D, Hansen C. Effects of a short-term vitamin D and calcium supplementation on body sway and secondary hyperparathyroidism in elderly women. J Bone Mineral Res 2000;15(6):1113-1118.
- 46. Ray WA, Taylor JA, Meador KG, Thapa PB, Brown AK, Kajihara HK, Davis C, Gideon P, Griffin MR. A randomized trial of a consultation service to reduce falls in nursing homes. J Am Med Assoc 1997;278(7):557-562.
- 47. Reinsch S, MacRae P, Lachenbruch PA, Tobis JS. Attempts to prevent falls and injury: a prospective community study. Gerontologist 1992;32:450-6.
- Robertson MC, Devlin N, Gardner MM, McGee R, Campbell AJ. Effectiveness and economic evaluation of a nurse delivered home exercise programme to prevent falls. 1: Randomised controlled trial. Br Med J 2001;322(7288):697-701.
- Rubenstein LZ, Robbins AS, Josephson KR, Schulman BL, Osterweil D. The value of assessing falls in an elderly population. A randomized clinical trial. Ann Intern Med 1990;113:308-316.
- Rubenstein LZ, Josephson KR, Trueblood PR, Loy S, Harker JO, Pietruszka FM, Robbins AS. Effects of a group exercise program on strength, mobility, and falls among fall-prone elderly men. J Gerontol 2000;55(6):M317-321.
- Ryan JW, Spellbring AM. Implementing strategies to decrease risk of falls in older women. J Gerontol Nursing 1996;22(12):25-31.
- 52. Sato Y, Manabe S, Kuno H, Oizumi K. Amelioration of osteopenia and hypovitaminosis D by 1alpha-hydroxyvitamin D3 in elderly patients with Parkinson's disease. J Neurol Neurosurg Psychiatry 1999;66(1):64-68.
- Schnelle JF, Kapur K, Alessi C, Osterweil D, Beck JG, Al-Samarrai NR, Ouslander JG.
 Does an exercise and incontinence intervention save healthcare costs in a nursing home

population? J Am Geriatr Soc 2003;51(2):161-168.

- Schoenfelder DP. A fall prevention programme for elderly individuals. Exercise in long-term care settings. J Geront Nursing 2000;26(3):43-51.
- 55. Shaw FE, Bond J, Richardson DA, Dawson P, Steen IN, McKeith IG, Kenny RA. Multifactorial intervention after a fall in older people with cognitive impairment and dementia presenting to the accident and emergency department: randomised controlled trial. Br Med J 2003;326(7380):73-75.
- 56. Steinberg M, Cartwright C, Peel N, Williams G. A sustainable programme to prevent falls and near falls in community dwelling older people: results of a randomised trial. J Epidem Comm Health 2000;54(3):227-232.
- 57. Stevens M, Holman CD, Bennett N, de Klerk N. Preventing falls in older people:
 Outcome evaluation of a randomised controlled trial. J Am Geriatr Soc
 2001;49(11):1448-1455.
- 58. Tideiksaar R, Feiner CF, Maby J. Falls prevention: the efficacy of a bed alarm system in an acute-care setting. Mount Sinai J Med 1993;60(6):522-527.
- 59. Tinetti ME, Baker DI, McAvay G, Claus EB, Garrett P, Gottschalk M et al. A multifactorial intervention to reduce the risk of falling among elderly people living in the community. N Engl J Med 1994;331(13):821-827.
- 60. Toulotte C, Fabre C, Dangremont B, Lensel G, Thevenon A. Effects of physical training on the physical capacity of frail, demented patients with a history of falling: a randomised controlled trial. Age Ageing 2003;32:67-73.
- van Haastregt JC, Diederiks JP, van Rossum E, de Witte LP, Voorhoeve PM, Crebolder HF. Effects of a programme of multifactorial home visits on falls and mobility impairments in elderly people at risk: randomised controlled trial. Br Med J 2000;321 (7267): 994-998.
- 62. van Rossum E, Frederiks CM, Philipsen H, Portengen K, Wiskerke J, Knipschild P.

Effects of preventive home visits to elderly people. Br Med J 1993;307(6895):27-32.

- 63. Vassallo M, Vignaraja R, Sharma JC, Hallam H, Binns K, Briggs R, Ross I, Allen S.
 Can intervention prevent falls and injury in geriatric wards? Hospital injury prevention (HIP) study [abstract]. Age Ageing 2001;30(Suppl 2):15.
- 64. Vellas B, Albarede JL. Effet de l'association raubasine-dihydroergocristine
 (Iskedyl(TM)) sur le syndrome post-chute et sur la prevention de la chute chez le sujet age [A randomized clinical trial on the value of raubasine-dihydroergocristine
 (Iskedyl(TM)) in the prevention of post fall syndrome]. Psychologie Medicale 1991;23(7):831-839.
- Vetter NJ, Lewis PA, Ford D. Can health visitors prevent fractures in elderly people? Br Med J 1992;304:888-890.
- 66. Wagner EH, LaCroix AZ, Grothaus L, Leveille SG, Hecht JA, Artz K, Odle K, Buchner DM. Preventing disability and falls in older adults: a population-based randomized trial. Am J Pub Health 1994;84:1800-1806.
- 67. Wolf SL, Barnhart HX, Kutner NG, McNeely E, Coogler C, Xu T. Reducing frailty and falls in older persons: an investigation of Tai Chi and computerized balance training. J Am Geriatr Soc 1996;44:489-497.
- Barnett A, Smith B, Lord SR, Williams M, Baumand A. Community-based group exercise improves balance and reduces falls in at-risk older people: a randomised controlled trial. Age Ageing 2003; 32:407-414.
- 69. Bunout d, Barrera G, Avendano M, de la Maza P, Gattas V, Leiva L, Hirsch S. Results of a community-based weight-bearing resistance training programme for healthy Chilean elderly subjects. Age Ageing. 2005 34(1):80-3.
- 70. Clemson L, Cumming RG, Kendig H, Swann M, Heard R, Taylor K. The effectiveness of a community-based program for reducing the incidence of falls in the elderly: a randomized trial. J Am Geriatr Soc 2004; 52:1487-1494.

