Canadian Stroke
Best Practices

CANADIAN STROKE BEST PRACTICE RECOMMENDATIONS

Rehabilitation, Recovery and Community Participation Following Stroke

Part Three: *Optimizing Activity and Community Participation following Stroke*

Evidence Tables

Functional Health Management Following Stroke

Nancy Salbach, Jennifer Yao (Writing Group Co-Chairs)
Michelle Nelson, Jing Shi (Part One Co-Leads)
on Behalf of the Canadian Stroke Best Practice Recommendations
Stroke Rehabilitation and Recovery Writing Group

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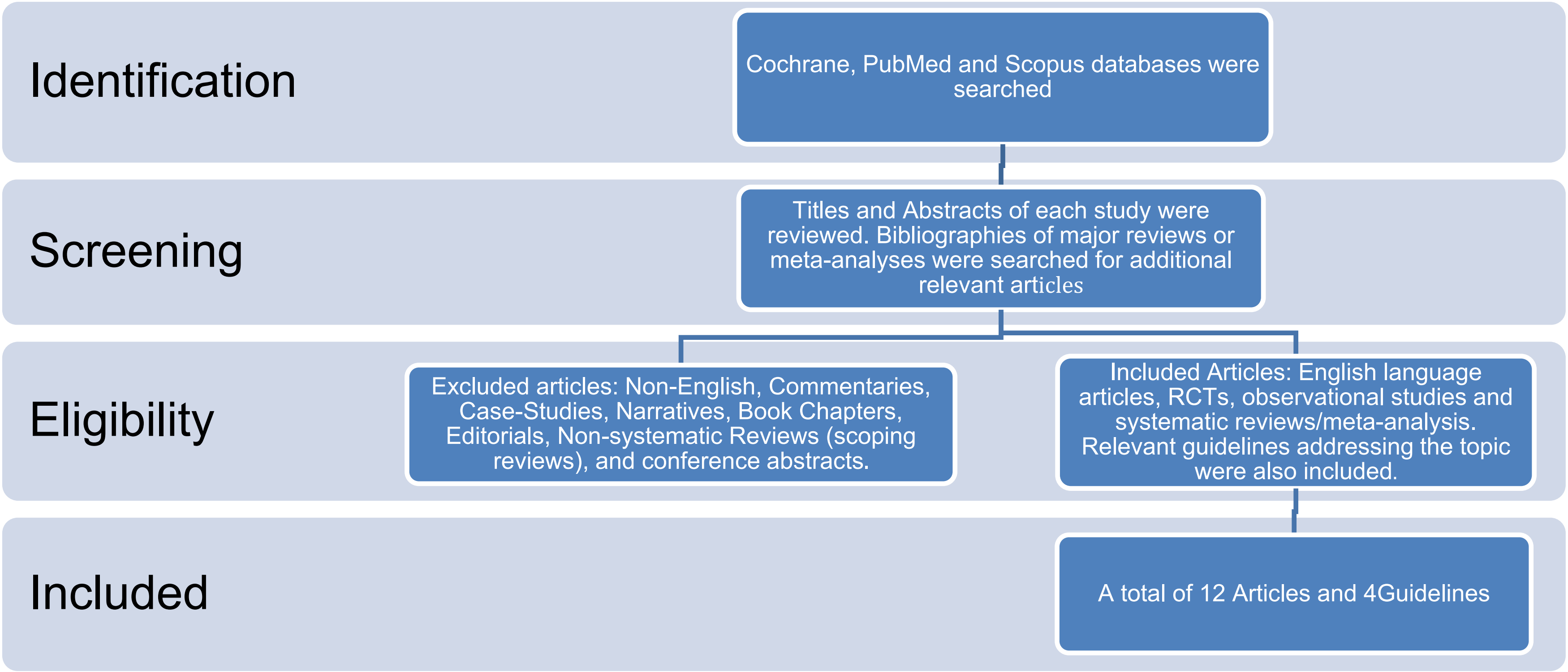
Search Strategy



Cochrane, PubMed and Scopus databases were search using the terms such as: (stroke OR cerebrovascular disease) AND (rehabilitation OR intervention OR therapy) AND (Advance care planning) OR Palliative care OR community-based exercise programs. Titles and abstract of each article were reviewed for relevance. Bibliographies were reviewed to find additional relevant articles. Articles were excluded if they were: non-English, commentaries, case-studies, narrative, book chapters, editorials, non-systematic review, or conference abstracts. Additional searches for relevant best practice guidelines were completed and included in a separate section of the review. A total of 12 articles and 4 guidelines were included and were separated into separate categories designed to answer specific questions.

