

Populations and Interventions for Palliative and End-of-Life Care: A Systematic Review

Adam E. Singer, PhD,^{1,2} Joy R. Goebel, RN, MN, PhD,³ Yan S. Kim, MD, PhD,⁴ Sydney M. Dy, MD, MSc,⁵
Sangeeta C. Ahluwalia, PhD, MPH,² Megan Clifford, PhD,² Elizabeth Dzeng, MD, PhD, MPH,⁶
Claire E. O'Hanlon, MPP,^{2,7} Aneesa Motala, BA,² Anne M. Walling, MD, PhD,^{1,2,8}
Jaime Goldberg, MSW, LCSW, ACHP-SW,⁹ Daniella Meeker, PhD, MS,¹⁰ Claudia Ochotorena, RN, BSN,¹¹
Roberta Shanman, MLS,² Mike Cui, MPH,¹² and Karl A. Lorenz, MD, MSHS^{2,13}

Abstract

Importance: Evidence supports palliative care effectiveness. Given workforce constraints and the costs of new services, payers and providers need help to prioritize their investments. They need to know which patients to target, which personnel to hire, and which services best improve outcomes.

Objective: To inform how payers and providers should identify patients with “advanced illness” and the specific interventions they should implement, we reviewed the evidence to identify (1) individuals appropriate for palliative care and (2) elements of health service interventions (personnel involved, use of multidisciplinary teams, and settings of care) effective in achieving better outcomes for patients, caregivers, and the healthcare system.

Evidence Review: Systematic searches of MEDLINE, EMBASE, PsycINFO, Web of Science, and Cochrane Database of Systematic Reviews databases (1/1/2001-1/8/2015).

Results: Randomized controlled trials (124) met inclusion criteria. The majority of studies in cancer (49%, 38 of 77 studies) demonstrated statistically significant patient or caregiver outcomes (e.g., $p < 0.05$), as did those in congestive heart failure (CHF) (62%, 13 of 21), chronic obstructive pulmonary disease (COPD; 58%, 11 of 19), and dementia (60%, 15 of 25). Most prognostic criteria used clinicians' judgment (73%, 22 of 30). Most interventions included a nurse (70%, 69 of 98), and many were nurse-only (39%, 27 of 69). Social workers were well represented, and home-based approaches were common (56%, 70 of 124). Home interventions with visits were more effective than those without (64%, 28 of 44; vs. 46%, 12 of 26). Interventions improved communication and care planning (70%, 12 of 18), psychosocial health (36%, 12 of 33, for depressive symptoms; 41%, 9 of 22, for anxiety), and patient (40%, 8 of 20) and caregiver experiences (63%, 5 of 8). Many interventions reduced hospital use (65%, 11 of 17), but most other economic outcomes, including costs, were poorly characterized. Palliative care teams did not reliably lower healthcare costs (20%, 2 of 10).

Conclusions: Palliative care improves cancer, CHF, COPD, and dementia outcomes. Effective models include nurses, social workers, and home-based components, and a focus on communication, psychosocial support, and the patient or caregiver experience. High-quality research on intervention costs and cost outcomes in palliative care is limited.

¹David Geffen School of Medicine, University of California at Los Angeles, Los Angeles, California.

²RAND Corporation, Santa Monica, California.

³School of Nursing, California State University, Long Beach, Long Beach, California.

⁴Division of Research, Kaiser Permanente Northern California, Oakland, California.

⁵Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland.

⁶Division of Hospital Medicine, University of California at San Francisco, San Francisco, California.

⁷Pardee RAND Graduate School, RAND Corporation, Santa Monica, California.

⁸Veterans Affairs Greater Los Angeles Healthcare System, Los Angeles, California.

⁹Supportive Care Medicine, Cedars-Sinai Medical Center, Los Angeles, California.

¹⁰Department of Preventive Medicine, University of Southern California, Los Angeles, California.

¹¹Cedars-Sinai Medical Center, Los Angeles, California.

¹²RAND Corporation, Pittsburgh, Pennsylvania.

¹³Stanford University School of Medicine, Stanford, California.

Accepted June 6, 2016.

Background

THERE IS INCREASING FOCUS on palliative and end-of-life care due to the high cost and poor quality of care near the end of life.¹ Previous systematic reviews of palliative care have characterized a broad range of clinical interventions for aspects of patients' and caregivers' health-related quality of life (HRQOL).² Given the limited palliative care workforce and often limited resources available to healthcare systems to invest in new services, payers and providers are faced with the decisions of which patients to focus on and what services to prioritize when implementing new palliative care services.

The term "palliative care" signifies both an approach to care and specific health services, including consultation and hospice, among many others. The Institute of Medicine (IOM) defines palliative care as "care that provides relief from pain and other symptoms, supports quality of life, and is focused on patients with serious advanced illness and their families"¹ and, in a seminal report on the quality of end-of-life care,¹ called for efforts to incorporate palliative care principles into education, payment and delivery models, and public awareness campaigns. The IOM report underscores the need for broad efforts to improve palliative care access for patients with advanced illness and their families.

To be successful, recommendations to improve access to palliative care will require specificity to inform how policymakers, payers, and providers should operationalize "advanced illness" and the specific interventions they should implement. Although there are good general recommendations for who should receive palliative care, it is often not clear how rigorously those recommendations have been tested in practice. To address these issues and inform policy, payment, and practice, we characterized the evidence base focusing on randomized controlled trials (RCTs) published since 2001. We addressed the following questions:

- What populations are appropriate for palliative care?
- What health service interventions and intervention elements improve aspects of patient and/or caregiver quality of life, healthcare use, and healthcare costs?

Methods

To identify the most rigorous sources of published evidence to inform interventions, we systematically reviewed published RCTs that addressed (1) advanced illness populations of patients and/or caregivers for whom palliative and end-of-life care should be considered; (2) effective palliative and end-of-life care interventions, including specific intervention components; and (3) the impact of palliative and end-of-life interventions on quality of life, healthcare use, and healthcare costs. Our search encompassed January 1, 2001, to January 8, 2015.

Data sources and searches

A research librarian searched MEDLINE, EMBASE, PsycINFO, Cochrane Database of Systematic Reviews, Web of Sciences Databases (SCI-EXPANDED, SSCI, A&HCI, CPCI-S, and CPCI-SSH), and the CareSearch Palliative Care Knowledge Network Review Collection.³ We derived our primary literature search strategy from the NIH State of the Science Meeting on End of Life Care in 2004⁴ (Supplementary

Table S1; Supplementary Data are available online at www.liebertpub.com/jpm). The original search encompassed terms for (1) specific diseases and debility associated with advanced illness and (2) domains and specific terms for HRQOL; we expanded it to include economic outcomes, which we defined as healthcare use, healthcare costs, and site of death.

We conducted an original review covering 2001 to 2013 and later updated it to include 2013 to 2015. We originally searched from January 1, 2001, to March 8, 2013, and identified RCTs in four ways: (1) directly from literature searches; (2) from reference lists in systematic reviews identified in searches with AMSTAR ratings of at least six⁵; (3) from accepted studies in reviews we had previously conducted for an American College of Physicians guideline⁶; (4) from systematic reviews that informed the development of the Assessing Care of Vulnerable Elders (ACOVE) quality measures and the Cancer Quality Assessing Symptoms Side Effects and Indicators of Supportive Treatment (ASSIST) quality indicators.^{7–11}

To update the review to January 2015, we reviewed title pages to identify all original research articles and systematic reviews published between March 2013 and January 8, 2015, in the *New England Journal of Medicine*, *Journal of the American Medical Association*, *Annals of Internal Medicine*, *British Medical Journal (BMJ)*, *Journal of Clinical Oncology*, *Journal of Pain and Symptom Management*, *Journal of the American Geriatrics Society*, *Journal of Palliative Medicine*, *Palliative Medicine*, *BioMed Central Palliative Care*, and *BMJ Supportive & Palliative Care*. We identified RCTs published in these journals and from reference lists in systematic reviews with AMSTAR ratings of at least six.⁵ We did not search gray literature.²

Study selection

Inclusion criteria were as follows:

- Adults ≥18 years old with advanced illness, and/or their caregivers
- Health service interventions addressing patient and/or caregiver quality-of-life-related elements in intervention design and/or as outcomes
- Cancer, heart failure and other cardiac conditions, chronic pulmonary disease, dementia and other neurological conditions, end-stage liver disease, or end-stage renal disease, or any advanced illness populations receiving palliative care, hospice, or end-of-life care
- Randomized controlled trials
- Published between January 1, 2001, and January 8, 2015.

We used Cochrane Collaboration definitions of study designs and attributes. We defined health service interventions using the World Health Organization's definition of a health service.¹² We defined quality of life and its related elements consistent with, but expanding upon, our previous work on this topic.⁴ In this study, we considered it to include HRQOL; pain, dyspnea, depressive symptoms, anxiety, and other symptoms; functional status; existential or spiritual well-being; communication with patients or families, including prognostication and care planning; continuity, defined as relationships with providers over time; experience or satisfaction; caregiving, including nonprofessional activities that address emotional, spiritual, practical, or medical aspects of

support; and bereavement care for caregivers or other loved ones.

