

## Complex interventions to improve physical function and maintain independent living in elderly people: a systematic review and meta-analysis

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	Study setting Number of participants (intervention: control) Mean age in intervention group (% men) Mortality rate	Intervention Intensity Control group activity	Follow up Outcomes Losses to follow-up
<b>Geriatric assessment general elderly people</b>			
Burton and colleagues 1995 <sup>27</sup> USA 1989	Primary care (HMO) N=4195 (2105:2090) Mean age 74 years (36%) Mortality rate 5.1%	Assessment mailed to primary care physician as focus of preventive visit Follow-up counselling within 6 months 24 months with 4 contacts scheduled Control group received pamphlet on good health practices	Follow-up 24 and 48 months Death, living at home, institutionalisation, QWB (Kaplan) Losses to follow-up 5.2-16.7%
Byles and colleagues 2004 <sup>28*</sup> Australia 1997	Veterans and war widows N=1569 (942:627) Mean age 77 years (about 3%) Mortality rate 4.0%	Home-based assessment by nurse, social worker, psychologist, therapist, and occupational therapist. Information provided to individual and GP. Telephone follow-up and 6 or 12 monthly visit 36 months with 3 or more visits Control group received usual care	Follow-up 36 months Death, living at home, permanent nursing home admission, SF-36 physical function, hospital admission, falls Losses to follow-up 12.0-20.1%
Carpenter and Demopoulos 1990 <sup>29</sup> UK date not stated	Primary care N=539 (272:267) Mean age 80.2 years (35%) Mortality rate 7.4%	Home visits by lay volunteers for activities of daily living dependency surveillance. Referrals to GP if specified increase recorded 36 months with approximately 6 to 12 visits Control group completed baseline ADL questionnaire	Follow-up 36 months Death, living at home, long term nursing care, Winchester ADL, hospital admissions, falls Losses to follow-up 9.1%
Clarke and colleagues 1992 <sup>30</sup> UK 1985	General practice N=523 (261:262) Mean age 81 years (not known) Mortality rate 7.5%	Social intervention initiated at home by lay community worker. Assistance tailored to request for help 15-24 months with 3 or more visits Control group completed baseline interview only	Follow-up 36 months Died or moved away, living at home, admitted to institution, Jagger ADL Losses to follow-up 0.2%
Eekhof and colleagues 2000 <sup>31</sup> Netherlands date not stated	General practice N=1470 (732:738)† Mean age 81.3 years (37%) Mortality rate 3.9%	Home or surgery based screening for hearing, visual, continence, and mobility disorders by general practitioner. Interventions as appropriate 1 visit Control group had intervention delayed by 12 months	Follow-up 12 months Death, living at home, nursing home admissions, prevalence of mobility disorders Losses to follow-up 4.9-11.8%
Fabacher and colleagues 1994 <sup>32</sup> USA 1988	Armed services veterans N=254 (131:123) Mean age 73.5 years (98%) Mortality rate 3.1%	Home based assessment by physician's assistant or nurse. Review by geriatrician. Education, recommendations, and referrals. Follow-up by volunteers and research staff 12 months with approximately 3 visits Control group received follow-up telephone interviews	Follow-up 12 months Death, living at home, nursing home admissions, Katz ADL, hospital admissions, falls Losses to follow-up 12.6-20.1%
Fletcher and colleagues 2004 <sup>33*</sup> UK 1995	General practice N=43,219 (21762:21457)† Mean age 81.5 years (36%) Mortality rate 7.6%	Brief assessment questionnaire followed by assessment at home or GP surgery by nurse. Appropriate referrals to clinical, medical and social services One detailed assessment visit Control group received brief questionnaire and detailed examination by study nurse for those who triggered need for full assessment	Follow-up 36 months, hospital 24 months Death, living at home estimated, institution admissions, SIP mobility, hospital admissions Losses to follow-up 0-17.8%
Fox and colleagues 1997 <sup>34</sup> USA 1994	Community living N=237 (118:119) Mean age not stated (about 30%) Mortality rate estimated <10%	Home -based assessment by public -health nurse. Health plan, counselling and appropriate referrals Intervention comprised one visit Control group received health assessment but no health plan or individual counselling	Follow-up 12 months No relevant outcome reported
Gunner-Svensson and colleagues 1984 <sup>35</sup> Denmark 1972	Population register N=4,128 (2 055:2 073)‡ Mean age 78.6 years (42%) Mortality rate 7.2%	Home based case finding by nurse using structured questionnaire. Social medical intervention 36 months with a mean of 5 visits Control group received usual care	Follow-up 36 months Death, living at home estimated, nursing home admission Losses to follow-up estimated 0%
Hendriksen and colleagues 1984 <sup>36*</sup> Denmark 1980	Social welfare register N=572 (285:287) Mean age 78.4 years (38%) Mortality rate 7.6%	Home visit by nurse or research fellow to assess social and health conditions. Coordination of community services. Visit every 3 months, telephone contact and extra visits could be arranged 36 months with up to 12 visits per person Controls not informed or contacted until 3 months before end of study	Follow-up 36 months Death, living at home, nursing home care, hospital admissions Losses to follow-up 0%
Jitapunkl 1998 <sup>37</sup> Thailand 1993	Living in slum area N=160 (80:80) Mean age 76.1 years (about 34%) Mortality rate 5.4%	Home based surveillance by lay worker at 3 monthly intervals. If ADL decline, nurse or geriatrician visit for assessment, appropriate treatment, education, rehabilitation, and referrals 36 months with 12 scheduled visits Control group received baseline assessment	Follow-up 36 months Death, Barthel ADL, hospital admissions, falls during last 3 months Losses to follow-up 11.3%

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(Continued from previous page)			