- Dhesi J, Jackson SHD, Bearne LM, Moniz C, Hurley MV, Swift C, Allain TJ. Vitamin D supplementation improves neuromuscular function in older people who fall. Age Ageing 2004; 33: 589-595.
- 72. Dukas L, Bischoff HA, Lindpaintner LS, Schacht E, Birkner-Binder D, Damm TN, Thalmann B, Stähelin HB. Alfaclacidol reduces the number of fallers in a communitydwelling elderly population with a minimum calcium intake of more than 500 mg daily. J Am Geriatr Soc 2004,52:230-236.
- 73. Harwood RH, Sahota O, Gaynor K, Masud T, Hosking DJ. A randomised, controlled comparison of different calcium and vitamin D supplementation regimens in elderly women after hip fracture: the Nottingham Neck of Femur (NoNOF) study. Age Ageing 2004; 33:45-51.
- 74. Helbostad JL, Sletvold O, Moe-Nilssen R. effect of home exercise and group training on functional abilities in home –dwelling older persons with mobility and balance problems. A randomized study. Aging Clin Exper Res 2004;16:113-21.
- 75. Liu-Ambrose T, Khan KM, Eng JJ, Janssen PA, Lord SR, McKay HA. Resistance and agility reduce fall risk in women aged 75 to 85 with low bone mass: 6 months randomized, controlled trial. J Am Geriatr Soc 2004; 52:657-665.
- 76. Nitz JC, Choy NL. The efficacy of a specific balance strategy training programme for preventing falls among older people: a pilot randomised controlled trail. Age Ageing 2004;33:52-58.
- 77. Wolf SL, Sattin RW, Kutner M, O'Grady M, Greenspan A, Gregor RJ. Intense Tai chi Training and Fall occurance in older transitionally frail adults: a randomized, controlled trial. J Am Geriatr Soc. 51: 1693-1701.
- 78. Dyer C, Taylor G, Reed M, Dyer C, Robertson D, Harrington R. Falls prevention in residential care homes: a randomised controlled trial. Age ageing 2004; 33:596-602.
- 79. Healey F, Monro A, Cockram A, Dams V, Heseltine D. Using targeted risk factor

reduction to prevent falls in older in-patients: a randomised controlled trail. Age Ageing 2004; 33: 390-395.

- Haines TP, Bennell KL, Osborne RH, Hill KD. Effectiveness of targeted falls prevention programme in subacute hospital setting: randomised controlled trail. BMF 2004;328: 676-682.
- 81. Kerse N, Butler M, Robinson E, Todd M. Fall prevention in residential care: a cluster, randomized, controlled trial. J Am Geriatr Soc. 2004; 52:524-531.
- Steadman J, Donaldson N, Kalra L. a randomized controlled trail of an enhanced balance training program to improve mobility and reduce falls in elderly patients. J Am Geriatr Soc 2003; 51:847-852.
- 83. Huang TT, Acton GJ. Effectiveness of home visit fall prevention strategy for Taiwanese community-dwelling elders: randomized trail. Public Health Nursing 2004; 21:247-253.
- Peel N, Steinberg M, Williams G. Home safety assessment in the prevention of falls among older people Aust NZ J Public Health 2000;24:536-9.
- 85. Lord SR, Castell S, Corcoran J, Dayhew J, Matters B, Shan A, Williams P. The Effect of group exercise on physical functioning and falls in frail older people living in retirement villages: a randomized, controlled trail. J Am Geriatr Soc 2003; 51:1685-1692.
- 86. Shimada H, Obuchi SA, Furuna T Suzuki T. New intervention program for preventing falls among frail elderly people: the effects of perturbed walking exercise using bilateral separated treadmill. Am J Phys Med Rehabil 2004; 83:493-499.
- Morgan RO, Virnig BA, Duque M, Abdel-Moty E, DeVito CA. Low-intensity exercise and reduction of the risk for falls among at-risk elders. J Gerontol Med Sci 2004; 59:M1062-M1067.
- Robson E, Edwards J, Gallagher E, Baker D. Steady as you go (SAYGO): A fallsprevention program for seniors living in the community. Can J Aging 2003;22(2):207-

10

16.

- 89. Crotty M, Whitehead C, Rowlett D, Halbert J, Weller D, Finucane P et al. An outreach intervention to implement evidence based practice in residential care: a randomized controlled trial [ISRCTN67855475]. BMC Health Services Research. http://www.biomedcentral.com/1472-6963/4/6 2004;4:(accessed 29 Nov 2004).
- 90. Whitehead C, Wundke R, Crotty M, Finucane P. Evidence-based clinical practice in falls prevention: a randomised controlled trial of a falls prevention service. Austr Health Review; 2003;26:88-97.