Additional file 1

Box 1 Search strategy: Our full identification strategy optimised for PubMed .

#1: (randomized trial) AND (clinical trial) [All Fields]
#2: ((long term care facility) OR (long term care) OR (assisted living) OR (group homes) OR (homes of aged) OR (Residential facilities) OR (nursing home) OR (retirement homes) OR (retirement communities)) [All Fields]
#3: ((cluster randomization) OR (cluster randomisation) OR (cluster) OR (clustered) OR (clustering) OR (clusters) OR (group-randomized) OR (group-randomised) OR (randomisation unit) OR (randomization unit)) [All Fields]
#4: #1 AND #2 AND #3

Table A. Quality criteria and other data extracted from publications

Quality criteria	Data extracted (mostly yes/no)	Source[i]
Term 'cluster' included in title or abstract	Was the term 'cluster' included in title or abstract?	Item 1
Cluster design justified	Reasons for choosing cluster randomisation given?	Item 2
Design type specified	Parallel, factorial, cross-over, other	Team (3a)
Reported eligibility criteria for participants	Reported eligibility criteria for participants?	Item 3 (4)
Reported eligibility criteria for clusters	Reported eligibility criteria for clusters?	Item 3 (4)
Sample size calculation reported	Was a sample size calculation reported?	Item 7 (7a)
Clustering accounted for in sample size calculation	Use of intra-cluster correlation coefficient, k or design effect to allow for clustering?	Item 7 (7a)
Evidence of variation in cluster size considered	Increased sample size to account for this (any method acceptable)?	Team decision
Reported method used to generate random allocation sequence	Simple randomisation, stratification, blocking, matching, minimisation	Item 8 (8b)
Minimised identification/ recruitment bias	Were participants identified/recruited prior to randomisation, or were recruiters blinded to allocation?	Item 10[k]
Reported on blinding of outcome assessors	Were outcome assessors (for primary outcome) reported as blind to assessment? (Note: if it was not applicable, e.g. recorded from routine data, the question was answered as 'Yes')	Item 11[k]
Clustering accounted for in analysis	Did the report describe an analysis that accounts for clustering?	Item 12a
Reported number of clusters randomised	Number of clusters randomised in each arm	Item 13a
Reported number of individuals randomised	Number of individuals randomised in each arm	Item 13a
Baseline characteristics of clusters reported	Was there a table or text indicating cluster-level baseline comparison between intervention and control?	Item 15
Baseline characteristics of individuals reported	Was there a table or text indicating individual-level baseline comparison between intervention and control?	Item 15
No statistical significance tests on baseline data	P-values not calculated for baseline comparisons of individual participant characteristics?	Previous review
Reported number of clusters analysed	Number of clusters in each arm for analysis of primary outcome	Item 16
Reported number of individuals analysed	Number of individuals in each arm for analysis of primary outcome	Item 16
ICC reported	ICC reported for at least one outcome?	Item 17
Adverse events reported	Number of adverse events (or statement that none) reported	Item 19
Other information	**Data extracted**	**Source**
Statistician involvement	Was a statistician, epidemiologist or other quantitative researcher a co-author in the report?	Team decision
Primary outcome measure	as designated by the authors, or the one used in sample size calculation, or the first outcome reported in the abstract	Team decision

[i] Items refer to 2004 extended CONSORT statement; numbers in parentheses are CONSORT items from the updated 2010 main CONSORT statement.

[k] We extracted more detail than simply whether or not the recruiter/identifier of participants was blind to allocation status, see Figure 1 for decision-aid.