Kerse and colleagues 1999 <sup>38</sup> Australia 1995	General practice N=267 (135:132)† Mean age 72.9 years (46%) Mortality rate 1.9%	Health promotion provided based on educational programme for general practitioners. Assessment, education and medical review by GP 1 or more visits Control GPs did not receive educational programme	Follow-up 12 months Death and institutionalised, living at home, Fix human activities profile Losses to follow-up 5.2–10.9%
McEwan and colleagues 1990 <sup>39</sup> UK 1986	Registered with GP N=296 (151:145) Mean age 81 years (not known) Mortality rate 7.9%	Home visit for assessment by nurse. Care plan, referrals, and advice Single visit Controls received usual care from primary care team	Follow-up 20 months Death, Nottingham health profile mobility Losses to follow-up 6.8–9.5%
Morrissey and colleagues 1995 <sup>40</sup> USA 1988	Primary care practices N=1914 (954:960) 60% less than 75 years old (39%) Mortality rate 4.0%	Counselling by physician at home or physician office and preventive care. Appropriate health promotion. Mobilisation of formal and informal care 24 months with 6 visits Control group received usual preventive services and transport costs	Follow-up 24 months Death, QWB, total hospital admissions Losses to follow-up 0–4.4%
Newbury and colleagues 2001 <sup>41*</sup> Australia 1998	General practice register N=100 (50:50) Mean age 78.5 years (63%) Mortality rate 6.0%	Assessment at home by nurse. Problems identified reported to GP 1 visit Control group completed SF36 and received usual care	Follow-up 12 months Death, living at home, living in institution, Barthel ADL, falls
Pathy and colleagues 1992 <sup>42</sup> UK dates not stated	General practice N=725 (369:356) Mean age 73.2 years (40%) Mortality rate 7.0%	Assessment by self completed questionnaire. Home visit by health visitor if problems identified. Advice, education, and referrals 36 months with 0 to 3 visits and more as needed Control group had the services of a health visitor	Follow-up 36 months Death, living at home estimated, long term institution admission, Townsend score, hospital admissions Losses to follow-up <6.5–20%
Sahlen and colleagues 2006 <sup>43</sup> Sweden 2000	People living independently N=595 (249:346)‡ Mean age 79.7 years (45%) Mortality rate 5.0%	Assessment at home and preventive visits by nurse and case manager. Counselling and education. Advice to contact primary care centre if needed 4 visits at 6 monthly intervals Control group not informed of trial	Follow-up estimated mean 54 months Death Losses to follow-up 0%
Sørensen and colleagues 1988 <sup>44</sup> Denmark 1978	Population register N=1555 (777:778)‡ Mean age 79.8 years (about 48%) Mortality rate 10.5%	Assessment at home by social worker and physician. Social services informed of unmet needs. Relevant referrals to GP who received summary of conclusions 1 visit of average 2 hours duration No intervention in control group	Follow-up 36 months (deaths/ institution 60 months) Death, nursing home admissions, hospital admissions Losses to follow-up 0%
Stuck and colleagues 1995 <sup>45*</sup> USA 1988	Voter registration list N=414 (215:199) Mean age 81 years (30%) Mortality rate 4.0%	Annual assessment at home by nurse practitioner. Recommendations developed with geriatrician. Follow-up to monitor implementation and facilitate adherence 36 months with 12 visits Control group received a yearly follow-up visit and questionnaire	Follow-up 36 months Death, living at home, nursing home admissions, Lawton ADL, hospital admissions Losses to follow-up 0–11.4%
Stuck and colleagues 2000 <sup>46*</sup> Switzerland 1993	Health insurance list N=791 (264:527) Mean age 82 years (27%) Mortality rate 4.8%	Annual assessment at home by nurse. Recommendations made with geriatrician. Health education, results to GP, and follow-up. Physiotherapist, occupational therapist, dietician, and social, worker involved if needed 24 months with a mean of 8.5 visits Control group received baseline interview and usual care	Follow-up 36 months (24 months for hospital admissions/ Lawton ADL) Death, living at home, nursing home admissions, Lawton ADL, hospital admissions Losses to follow-up 0–0.1%
Tulloch and Moore 1979 <sup>47</sup> UK 1972	General practice N=295 (145:150) Mean age not specified (54%) Mortality rate 10.0%	Regular socio-economic and medical surveillance in GP clinic by GP, nurse, and health visitor. Home visit by nurse for assessment. Offer of GP examination 1 visit and a further visit to GP offered per year Controls received conventional patient-initiated care	Follow-up 24 months Death, living at home, living in nursing home, domestic care rating, hospital admissions Losses to follow-up 4.4–14.5%
van Rossum and colleagues 1993 <sup>48</sup> Netherlands date not specified	Community survey N=580 (292:288) Mean age 78.4 years (42%) Mortality rate 5.3%	Home visit by public-health nurse for discussion of health topics with advice and information. Advised to contact appropriate services or referred to GP 36 months with 4 or more visits per year as needed Control group received no home visits	Follow-up 36 months Death, living at home estimated, nursing home admissions, authors' own ADL, hospital admissions Losses to follow-up 0–7.2%
Vass and colleagues 2004 <sup>49*</sup> Denmark 1999	General practice N=4,034 (2,092:1,942)† Two groups aged 75 and 80 (about 56%) Mortality rate 4.2%	GP and lay-home visitor educational intervention. Assessment at home visit by GP and lay home visitor. Appropriate follow-up and referral to GP 1 or more visits Control group general practitioners and home visitors did not receive an educational intervention	Follow-up 36 months Death, living at home, nursing home admission, MOB-H functional decline in mobility Losses to follow-up 0.9–7.4%
Vetter and colleagues 1984 <sup>50</sup> UK date not specified	Rural community N=554 (281:273) Mean age 77.5 years (not known) Mortality rate 8.1%	Assessment by home visitor. Health education, referral, and follow-up. Results sent to GP practice 24 months with two to three unsolicited visits Control group received no intervention	Follow-up 24 months Death, living at home, residential care, Townsend score Losses to follow-up 0–0.9%