Published Guidelines

Guideline	Recommendations
Palliative Care & Advance Care Planning	
National Clinical Guideline for Stroke for the UK and Ireland. London: Intercollegiate Stroke Working Party; 2023 May 4. **Available at:** www.strokeguideline.org.	Services providing acute and long-term care for people with stroke should provide high quality end-of-life care for those who need it. [2016] Staff caring for people dying of stroke should be trained in the principles and practice of end-of-life care, including the recognition of people who are approaching the end of life. [2016] Decisions to withhold or withdraw life-prolonging treatments after stroke including artificial nutrition and hydration should, whenever possible, take the person's prior expressed wishes and preferences into account and should be taken in the best interests of that person. When withdrawing artificial nutrition and hydration, a recognised nutrition and hydration decision-making process should be considered. [2023] End-of-life (palliative) care for people with stroke should include an explicit decision not to have burdensome restrictions that may exacerbate suffering. In particular, following assessment this may involve a decision, taken together with the person with stroke, their family/carers, and the multidisciplinary team, to allow oral food or fluids despite risks including aspiration and choking. [2023] People with stroke with limited life expectancy, and their family where appropriate, should be offered advance care planning, with access to specialist inpatient and community palliative care services when needed. The multidisciplinary team should establish whether there is any existing documentation of the patient's wishes regarding management of risks associated with continued eating and drinking and whether it remains relevant, and agree with the patient and/or family/carers an advanced care plan where appropriate. [2023] People dying of stroke should have access to specialist palliative care, including the timely transfer of care to their home or to a hospice or care home according to the wishes of the person and their family/carers. This should also include timely communication and involvement of the primary care team. [2016]
McKenzie E & Couillard P. **Choosing Wisely: Canadian Neurological Society recommendations for advance care planning.** ***Can J Neurol Sci.* 2023 May;50(3):351-354.**	1. Don't wait for your patient to bring up ACP, initiate the conversation. 2. For patients with progressive illness that could impact cognition, initiate ACP conversations as early in the disease course as possible. 3. Encourage family and care partner involvement in ACP. 4. Use clear, direct language when discussing prognosis. 5. Use standardized, specific language to document ACP conversations. 6. Don't recommend or initiate aggressive care without establishing prognosis, preferences and goals of care.

