

Models of Palliative Care Delivery for Patients With Cancer

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Palliative care has evolved over the past five decades as an interprofessional specialty to improve quality of life and quality of care for patients with cancer and their families. Existing evidence supports that timely involvement of specialist palliative care teams can enhance the care delivered by oncology teams. This review provides a state-of-the-science synopsis of the literature that supports each of the five clinical models of specialist palliative care delivery, including outpatient clinics, inpatient consultation teams, acute palliative care units, community-based palliative care, and hospice care. The roles of embedded clinics, nurse-led models, telehealth interventions, and primary palliative care also will be discussed. Outpatient clinics represent the key point of entry for timely access to palliative care. In this setting, patient care can be enhanced longitudinally through impeccable symptom management, monitoring, education, and advance care planning. Inpatient consultation teams provide expert symptom management and facilitate discharge planning for acutely symptomatic hospitalized patients. Patients with the highest level of distress and complexity may benefit from an admission to acute palliative care units. In contrast, community-based palliative care and hospice care are more appropriate for patients with a poor performance status and low to moderate symptom burden. Each of these five models of specialist palliative care serve a different patient population along the disease continuum and complement one another to provide comprehensive supportive care. Additional research is needed to define the standards for palliative care interventions and to refine the models to further improve access to quality palliative care.

J Clin Oncol 38:852-865. © 2020 by American Society of Clinical Oncology

INTRODUCTION

Over the past five decades, palliative care has evolved from a philosophy of care that focuses on the last days of life to a professional specialty that delivers comprehensive supportive care to patients with advanced illnesses throughout the disease trajectory. Conceptualized by Dame Cicely Saunders in the 1960s, the first model of care was community-based hospice care.¹ In the 1970s, Balfour Mount coined the term palliative care and started the first palliative care unit in an acute care academic hospital in Montreal.² This model of inpatient care was widely accepted and contributed to a rapid growth in inpatient palliative care teams worldwide. In the 1990s, several palliative care teams started to see patients in outpatient clinics, which paved the way for patients to gain access to palliative care earlier in the disease trajectory.³⁻⁶ Over the past decade, multiple landmark clinical trials confirmed the benefits of outpatient palliative care, which stimulated more interest and growth in this field.^{7,8} The model of palliative care continues to evolve to better serve a growing number of patients throughout the disease continuum while adapting to an aging population and the ever-changing landscape of novel

cancer therapeutics. On the basis of the consolidated body of evidence,⁹⁻¹¹ ASCO has published multiple statements to support the integration of palliative care, with a vision toward comprehensive cancer care by 2020.¹²⁻¹⁵

Currently, the five major service delivery models of specialist palliative care, namely outpatient palliative care clinics, inpatient palliative care consultation teams, acute palliative care units (APCUs), community-based palliative care, and hospice care, complement one another to provide comprehensive supportive care from diagnosis to the end of life. These five services differ in their team structures, care processes, patient populations, location of care, and reimbursement models¹⁶ (Fig 1; Table 1). Specialist palliative care, delivered by individuals with specialized training and expertise, complements and augments primary palliative care, which is basic symptom management and communication provided by nonpalliative care clinicians.¹⁷ In this article, we review the literature that supports each of the five specialist palliative care service delivery models and their variations. Conceptual models and primary palliative care have been discussed elsewhere.^{18,19}

Author affiliations and support information (if applicable) appear at the end of this article.

Accepted on February 14, 2019 and published at ascopubs.org/journal/jco on February 5, 2020; DOI <https://doi.org/10.1200/JCO.18.02123>