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Vetter and colleagues 1984 <sup>30</sup> urban community UK date not specified	Urban community N=594 (296:298) Mean age 77.5 years (not known) Mortality rate 8.0%	Assessment by home visitor. Health education, referral and follow-up. Results sent to GP practice 24 months with two to three unsolicited visits Controls received no intervention	Follow-up 24 months Death, living at home, residential care, Townsend score Losses to follow-up 0-2.4%
Wagner and colleagues 1994 <sup>31</sup> Health promotion intervention (2) USA date not stated	HMO patients N=924 (317:607) Mean age 72.6 years (42%) Mortality rate 1.9%	Assessment at home by nurse. Counselling by nurse and educator, pamphlets, and classes. No emphasis on exercise 1 visit Controls received no intervention	Follow-up 24 months Death, living at home, living in institution, MOS SF-36 physical limitations, falls Losses to follow-up 0-1.5%
Wallace and colleagues 1998 <sup>32</sup> USA date not stated	Senior-centre volunteers N=100 (53:47) Mean age 73.1 years (27%) Mortality rate 0%	Risk factor review by nurse at senior centre. Targeted health promotion, supervised exercise programme, referrals to physician, and classes 6 months with 72 classes of 1 hour Control group had intervention deferred for 6 months	Follow-up 6 months Death, living at home estimated, SF36 physical function Losses to follow-up 7-10%
Yeo and colleagues 1987 <sup>33</sup> USA 1979	Medical centre N=205 (106:99) Mean age 73 years (99.5%) Mortality rate 9.1%	Assessment at outpatient clinic by specialist physician, nurse, and social worker. Health education, classes, referrals, and home nursing visits if needed 18 months with unspecified number of visits Controls attended general medical clinic	Follow-up 18 months Death, Sickness impact profile ADL component, hospital admissions Losses to follow-up 9.5-15.2%
<b>Geriatric assessment in elderly people selected as frail</b>			
Balaban and colleagues 1988 <sup>34</sup> USA 1981	Primary care N=198 (103:95) Mean age 69.2 years (24%) Mortality rate 12.9%	Assessment at home and follow-up care by physician, nurse, lay people, students, and health-care providers 24 months with 1 or more visits Control group received usual office based care with family physician	Follow-up 24 months Death, ADL Barthel, hospital admissions Losses to follow-up 1-2%
Bernabei and colleagues 1998 <sup>35</sup> Italy 1995	Recipients of home health care N=199 (99:100) Mean age 80.7 years (29%) Mortality rate 12.6%	Assessment at home by case managers. Care plan formulated by case-manager, geriatrician, social worker, nurse, and GP 12 months with about six visits Control group received usual care	Follow-up 12 months Death, living at home estimated, any nursing home admission, British Columbia ADL, hospital admission Losses to follow-up 0%
Boult and colleagues 2001 <sup>36</sup> USA 1994	Community Medicare screening N=568 (294:274) Mean age 78.7 years (56%) Mortality rate 6.6%	Assessment at home by social worker. Care planned and managed by social worker, nurse, and geriatrician 6 months with estimated 8 contacts Control group primary care physicians notified if high risk of hospitalisation	Follow-up 18 months Death, SIP physical functioning Losses to follow-up 0-3%
Coleman and colleagues 1999 <sup>37</sup> USA date not stated	Health cooperative primary care facility N=169 (96:73)† Mean age 77.3 years (49%) Mortality rate 8.0%	Assessment at clinic by physician, nurse, pharmacist, and social worker. Organisation of primary care service delivery to emphasise reduction in disability. Individual counselling 24 months with estimated seven to eight contacts Control group received usual care	Follow-up 24 months Death, SF-36 physical function, hospital admissions, falls Losses to follow-up 4.1-8.3%
Dalby and colleagues 2000 <sup>38*</sup> Canada 1995	Primary care screening N=142 (73:69) Mean age 79.1 years (33%) Mortality rate 6.0%	Nurse review of medical record. Home-based assessment. Integration of community services and agencies into care plan with primary care physician, patient, family, caregivers, and other health-care professionals 14 months with 1 visit and more as needed Control group received usual care	Follow-up 14 months Death, living at home, moved to nursing home, Lawton IADL, SF-36 physical functioning, hospital admissions Losses to follow-up 12.7%
Engelhardt and colleagues 1996 <sup>39</sup> USA 1994	Above average users of outpatient clinic services N=160 (80:80) Mean age 71.7 years (100%) Mortality rate 6.1%	Assessment at outpatient clinic by geriatrician, nurse practitioner, and social worker. Development and implementation of care plan with periodic reassessment 16 months with a mean of 7 visits Control group attended primary care clinic with internists and nurse support	Follow-up 16 months Death, living at home, nursing home admissions, Granger functional independence measure, hospital admissions Losses to follow-up 0-23.1%
Epstein and colleagues 1990 <sup>40</sup> USA 1985	HMO N=390 (185:205) Mean age 76.7 years (51%) Mortality rate 5.9%	Clinic-based and home-based assessment by geriatrician, geriatric nurse practitioner, and geriatric social worker. Care plan formulated with patient and family 2 months with 1 visit and follow-up by telephone Control group received usual care	Follow-up 12 months Death, living at home, nursing home admission, Bergner SIP physical function, hospital admissions Losses to follow-up 0-9%
Gagnon and colleagues 1999 <sup>61*</sup> Canada 1996	Emergency department in previous 12 months N=427 (212:215) Mean age 81.4 years (42%) Mortality rate 8.1%	Nurse led coordination and provision of health-care services. Assessment and interventions according to framework. Home visits, telephone calls and bleeper Mean 4 visits, 3 phone calls Controls received usual hospital and community services	Follow-up 10 months Death, OARS ADL, SF-36 physical function, total hospital admissions Losses to follow-up 0-20.9%