Table B Basic characteristics of primary reports included in review

Author	Year	Journal	Country	Outcome measure	Individuals analysed*	Clusters randomised*
Avorn[1]	1992	N Engl J Med	USA	psychoactive drug use	678	12
Rimer[2]	1992	Public Health Rep	USA	use of mammograms	412	8
McMurdo[3]	1993	Age and Ageing	UK	battery of physical measures	41	4
Evans[4]	1997	J Am Geriatr Soc	USA	use of physical restraints	463	16
Meador[5]	1997	J Am Geriatr Soc	USA	antipsychotic use	1152	12
Ray[6]	1997	JAMA	USA	recurrent fallers	482	14
Schmidt[7]	1998	J Am Geriatr Soc	Sweden	psychotropic drugs use	1805	36
Morris[8]	1999	J Gerontol A Biol Sci Med Sci	USA	activities of daily life summary scale	392	6
Proctor[9]	1999	Lancet	UK	Crichton Royal Behaviour rating scale	105	12
McMurdo[10]	2000	Gerontology	UK	number of residents sustaining a fall	133	9
Furniss[11]	2000	Br J Psychiatry	UK	Crichton Royal Behaviour rating scale	294	14
Molloy[12]	2000	JAMA	Canada	residents' and families' satisfaction with health care and health care services utilization	n/r	6
Roberts[13]	2001	Br J Clin Pharmacol	Australia	continuous drug use	n/r	52
Naughton[14]	2001	J Am Geriatr Soc	USA	antibiotic use	n/a	10
Frenkel[15]	2001	Community Dent Oral Epidemiol	UK	denture plaque scores	378	22
Jensen[16]	2002	Ann Intern Med	Sweden	number of residents sustaining a fall	384	9
Midlov[17]	2002	Eur J Clin Pharmacol	Sweden	Short Form-36	n/r	48
Lee[18]	2002	J Am Geriatr Soc	Hong Kong	Barthel index score	89	45
Lord[19]	2003	J Am Geriatr Soc	Australia	falls	508	20
Wolf[20]	2003	J Am Geriatr Soc	USA	falls	286	20
Becker[21]	2003	J Am Geriatr Soc	Germany	rate of falls	981	6
Meyer[22]	2003	BMJ	Germany	hip fracture	942	49
O'Halloran[23]	2004	Age and Ageing	Northern Ireland	fractured proximal femur	n/a	127
Crotty[24]	2004	Age and Ageing	Australia	Medication Appropriateness Index	n/r	10
Dyer[25]	2004	Age and Ageing	UK	number of falls per person	196	20
Crotty[26]	2004	BMC Health Serv Res	Australia	fall rate	715	20
Gold[27]	2004	J Am Geriatr Soc	USA	trunk extension strength	122	9
Sloane[28]	2004	J Am Geriatr Soc	USA	care recipient behaviour assessment	69	15
Kerse[29]	2004	J Am Geriatr Soc	New Zealand	proportion of residents sustaining a fall	547	14