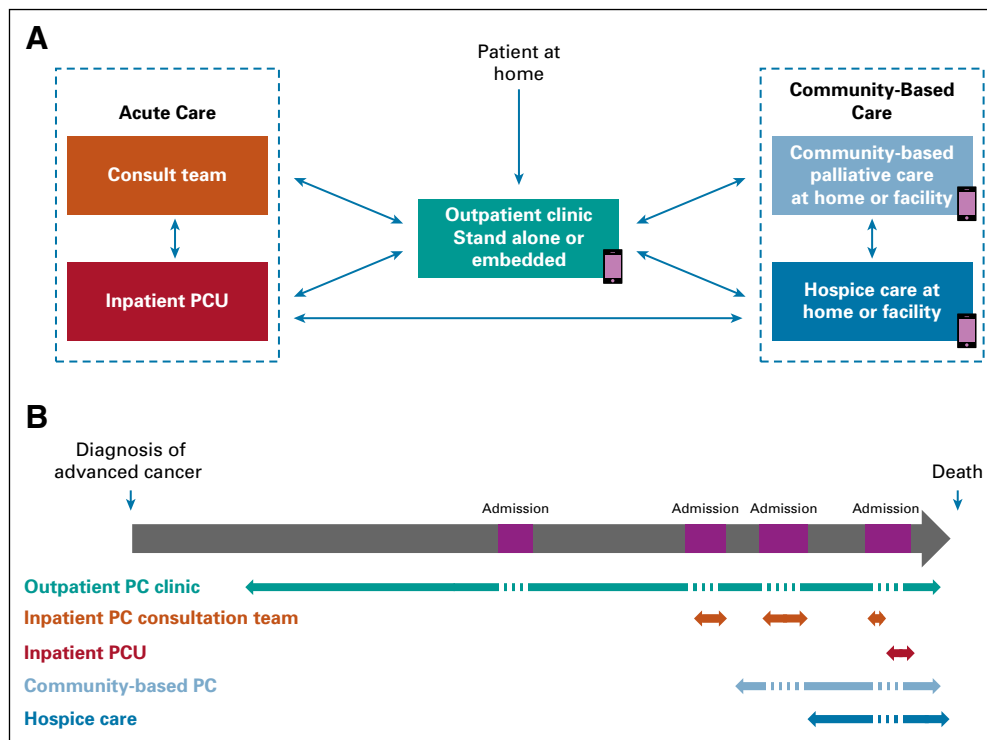


FIG 1. Service models of specialist palliative care (PC). (A) Care anywhere. Outpatient clinics facilitate access to palliative care in the ambulatory setting while coordinating care with the other models of PC. Inpatient consultation teams and PC units (PCUs) are available at acute care facilities, whereas community-based PC and hospice care allow patients to be cared for in the ambulatory and community setting. The smartphone icon indicates telehealth outreach. (B) Care anytime. This figure highlights how the five service models complement one another to provide comprehensive PC along the entire disease continuum for patients and their families. The arrows indicate the general time frame of patient engagement.

OUTPATIENT PALLIATIVE CARE CLINICS

Compared with the other service models, outpatient palliative care clinics require relatively few resources, can serve a large number of patients, and represent the main setting for patients to be seen early along the disease trajectory²⁰ (Table 1). In a 2010 national survey, 59% of National Cancer Institute (NCI)-designated cancer centers and 22% of non-NCI-designated cancer centers offered outpatient palliative care.²¹ In 2015, 91% of National Comprehensive Cancer Network (NCCN) cancer centers reported having outpatient palliative care clinics.²²

Several variations of outpatient palliative care interventions exist, including stand-alone clinics, embedded clinics, telehealth-based palliative care, and enhanced primary palliative care.^{23,24} Currently, much of the available evidence supports stand-alone clinics delivered by an interdisciplinary specialist palliative care team. Rabow et al²⁵ conducted the first controlled trial on this model of delivery in 2004. Subsequently, a landmark randomized clinical trial that examined early outpatient palliative care was published in 2010.⁷ Patients who were within 2 months of diagnosis of stage IV non-small-cell lung cancer and had

a performance status of 0 to 2 were randomly assigned to routine oncologic care with or without specialist outpatient palliative care. Early palliative care referral was associated with improved quality of life, depression, illness understanding, and survival.^{7,26-28} In a subsequent study, Zimmermann et al⁸ conducted a large cluster randomized trial in Canada that examined outpatient palliative care in patients with advanced solid tumors. The primary outcome of quality of life favored palliative care, although it did not reach statistical significance at 3 months and only became significant at 4 months. Secondary outcomes, including symptom burden, patient satisfaction, and patient-clinician communication, also improved with palliative care. To date, more than a dozen randomized trials have been published on variations of outpatient palliative care (Tables 2A and 2B). A 2017 Cochrane meta-analysis that included seven of these studies confirmed the benefits of early palliative care.⁹ Outside the clinical trial setting, multiple retrospective cohort studies also reported that earlier referral is associated with better quality of end-of-life care outcomes.^{42,43} By reducing the prolonged hospitalizations and intensive care unit admissions near the end of life, early palliative care also may provide indirect health care savings through