Guideline	Recommendations
	7. Revisit advance care plans regularly and whenever there is significant change in a patient’s status. 8. Patients who enquire about Medical Assistance in Dying should receive comprehensive information about care options.
Ferrell BR, Twaddle ML, Melnick A, Meier DE. **National Consensus Project Clinical Practice Guidelines for Quality Palliative Care Guidelines, 4th Edition.** ***J Palliat Med.* 2018 Dec;21(12):1684-1689.** **(selected)**	Statements are made within each of 8 domains including Domain1. Structure and processes of care Domain 2: Physical aspects of care Domain 3: Psychological and psychiatric aspects of care Domain 4: Social aspects of care Domain 5. Spiritual, religious, and existential aspects of care Domain 6. Cultural aspects of care Domain 7. Care of the patient nearing the end of life Domain 8. Ethical and legal aspects of care Five key themes were added to each domain: • The elements of a comprehensive assessment are described • Family caregiver assessment, support, and education are referenced in numerous domains • The essential role of care coordination, especially during care transitions, is emphasized • Culturally inclusive care is referenced in all the domains and expanded in the cultural aspects of care domain • Communication (within the palliative care team, with patients and families, with other clinicians, and with community resource providers) is prerequisite for delivery of quality care for the seriously ill and is emphasized throughout
Royal College of Physicians, British Geriatrics Society, Royal College of Nursing, Royal College of Psychiatrists, Royal College of General Practitioners, British Society of Rehabilitation Medicine, Alzheimer’s Society, Help the Aged and the National Council for Palliative Care. Advance care planning. RCP Concise Guidance for Good Practice No. 12. February 2009.	Detailed recommendations were made within the following categories: When and with whom should I be considering ACP discussions? The discussion Will ACP work? Individuals with progressive cognitive impairment Recommendations for training and implementation of ACP
Exercise	
MacKay-Lyons M, Billinger SA, Eng JJ, Dromerick A, Giacomantonio N, Hafer-Macko C et al. **Aerobic Exercise Recommendations to Optimize Best Practices in Care After Stroke: AEROBICS 2019 Update.**	Aerobic exercise programs can be administered in a variety of barrier-free and accessible settings: hospital, outpatient clinics, community, and home. Training of high-risk individuals must be done in a setting with immediate access to external defibrillation and emergency medical response. For lower-risk individuals, home-based aerobic exercise programs may be a safe and effective option (LOE = C). Any mode of exercise that activates a large muscle mass for a prolonged period can be used to induce an aerobic training effect (LOE = B).

Guideline	Recommendations
***Phys Ther*. 2020 Jan 23;100(1):149-156.** **(selected)**	A minimum of 8 weeks of aerobic exercise is recommended to achieve a clinically meaningful training effect. However, physical activity should be sustained indefinitely to maintain health benefits (LOE = B) Structured aerobic exercise should be conducted a minimum of 3 d/wk. On the other days of the week, participants are encouraged to engage in lighter forms of physical activity (LOE = B). Aerobic exercise sessions of >20 minutes are recommended, depending on exercise frequency and intensity. Warm-up and cool-down periods of 3 to 5 minutes are also advised. A gradual progression in the duration may be required, starting with bouts of 5 minutes or less and alternating intervals of rest or lower-intensity exercise (LOE = B). Intensity of aerobic exercise must be determined on an individual basis, depending on responses to exercise testing, health status (neurologic status, cardiac, and other comorbidities), and planned exercise frequency and duration. Percentage of heart rate reserve (HRR) is often used to establish the target training intensity. Other markers of intensity, such as percentage of maximal heart rate (% HRmax) and rating of perceived exertion (RPE), can be used, particularly when heart rate is compromised by medication (LOE = B).

Evidence Tables

Functional Health Management

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Saunders et al. 2020 **UK** **Cochrane review**	36 trials were at low risk of bias for sequence generation, 32 were at low risk of bias for CA, 28 trials blinded the outcome assessor, 26 were at low risk of bias for incomplete outcome data and all but 2 trials were at unclear risk of bias for selective reporting	75 RCTs trials, involving 3,017 stroke survivors who were considered suitable for fitness training. Mean age was approximately 62 years. The mean time since stroke onset ranged from 8.8 days in trials assessing participants before discharge from hospital to 7.7 years in trials assessing participants after hospital discharge.	Trials compared cardiorespiratory interventions (32 trials, 1631 participants), resistance interventions (20 trials, 779 participants), and mixed training interventions 23 trials, 1,207) with usual care, no intervention, or a non-exercise intervention.	**Primary outcomes:** Death, death or dependency and disability **Secondary outcomes:** Physical fitness, mobility, physical function	*Cardiovascular vs. control (end of intervention)* There were 4 deaths, 2 in the intervention group and 2 in the control group. No trial assessed death or dependence. Active intervention was associated with a significant reduction in disability (SMD=0.52, 95% CI 0.19 to 0.84; 8 trials included). GRADE: moderate certainty Active intervention was associated with a significant improvement in physical fitness (VO2 peak (mL/kg/min, MD=3.4, 95% CI 2.98-3.83; 9 trials included). GRADE: moderate certainty Active intervention was associated with significantly faster preferred walking speed (MD=4.47 m/min, 95% CI 2.07 to 6.87; 12 trials). GRADE: high certainty Active intervention was associated with significantly greater endurance, assessed using the 6MWT (MD=33.4 meters, 95% CI 19.0 to 47.8; 16 trials included) GRADE: moderate certainty Active intervention was associated with significantly better balance, assessed using the BBS (MD=1.92 points, 95% CI 0.16 to 3.68; 8 trials included) GRADE: moderate certainty *Resistance Intervention vs. control (end of intervention)* Resistance training was associated with significant improvements in muscle strength (SMD=0.58, 95% CI 0.06 to 1.1; 2 trials included). GRADE: low certainty; significant increase in preferred walking