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Gill and colleagues 2002 <sup>62*</sup> USA 1999	Primary care screening N=188 (94:94) Mean age 82.8 years (20%) Mortality rate 5.3%	Home-based assessment by physical therapist. Education and training, and home-based exercise programme 12 months with a mean of 16 visits (range 7–19) Controls received health education programme	Follow-up 12 months Death, living at home, nursing home admission, Gill summary disability score, hospital admissions, falls Losses to follow-up 0% (at 12 months)
Hall and colleagues 1992 <sup>63</sup> Canada 1986	People receiving personal care at home N=167 (81:86) Mean age 78 years (22%) Mortality rate 6.4%	Home-based nurse led personalised health promotion. Personal health plan, referrals and follow-up visits 36 months with approximately 7 or more visits Control group received standard long term care with yearly monitoring	Follow-up 36 months Death, living at home, placement in facility Losses to follow-up 0%
Hebert and colleagues 2001 <sup>64</sup> Canada 1993	Population register N=503 (250:253) Mean age 80.2 years (36%) Mortality rate 6.0%	Nurse led home-based assessment. Appropriate interventions recommended to GP and direct referrals 6 months with 1 visit and 5 scheduled phone contacts Controls received usual health care	Follow-up 12 months Death, living at home, admission to nursing home or long-term care hospital, Hebert SMAF ADL, hospital admission Losses to follow-up 0–1.8%
Kono and colleagues 2004 <sup>65</sup> Japan 2000	People identified by local volunteers N=119 (59:60) Mean age 82.5 years (21%) Mortality rate 5.6%	Home-based assessment by public-health nurse. Care recommendations and private or public home services provided if required 18 months with a mean of 4.3 home visits (range 1–20) Controls received routine care	Follow-up 18 months Death, living at home, nursing home at follow-up, Barthel ADL (authors' modification) Losses to follow-up 1.7%
Leveille and colleagues 1998 <sup>66*</sup> USA 1995	Senior citizens centre N=201(101:100) Mean age 77.1 years (44%) Mortality rate 1.5%	Assessment based on primary care records and assessment at home or senior centre by nurse. Health action plan, support from volunteer mentor, referrals and encouragement to attend exercise and disease self-management classes 3 months with a mean of 3 visits per person (range 1–8). 35% attended classes Controls received tour of the senior centre and a schedule of activities	Follow-up 12 months Death, living at home, institutionalisation, Fries HAQ, SF-36 physical function, hospital admissions, falls Losses to follow-up 0–9.9%
Newcomer and colleagues 2004 <sup>67*</sup> USA 2000	Primary care N=3079 (1537:1542) Mean age 82 years (40%) Mortality rate 2.9%	Assessment at home by nurse case-manager. Follow-up and medical record review. Care plan and active case management for high risk individuals 12 months with a mean of 7.7 hours contact Control group received baseline assessment and were eligible for existing case management	Follow-up 12 months Death, living at home, living in nursing home or hospice, SF-12 physical status, hospital admission, falls Losses to follow-up 0–12.5%
Reuben and colleagues 1999 <sup>68</sup> USA date not stated	Community-based site N=363 (180:183) Mean age 75.8 years (18%) Mortality rate 1.1%	Assessment at outpatient clinic by social worker, nurse practitioner, geriatrician, and physical therapist. Report to GP. Recommendations to participant and follow-up call 96% received assessment Controls received usual care from primary care physician plus non-medical recruitment incentives	Follow-up 15 months Death, living at home, no reported nursing home admissions, MOS SF-36 physical function, hospital admissions Losses to follow-up 0–1.9%
Rockwood and colleagues 2000 <sup>69*</sup> Canada date not stated	General practice N=182 (95:87) Mean age 82.2 years (43%) Mortality rate 11.0%	Home visit for assessment by nurse. Goals and preventive strategy set by nurse and geriatrician. Specific interventions by physiotherapist, occupational therapist, social worker, dietician, audiologist, speech language pathologist, and geriatrician if indicated Up to 3 months with average 3 consults (range 1–6) Control group primary care physician notified of group allocation and patient "frailty"	Follow-up 12 months Death, living at home, institutionalised, Barthel ADL (Granger modification) Losses to follow-up 0–9.3%
Rubenstein and colleagues 1989 <sup>70</sup> USA date not stated	Internal medicine practices N=649 (322:327)† 34% of participants aged 70+ years (31%) Mortality rate 3.4%	Physician education programme. Participants completed self-assessment questionnaire at 4-month intervals and returned to physician. Education and goal setting 12 months with 4 contacts Control group questionnaires not returned to physician	Follow-up 12 months Death, Beth Israel UCLA functional status assessment ADL Losses to follow-up 18.0%
Schrijnemaekers and Haveman 1995 <sup>71</sup> Netherlands 1988	People living at home responding to questionnaire N=222 (110:112) Mean age not stated (36%) Mortality rate 12.6%	Assessment by geriatrician, psychologist, social worker at outpatient clinic. Advice to individual and GP on treatment and support Two outpatient visits Controls were not invited to the outpatient clinic	Follow-up 6 months Death, authors' own ADL, falls Losses to follow-up 10.4–11.7%
Shapiro and Taylor 2002 <sup>72</sup> USA 1998	Social services waiting list N=105 (40:65) Mean age 77.7 years (20%) Mortality rate 3.2%	Home visit for assessment by nurse. Case manager coordinated delivery of services and conducted follow-up every 3 months. Additional services provided as required Intervention lasted 18 months with six contacts Control group followed up by case manager every 3 months	Follow-up 18 months Death, living at home, institution at follow-up, Ryff environmental mastery Losses to follow-up 27.6–33.3%