TABLE 1. Clinical Models of Specialist Palliative Care Delivery

Characteristic	Outpatient Clinics	Inpatient Palliative Care Consultation	Inpatient Palliative Care Unit	Community-Based Palliative Care and Hospice Care
Patient				
Level of distress	+ to ++	++	+++	+ to ++
Survival	Months to years	Weeks to months	Days to weeks	Days to weeks
ECOG performance status	Ideally 1-2, some 3-4	Mostly 3-4	Mostly 4	Mostly 3-4
Clinical model				
Resources required to start service	++	+	+++	+++
Staffing	+ to ++	+ to ++	+++	+ to ++
Typical availability	M-F or several days a week	M-F or 24/7	24/7	24/7
Typical intensity of follow-up	Every 3-4 weeks, but may vary	Daily while admitted	Daily while admitted	Several times a week, but may vary
Facilitates early referral	+++	++	+	+
Variations	Embedded clinics, Telehealth	—	—	Day-care programs
Clinical processes				
Symptom management	+ to ++	++	+++	+ to ++
Psychosocial support	+ to ++	+ to ++	+++	+ to ++
Spiritual support	+ to ++	+ to ++	+++	+ to ++
Illness understanding	+ to ++	+ to ++	++ to +++	+ to ++
Advance care planning	+ to +++	+ to +++	+ to +++	+ to +++
Discharge planning	—	++	+++	—
EOL care planning	+ to ++	++	+++	++ to +++
Cancer treatment decision making	++	+ to ++	+	— to +

NOTE. The number of plus signs indicates the relative extent of involvement or requirement among the service models (ie, +, relatively low; ++, moderate; +++, relatively high). The minus sign indicates not applicable.

Abbreviations: 24/7, 24 hours a day/7 days a week; ECOG, Eastern Cooperative Oncology Group; EOL, end of life; M-F, Monday to Friday.

cost-avoidance measures and thus enhance the overall value of care.⁴⁴

Tables 2A and 2B list the design and outcomes of contemporary trials. A few observations are noteworthy. First, much variation exists in the composition and training of interdisciplinary palliative care teams, comprehensiveness of intervention, timing of referral, and intensity of follow-up.²⁴ In general, interdisciplinary interventions led by palliative medicine specialists^{7,8,29} have resulted in more-positive outcomes relative to a physician alone³²⁻³⁴ or nurse-led interventions^{35,36,38-41} (Tables 2A and 2B). This finding is not surprising because many palliative care interventions, such as methadone rotation and family meetings, are complex and require considerable expertise, planning, and resources, not unlike other sophisticated medical or surgical procedures. Second, contamination was a common issue, which made it increasingly difficult to include a usual care group.^{29,31,34-36} Third, these issues coupled with other methodological weaknesses, such as under enrollment (Table 3), explain why some recent studies have been negative. Methodologically sound trial designs are needed to minimize false-negative and false-positive findings.

Across the nation, the structure of outpatient palliative care operations vary widely.^{21,22,45} Among 20 palliative care clinics at NCCN institutions, 43% had both physicians and advanced practice providers, 19% had physicians only, 10% had advanced practice providers only, and 29% were operated by others.²² These clinics saw an average of 469 new patients per year, with an average full-time equivalent of 3.3 clinicians. The average clinic duration was 60 minutes, and follow-up visits were 30 minutes.²² The MD Anderson Cancer Center has one of the largest programs in the United States. To overcome the potential stigma associated with the name palliative care among referring oncologists,⁴⁸⁻⁴⁸ this clinic changed its name to supportive care in 2007. In a before-and-after name change comparison, a significant increase in the time from referral to death (6.2 v 4.7 months) occurred.⁴⁹ The number of patients referred to this clinic increased steadily from 750 in 2007 to 1,225 in 2013, which outpaced the growth of the cancer center.⁵⁰ The interval from referral to death also increased from 4.8 to 7.9 months.⁴⁸ Operating 5 days a week and staffed by four physicians, 12 nurses, and three counselors/psychologists, this clinic provided 1,772 new patient consultations and 6,943 follow-up visits in 2018.