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
					speed (MD=2.15 m/min, 95% CI 3.57 to 7.87; 5 trials included) GRADE: moderate; significant improvement in 6MWT (MD=24.98 m, 95% CI 11.98 to 37.98; 5 trials included). GRADE: low certainty; and significant improvement in BBS scores (MD=3.27, 95% CI 2.15 to 4.38; 5 trials included) GRADE: low certainty *Mixed training Interventions (end of intervention)* Mixed training interventions were associated with significant improvements in disability (small effect), physical fitness, preferred gait speed, and balance.
Lim et al. 2021 **South Korea** **RCT**	CA: ☑ Blinding: Patient ☒ Assessor ☑ ITT: ☑	17 adults living in the community, with chronic stroke (≥24 months), who were able to walk 50-meter (+/- assistive devices). Mean age was 69 years, 59% were men.	Participants were randomized to a home-based rehabilitative program (HBP), or a control group. The HBP group conducted coordination exercises for the lower extremities at home for 6 weeks with visiting rehabilitative service providers (weeks 1 and 3) and the third week) and tele-rehabilitative services (on the second, fourth, fifth, and sixth weeks), while the control group received conventional therapy for the same period of time	**Primary outcomes:** 10-meter walk test (10MWT), figure of 8 walk test (F8WT), four-square step test (FSST), and 36 item short-form survey (SF-36)	Participants in both groups experienced significant improvement in the 10MWT (comfortable and fast), and F8WT. Participants in the HBP group also experienced significant improvement in FSST, while those in the control group did not. There were no significant improvements in either group in median SF-36 scores (physical or mental components). There was significantly greater improvement in median F8WT speed (-6.74 vs. -2.00 sec, p=0.036).
Pang et al. 2005 **Canada** **RCT**	CA: ☑ Blinding: Patient ☒ Assessor ☑ ITT: ☒	63 older adults (≥50 years), living at home, > one year following stroke, who were able to walk >10 meters independently (+/- walking aids). Median age was 65 years, 58% were men.	Participants were randomized to an intervention group (n=32) or control group (n=31). The intervention group underwent a Fitness and Mobility Exercise (FAME) program designed to improve cardiorespiratory fitness, mobility, leg muscle strength, balance and hip	**Primary outcomes:** Cardiorespiratory fitness (maximal oxygen consumption), mobility (6-Minute Walk Test) [6MWT], leg muscle strength (isometric knee extension), balance (Berg Balance Scale [BBS]), (5) activity and participation (Physical Activity Scale for	There were 3 losses to follow-up. There was significantly greater improvement in the intervention group for VO_2 max (ml/kg/min), 6MWT distance (m), and paretic leg muscle strength. There was a small decrease in paretic femoral neck BMD (g/cm^2) in the control group (-0.02 g/cm^2), but not in the intervention group.