We excluded (1) non-English publications; (2) studies that were not conducted in the United States, Western Europe, Israel, Canada, Australia, or New Zealand; (3) studies with only qualitative data; (4) studies of economic outcomes only; (5) studies of drugs, devices, or technical care if they were not part of a health service intervention; and (6) studies of only support groups or psychological interventions unless they addressed an aspect of health service delivery (e.g., in-person versus remote support).

Data extraction and quality assessment

Our multidisciplinary review team possessed extensive experience in palliative care and review methods. Following definition of review goals, procedures, and inclusion and exclusion criteria, teams of paired reviewers conducted title, abstract, and full-text reviews on all RCTs and systematic reviews. Review forms reflected the study's aims and conceptual framework (i.e., population categories, quality-of-life-related elements, and intervention attributes). At all stages, review forms were reviewed and piloted. Weekly team discussions resolved conflicts and clarified review procedures, with adjudication by senior team leaders. A single reviewer screened all accepted RCTs for bias using a Cochrane risk of bias tool modified for a previous systematic review of palliative care.^{13–16}

Data synthesis and analysis

Because of the heterogeneity of included studies and review outcomes, we determined that a meta-analysis was inappropriate. Instead, we qualitatively synthesized evidence according to the patient and caregiver populations, intervention elements, and quality-of-life-relevant and economic outcomes of included studies. We assessed consistency of evidence through the total numbers of studies that addressed each category of interest and the frequency of positive results within each category. We assessed directness of evidence by evaluating (1) the extent to and manner in which populations were characterized and (2) whether the literature shed light on quality-of-life-relevant outcomes.¹⁷

We characterized “strength of evidence” for outcomes of interest by qualitatively synthesizing the number and quality of studies that addressed each outcome, study population sizes, and effect sizes. Our assessment of evidence strength is a relative one that compares outcomes within the body of accepted RCTs in this review.

Studies often analyzed more than one outcome (e.g., pain, depressive symptoms, and functional status) and operationalized outcomes using more than one measure (e.g., average pain, worst pain, and least pain). We considered an intervention to have a “significant” effect on an outcome if a majority of that outcome's measures were statistically significant (e.g., two of three pain measures were statistically significant). Similarly, we considered an intervention as a whole to be “significant” if it had statistically significant effects on a majority of its outcomes (e.g., a study that analyzed pain, depressive symptoms, and functional status, and pain and depressive symptoms were statistically significant).

Results

Literature flow

In our original review, we identified 14,961 titles from primary searches and reference mining. We identified 3342 potentially relevant abstracts and 629 potentially relevant articles, and accepted 99 RCTs. In our update review, we identified 3647 titles from the title pages of 11 major journals and reference mining of systematic reviews in these journals (Fig. 1). We identified 71 potentially relevant abstracts and 68 potentially relevant articles, and accepted 25 RCTs. We accepted a total of 124 RCTs in our original and update reviews combined. The summary characteristics of these studies, as well as a list of relevant acronyms used by these studies, are provided in Supplementary Tables 2 and 3; Supplementary Data are available online at www.liebertpub.com/jpm

Intervention populations and characterizing advanced illness

Conditions of study participants. Table 1 presents the patient populations in the included studies. Ninety-three percent of all studies (115 of 124) described the conditions of their participants. Cancer was the most-studied condition, followed by dementia, congestive heart failure (CHF), and chronic obstructive pulmonary disease (COPD). Of the studies with conditions described, 83% (95 of 115) included only one condition. Cancer and dementia were overwhelmingly studied alone: 84% (65 of 77) and 88% (22 of 25), respectively, of studies that included these conditions did not include any other conditions. By contrast, 76% (16 of 21) and 84% (16 of 19), respectively, of studies that included CHF and COPD included at least one other condition.

For the most commonly studied conditions, 62% (13 of 21) and 58% (11 of 19) of interventions for CHF and COPD, and 49% (38 of 77) and 60% (15 of 25) of interventions for cancer and dementia, had a majority of significant results.

Among cancer studies, interventions for metastatic cancer were more likely to have a majority of significant results than those for nonmetastatic cancer, as were interventions for patients receiving disease-directed treatment (curative chemotherapy and/or radiotherapy) compared with no treatment: 59% of interventions for metastatic cancer (20 of 34), compared with 42% of interventions for nonmetastatic cancer (18 of 43), demonstrated a majority of significant results; similarly, 58% of interventions for cancer being treated with chemotherapy and/or radiotherapy (15 of 26), compared with 45% of interventions for cancer not being treated with these modalities (23 of 51), had a majority of significant results.

Additional characterization of intervention populations may be found in the Appendix.

Intervention elements

Intervention personnel. Nurses, including advanced practice nurses, were the most common clinical discipline to deliver interventions: 70% (69 of 98) of interventions included a nurse, and 39% of these interventions (27 of 69) were delivered only by nurses (Table 2). Nurse-only interventions, or interventions with nurses in primary roles, involved palliative case management,^{18–25} education in symptom management and monitoring,^{26–40} and/or counseling and therapy,^{27,41,42} and

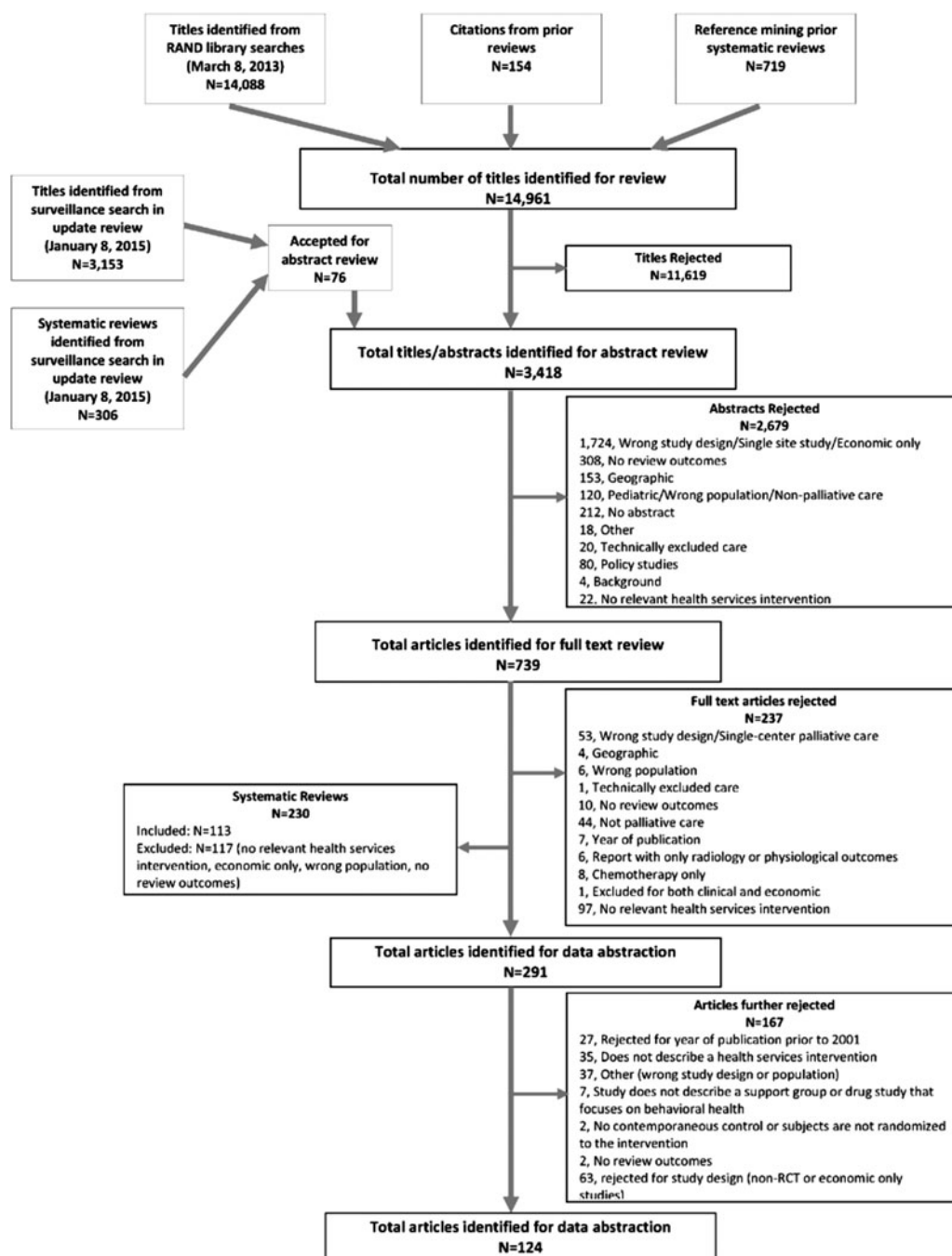


FIG. 1. Literature flow. RCT, randomized controlled trial.

were overwhelmingly delivered at home (85% of nurse-only interventions [23 of 27] included home visits and/or telephone calls).

Fifty-two percent of interventions that included a nurse (36 of 69) demonstrated a majority of significant results, compared with 58% of interventions that did not include a nurse (32 of 55). This pattern was similar for nurse-only interventions: 52% of interventions that were nurse-only (14 of 27) demonstrated a majority of significant results, compared with 56% of interventions that included nurses and other personnel (54 of 97).