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Silverman and colleagues 1995 <sup>3</sup> USA 1988	Medicare or Medicaid patients with referral N=442 (239:203) Mean age 74.6 years (19%) Mortality rate 3.8%	Assessment at outpatient clinic by geriatric internist, geriatric nurse, and geriatric social worker. Treatment plan and family conference. Recommendations to primary care physician. Additional tests and referrals as required 1 visit Control group received usual care, physical examination and payment after follow-up	Follow-up 12 months Death, living at home, nursing home admission, Barthel ADL Losses to follow-up 1.1-10.5%
Sommers and colleagues 2000 <sup>24</sup> USA 1993	Primary care N=543 (280:263)† Mean age 77 years (31%) Mortality rate 4.8%	Self-completed assessment questionnaire. Home visit for assessment by nurse or social worker. Risk reduction plan and targets set. Follow-up visits, small group sessions, and hospital visits. Reassessment and promotion of community services 18 months (mean 14 months) with a mean of 34 nurse or social worker contacts Control group had baseline questionnaire	Follow-up 24 months Death, skilled nursing facility admissions in second year of follow-up, Lorig HAQ, hospital admissions Losses to follow-up 2.6-29.3%
Stewart and colleagues 2005 <sup>25</sup> UK 2000	Referrals to social services or occupational therapy N=321 (160:161) Mean age 81 years (36%) Mortality rate 16.8%	Home visit with assessment by occupational therapist. Interventions aimed to minimise individual's dependence on others. Provision of equipment 1 month with up to 1 visit Control and intervention group received assessment by social worker	Follow-up 8 months Death, Eakin community dependence index, hospital admissions Losses to follow-up 5.3-6.5%
Williams and colleagues 1987 <sup>26</sup> USA 1983	Community based including case management agency N=117 (58:59) Mean age 76 years (40%) Mortality rate 8.5%	Assessment and counselling at outpatient clinic by internists, family physicians, psychiatrists, nurses, social workers, dieticians. Goals set, specialist consultations and follow-up visits 1 visit with follow-up visits if needed Controls received comprehensive geriatric assessment and care from internist	Follow-up 12 months (8 months physical function) Death, maintaining home environment, nursing home admission, patient assessment form functional scale, hospital admissions Losses to follow-up 0-4.3%
Zimmer and colleagues 1985 <sup>27</sup> USA date not stated	Publicity campaign in health professionals and community N=158 (82:76) Mean age 73.8 years (32%) Mortality rate 60.8%	Assessment at home by physician, nurse, and social worker. Care plan established and primary care provider designated. Family member or friend to act as care provider and appropriate education and counselling provided 6 months with 1 visit and more if appropriate Control received existing services and completed health diaries and were visited by interviewers	Follow-up 6 months Death, living at home estimated, nursing home admission, SIP physical health, hospital admissions Losses to follow-up 9.5-15.2%
<b>Community-based care after hospital discharge</b>			
Burns and colleagues 1995 <sup>28*</sup> USA 1991	Surgical or neurological hospital discharge N=128 (60:68) Mean age 71.7 years (97%) Mortality rate 11.7%	Assessment at outpatient and long-term management and follow-up by physician, nurse practitioner, social worker, psychologist, and pharmacist 24 months with 1 outpatient clinic visit and appropriate follow-up Control group received usual care through ambulatory clinics	Follow-up 24 months Death, living at home, nursing home at follow-up, Katz ADL, hospital admission Losses to follow-up 0%
Caplan and colleagues 2004 <sup>29*</sup> Australia 1996	Discharged from emergency department N=738 (369:369) Mean age 82.1 years (40%) Mortality rate 9.8%	Assessment by nurse in emergency department and home. Discussion with GP, geriatrician, nurses, physiotherapists, occupational therapists. Initiation of appropriate interventions and referrals 4 weeks with a mean of 2.3 visits Control group received discharge plan by medical officer in emergency department	Follow-up 18 months Death, living at home, nursing home admissions, Barthel ADL, hospital admissions Losses to follow-up 0-7.5%
Crotty and colleagues 2003 <sup>30*</sup> Australia 1998	Discharged to home after hospital admission for fall-related hip fracture surgery N=66 (34:32) Median age 81.6 years (27%) Mortality rate 10.6%	Home based rehabilitation after early hospital discharge by physiotherapists, occupational therapists, speech pathologists, social workers, and treatment aides. Negotiated set of treatment goals with patients and carers 4 months with two or more visits as needed Control group received conventional rehabilitation	Follow-up 12 months (hospital 4 months) Death, living at home, living in nursing home at follow-up, Shah modified Barthel ADL, SF-36 physical component, falls Losses to follow-up 4.5%
Cunliffe and colleagues 2004 <sup>31</sup> UK 1999	Discharge from medical and surgical wards N=370 (185:185) Mean age 80 years (34%) Mortality rate 17.8%	Early hospital discharge and rehabilitation. Assessment in hospital and at home and provision of rehabilitation therapies, assistance or care by occupational therapist, physiotherapist, nurse, community care officer, social service liaison, and rehabilitation assistant 1 month with up to 4 home visits per day Control group received usual hospital and post-discharge care	Follow-up 12 months Death, place of residence, nursing home admission, Barthel ADL, hospital admissions Losses to follow-up 0-8.9%
Dunn and colleagues 994 <sup>32</sup> UK date not stated	Discharged home from geriatric ward N=204 (102:102) Mean age 82.7 years (32%) Mortality rate 39.2%	Home visit by health visitor to stabilise patient in own home and deal with any problems identified in pre-discharge based assessment One home visit Control group received pre-discharge assessment and usual follow-up services	Follow-up 6 months Death, residence at follow-up, nursing home at follow-up, hospital admission Losses to follow-up 0%