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
			bone mineral density (BMD). Sessions were provided for one hour, 3 days/week, for 19 weeks. The control group underwent a seated upper extremity program. In each session, conducted at a community hall, 9–12 participants were supervised by a physical therapist, an occupational therapist and an exercise instructor.	Individuals with Physical Disabilities [PASIPD]) and femoral neck BMD (Dual-energy X-ray absorptiometry) Assessments were conducted at baseline and post intervention.	There were no differences between groups with respect to improvements in mean BBS or PASIPD scores.
Eng et al. 2003 **Canada** **Prospective study**	NA	25 participants recruited from the community at least one year post stroke, with residual hemiparesis, able to walk at least 10 m +/- assistance, with an activity tolerance of 60 minutes and medically fit to participate. Mean age was 63 years, 76% were men. Mean time since stroke was 4.2 years.	Participants engaged in an 8-week community-based functional exercise program focused on balance, mobility, functional strength and functional capacity, provided for 60 minutes,3 times per week. Assessments were conducted at baseline (T1), at a second baseline assessment 4 weeks later (T2), post intervention (T3) and 4 weeks post intervention (T4).	**Primary outcomes:** Berg Balance Scale (BBS), 12-minute walk test distance, gait speed and stair climbing speed **Psychosocial outcomes:** Reintegration to Normal Living Index (RNL) and Canadian Occupational Performance Measure (COPM) .	There were significant improvements over time for each outcome, except for COPM (performance and satisfaction). The improvements were significant from the second baseline assessment (T2) to the end of the intervention (T3) and were retained at T4.

Interventions Associated with Advance Care Planning

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Malhotra et al. 2022 **USA** **Systematic review**	PEDro scores ranged from 3 to 8. Median score was 6. 47 (36%) RCTs were classified as low-quality	132 RCTs published between 1992 and May 2021 that examined the efficacy of ACP interventions. Samples included healthy participants (95% were adults) and those with chronic disease (e.g., cancer, infectious disease and dementia).	Narrative synthesis. Most interventions focused on communication. Examples of interventions: Caregiver ACP discussion vs attention control, ACP video decision aid vs usual care, Brief, physician-led explanation and leaflets about AD vs usual care	**Primary outcomes:** Patient (distal and proximal), healthcare use and process outcomes	RCTs were conducted in a variety of settings, including hospitals (54%), communities (16%), primary care clinics 12%), and nursing homes. 8% of RCTs were conducted in multiple settings. *Patient outcomes (distal)* End-of-life care consistent with preferences: Outcomes were positive in 3/12 (25%) trials. Quality of life: 0/14 RCTs that assessed this domain were positive. Mental health: 4/19 (21%) trials that assessed this outcome, were positive Place of death: Outcome was positive in ¼ trials (25%). *Patient outcomes (proximal)* Quality of patient–physician communication: 13/19 (68%) of trials assessing this outcome were positive. Treatment preference: 16/23 RCTs (70%) reported that the intervention increased a preference for comfort care. Decisional conflict: 9/14 trials (64%) reported that ACP reduced decisional conflict. Patient–caregiver congruence in preference: 18/22 RCTs (82%) reported a significant improvement in congruence. *Healthcare use/costs* 4/18 (18%) RCTs reported significantly reduced healthcare associated with the intervention. *ACP processes* Documentation of ACP/advance directives: 34/54 (63%) reported positive outcomes associated with the intervention. DNR orders: 0/5 RCTs reported a positive outcome
Kirchhoff et al. 2012	CA: ☑	313 patients (and their surrogate decision	Participants and their surrogates were randomized	**Primary outcome:** The Statement of	Of the 313 patients enrolled in the study, 110 died within the study period. 26% of these individuals