Multidisciplinary teams. Twenty-six percent of studies (32 of 124) employed multidisciplinary teams. Sixty-six percent of teams (21 of 32) included three or more types of clinically trained individuals; 94% (30 of 32) included a nurse and 50% (16 of 32) included a social worker. Social workers were part of clinically diverse teams: 100% of multidisciplinary teams that included a social worker (16 of 16) included three or more different types of clinically trained individuals. Receiving care from a palliative care team (versus usual care) comprised 56% of all interventions involving palliative care teams (10 of 18)^{43–52}; the remainder was a heterogeneous set of

TABLE 1. PATIENT POPULATIONS

	<i>No. of studies</i>	<i>Percentage of studies^a</i>
Participant conditions		
Conditions described	115	93
Cancer	77	67
Two or more types of cancer	60	78
Metastatic	34	44
Chemotherapy and/or radiotherapy	26	34
CHF	21	18
COPD	19	17
Dementia	25	22
Health service-defined prognosis		
Participants satisfy health service-defined prognosis	30	24
Clinician-defined "poor prognosis"	22	73
Referred to or receiving palliative care	8	27
Referred to or receiving hospice	6	20
Other explicit criteria	0	0

^aEach percentage is calculated for each category in relation to its parent category.

CHF, congestive heart failure; COPD, chronic obstructive pulmonary disease.

interventions delivered alongside palliative consultation or in the context of palliative care (e.g., delivering dignity therapy to patients already receiving care from a palliative care team, or delivering a multifaceted intervention of which a palliative care team was one component).^{53–60}

Interventions without multidisciplinary teams often addressed more limited goals than team-based interventions (e.g., nurse-directed pain management versus comprehensive, team-based patient and family support).⁶¹

Intervention settings. Home was the most common intervention setting, followed by outpatient clinics and inpatient hospitals (Table 2). In addition to the nurse-led, home-based interventions described above, interventions delivered at home also involved caregiver and family support and training.^{56,59,62–72} Sixty-six percent of home interventions (46 of 70) did not involve any other settings, 63% (44 of 70) involved home visits by intervention personnel, and 59% (41 of 70) involved the use of a telephone. Sixty-four percent of interventions that included home visits (28 of 44), compared with 46% of home interventions without visits (12 of 26), demonstrated a majority of significant results.

Sixty-one percent of interventions delivered in a hospital (11 of 18) involved at least one other setting, and 56% of interventions with a hospital component (10 of 18) were delivered by palliative care teams.^{43–48,51,52,54,58} Interventions delivered in outpatient clinics were heterogeneous, ranging from disease and symptom management education^{39,61,73–79} to counseling and therapy.^{41,42,77,80,81} Outpatient clinics were often one of many settings in multisetting, multicomponent interventions.

Supporting technology. Forty-eight percent of all interventions (59 of 124) involved a technology component, most often a telephone to enable remote delivery of interventions and/or supportive check-in calls. Only three studies used

TABLE 2. INTERVENTION COMPONENTS

	<i>No. of studies</i>	<i>Percentage of studies^a</i>
Multidisciplinary teams		
Any	32	26
Palliative care team	17	53
Hospice care team	4	13
Other ^b	11	24
Clinical disciplines of intervention personnel		
Delivered by clinically trained individuals	107	86
Disciplines specified	98	92
Physicians	45	46
Nurses	61	62
Advanced practice nurses	12	12
Social workers	21	21
Chaplains	14	14
Mental health professionals	22	22
Intervention settings		
Outpatient clinics	47	38
Home	70	56
Hospital	18	15
Nursing home	6	5
Residential care facilities	4	3
Not specified	11	9
Technology		
Any technology	59	48
Telephone support	51	86
Telehealth, EHR-based tools, mobile computing, other ^c	16	27
Intervention elements		
Palliative care team	17	14
Inpatient consultation	9	53
Outpatient consultation	13	76
Hospice	5	4
Case management	22	18
Decision support	9	7
Family meetings	2	2
Advance directive completion	6	5
Intervention duration (days)		
Duration described	115	93
One-time intervention	19	17
Sustained intervention	96	83
Minimum days	3	
Maximum days	1826	
Median days (IQR)	91 (35–183)	

^aEach percentage is calculated for each category in relation to its parent category.

^b"Other" includes a heterogeneous set of teams such as a heart failure management team and a multidisciplinary team for patients who did not yet qualify for palliative or hospice services. No two studies in this category used the same type of team.

^c"Other" includes a heterogeneous set of technological intervention components such as a technology-based heart failure monitoring system. No two studies included in the "other" category used the same technology component.

EHR, electronic health record; IQR, interquartile range.

audio- or video-based telehealth technology.^{22,65,82} Two studies used electronic health record (EHR)-based tools,^{83,84} and two studies used mobile phones or tablets.^{39,85} Sixty-one percent of interventions that included a telephone component (31 of 51), compared with 51% of interventions that did not include a telephone component (37 of 73), demonstrated a majority of significant results.

TABLE 3. PATIENT AND CAREGIVER QUALITY-OF-LIFE-RELEVANT OUTCOMES

	No. of studies		Percentage of studies
	Addressed outcome	Majority results significant	
Patient QOL-relevant domains			
Patient outcomes described	96		77
Pain	37	9	24
Dyspnea	14	3	21
Depressive symptoms	33	12	36
Anxiety	22	9	41
Other symptoms ^a	40	15	38
Existential or spiritual concerns	11	4	36
Communication or care planning	18	12	67
Experience or satisfaction	20	8	40
Functional status	37	12	32
HRQOL	38	10	26
	Total No. of studies	Majority results significant	Percentage of studies
Majority of results significant in majority of QOL-relevant domains	96	42	44
No. of domains addressed			
1	24	15	63
2	12	10	83
3–10	60	17	28
Majority of total number of results significant in total number of QOL-relevant outcomes	96	34	35
No. of outcomes addressed			
1	11	9	82
2–4	27	11	41
5–13	58	14	24
	Addressed outcome	Majority results significant	Percentage of studies
Caregiver QOL-relevant domains			
Caregiver outcomes described	52		42
Depressive symptoms	21	12	57
Anxiety	6	2	33
Other symptoms ^a	8	5	63
Existential or spiritual concerns	3	0	0
Communication or care planning	4	3	75
Experience or satisfaction	8	5	63
HRQOL	7	3	43
	Total No. of studies	Majority results significant	Percentage of studies
Majority of results significant in majority of QOL-relevant domains	52	31	60
No. of domains addressed			
1	26	18	69
2	14	6	43
3–5	12	7	58
Majority of total number of results significant in total number of QOL-relevant outcomes	52	30	58
No. of outcomes addressed			
1	18	13	72
2–3	13	6	46
4–10	21	11	52

^aOther symptoms include all symptoms other than pain, dyspnea, depressive symptoms, and anxiety (e.g., fatigue, anorexia, nausea, and diarrhea).

HRQOL, health-related quality of life; QOL, quality of life.

Quality-of-life-relevant outcomes

Patient outcomes. Seventy-seven percent of studies (96 of 124) addressed patient quality-of-life-relevant domains, ranging from 11% (11 of 96) for existential or spiritual concerns to 42% (40 of 96) for other symptoms (all symptoms other than pain, dyspnea, depressive symptoms, and anxiety) (Table 3). Approximately 20%–30% of studies that addressed pain (9 of 37),^{28,29,42,51,60,61,75,83,86} dyspnea (3 of 14),^{24,53,87} functional status (12 of 37),^{21,42,57,67,69,74,88–93} and HRQOL (10 of 38)^{18,49,64,66,85,90–92,94,95} had a majority of significant results in each of those domains; these frequencies were ~40%–50% for studies that addressed depressive symptoms (12 of 33),^{18,35,49,50,58,66,69,82,96–99} anxiety (9 of 22),^{35,37,53,55,58,69,78,94,100} other symptoms (15 of 40),^{21,35,37,49,57,60,77–79,88,91,94,101–103} existential or spiritual concerns (4 of 11),^{53,87,103,104} patient experience or satisfaction (8 of 20),^{20,23–25,43,44,105,106} and ~70% for communication or care planning (12 of 18).^{31,44,49,53,88,104,106–111} Of studies that addressed patient quality-of-life-relevant outcomes, 45% (43 of 96) demonstrated a majority of significant results in the majority of quality-of-life-relevant domains.

Caregiver outcomes. Forty-two percent of studies (52 of 124) addressed caregiver quality-of-life-relevant domains. The range of these studies that addressed individual domains was 6% (3 of 52) for existential or spiritual concerns to 40% (21 of 52) for depressive symptoms. No studies that addressed existential or spiritual concerns (0 of 3) had a majority of significant results in each of those domains; this frequency was ~30% for studies that addressed anxiety (2 of 6),^{112,113} 40% for studies that addressed HRQOL (3 of 7),^{31,36,66} 60%–70% for studies that addressed depressive symptoms (12 of 21),^{62–64,66,70,71,80,112–116} other symptoms (all symptoms other than pain, dyspnea, depressive symptoms, and anxiety) (5 of 8),^{31,62,112,116,117} and caregiver experience or satisfaction (5 of 8),^{25,48,104,106,118} and 75% for communication or care planning (3 of 4).^{31,72,119} Of studies that addressed caregiver quality-of-life-relevant outcomes, 60% (31 of 52) demonstrated a majority of significant results in the majority of quality-of-life-relevant domains.