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Ford and colleagues 1971 <sup>83</sup> USA date not stated	Discharged from chronic disease rehabilitation hospital N=300 (150:150) Mean age 72 years (33%) Mortality rate 14.2%	Referral by hospital staff to Visiting Nurse Association for home nursing care provided by nurse 24 months with 1 or more visits as needed Control not referred to Visiting Nursing Association	Death estimated from graph, living at home estimated, nursing home admissions estimated from graph, Katz ADL, hospital admissions and falls with fracture estimated from graph Losses to follow-up 0%
Hansen and colleagues 1992 <sup>84</sup> Denmark 1987	Discharged from medical and surgical specialities N=404 (199:205)‡ 55% of people aged 80+ years (about 39%) Mortality rate 18.6%	Home visit by district nurse. Identification and solving of new and unforeseen problems and organisation of services. Home visit by GP for socio-medico evaluation 2 visits Control received usual care	Follow-up 12 months Death, living at home estimated, nursing home admissions, hospital admissions Losses to follow-up 0%
Hansen and colleagues 1995 <sup>85</sup> Denmark 1991	Discharged from geriatric ward or after rehabilitation N=193 (96:97) Mean age 78.7 years (33%) Mortality rate 37.3%	Post discharge home visits for assessment by geriatrician, nurse, and physical therapist. Home rehabilitation, report to GP and alteration of social services. Appropriate referral to day hospital and sub-acute ward 4 months with 4 visits Control group had discharge summary sent to GP and social support arranged at discharge	Follow-up 6 months Death, living at home, nursing home at follow-up, hospital admission Losses to follow-up 0%
Hughes and colleagues 2000 <sup>86</sup> USA 1994	Discharged from hospital within 3 months N=1861 (925:936) Mean age 70.4 years (96%) Mortality rate 36.3%	Screening to identify high-risk patients and targeting of care. Continuity of care and home management by physician, social worker, dietician, therapist, pharmacist, and health technicians Intervention lasted a mean of 5.6 months with a mean of 24 visits Control group had access to care services other than intervention	Follow-up 12 months Death, Barthel ADL, SF-36 physical function, hospital admissions Losses to follow-up 0-27.8%
Leung and colleagues 2004 <sup>87</sup> China 2000	Discharge from rehabilitation hospital N=260 (130:130) Mean age 74.4 years (55%) Mortality rate <9.2%	Home-based assessment by nurse and social worker. Care plan, referrals and case conferences. Education, counselling and support groups 6 months with an estimated mean of 4 visits Controls received conventional health and social services and assessment at 6 monthly intervals	Follow-up 6 months Living at home calculated, Minimum data set home care ADL, hospital admissions Losses to follow-up 0%
Martin and colleagues 1994 <sup>88</sup> UK 1989	Discharged from hospital and rehabilitation N=54 (29:25) Mean age 81.5 years (19%) Mortality rate 22.2%	Clinical assessment before discharge and at home visit by nurse. Care plan, home rehabilitation and appropriate referrals by nurse and health-care assistant Up to 6 weeks with up to 3 visits per day Control group received conventional community services	Follow-up 12 months Death, living at home, living in residential care, hospital admissions Losses to follow-up 0%
Melin and Bygren 1992 <sup>89</sup> Sweden 1988	Discharge from hospital N=249 (150:99) Mean age 81.3 years (21%) Mortality rate 53.0%	Home visits for assessment by nurse and home service assistant, and physician. Treatment plan, 24 hour medical and social services and home visits as required. Weekly monitoring conference with geriatrician and psychiatrist 6 months with visits whenever needed Control group discharged to standard care	Follow-up 6 months Death, living at home, living in institution estimated, Katz ADL, hospital admissions Losses to follow-up 0-5.1%
Naylor and colleagues 1999 <sup>90*</sup> USA 1992	Discharge after hospital admission N=363 (177:186) Mean age 75.5 years (28%) Mortality rate 12.1%	Discharge planning by advanced practice nurse. Assessment at home and management plan for participant, carers, physicians, and other providers. Counselling and monitoring 1 month with 2 or more visits Control group received routine discharge planning	Follow-up 6 months Death, living at home, living in institution, Moynour enforced social dependency scale, hospital admissions Losses to follow-up 21.8-24.5%
Nikolaus and colleagues 1999 <sup>91*</sup> Germany 1994	Discharged from hospital or at risk of nursing home placement N=360 (181:179) Mean age 81.4 years (27%) Mortality rate 17.5%	Assessment before hospital discharge. Post-discharge follow-up by nurse, physiotherapist, occupational therapist, and social worker 7.6 days (range 1-41 days) with 3 or more home visits as needed Control group received assessment and usual care in hospital and home	Follow-up 12 months Death, living at home, living in long-term care institution, Barthel ADL, hospital admissions, falls
Nikolaus and Bach 2003 <sup>92*</sup> Germany 1996	Discharge to home following inpatient geriatric clinic N=360 (181:179) Mean age 81.2 years (27%) Mortality rate 10.5%	Home visits for assessment by nurse, physiotherapist, and occupational therapist. Case management and information and education provided Mean of 2.6 visits (range 1-8) Control group received assessment with recommendations and falls diary. GP responsible for case management	Follow-up 12 months Death, living at home, moved to long-term care institution, falls (2 or more) Losses to follow-up 5.0%
Rubin and colleagues 1993 <sup>93</sup> USA 1985	Patients discharged from hospital emergency room N=194 (97:97) Mean age 76.8 years (39%) Mortality rate 28.9%	Outpatient assessment by geriatric internist, geriatric psychiatrist, geriatric nurse specialist, and geriatric social worker. Long-term care plan and primary care and clinic management 2 months with estimate of many visits Control group medical care team received no recommendations	Follow-up 12 months Death, living at home, nursing home placement, Katz ADL Losses to follow-up 8.2%