Author	Year	Journal	Country	Outcome measure	Individuals analysed*	Clusters randomised*
Eisses[30]	2005	Br J Psychiatry	Netherlands	geriatric depression scale GDS-15	360	10
Loeb[31]	2005	BMJ	Canada and USA	antimicrobials prescription	3754	24
Ray[32]	2005	Arch Intern Med	USA	serious fall-related injuries	n/r	112
Bravo[33]	2005	Int J Qual Health Care	Canada	quality of care scores (QUALCARE Scale)	122	40
Testad[34]	2005	Int J Geriatr Psychiatry	Norway	use of physical restraints	142	4
Law[35]	2006	Age and Ageing	UK	incidence of falls	3717	223
Hayward[36]	2006	BMJ	UK	all-cause mortality	2572	50
Nijs[37]	2006	BMJ	Netherlands	quality of life using validated questionnaire	178	10
Rosendahl[38]	2006	Aust J Physiother	Sweden	Berg Balance scale.	172	34
Huizing[39]	2006	BMC Geriatr	Netherlands	use of physical restraints	126	5
Loeb[40]	2006	JAMA	Canada	hospital admissions rates	661	22
Fossey[41]	2006	BMJ	UK	neuroleptics prescription	346	12
Monette[42]	2007	J Am Geriatr Soc	Canada	adherence to the recommendations	n/r	10
Kovacs[43]	2007	Spine (Phila Pa 1976)	Spain	Roland-Morris questionnaire	584	12
Kiel[44]	2007	JAMA	USA	adjudicated hip fractures	1042	37
Sloane[45]	2007	J Am Geriatr Soc	USA	night-time sleep using wrist actigraphy and daytime activity using non-obtrusive daytime observations	66	3
Colon-Emeric[46]	2007	Am J Med	USA	prescription of osteoporosis pharmacotherapy or hip protectors	n/r	67
Orrell[47]	2007	Int J Geriatr Psychiatry	UK	Camberwell Assessment of Needs in Elderly	192	24
Simmons[48]	2008	J Am Geriatr Soc	USA	residents' weight	76	4
Gurwitz[49]	2008	J Am Geriatr Soc	USA and Canada	adverse drug events	1118	29
Riemersma-van der Lek[50]	2008	JAMA	Netherlands	Mini Mental State Examination	189	12
Kerse[51]	2008	BMJ	New Zealand	elderly mobility scale and time to fall.	473	41
Bouwen[52]	2008	Age and Ageing	Belgium	number of participants with at least one accidental fall requiring an intervention by a physician or a nurse	379	10
Peri[53]	2008	Age and Ageing	New Zealand	Short Form-36	n/r	10
Bentzen[54]	2008	Osteoporos Int	Norway	adherence between people offered soft and hard hip protectors	n/r	18

Author	Year	Journal	Country	Outcome measure	Individuals analysed*	Clusters randomised*
Cox[55]	2008	Age and Ageing	UK	hip fractures	5637	230
Gopal Rao[56]	2009	Epidemiol Infect	UK	proportion of compliance with infection control guidelines	n/a	12
Field[57]	2009	J Am Med Inform Assoc	Canada	appropriate drug orders within alert categories	833	22
Huizing[58]	2009	J Am Geriatr Soc	Netherlands	use of physical restraints	241	15
Kuske[59]	2009	Int Psychogeriatr	Germany	GEROLF - staff knowldege in dealing with dementia	210	6
Lemaitre[60]	2009	J Am Geriatr Soc	France	all-cause mortality	3400	40
Resnick[61]	2009	J Am Geriatr Soc	USA	Barthel index score	n/r	12
Meyer[62]	2009	Age and Ageing	Germany	number of residents sustaining a fall	1125	58
Patterson[63]	2009	J Am Geriatr Soc	Northern Ireland	inappropriate psycho- active prescriptions	253	22
Sackley[64]	2009	BMJ	UK	Barthel index score	243	24
Eggermont[65]	2009	Behav Brain Res	Netherlands	neuropsychological tests, mood questionnaires and actigraphy	61	n/a
Neyens[66]	2009	Age and Ageing	Netherlands	falls	518	12
Marcantonio[67]	2010	J Am Geriatr Soc	USA	persistence of delirium	370	8
Testad[68]	2010	J Clin Psychiatry	Norway	Cohen-Mansfield Agitation Inventory	145	n/r
Pellfolk[69]	2010	J Am Geriatr Soc	Sweden	use of physical restraints	288	40
Ward[70]	2010	Med J Aust	Australia	fracture neck of femur	5391	88
Baldwin[71]	2010	J Hosp Infect	Northern Ireland	*methicillin-resistant staphylococcus aureus* prevalence in residents and staff	478	32
van Gaal[72]	2010	Int J Nurs Stud	Netherlands	score on a knowledge test regarding 3 topics: pressure ulcers, urinary infection, falls	102	10
Looijmans-van den Akker[73]	2010	Vaccine	Netherlands	proportion of health care workers vaccinated against influenza	6636	36

* n/a not applicable; n/r not reported.