Relationships among key study characteristics and select quality-of-life-relevant outcomes. Sixty-one percent of interventions that addressed patient symptoms (59 of 96) were delivered only to cancer patients. Patient pain and depressive symptoms were a common focus in cancer studies but less commonly addressed in other conditions.^{20,24,52,53,66,82,87,100,102,120} Interventions that addressed pain and depressive symptoms in cancer patients were much more effective than those that addressed pain and depressive symptoms in other conditions: no interventions demonstrated significant results for pain, and only two for depressive symptoms,^{66,82} in CHF, COPD, or dementia.

Interventions with a significant effect on patient pain (nine studies)^{28,29,42,51,60,61,75,83,86} were usually delivered to cancer patients (78% [7 of 9] included only cancer patients)^{28,29,42,61,75,83,86} and specifically designed to address cancer pain, usually involved pain education and management, were short term (33% [3 of 9], were one-time interventions,^{60,61,86} and none exceeded six weeks). Nurse-only

interventions were particularly effective at reducing pain: 44% of all interventions that reduced pain (4 of 9) used only nurses.^{28,29,42,83}

In contrast to pain, interventions that had a significant effect on patient depressive symptoms (12 studies)^{18,35,49,50,58,66,69,82,96–99} were heterogeneous in terms of settings, use of multidisciplinary teams, clinical disciplines, duration, and focus; case management, palliative care teams, hospice, skills training, and other interventions were all effective. Interventions with significant effect on caregiver depressive symptoms (12 studies),^{62–64,66,70,71,80,112–116} by contrast, often involved a home component (83% [10 of 12]),^{62–64,66,70,71,113–116} did not use multidisciplinary teams, were long term (average duration 1.2 years), and often involved caregiver skills training^{63,64,71,113} or counseling and therapy.^{62,66,70,114–116} The use of mental health professionals also differed between effective interventions in patient versus caregiver depressive symptoms: 86% of interventions (6 of 7)^{64,70,80,114–116} that used mental health professionals and addressed caregiver depressive symptoms were effective, compared with 0% of interventions (0 of 7) that used mental health professionals and addressed patient depressive symptoms.

Interventions with significant effect on patient HRQOL (10 studies)^{18,49,64,66,85,90–92,94,95} were generally more comprehensive in focus. They ranged from case management^{18,90,91} to caregiver training,⁶⁴ occupational therapy,⁶⁶ quality-of-life questionnaire completion,^{85,95} and a hospital-to-home transitional care program.⁹⁰ Forty percent (4 of 10)^{49,91,92,94} involved a multidisciplinary team, and all were delivered in outpatient settings and/or at home.

Interventions with a significant effect on patient and/or caregiver communication or care planning outcomes (14 studies)^{31,53,72,88,104,106–111,119} often included decision support,^{88,106,108,109,119} advance directive completion,^{53,88,106} education and/or communication training,^{31,72,104,110} and case management components.^{53,88,106} Seventy-one percent of interventions that included a nurse (5 of 7)^{31,44,49,53,88} and addressed patient communication or care planning outcomes had a significant effect on these outcomes; 100% of interventions that included a social worker (4 of 4)^{44,53,88,104} and addressed patient communication or care planning outcomes had a significant effect on these outcomes. Only 7% of interventions (9 of 124) involved decision support, but 56% of these (5 of 9)^{88,106,108,109,119} had a significant effect on communication or care planning outcomes. This pattern was similar for advance directive completion: only 5% of interventions (6 of 124) involved advance directive completion, but 50% of these (3 of 6)^{53,88,106} had a significant effect on communication or care planning outcomes.

Interventions with a hospital component focused on patients with a greater burden of illness than those without a hospital component: many were in advanced stages of cancer, CHF, or COPD, and 44% of these interventions (8 of 18)^{43–45,48,54,58,62,112} were delivered to patients determined by clinicians to have a poor prognosis (in one case within days of death).¹¹² These interventions were generally less effective than those without a hospital component.

Longer interventions tended to be more effective for patient depressive symptoms and anxiety (56% of interventions [11 of 18]^{18,35,49,50,53,55,69,78,82,96,98} with significant effects on these outcomes lasted at least 12 weeks) and patient and caregiver quality of life (75% of interventions [9 of

TABLE 4. ECONOMIC OUTCOMES

<i>Economic outcomes</i>	<i>No. of studies</i>		<i>Percentage of studies</i>
	<i>Addressed outcome</i>	<i>Significant results</i>	
Any	51		41
Site of death	9	3	33
Drugs	16	5	31
Medical devices	0	0	0
Procedures	2	0	0
Healthcare use	36	17	47
Inpatient hospital	27	11	41
ICU	6	1	17
Outpatient	11	1	9
Emergency department	13	4	31
Nursing home	2	0	0
Home healthcare	4	0	0
Hospice	4	2	50
Referral	2	1	50
Use	3	2	67
Life-extending devices or procedures	3	1	33
Invasive ventilation	3	1	33
Dialysis	1	0	0
CPR	1	0	0
Costs	19	6	32
Overall	15	3	20
Specific	11	4	36

CPR, cardiopulmonary resuscitation; ICU, intensive care unit.

12]^{18,31,49,64,85,90–92,95} with significant effects on these outcomes lasted at least 12 weeks).

Economic outcomes

Healthcare use. Forty-one percent of studies (51 of 124) addressed economic outcomes (Table 4). Healthcare use was the most frequently studied, followed by costs and drugs. Hospital use was the most well-studied utilization outcome: 65% of studies with a significant effect on healthcare use (11 of 17)^{23,24,43,44,57,74,89,91,102,104,118} had effects on CHF-related and all-cause hospital readmissions and length of stay. Emergency department (ED) use was also relatively well studied, but only 31% of interventions (4 of 13) had a significant effect on it.^{22,43,82,90} Fifty-three percent of interventions with a significant effect on healthcare use (9 of 17)^{22–24,53,57,74,89–91} included a case management component, and many included education^{57,74,104} and disease and symptom management^{40,82,102} components. Only four studies addressed hospice use.^{24,43,44,118}

Healthcare costs. Of the studies that addressed healthcare costs, 74% (14 of 19)^{23–25,44,83,89,91–93,105,106,117,121,122} reported intervention costs; however, only 50% of these (7 of 14)^{25,89,92,93,117,121,122} incorporated intervention costs into statistical tests for intervention efficacy in lowering costs or in cost-effectiveness analyses. Thirty-two percent of studies that addressed healthcare costs (6 of 19)^{22,43,44,89,92,96} demonstrated significant effects on cost outcomes or cost-effectiveness. Interventions tended to be more successful in lowering specific costs (36% of interventions that addressed specific costs [4 of 11]^{22,44,89,96} significantly reduced these

costs) than in lowering overall costs of care (20% of interventions that addressed overall costs [3 of 15]^{43,44,92} significantly reduced these costs). Specific costs reduced included hospital readmission,^{44,89} ED,²² and pharmacologic^{89,96} costs.

Interventions that lowered costs included participants from a variety of clinical disciplines (83% [5 of 6])^{43,44,89,92,96} included at least three clinical disciplines). Nurses and social workers were well represented among these interventions: all of these interventions included a nurse, and 67% of them (4 of 6)^{43,44,92,96} included a social worker. Palliative care teams had little effect on costs: only 20% of interventions in which the intervention itself was the palliative care team (2 of 10)^{43,44} reduced healthcare costs.

Discussion

We identified many RCTs of palliative and end-of-life health service interventions with the strongest evidence for interventions in cancer, CHF, and COPD. We found the strongest evidence for the roles of nurses and social workers, strong evidence for home-based components, and moderate evidence for multidisciplinary approaches. In terms of quality-of-life-relevant outcomes for both patients and caregivers, we found the strongest evidence for palliative and end-of-life services in improving communication and care planning, moderate evidence for improving psychosocial health and the patient and caregiver experience, and weaker evidence for improving HRQOL, pain, dyspnea, functional status, and existential or spiritual concerns. In terms of economic outcomes, we found moderate evidence relevant to reducing hospital use, weaker evidence for palliative care in reducing other specific healthcare use, and moderate evidence for effectiveness in lowering healthcare costs. We found weak evidence for palliative care teams specifically in reducing healthcare costs.

The strategy of identifying patients for palliative care by eliciting clinician-reported risk was a common and generally effective approach. It is prudent, relatively simple to implement, and may foster buy-in.¹²³ However, there are also drawbacks to clinician-reported risk, including lack of familiarity with palliative health services and bias against referral to those services. The literature was silent on innovative approaches that contemporary entrepreneurs, payers, and providers are taking to identify high-risk patients who might be targeted for palliative care. These include data mining that combines health and consumer information and novel sensor technologies that characterize function and high-risk events (e.g., falls).

Palliative and end-of-life services were most frequently studied in cancer populations. In general, studies of cancer focused on very sick patients, identified by severity (e.g., metastatic cancer) or clinician-identified poor prognosis. We found evidence for the effectiveness of interventions in cancer, supporting a recent American Society of Clinical Oncology guideline's and other calls for integrating palliative care in advanced cancer.¹²⁴ While cancer was most frequently studied, we also found evidence supporting the application of palliative care to other advanced illnesses (CHF, COPD, and dementia) and to mixed populations.