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	Study setting Number of participants (intervention: control) Mean age in intervention group (% men) Mortality rate	Intervention Intensity Control group activity	Follow up Outcomes Losses to follow-up
(Continued from previous page)			
Stewart and colleagues 1998 <sup>94</sup> Australia date not stated	Patients discharged from medical and surgical units N=762 (381:381) Mean age 66 years (50%) Mortality rate 10.8%	Assessment and counselling before discharge. High-risk individuals received home visit for assessment and counselling. Referrals and community support. Primary care physician informed of assessment outcome 1 or 2 visits Control group received existing discharge planning	Follow-up 6 months Death, hospital admissions Losses to follow-up 0%
Tinetti and colleagues 1999 <sup>95</sup> USA 1993	Hospital discharge after surgical repair of hip fracture N=304 (148:156) Mean age 80.5 years (18%) Mortality rate 6.3%	Assessment at home by nurse and physical therapist. Appropriate recommendations and referrals. Physical, functional and psychological therapy treatment, home exercise programme and assistive devices 6 months with 36–37 visits for physical and functional therapy treatment Control group received 11–15 home visits over 6 months for physical therapy treatment through home-care agency	Follow-up 12 months (6 months hospital and falls) Death, living at home, no nursing home admission reported, Fillenbaum ADL, hospital admissions, falls Losses to follow-up 0–4.3%
Townsend and colleagues 1988 <sup>96</sup> UK 1984	Discharged from hospital N=903 (464:439) Mean age 82 years (36%) Mortality rate 19.0%	Care attendant visits with provision of care, help with rehabilitation, aids for daily living and organisation of social and informal help 2 weeks with up to 12 hours care per week Control group received pre-discharge, 2 week and three month assessment, or standard care and assessment after 3 months	Follow-up 12 months (death), 18 months (hospital admission). Interview outcomes 3 months only Death, Sheikh ADL (no assessment after 3 months), hospital admissions Losses to follow-up 0%
Trentini and colleagues 2001 <sup>97</sup> Italy 1992	Discharged from hospital N=152 (79:73) Mean age 78.7 years (39%) Mortality rate 11.8%	Assessment at outpatient clinic by geriatrician, social worker, nurse (and rehabilitation specialists if required). Treatments, contact with GP, follow-up and diagnostic and therapeutic procedures. Geriatric outpatient clinic 12 months with an estimate of 2 visits scheduled Control group received comprehensive geriatric assessment and usual care	Follow-up 12 months Death, living at home, nursing home at follow-up, Katz ADL, hospital admissions Losses to follow-up 0–6.6%
Williams and colleagues 1992 <sup>98*</sup> UK 1986	Discharged from hospital N=470 (231:239) Mean age not specified (not known) Mortality rate 14.9%	Assessment by health visitor at home. Advice and counselling 12 months with 8 scheduled visits Control group received standard discharge care	Follow-up 12 months Death, Townsend ADL (not intention to treat analysis) Losses to follow-up 7.7%
<b>Fall prevention</b>			
Clemson and colleagues 2004 <sup>99</sup> Australia 1999	Volunteers and primary care N=310 (157:153) Mean age 78.3 years (26%) Mortality rate 1.9%	Community-based cognitive behavioural programme led by occupational therapist. Home visit and 3-month booster session Approximately 5 months with 9 sessions Control group received up to two social visits by student	Follow-up 14 months Mobility efficacy scale, SF-36 physical component, falls Losses to follow-up 0–11.8%
Close and colleagues 1999 <sup>100</sup> UK 1995	Attended emergency department with primary diagnosis of fall N=397 (184:213) Mean age 77.3 years (32%) Mortality rate 11.6%	Medical and occupational therapy assessment at home and in day hospital by physician and occupational therapist. Advice, education and referrals Less than 1 month with 2 contacts Control group completed falls diary	Follow-up 12 months Death, living at home, institutional care, Barthel ADL, total hospital admissions, falls Losses to follow-up 2.8–13.4%
Davison and colleagues 2005 <sup>101</sup> UK 1998	Attending emergency department with fall or fall-related injury N=313 (159:154) Mean age 77 years (28%) Mortality rate 2.6%	Home and hospital based assessment by nurse, physiotherapist, and occupational therapist with appropriate interventions and referrals Median of two outpatient visits and three home visits Control group received baseline interviews but no hospital based assessment	Follow-up 12 months Death, hospital admissions (fall related), falls Losses to follow-up 7.3%
Gallagher and Brunt 1996 <sup>102</sup> Canada date not stated	Volunteers with fall in previous 3 months N=100 (50:50) Mean age 73.8 years (about 80%) Mortality rate 0%	Home-based assessment by nurse. Education and counselling 2 weeks with 3 visits in addition to baseline assessment Control received assessment and completed falls reports	Follow-up 6 months Edwards social ADL, falls Losses to follow-up not reported
Hogan and colleagues 2001 <sup>103</sup> Canada 1997	People with history of falling N=163 (79:84) Mean age 77.4 years (28%) Mortality rate 4.3%	Home based assessment and discussion by specialist in geriatric medicine, nurse, occupational therapist, or physiotherapist. Individualised plan, recommendations to participant and GP, advice, home exercise plan. Referral to exercise class 6 months with 5 visits Control group received leisure assessment by recreational therapist	Follow-up 12 months Death, living at home, admitted to an institution, fall related hospital admissions, falls Losses to follow-up 8.6%
Hornbrook and colleagues 1994 <sup>104</sup> USA date not stated	Primary care (HMO) N=3,182 (1611:1571) Mean age 73.6 years (38%) Mortality rate not estimable	Home visit for assessment by home assessor. Education and action plan. Fall prevention and supervised exercise classes. Assistance with improvements to home safety 1 home visit and 9 group meetings Controls received home visit by home assessor. Minimal treatment	Follow-up 23 months Falls Losses to follow-up 4.9%