Table C Basic characteristics of secondary reports included in review

Author	Publication year	Related to reference	Journal	Primary outcome measure for this publication
Jensen[74]	2003	Jensen[16]	J Am Geriatr Soc	time to first fall
Warnke[75]	2004	Meyer[22]	Z Gerontol Geriatr	quality of life assessment: fear of falling
Warnke[76]	2004	Meyer[22]	J Am Geriatr Soc	time to first fall without hip protector
Jensen[77]	2004	Jensen[16]	Aging Clin Exp Res	functional ambulation categories
Sattin[78]	2005	Wolf[20]	J Am Geriatr Soc	Activities-Specific Balance Confidence Scale and the Fall Efficacy Scale
Bentzen[79]	2008	Bentzen [54]	Inj Prev	hip fractures
Rapp[80]	2008	Becker[21]	J Am Geriatr Soc	time to first fall
Rosendahl[81]	2008	Rosendahl[38]	Aging Clin Exp Res	fall rate
Huizing[82]	2009	Huizing [58]	Int J Nurs Stud	use of physical restraints
Littbrand[83]	2009	Rosendahl[38]	J Am Geriatr Soc	Barthel index score
Conradsson[84]	2010	Rosendahl[38]	Aging Ment Health	geriatric depression scale GDS-15

Box 2 Examples of interventions

Example 1: Activity for residents plus staff training (Sackley et al, 2009[64])

Activity for residents: Three-month physiotherapy and occupational therapy aimed at enhancing mobility and ability to perform activities of daily living, addressing components such as strength, flexibility, balance, and exercise tolerance, delivered by two qualified physiotherapists. Dose, frequency and duration were dependent on goals agreed by the individual participant and the therapists and on progress throughout the intervention.

Staff training: Programme aiming to promote residents' independence and use of therapeutic aids.

Example 2: Drug or technology aimed at individual residents (Law et al, 2006[35])

Ergocalciferol 2.5 mg every three months to prevent falls and fractures

Example 3: Staff training plus risk assessment tool use (Cox et al, 2008[55])

Staff training: Half-day training by specialist osteoporosis nurses organised for managers, nurses and health care assistants at central locations, aiming to support staff to recognise the importance of falls and fracture prevention and identify those at high risk.

Risk assessment tool use: The care home staff were trained to use the Black fracture risk assessment tool and the STRATIFY risk assessment tool. They used these on each resident and reported results to the specialist nurses who fed back to the care home staff and the resident's GP with an assessment of fracture and falls risk.

Example 4: Falls risk assessment tool plus information (Kerse et al, 2004[29])

Risk assessment: Each home appointed a falls coordinator to undertake risk assessment of all residents using an evidence-based falls risk assessment tool. High-risk residents had a logo attached to wall of their room.

Information: This was provided on specific fall-prevention strategies and environmental assessment of surroundings and hazards. In addition, all useful material was included in a manual.