The literature supports various models for palliative care delivery. Evidence supports the role of nurses and social workers in teams and working alone. Our findings underscore the value of home services, whether in-person or by

telephone, and the role of nurses and social workers in home-based care. Integrated payment and delivery may improve support for nurses and social workers,¹²⁵ who play crucial roles in communication and coordination. For example, two-thirds of Physician Orders for Life Sustaining Treatment in Oregon are completed in nursing homes by social workers.¹²⁶

Our review generally supported the ability of palliative services to promote effective communication and deliver symptomatic support. The evidence is strongest for care planning and psychological outcomes, consistent with the results of clinical systematic reviews.² The recent IOM report on death and dying has a special emphasis on communication and advance care planning that is appropriate, given the evidence supporting this practice area.¹ We found that decision support and advance directive completion should be considered a facilitative component of this emphasis.

We found that the use of mental health professionals was effective for depressive symptoms in caregivers but not in patients. Our review excluded studies of psychological interventions unless they addressed an aspect of health service delivery (e.g., in person versus remote counseling). As such, our results are not a comment on the overall efficacy of mental health professionals in all palliative settings, in which psychotherapy, counseling, and medication are known to be effective for patient depression. This finding may be explained by the fact that interventions for caregiver depression on the whole lasted much longer than those for patient depression. Long-term interventions are known to be more effective for depression than short-term ones.¹²⁷

We found minimal healthcare use and cost reductions for palliative care in general (aside from hospital use) and palliative care teams specifically. Other reviews demonstrated an advantage for the latter but have included lower quality study designs,¹²⁸ and a recent high-quality RCT of a palliative care team that demonstrated clinical benefit and lower healthcare use failed to demonstrate a cost advantage.¹²⁹ That said, our economic results likely reflect a lack of evidence rather than a lack of effect, as the included studies had very significant shortcomings in characterizing economic outcomes. Their measurement of these outcomes was heterogeneous and they often failed to account for various dimensions of cost or use. Our results call for much higher quality economic research.

We faced several limitations. First, we focused on health service interventions only, so our review does not encompass the full range of effective interventions that palliative care teams and providers are capable of delivering. Second, our definition of what constitutes “palliative care” was not limited to a specialty service and could have increased the heterogeneity of included articles, both because of the subjectivity of the definition and inconsistent indexing in the literature. However, our approach improves the generalizability and applicability of our findings. Third, we limited our review to studies of adults aged 18 years and older due to concerns about feasibility, given that our literature searches in the adult population identified nearly 15,000 titles. Pediatric end-of-life populations are equally deserving of attention, and future systematic reviews of palliative health services should focus on this population. Fourth, we limited our included studies to RCTs, which excluded observational and qualitative study designs. These types of studies can offer valuable information, particularly in end-of-life populations,

whose vulnerability poses challenges for conducting RCTs. However, our goal was not to incorporate all available evidence, but rather to synthesize the highest quality evidence. Future systematic reviews of palliative health services should focus on observational and qualitative study designs.

In summary, our review underscores the importance of the recent IOM report and its call to more broadly implement palliative and end-of-life care. It supports an emphasis on cancer, chronic cardiopulmonary conditions, and dementia; highlights the importance of nurses and social workers, multidisciplinary approaches, and interventions that encompass the home; and reinforces the focus on improving communication and psychosocial support. It also highlights the need for much more rigorous and comprehensive research to understand the impact of palliative care on healthcare costs.

Acknowledgments

The authors thank Paul Shekelle, MD, PhD, for consulting on methodological approaches to this topic, and Keegan Wood, BSN, for helping to prepare the evidence tables for publication. All authors had full access to all of the data and take responsibility for the integrity of the data and the accuracy of the data analysis.

Grant Support: This work was supported by grant R01 NR013372 from the National Institute of Nursing Research, a Cambia Health Foundation Sojourns Award, and the California HealthCare Foundation. Dr. Singer received support from grant T32 GM008042 as a member of the Medical Scientist Training Program at the University of California, Los Angeles. Dr. Walling received support from the NIH/National Center for Advancing Translational Science (NCATS) UCLA CTSI grant UL1 TR000124 and the NIH loan repayment program.

Disclaimer: The views expressed are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs or the US government.

Author Disclosure Statement

No competing financial interests exist.

References

1. Pizzo PA, Walker DM, Bomba PA, et al.: *Dying in America: Improving Quality and Honoring Individual Preferences Near the End of Life*. Washington, DC: Institute of Medicine, 2014.
2. Lorenz KA, Lynn J, Dy SM, et al.: Evidence for improving palliative care at the end of life: A systematic review. *Ann Intern Med* 2008;148:147–159.
3. CareSearch Review Collection: CareSearch Palliative Care Knowledge Network. www.caresearch.com.au/caresearch/tabid/501/Default.aspx (Last accessed April 3, 2016).
4. Lorenz K, Lynn J, Morton SC, et al.: *End-of-Life Care and Outcomes Summary: Evidence Report/Technology Assessment: Number 110*. Rockville, MD: Agency for Healthcare Research and Quality, 2004.
5. Shea BJ, Bouter LM, Peterson J, et al.: External validation of a measurement tool to assess systematic reviews (AMSTAR). *PLoS One* 2007;2:e1350.
6. Qaseem A, Snow V, Shekelle P, et al.: Evidence-based interventions to improve the palliative care of pain, dyspnea, and depression at the end of life: A clinical practice

- guideline from the American College of Physicians. *Ann Intern Med* 2008;148:141–146.
7. Lorenz KA, Rosenfeld K, Wenger N: Quality indicators for palliative and end-of-life care in vulnerable elders. *J Am Geriatr Soc* 2007;55 Suppl 2:S318–S326.
 8. Naeim A, Dy SM, Lorenz KA, et al.: Evidence-based recommendations for cancer nausea and vomiting. *J Clin Oncol* 2008;26:3903–3910.
 9. Walling A, Lorenz KA, Dy SM, et al.: Evidence-based recommendations for information and care planning in cancer care. *J Clin Oncol* 2008;26:3896–3902.
 10. Dy SM, Lorenz KA, Naeim A, et al.: Evidence-based recommendations for cancer fatigue, anorexia, depression, and dyspnea. *J Clin Oncol* 2008;26:3886–3895.
 11. Dy SM, Asch SM, Naeim A, et al.: Evidence-based standards for cancer pain management. *J Clin Oncol* 2008;26:3879–3885.
 12. Health Systems Strengthening Glossary. www.who.int/healthsystems/hss_glossary/en/index5.html (Last accessed October 14, 2015).
 13. Dy SM, Aslakson R, Wilson RF, et al.: *Improving Health Care and Palliative Care for Advanced and Serious Illness*. Rockville, MD: Agency for Healthcare Research and Quality, 2012.
 14. Armijo-Olivo S, Ospina M, da Costa BR, et al.: Poor reliability between Cochrane reviewers and blinded external reviewers when applying the Cochrane risk of bias tool in physical therapy trials. *PLoS One* 2014;9:e96920.
 15. Graham N, Haines T, Goldsmith CH, et al.: Reliability of 3 assessment tools used to evaluate randomized controlled trials for treatment of neck pain. *Spine (Phila Pa 1976)* 2012;37:515–522.
 16. Hartling L, Hamm MP, Milne A, et al.: Testing the risk of bias tool showed low reliability between individual reviewers and across consensus assessments of reviewer pairs. *J Clin Epidemiol* 2013;66:973–981.
 17. Kronick R, Slutsky J, Chang S: *Methods Guide for Effectiveness and Comparative Effectiveness Reviews*. Rockville, MD: Agency for Healthcare Research and Quality, 2014.
 18. Bakitas M, Lyons KD, Hegel MT, et al.: Effects of a palliative care intervention on clinical outcomes in patients with advanced cancer: The Project ENABLE II randomized controlled trial. *JAMA* 2009;302:741–749.
 19. O'Hara RE, Hull JG, Lyons KD, et al.: Impact on caregiver burden of a patient-focused palliative care intervention for patients with advanced cancer. *Palliat Support Care* 2010;8:395–404.
 20. Egan E, Clavarino A, Burridge L, et al.: A randomized control trial of nursing-based case management for patients with chronic obstructive pulmonary disease. *Lippincotts Case Manag* 2002;7:170–179.
 21. Given B, Given CW, McCorkle R, et al.: Pain and fatigue management: Results of a nursing randomized clinical trial. *Oncol Nurs Forum* 2002;29:949–956.
 22. Jerant AF, Azari R, Nesbitt TS: Reducing the cost of frequent hospital admissions for congestive heart failure: A randomized trial of a home telecare intervention. *Med Care* 2001;39:1234–1245.
 23. Riegel B, Carlson B, Kopp Z, et al.: Effect of a standardized nurse case-management telephone intervention on resource use in patients with chronic heart failure. *Arch Intern Med* 2002;162:705–712.
 24. Moore S, Corner J, Haviland J, et al.: Nurse led follow up and conventional medical follow up in management of patients with lung cancer: Randomised trial. *BMJ* 2002;325:1145.
 25. Uitdehaag MJ, van Putten PG, van Eijck CH, et al.: Nurse-led follow-up at home vs. conventional medical outpatient clinic follow-up in patients with incurable upper gastrointestinal cancer: A randomized study. *J Pain Symptom Manage* 2014;47:518–530.
 26. Keefe FJ, Ahles TA, Sutton L, et al.: Partner-guided cancer pain management at the end of life: A preliminary study. *J Pain Symptom Manage* 2005;29:263–272.
 27. Wright LK, Litaker M, Lariaia MT, DeAndrade S: Continuum of care for Alzheimer's disease: A nurse education and counseling program. *Issues Ment Health Nurs* 2001;22:231–252.
 28. Miaskowski C, Dodd M, West C, et al.: The use of a responder analysis to identify differences in patient outcomes following a self-care intervention to improve cancer pain management. *Pain* 2007;129:55–63.
 29. Miaskowski C, Dodd M, West C, et al.: Randomized clinical trial of the effectiveness of a self-care intervention to improve cancer pain management. *J Clin Oncol* 2004;22:1713–1720.
 30. Northouse L, Kershaw T, Mood D, Schafenacker A: Effects of a family intervention on the quality of life of women with recurrent breast cancer and their family caregivers. *Psychooncology* 2005;14:478–491.
 31. Northouse LL, Mood DW, Schafenacker A, et al.: Randomized clinical trial of a family intervention for prostate cancer patients and their spouses. *Cancer* 2007;110:2809–2818.
 32. Ward S, Donovan H, Gunnarsdottir S, et al.: A randomized trial of a representational intervention to decrease cancer pain (RIDCancerPain). *Health Psychol* 2008;27:59–67.
 33. Wells N, Hepworth JT, Murphy BA, et al.: Improving cancer pain management through patient and family education. *J Pain Symptom Manage* 2003;25:344–356.
 34. Anderson KO, Mendoza TR, Payne R, et al.: Pain education for underserved minority cancer patients: A randomized controlled trial. *J Clin Oncol* 2004;22:4918–4925.
 35. Ream E, Richardson A, Alexander-Dann C: Supportive intervention for fatigue in patients undergoing chemotherapy: A randomized controlled trial. *J Pain Symptom Manage* 2006;31:148–161.
 36. McMillan SC, Small BJ, Weitzner M, et al.: Impact of coping skills intervention with family caregivers of hospice patients with cancer: A randomized clinical trial. *Cancer* 2006;106:214–222.
 37. Bruera E, Yennurajalingam S, Palmer JL, et al.: Methylphenidate and/or a nursing telephone intervention for fatigue in patients with advanced cancer: A randomized, placebo-controlled, phase II trial. *J Clin Oncol* 2013;31:2421–2427.
 38. Donovan HS, Ward SE, Sereika SM, et al.: Web-based symptom management for women with recurrent ovarian cancer: A pilot randomized controlled trial of the WRITE Symptoms intervention. *J Pain Symptom Manage* 2014;47:218–230.
 39. Nguyen HQ, Donesky D, Reinke LF, et al.: Internet-based dyspnea self-management support for patients with chronic obstructive pulmonary disease. *J Pain Symptom Manage* 2013;46:43–55.
 40. Yount SE, Rothrock N, Bass M, et al.: A randomized trial of weekly symptom telemonitoring in advanced lung cancer. *J Pain Symptom Manage* 2014;47:973–989.