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
USA **RCT**	Blinding: Patient ☒ Assessor ☒ ITT: ☒	makers) with congestive heart failure or end-stage renal disease who were expected to experience serious complication or death within 2 years.	to receive a patient-centered advance care planning intervention (n=160) or care as usual (n=153). The intervention involved a 60-90-minute interview with a trained facilitator that involved discussion of disease-specific end-of-life care issues and options. The facilitator also assisted in documenting treatment preferences.	Treatment Preferences (STP) was used to document patient preferences. For patients who died during the study period, telephone interviews with surrogates and medical records were used to identify end-of-life care received.	required a surrogate decision maker at the end-of-life. 1 patient in the intervention group and 3 in the control group received care at the end-of-life that was contrary to their wishes for reasons other than medical futility. With respect to resuscitation preferences, fewer patients in the intervention group received care that was contrary to their wishes (1/62) than patients in the usual care group (6/48); however, between group comparisons were not significant.
Detering et al. 2010 **Australia** **RCT**	CA: ☑ Blinding: Patient ☒ Assessor ☒ ITT: ☑	309 patients' ≥ 80 years who were admitted to internal medicine, cardiology, or respiratory medicine. Patients who were not competent, who had an existing advance care plan, or who were expected to die or be discharged within 24 hours were excluded. 35.5% of those assessed were eligible for inclusion	Participants were randomized to receive formal advance care planning from a trained facilitator (n=154) or care as usual (n=155). The intervention was based on the Respecting Patient Choices model which involves reflection on goals, values, and beliefs, documentation of future health care wishes, and appointment of a surrogate decision maker. Participants in the control group only received advance care planning if it was specifically requested.	**Primary Outcome:** The proportion of deceased participants whose end-of-life wishes were respected. **Secondary Outcomes:** Patient satisfaction of hospital stay (5-item survey) and the impact of death on a surviving family member (Impact of Events Scale and Hospital Anxiety and Depression Scale). Assessments were conducted 3 and 6 months after enrollment. For those who died during the 6-month study period, a final follow-up was conducted with a family member 3 month following the death.	Of the 154 participants randomized to the intervention group, 108 completed a formal advance care plan, including end-of-life health care wishes and/or appointment of a surrogate. By the end of the study period, 56 participants were deceased (29 in the intervention group and 27 in the control group). Of those who died, end-of life wishes were significantly more likely to be known and respected for participants in the intervention group as compared to those in the control group (86% vs. 30%, $p<0.01$). Following the death of a relative, family members of those in the intervention group reported significantly less anxiety and depression and more satisfaction with the quality of their relative's death, as compared to control group family members (all at $p<0.05$).
Grimaldo et al. 2001	CA: ☑ Blinding:	200 elective surgery patients' ≥65 years of age attending an	Participants were randomized to receive the advance care planning	**Primary outcome:** A questionnaire (with items concerning advance	Preoperatively, 70% of participants in the intervention group and 61% of participants in the control group had discussed end-of-life- care

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
USA **RCT**	Patient ☒ Assessor ☒ ITT: ☒	anesthesia preoperative evaluation clinic. 65% of eligible patients agreed to participate in the study.	intervention (n=99) or care as usual (n=99). The intervention consisted of a single 5-10-minute information session focusing on issues such as designation of surrogate decision-makers and end-of-life care.	care planning, quality of communication, and treatment preferences) and the SF-36. Assessments were conducted before and after the intervention.	wishes with a family member. Post-operatively, an additional 15% of those who had received the intervention reported having discussed end-of-life care with a loved one, as compared to an additional 8% in the control group (p<0.05). Dropouts: 10 in the intervention group and 3 in the control group.