Table D. CONSORT endorsement by journals included in this review

Journal	**Strength of CONSORT endorsement**	**Quote from 'Instructions for authors'**
Int J Geriatr Psychiatry	Low	No mention of CONSORT guidelines
Behav Brain Res	Low	No reference found in guidelines for authors
Am J Med	Low	No mention of CONSORT in guidelines for authors
J Am Medical Informatics Assoc	Low	No mention of CONSORT in guidelines for authors
Osteoporos Int	Low	No mention of CONSORT in instructions for authors
Int J Qual Health Care	Low	No mention of CONSORT in author guidelines
Aging Clin Exp Res	Low	No mention of CONSORT in instruction for authors
Aging Ment Health	Low	No mention of CONSORT in instruction for authors
Vaccine	Low	Please refer to the CONSORT statement website at http://www.consort-statement.org for more information.
Epidemiol Infect	Low	The requirements of the journal are in accordance with the International Committee of Medical Journal Editors Uniform Requirements for Manuscripts submitted to biomedical journals [*British Medical Journal* 1991; 302: 338–341 and *New England Journal of Medicine* 1991; 324: 424–428.].
Age and Ageing	Medium	For reporting of randomised trials, authors are advised to work to the guidelines in the CONSORT statement. www.consort-statement.org
JAGS	Medium	To improve the quality of reporting randomized, controlled trials (RCTs), it is recommended that authors adhere to the CONSORT (Consolidated Standards of Reporting Trials) statement, which consists of a checklist and flow diagram that authors can use to report RCTs. Authors should refer to the paper, Altman DG, et al. The revised CONSORT statement for reporting randomized trials: Explanation and elaboration. *Annals of Internal Medicine* 2001; 134:663-694
BMC Geriatrics	Medium	(the journal) also supports initiatives aimed at improving the reporting of biomedical research. Checklists have been developed for a number of study designs, including randomized controlled trials (CONSORT). Authors are requested to make use of these when drafting their manuscript and peer reviewers will also be asked to refer to these checklists when evaluating these studies.
Br J Psychiatry	Medium	The *Journal* recommends to authors the CONSORT guidelines (1996, *Journal of the American Medical Association*, 276, 637-639) and their basis (2001, *Annals of Internal Medicine*, 134, 663-694) in relation to the reporting of randomised controlled clinical trials; also recommended is their extension to cluster randomised controlled trials (2004, *BMJ*, 328, 702-708).
Archives Intern Med	High	Preparing Reports of Randomized Controlled Trials: The CONSORT Checklist should be completed and submitted with the manuscript. In addition, a flow diagram illustrating the progress of patients throughout the trial should be included as a figure in the manuscript (see Figure for example). The checklist and flow diagram will be reviewed along with the manuscript.
Australian Journal Physiotherapy	High	Instruction for authors: Submit a CONSORT-like figure outlining the flow of participants through the trial, including reasons for dropouts Instruction for reviewers: Reviewers are asked to consult checklists where appropriate. Specifically, reviewers of randomised controlled trials are asked to consult the CONSORT e-checklist,
BMJ	High	If you are submitting a RCT please send with your manuscript a completed checklist and flowchart in accordance to the appropriate CONSORT guidelines, the trial protocol and the registration details of the trial.
JAMA	High	All randomized clinical trials should include a flow diagram and authors should

		provide a completed randomized trial checklist (see CONSORT Flow Diagram and Checklist) and a trial protocol.
Int Psychogeriatr	High	All manuscripts reporting randomized controlled trials should have the following sent with them or they will be returned to the authors: A check list and flow chart in accordance with the CONSORT guidelines which can be found at http://www.consort-statement.org. Please send in the checklist as a supplementary file and include the flow chart as Figure 1 in the manuscript
Med J Aust	High	RCTs must follow CONSORT guidelines (including checklist and flowchart, see www.consort-statement.org).
Int J Nurs Stud	High	The editors require that manuscripts adhere to recognized reporting guidelines relevant to the research design used. These identify matters that should be addressed in your paper. These are not quality assessment frameworks and your study need not meet all the criteria implied in the reporting guideline to be worthy of publication in the journal. The checklists do identify essential matters that should be considered and reported upon. For example, a controlled trial may or may not be blinded but it is important that the paper identifies whether or not participants, clinicians and outcome assessors were aware of treatment assignments. You are encouraged (although not required) to submit a checklist from the appropriate reporting guideline together with your paper as a guide to the editors and reviewers of your paper. *Randomised (and quasi-randomised) controlled trial* - CONSORT http://www.equator-network.org/index.aspx?o=1032
Spine	High	For Clinical Trials and similar study designs, please adhere to the CONSORT statement (www.consort-statement.org/).
Injury Prev	High	Please note that we require registration of clinical trials and reporting of randomized clinical trials according to the CONSORT guidelines. We also ask that authors follow the STROBE guidelines when reporting observational studies. Although not required for publication in Injury Prevention, authors are encouraged to review similar published guidelines for the reporting of systematic reviews, meta-analyses, and assessments of diagnostic test. Templates for CONSORT, STROBE and other reporting guidelines are available through the Equator Network (http://www.equator-network.org/)

List of studies included in this systematic review

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