41. Given B, Given CW, Sikorskii A, et al.: The impact of providing symptom management assistance on caregiver reaction: Results of a randomized trial. *J Pain Symptom Manage* 2006;32:433–443.
42. Dalton JA, Keefe FJ, Carlson J, Youngblood R: Tailoring cognitive-behavioral treatment for cancer pain. *Pain Manag Nurs* 2004;5:3–18.
43. Brumley R, Enguidanos S, Jamison P, et al.: Increased satisfaction with care and lower costs: Results of a randomized trial of in-home palliative care. *J Am Geriatr Soc* 2007;55:993–1000.
44. Gade G, Venohr I, Conner D, et al.: Impact of an inpatient palliative care team: A randomized control trial. *J Palliat Med* 2008;11:180–190.
45. Jordhoy MS, Fayers P, Loge JH, et al.: Quality of life in palliative cancer care: Results from a cluster randomized trial. *J Clin Oncol* 2001;19:3884–3894.
46. Hanks GW, Robbins M, Sharp D, et al.: The imPaCT study: A randomised controlled trial to evaluate a hospital palliative care team. *Br J Cancer* 2002;87:733–739.
47. Wallen GR, Baker K, Stolar M, et al.: Palliative care outcomes in surgical oncology patients with advanced malignancies: A mixed methods approach. *Qual Life Res* 2012;21:405–415.
48. Ringdal GI, Jordhoy MS, Kaasa S: Family satisfaction with end-of-life care for cancer patients in a cluster randomized trial. *J Pain Symptom Manage* 2002;24:53–63.
49. Temel JS, Greer JA, Muzikansky A, et al.: Early palliative care for patients with metastatic non-small-cell lung cancer. *N Engl J Med* 2010;363:733–742.
50. Pirl WF, Greer JA, Traeger L, et al.: Depression and survival in metastatic non-small-cell lung cancer: Effects of early palliative care. *J Clin Oncol* 2012;30:1310–1315.
51. Higginson IJ, McCrone P, Hart SR, et al.: Is short-term palliative care cost-effective in multiple sclerosis? A randomized phase II trial. *J Pain Symptom Manage* 2009;38:816–826.
52. Pantilat SZ, O'Riordan DL, Dibble SL, Landefeld CS: Hospital-based palliative medicine consultation: A randomized controlled trial. *Arch Intern Med* 2010;170:2038–2040.
53. Rabow MW, Dibble SL, Pantilat SZ, McPhee SJ: The comprehensive care team: A controlled trial of outpatient palliative medicine consultation. *Arch Intern Med* 2004;164:83–91.
54. Chochinov HM, Kristjanson LJ, Breitbart W, et al.: Effect of dignity therapy on distress and end-of-life experience in terminally ill patients: A randomised controlled trial. *Lancet Oncol* 2011;12:753–762.
55. Moorey S, Cort E, Kapari M, et al.: A cluster randomized controlled trial of cognitive behaviour therapy for common mental disorders in patients with advanced cancer. *Psychol Med* 2009;39:713–723.
56. Walsh K, Jones L, Tookman A, et al.: Reducing emotional distress in people caring for patients receiving specialist palliative care. Randomised trial. *Br J Psychiatry* 2007;190:142–147.
57. Abernethy AP, Currow DC, Shelby-James T, et al.: Delivery strategies to optimize resource utilization and performance status for patients with advanced life-limiting illness: Results from the “palliative care trial” [ISRCTN 81117481]. *J Pain Symptom Manage* 2013;45:488–505.
58. Juliao M, Oliveira F, Nunes B, et al.: Efficacy of dignity therapy on depression and anxiety in Portuguese terminally ill patients: A phase II randomized controlled trial. *J Palliat Med* 2014;17:688–695.
59. Hudson PL, Aranda S, Hayman-White K: A psycho-educational intervention for family caregivers of patients receiving palliative care: A randomized controlled trial. *J Pain Symptom Manage* 2005;30:329–341.
60. Mitchell GK, Del Mar CB, O'Rourke PK, Clavarino AM: Do case conferences between general practitioners and specialist palliative care services improve quality of life? A randomised controlled trial (ISRCTN 52269003). *Palliat Med* 2008;22:904–912.
61. Kalauokalani D, Franks P, Oliver JW, et al.: Can patient coaching reduce racial/ethnic disparities in cancer pain control? Secondary analysis of a randomized controlled trial. *Pain Med* 2007;8:17–24.
62. Kissane DW, McKenzie M, Bloch S, et al.: Family focused grief therapy: A randomized, controlled trial in palliative care and bereavement. *Am J Psychiatry* 2006;163:1208–1218.
63. Bourgeois MS, Shulz R, Burgio LD, Beach S: Skills training for spouses of patients with Alzheimer's disease: Outcomes of an intervention study. *J Clin Geropsychol* 2002;8:53–73.
64. Teri L, McCurry SM, Logsdon R, Gibbons LE: Training community consultants to help family members improve dementia care: A randomized controlled trial. *Gerontologist* 2005;45:802–811.
65. Gant JR, Steffen AM, Lauderdale SA: Comparative outcomes of two distance-based interventions for male caregivers of family members with dementia. *Am J Alzheimers Dis Other Dement* 2007;22:120–128.
66. Graff MJ, Vernooij-Dassen MJ, Thijssen M, et al.: Effects of community occupational therapy on quality of life, mood, and health status in dementia patients and their caregivers: A randomized controlled trial. *J Gerontol A Biol Sci Med Sci* 2007;62:1002–1009.
67. Graff MJ, Vernooij-Dassen MJ, Thijssen M, et al.: Community based occupational therapy for patients with dementia and their care givers: Randomised controlled trial. *BMJ* 2006;333:1196.
68. Nobili A, Riva E, Tettamanti M, et al.: The effect of a structured intervention on caregivers of patients with dementia and problem behaviors: A randomized controlled pilot study. *Alzheimer Dis Assoc Disord* 2004;18:75–82.
69. Porter LS, Keefe FJ, Garst J, et al.: Caregiver-assisted coping skills training for lung cancer: Results of a randomized clinical trial. *J Pain Symptom Manage* 2011;41:1–13.
70. Eisdorfer C, Czaja SJ, Loewenstein DA, et al.: The effect of a family therapy and technology-based intervention on caregiver depression. *Gerontologist* 2003;43:521–531.
71. Belle SH, Burgio L, Burns R, et al.: Enhancing the quality of life of dementia caregivers from different ethnic or racial groups: A randomized, controlled trial. *Ann Intern Med* 2006;145:727–738.
72. Done DJ, Thomas JA: Training in communication skills for informal carers of people suffering from dementia: A cluster randomized clinical trial comparing a therapist led workshop and a booklet. *Int J Geriatr Psychiatry* 2001;16:816–821.
73. Oliver JW, Kravitz RL, Kaplan SH, Meyers FJ: Individualized patient education and coaching to improve pain control among cancer outpatients. *J Clin Oncol* 2001;19:2206–2212.