Community-Based Palliative Care

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
Shepperd et al. 2021 **UK** **Cochrane review**	One trial was at low risk of bias. Risk of bias was unclear (in ≥1 domain) in 2 trials and in the 4th trial, the risk of bias was high in 2 domains	4 RCTs, published in 1992, 1997, 2000 and 2007, including persons who were at the end of life and required terminal care. The most common diagnosis was cancer. Mean age of participants ranged from 63 years to 74 years, with similar proportions of men and women.	Trials compared home-based end-of-life care vs hospital or hospice care. In 3 trials, the intervention was multidisciplinary care, which included specialist palliative-care nurses, family physicians, palliative-care consultants, physiotherapists, occupational therapists, nutritionists and social care workers. Services were provided for a maximum of 14 days in one trial, a mean of 68 days in a second trial. Duration of service provision was not reported in the other two trials.	**Primary outcome:** At-home death **Secondary outcomes:** Unplanned admission to hospital, participant health outcomes patient satisfaction, caregiver outcomes, health service resource use and cost	At 6-24 months, home based end-of-life care interventions were associated with an increased likelihood of at at-home death (RR=1.31, 95% CI 1.12 to 1.52; 2 trials, 539 participants). GRADE: high certainty At 6-24 months, home based end-of-life care interventions were not associated with a decreased risk of an unplanned admission to hospital (RR=0.89, 95% CI 0.73 to 1.09; 3 trials, 710 participants) GRADE: low Based on the results of a single trial, there may be a small difference in participants pain control assessed by caregivers (4-point scale: MD –0.48 points, 95% CI –0.93 to –0.03). GRADE: very low Pooled analyses were not carried out for the other outcomes, given there were data available for only one or two trials. The effects of home-based end-of-life care on participant health outcomes or satisfaction, caregiver outcome and health service resource use and cost were all uncertain. GRADE: very low
Gomes et al. 2013 **UK** **Cochrane review**	6 of the 16 RCTs were considered of high quality.	23 studies including 37,561 participants with advanced stage cancer, HIV/AIDS, congestive heart failure, COPD and MS, and 4,042 family caregivers, evaluating the impact of home palliative care services on outcomes for adults with advanced illness or their family caregivers, or both.	Trials compared home-based palliative care, which included 19 different models, most including a multidisciplinary team, with and without caregiver support vs usual care (which could include community care (primary or specialist care at home and in	**Primary outcome:** Death at home **Secondary outcomes**: Time the patient spent at home, satisfaction with care, pain, other symptoms, physical function, QoL, costs	The odds of an at home death from 3-24 months follow-up were increased significantly with home-based palliative care (OR=2.21, 95% CI 1.24-2.47). Results from 7 RCTs included. Pooled analyses from the secondary outcomes were not estimated.

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
			nursing homes), hospital care (inpatient and outpatient) and in some instances palliative or hospice care (or both)		
Stevens et al. 2007 **UK** **Systematic review**	NA	7 studies that examined the palliative care needs of stroke patients. Study samples included patients, caregivers, and bereaved family members	Narrative synthesis	**Primary outcome:** None stated *a priori*	Patients: the persistence of uncontrolled pain, incontinence, confusion and low mood were identified. Compared with persons dying from cancer, stroke patients suffered more gradual functional decline and were more likely to die in a hospital or nursing home, than at home Caregivers: difficulties accessing information, negative impacts on their personal lives and high levels of emotional distress were identified.
Brumley et al. 2007 **USA** **RCT**	CA: ☒ Blinding: Patient ☒ Assessor ☑ ITT: ☒	297 terminally ill patients with a life expectancy of <12 months, diagnoses of cancer, CHF or COPD, who had ≥1 visits to the ER in the previous year. All patients scored ≤70% on the Palliative Performance Scale	Patients were randomized to the In-home Palliative Care group (n=145) or to a usual care group (n=152). The intervention was a home-based program designed to provide treatment with a focus on enhancing comfort, managing symptoms and improving quality of patient's life until death. The program was delivered by an interdisciplinary team. Family support and education was also provided to the family and informal caregivers. Usual care included home health services, acute care services,	**Primary outcomes:** Satisfaction with care (Reid-Gundlach Satisfaction with Care instrument), service utilization, site of death.	The percentage of patients who were very satisfied with care was significantly higher in the intervention group at 30 (93.1% vs. 80%) and 90 days (93.4% vs. 80.8%) following enrolment, but not at 60 days (92.3% vs. 87%). Patients in the intervention group had significantly fewer ER visits (20% vs. 33%) and fewer hospitalizations (36% vs. 59%). Intervention group assignment was associated with a reduction of 4.36 in hospital days and 0.35 ER visits. Costs of care were 33% less compared to usual care. ($12,670 vs. $20,222). 75% of patients died during the study period. Significantly more patients in the intervention group died at home (71% vs. 51%, p<0.001).

Study/Type	Quality Rating	Sample Description	Method	Outcomes	Key Findings and Recommendations
			primary care services and hospice care, as provided for by Medicare guidelines		

Abbreviations

CA: concealed allocation	CI: confidence interval	ITT: intention-to-treat
MD: mean difference	mRS: modified Rankin Scale	NA: not assessed
OR: odds ratio	RR: relative risk	SMD: standardized mean difference

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