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	<b>Study setting</b> <b>Number of participants</b> <b>(intervention: control)</b> <b>Mean age in intervention</b> <b>group (% men)</b> <b>Mortality rate</b>	<b>Intervention</b> <b>Intensity</b> <b>Control group activity</b>	<b>Follow up</b> <b>Outcomes</b> <b>Losses to follow-up</b>
(Continued from previous page)			
Lightbody and colleagues 2002 <sup>105</sup> UK 1997	Discharged from A&E after fall N=348 (171:177) Mean age 75 years (26%) Mortality rate 10.3%	Home visit for assessment by nurse and management plan. Advice, education, simple home modifications and referrals One visit Control group completed daily falls diaries	Follow-up 6 months Death, Barthel ADL, fall related hospital admission, falls Losses to follow-up 0-4.6%
Lord and colleagues 2005 <sup>106</sup> Australia date not specified	Health insurance database N=414 (210:204) Mean age 80.3 years (32%) Mortality rate 1.0%	Outpatient clinic assessment by researcher, eye specialist, fitness instructor, primary care physician. Recommendations, counselling and referrals. Exercise classes One visit plus appropriate exercise, visual and peripheral sensation interventions Control group had assessment but no intervention	Follow-up 6 months and 12 months (falls) Death, falls Losses to follow-up 1.7-5.1%
Steinberg and colleagues 2000 <sup>107*</sup> Australia 1996	National seniors branches N=252 (189:63)†# Mean age 69 years (21%) Mortality rate <2.5%	Educational materials and presentations by researcher. Monthly exercise class with fitness trainer. Home visit with financial and practical safety assistance, and clinical assessment with advice. Input from occupational therapist and general practitioner if needed 12 months with 12 exercise classes Control group received oral presentation and pamphlet and completed falls calendar	Follow-up 17 months Death or ill health, falls Losses to follow-up <3.6%
Tinetti and colleagues 1994 <sup>108</sup> USA 1990	Primary care N=301 (153:148)†# Mean age 78.3 years (31%) Mortality rate 4.0%	Assessment at home by nurse and physical therapist. Home exercise programme, recommendations, training and home modifications. Medication review with primary care physician 6 months with a mean of 7.8 home visits Control group completed falls calendar and received visits from social-work students with structured interviews	Follow-up 12 months Death, hospital admissions, falls Losses to follow-up 0-0.7%
van Haastregt and colleagues 2001 <sup>109</sup> Netherlands 1997	General practice N=316 (159:157) Mean age 77.2 years (34%) Mortality rate 5.1%	Assessment at home by nurse. Screening for medical, environmental, and behavioural factors. Appropriate advice and referrals 12 months with 5 visits per person. Control group received no special attention or intervention	Follow-up 18 months Death, Frenchay daily activities, Sickness impact profile mobility control, falls Losses to follow-up 0.9-18.0%
Vetter and colleagues 1992 <sup>110</sup> UK date not stated	General practice N=674 (350:324) Mean age 76.8 years (not known) Mortality rate 7.2%	Assessment at home by health visitor. Advice, home modifications by local voluntary agencies and authorities and, if appropriate, fitness class 48 months with 4 visits or more if needed Control group received baseline assessment	Follow-up 48 months Death, falls Losses to follow-up 2.8%
Wagner and colleagues 1994 <sup>51</sup> Disability and fall prevention intervention (1) USA date not stated	HMO patients N=1,242 (635:607) Mean age 72.5 years (40%) Mortality rate 1.6%	Assessment at home by nurse. Tailored intervention and motivation by nurse and educator. Referrals, medication review, information, classes if required and encouragement to have home safety inspection. Results to primary care 1 month, 1 home visit and 1 exercise orientation class Control group received no specific preventive interventions	Follow-up 24 months Death, living at home, living in institution, MOS SF-36 physical limitations, falls Losses to follow-up 0-1.5%
<b>Group education and counselling</b>			
Beck and colleagues 1997 <sup>111*</sup> USA date not stated	Primary care (HMO) N=321 (160:161) Mean age 72 years (34%) Mortality rate 4.4%	Group education on health related topics and disease processes by general practitioner, nurse, clinical psychologist, clinical pharmacist, physical therapist, and dietician. Also individual assessment 12 months with mean of 6.6 sessions Control group received usual care	Follow-up 12 months Death, living at home, living in skilled nursing facility, Katz ADL, hospital admission Losses to follow-up 0-16.2%
Clark and colleagues 1997 <sup>112</sup> USA 1994	Retirement complex and private homes N=241 (122:119) Mean age 74.4 years (67%) Mortality rate 2.7%	Community complex based individual and group intervention by occupational therapist 9 months with individuals attending approximately 36 group sessions Control group received no intervention	Follow-up 15 months Jette functional status questionnaire ADL, RAND SF-36 physical Losses to follow-up 20.4%
Scott and colleagues 2004 <sup>113*</sup> USA 1995	HMO patients N=294 (145:149) Mean age 74.2 years (41%) Mortality rate 3.4%	Group health education by primary care physician and nurse, with input by physical therapist, pharmacist, occupational therapist, and representatives of community resources as needed. Individual medical examination with appropriate referrals 24 months with mean of 10.6 sessions Control group completed health survey and stated interest in attending group clinics	Follow-up 24 months Death, Living at home estimated, skilled nursing facility admissions per person, Katz ADL (Wolinsky modification), hospital admissions Losses to follow-up 0-15.3%
HMO=health maintenance organisation. QWB=Quality of Well Being. ADL=activities of daily living. UCLA=University of California, Los Angeles.*Additional information provided by authors. †Cluster randomisation. ‡Alternate allocation or allocation by date of birth.			
<b>Webtable 1: Characteristics of randomised controlled trials included in the systematic review</b>			