74. Doughty RN, Wright SP, Pearl A, et al.: Randomized, controlled trial of integrated heart failure management: The Auckland Heart Failure Management Study. *Eur Heart J* 2002;23:139–146.
75. Vallieres I, Aubin M, Blondeau L, et al.: Effectiveness of a clinical intervention in improving pain control in outpatients with cancer treated by radiation therapy. *Int J Radiat Oncol Biol Phys* 2006;66:234–237.
76. Ward SE, Serlin RC, Donovan HS, et al.: A randomized trial of a representational intervention for cancer pain: Does targeting the dyad make a difference? *Health Psychol* 2009;28:588–597.
77. Boesen EH, Ross L, Frederiksen K, et al.: Psychoeducational intervention for patients with cutaneous malignant melanoma: A replication study. *J Clin Oncol* 2005;23:1270–1277.
78. de Raaf PJ, de Klerk C, Timman R, et al.: Systematic monitoring and treatment of physical symptoms to alleviate fatigue in patients with advanced cancer: A randomized controlled trial. *J Clin Oncol* 2013;31:716–723.
79. Berry DL, Hong F, Halpenny B, et al.: Electronic self-report assessment for cancer and self-care support: Results of a multicenter randomized trial. *J Clin Oncol* 2014;32:199–205.
80. Haley WE, Bergman EJ, Roth DL, et al.: Long-term effects of bereavement and caregiver intervention on dementia caregiver depressive symptoms. *Gerontologist* 2008;48:732–740.
81. McLean LM, Walton T, Rodin G, et al.: A couple-based intervention for patients and caregivers facing end-stage cancer: Outcomes of a randomized controlled trial. *Psychooncology* 2013;22:28–38.
82. Gellis ZD, Kenaley BL, Ten Have T: Integrated telehealth care for chronic illness and depression in geriatric home care patients: The Integrated Telehealth Education and Activation of Mood (I-TEAM) study. *J Am Geriatr Soc* 2014;62:889–895.
83. McDonald MV, Pezzin LE, Feldman PH, et al.: Can just-in-time, evidence-based “reminders” improve pain management among home health care nurses and their patients? *J Pain Symptom Manage* 2005;29:474–488.
84. Tierney WM, Dexter PR, Gramelspacher GP, et al.: The effect of discussions about advance directives on patients’ satisfaction with primary care. *J Gen Intern Med* 2001;16:32–40.
85. Velikova G, Booth L, Smith AB, et al.: Measuring quality of life in routine oncology practice improves communication and patient well-being: A randomized controlled trial. *J Clin Oncol* 2004;22:714–724.
86. Syrjala KL, Abrams JR, Polissar NL, et al.: Patient training in cancer pain management using integrated print and video materials: A multisite randomized controlled trial. *Pain* 2008;135:175–186.
87. Allen RS, Hilgeman MM, Ege MA, et al.: Legacy activities as interventions approaching the end of life. *J Palliat Med* 2008;11:1029–1038.
88. Aiken LS, Butner J, Lockhart CA, et al.: Outcome evaluation of a randomized trial of the PhoenixCare intervention: Program of case management and coordinated care for the seriously chronically ill. *J Palliat Med* 2006;9:111–126.
89. Capomolla S, Febo O, Ceresa M, et al.: Cost/utility ratio in chronic heart failure: Comparison between heart failure management program delivered by day-hospital and usual care. *J Am Coll Cardiol* 2002;40:1259–1266.
90. Harrison MB, Browne GB, Roberts J, et al.: Quality of life of individuals with heart failure: A randomized trial of the effectiveness of two models of hospital-to-home transition. *Med Care* 2002;40:271–282.
91. Kasper EK, Gerstenblith G, Hefter G, et al.: A randomized trial of the efficacy of multidisciplinary care in heart failure outpatients at high risk of hospital readmission. *J Am Coll Cardiol* 2002;39:471–480.
92. Jones L, Fitzgerald G, Laurent B, et al.: Rehabilitation in advanced, progressive, recurrent cancer: A randomized controlled trial. *J Pain Symptom Manage* 2013;46:315–325.e313.
93. Hollingworth W, Metcalfe C, Mancero S, et al.: Are needs assessments cost effective in reducing distress among patients with cancer? A randomized controlled trial using the Distress Thermometer and Problem List. *J Clin Oncol* 2013;31:3631–3638.
94. Rummans TA, Clark MM, Sloan JA, et al.: Impacting quality of life for patients with advanced cancer with a structured multidisciplinary intervention: A randomized controlled trial. *J Clin Oncol* 2006;24:635–642.
95. Mills ME, Murray LJ, Johnston BT, et al.: Does a patient-held quality-of-life diary benefit patients with inoperable lung cancer? *J Clin Oncol* 2009;27:70–77.
96. Markle-Reid M, Weir R, Browne G, et al.: Health promotion for frail older home care clients. *J Adv Nurs* 2006;54:381–395.
97. McMillan SC, Small BJ, Haley WE: Improving hospice outcomes through systematic assessment: A clinical trial. *Cancer Nurs* 2011;34:89–97.
98. McLachlan SA, Allenby A, Matthews J, et al.: Randomized trial of coordinated psychosocial interventions based on patient self-assessments versus standard care to improve the psychosocial functioning of patients with cancer. *J Clin Oncol* 2001;19:4117–4125.
99. Stanton AL, Thompson EH, Crespi CM, et al.: Project connect online: Randomized trial of an internet-based program to chronicle the cancer experience and facilitate communication. *J Clin Oncol* 2013;31:3411–3417.
100. Chapman DG, Toseland RW: Effectiveness of advanced illness care teams for nursing home residents with dementia. *Soc Work* 2007;52:321–329.
101. McMillan SC, Small BJ: Using the COPE intervention for family caregivers to improve symptoms of hospice homecare patients: A clinical trial. *Oncol Nurs Forum* 2007;34:313–321.
102. Rea H, McAuley S, Stewart A, et al.: A chronic disease management programme can reduce days in hospital for patients with chronic obstructive pulmonary disease. *Intern Med J* 2004;34:608–614.
103. Allen RS, Harris GM, Burgio LD, et al.: Can senior volunteers deliver reminiscence and creative activity interventions? Results of the legacy intervention family enactment randomized controlled trial. *J Pain Symptom Manage* 2014;48:590–601.
104. Engelhardt JB, Rizzo VM, Della Penna RD, et al.: Effectiveness of care coordination and health counseling in advancing illness. *Am J Manag Care* 2009;15:817–825.
105. Laramee AS, Levinsky SK, Sargent J, et al.: Case management in a heterogeneous congestive heart failure population: A randomized controlled trial. *Arch Intern Med* 2003;163:809–817.
106. Engelhardt JB, McClive-Reed KP, Toseland RW, et al.: Effects of a program for coordinated care of advanced

- illness on patients, surrogates, and healthcare costs: A randomized trial. *Am J Manag Care* 2006;12:93–100.
107. Clayton JM, Butow PN, Tattersall MH, et al.: Randomized controlled trial of a prompt list to help advanced cancer patients and their caregivers to ask questions about prognosis and end-of-life care. *J Clin Oncol* 2007;25:715–723.
 108. El-Jawahri A, Podgurski LM, Eichler AF, et al.: Use of video to facilitate end-of-life discussions with patients with cancer: A randomized controlled trial. *J Clin Oncol* 2010;28:305–310.
 109. Volandes AE, Ferguson LA, Davis AD, et al.: Assessing end-of-life preferences for advanced dementia in rural patients using an educational video: A randomized controlled trial. *J Palliat Med* 2011;14:169–177.
 110. Au DH, Udris EM, Engelberg RA, et al.: A randomized trial to improve communication about end-of-life care among patients with COPD. *Chest* 2012;141:726–735.
 111. Stein RA, Sharpe L, Bell ML, et al.: Randomized controlled trial of a structured intervention to facilitate end-of-life decision making in patients with advanced cancer. *J Clin Oncol* 2013;31:3403–3410.
 112. Lautrette A, Darmon M, Megarbane B, et al.: A communication strategy and brochure for relatives of patients dying in the ICU. *N Engl J Med* 2007;356:469–478.
 113. Beauchamp N, Irvine AB, Seeley J, Johnson B: Website-based internet multimedia program for family caregivers of persons with dementia. *Gerontologist* 2005;45:793–801.
 114. Mittelman MS, Brodaty H, Wallen AS, Burns A: A three-country randomized controlled trial of a psychosocial intervention for caregivers combined with pharmacological treatment for patients with Alzheimer disease: Effects on caregiver depression. *Am J Geriatr Psychiatry* 2008;16:893–904.
 115. Mittelman MS, Roth DL, Coon DW, Haley WE: Sustained benefit of supportive intervention for depressive symptoms in caregivers of patients with Alzheimer's disease. *Am J Psychiatry* 2004;161:850–856.
 116. Livingston G, Barber J, Rapaport P, et al.: Clinical effectiveness of a manual based coping strategy programme (START, STRategies for RelaTives) in promoting the mental health of carers of family members with dementia: Pragmatic randomised controlled trial. *BMJ* 2013;347:f6276.
 117. Knapp M, King D, Romeo R, et al.: Cost effectiveness of a manual based coping strategy programme in promoting the mental health of family carers of people with dementia (the START (STRategies for RelaTives) study): A pragmatic randomised controlled trial. *BMJ* 2013;347:f6342.
 118. Casarett D, Karlawish J, Morales K, et al.: Improving the use of hospice services in nursing homes: A randomized controlled trial. *JAMA* 2005;294:211–217.
 119. Volandes AE, Mitchell SL, Gillick MR, et al.: Using video images to improve the accuracy of surrogate decision-making: A randomized controlled trial. *J Am Med Dir Assoc* 2009;10:575–580.
 120. Curtis JR, Back AL, Ford DW, et al.: Effect of communication skills training for residents and nurse practitioners on quality of communication with patients with serious illness: A randomized trial. *JAMA* 2013;310:2271–2281.
 121. Ward SE, Wang KK, Serlin RC, et al.: A randomized trial of a tailored barriers intervention for Cancer Information Service (CIS) callers in pain. *Pain* 2009;144:49–56.
 122. Spiro SG, Rudd RM, Souhami RL, et al.: Chemotherapy versus supportive care in advanced non-small cell lung cancer: Improved survival without detriment to quality of life. *Thorax* 2004;59:828–836.
 123. Walling AM, Schreiber-Baum H, Pimstone N, et al.: Proactive case finding to improve concurrently curative and palliative care in patients with end-stage liver disease. *J Palliat Med* 2015;18:378–381.
 124. Smith TJ, Temin S, Alesi ER, et al.: American Society of Clinical Oncology provisional clinical opinion: The integration of palliative care into standard oncology care. *J Clin Oncol* 2012;30:880–887.
 125. Lynn J: Reliable and sustainable comprehensive care for frail elderly people. *JAMA* 2013;310:1935–1936.
 126. Hickman SE, Tolle SW, Brummel-Smith K, Carley MM: Use of the physician orders for life-sustaining treatment program in Oregon nursing facilities: Beyond resuscitation status. *J Am Geriatr Soc* 2004;52:1424–1429.
 127. *Depression in Adults with a Chronic Physical Health Problem: Recognition and Management*. London, England: National Institute for Health and Care Excellence, 2009.
 128. May P, Normand C, Morrison RS: Economic impact of hospital inpatient palliative care consultation: Review of current evidence and directions for future research. *J Palliat Med* 2014;17:1054–1063.
 129. Greer JA, Tramontano A, McMahon PM, et al.: *Cost Analysis of a Randomized Trial of Early Palliative Care (PC) in Patients with Metastatic Non-small Cell Lung Cancer (NSCLC)*. Boston, MA: Palliative Care in Oncology Symposium, 2014.
 130. Goldberg LR, Piette JD, Walsh MN, et al.: Randomized trial of a daily electronic home monitoring system in patients with advanced heart failure: The Weight Monitoring in Heart Failure (WHARF) trial. *Am Heart J* 2003;146:705–712.
 131. Melis RJ, van Eijken MI, van Achterberg T, et al.: The effect on caregiver burden of a problem-based home visiting programme for frail older people. *Age Ageing* 2009;38:542–547.
 132. Dyar S, Lesperance M, Shannon R, et al.: A nurse practitioner directed intervention improves the quality of life of patients with metastatic cancer: Results of a randomized pilot study. *J Palliat Med* 2012;15:890–895.
 133. Hoekstra J, de Vos R, van Duijn NP, et al.: Using the symptom monitor in a randomized controlled trial: The effect on symptom prevalence and severity. *J Pain Symptom Manage* 2006;31:22–30.
 134. Brown RF, Butow PN, Sharrock MA, et al.: Education and role modelling for clinical decisions with female cancer patients. *Health Expect* 2004;7:303–316.
 135. Curtis JR, Nielsen EL, Treece PD, et al.: Effect of a quality-improvement intervention on end-of-life care in the intensive care unit: A randomized trial. *Am J Respir Crit Care Med* 2011;183:348–355.
 136. Fortinsky RH, Kulldorff M, Kleppinger A, Kenyon-Pesce L: Dementia care consultation for family caregivers: Collaborative model linking an Alzheimer's association chapter with primary care physicians. *Aging Ment Health* 2009;13:162–170.
 137. Grande GE, Farquhar MC, Barclay SI, Todd CJ: Care-giver bereavement outcome: Relationship with hospice at home, satisfaction with care, and home death. *J Palliat Care* 2004;20:69–77.
 138. Cornbleet MA, Campbell P, Murray S, et al.: Patient-held records in cancer and palliative care: A randomized, prospective trial. *Palliat Med* 2002;16:205–212.

139. Hepburn KW, Lewis M, Kirk LN, et al.: Partners in caregiving: A psychoeducation program affecting dementia family caregivers' distress and caregiving outlook. *Clin Gerontologist* 2005;29:53–69.
140. Magai C, Cohen CI, Gomberg D: Impact of training dementia caregivers in sensitivity to nonverbal emotion signals. *Int Psychogeriatr* 2002;14:25–38.
141. Pillemer K, Suitor JJ: Peer support for Alzheimer's caregivers: Is it enough to make a difference? *Res Aging* 2002;24:171–192.
142. Wilkie D, Berry D, Cain K, et al.: Effects of coaching patients with lung cancer to report cancer pain. *West J Nurs Res* 2010;32:23–46.
143. Williams JG, Cheung WY, Chetwynd N, et al.: Pragmatic randomised trial to evaluate the use of patient held records for the continuing care of patients with cancer. *Qual Health Care* 2001;10:159–165.
144. Steinhauer KE, Alexander SC, Byock IR, et al.: Do preparation and life completion discussions improve functioning and quality of life in seriously ill patients? Pilot randomized control trial. *J Palliat Med* 2008;11:1234–1240.
145. Azoulay E, Pochard F, Chevret S, et al.: Impact of a family information leaflet on effectiveness of information provided to family members of intensive care unit patients: A multicenter, prospective, randomized, controlled trial. *Am J Respir Crit Care Med* 2002;165:438–442.
146. Epstein AS, Volandes AE, Chen LY, et al.: A randomized controlled trial of a cardiopulmonary resuscitation video in advance care planning for progressive pancreas and hepatobiliary cancer patients. *J Palliat Med* 2013;16:623–631.
147. Kinley J, Stone L, Dewey M, et al.: The effect of using high facilitation when implementing the Gold Standards Framework in Care Homes programme: A cluster randomised controlled trial. *Palliat Med* 2014;28:1099–1109.
148. Metzelthin SF, van Rossum E, de Witte LP, et al.: Effectiveness of interdisciplinary primary care approach to reduce disability in community dwelling frail older people: Cluster randomised controlled trial. *BMJ* 2013;347:f5264.

Address correspondence to:

Adam E. Singer, PhD

RAND Corporation

1776 Main Street, PO Box 2138

Santa Monica, CA 90407-2138

E-mail: asinger@rand.org

APPENDIX: ADDITIONAL DESCRIPTION OF STUDIES

Severity of illness

Studies assessed patients' severity of illness in a variety of ways. Forty-four percent of studies of cancer (34 of 77) included patients with metastatic cancer, and 34% (26 of 77) included patients undergoing chemotherapy and/or radiotherapy. Thirty-eight percent of studies of CHF (8 of 21) assessed the New York Heart Association (NYHA) class of their participants; of these, 63% (5 of 8) included at least 50% of participants with NYHA Class III or IV CHF. Studies of other conditions did not report similar measures of disease severity.

Sixty-two percent of all studies (77 of 124) reported both the number of patients enrolled and the number of decedents. Of these, the median percentage of decedents was 14%, with a range of 0% to 100%.

Sixty percent of all studies (74 of 124) reported the functional status of their patient participants. There were a variety of scales

used: common scales included Eastern Cooperative Oncology Group performance status, Karnofsky Performance Status, Palliative Performance Scale, SF-12 and SF-36 physical component summaries and physical functioning subscales, and activities of daily living counts. The heterogeneity in measuring functional status precluded synthesis of or comparisons among the functional status of participants across studies.

Twenty-four percent of all studies (30 of 124) used a health service-derived definition to classify their participants' prognosis. Of these, 73% (22 of 30) used clinicians' judgment of "poor prognosis," and of this latter set, 9% (2 of 22) asked the patient's primary care or attending physician if they "would not be surprised if the patient died within one year."^{43,44} Interventions that used clinicians' judgment of "poor prognosis" were similarly effective compared with those that did not. No studies used explicit criteria or administrative data-derived approaches.