TABLE 2A. RCTs on Outpatient PC
Intervention Lead and First Author

Variable	Interdisciplinary			MD Only			
	Temel⁷, Greer²⁷, and Temel²⁸	Zimmermann⁸	Temel²⁹	Groenvold³⁰	do Carmo³¹	Maltoni^{32,33}	Scarpì³⁴
Country	United States	Canada	United States	Denmark	Brazil	Italy	Italy
Design							
Overall	RCT: PC + UC v UC	Cluster RCT: PC + UC v UC	RCT: PC + UC v UC	RCT: PC + UC v UC	RCT: PC + UC + psych v PC + UC v UC	RCT: PC + UC v UC	RCT: PC + UC v UC
Blinding	Not blinded	Patients partially blinded	Not blinded	Blinded analyses	Not blinded	Not blinded	Not blinded
Centers	Single	Single	Single	Multiple (n = 6)	Single	Multiple (n = 21)	Multiple
Eligibility							
Advanced cancer type	Lung	Lung, breast, GI, GU, GYN	Lung, GI	Solid tumor mostly	Head and neck, lung, breast, GI, GU, GYN	Pancreas	Gastric
Timing	Within 8 weeks of diagnosis	Prognosis 6-24 months	Within 8 weeks of diagnosis	Symptomatic	Life expectancy of 6-24 months	Within 8 weeks of diagnosis	Within 8 weeks of diagnosis
Performance status	ECOG 0-2	ECOG 0-2	ECOG 0-2	—	ECOG 0-2	ECOG 0-2	ECOG 0-2
Enrollment	Jun 2006-Jul 2009	Dec 2006-Feb 2011	May 2011-Jul 2015	May 2011-Dec 2013	Aug 2014-Aug 2015	Oct 2012-Feb 2015	Aug 2012-Jul 2016
Median time from enrollment to death	PC: 11.6 months UC: 8.9 months	PC: 340 days UC: NR	NR	PC: 323 days UC: 364 days	NR	PC: 38% 1-year survival UC: 32% 1-year survival	PC: 10.2 months UC: 9.9 months
No. of patients randomly assigned	PC: 77 UC: 74	PC: 228 UC: 233	PC: 175 UC: 175	PC: 145 UC: 152	PC + psych: 19 UC: 22	PC: 107 UC: 100	PC: 91 UC: 95
Intervention							
PC staffing	MD, APN	MD, RN	MD, APN	MD, RN, others	MD, RN, psychologists	MD only	MD only
Visits	In-person consult (55 minutes) then at least monthly	In-person consult (60-90 minutes) then monthly	In-person consult then at least monthly	In-person consult then as needed	PC: in-person consult then every 3 ± 1 weeks Psych: five weekly sessions	In-person consult then every 2-4 weeks	In-person consult then every 2-4 weeks
PC referrals in UC group	14% by 12 weeks	9%	20% by 12 weeks	9% by 8 weeks	32% by 6 months	NR	43%
Retention at primary time point	PC: 60 of 77 (78%) UC: 47 of 74 (64%)	PC: 152 of 228 (67%) UC: 149 of 233 (64%)	PC: 148 of 175 (85%) UC: 153 of 175 (87%)	PC: 113 of 145 (78%) UC: 113 of 152 (74%)	PC + psych: 15 of 19 (79%) PC: 19 of 22 (86%) UC: 19 of 22 (86%)	PC: 64 of 107 (60%) UC: 65 of 100 (65%)	PC: 66 of 91 (73%) UC: 65 of 95 (68%)

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TABLE 2A. RCTs on Outpatient PC (continued)

Variable	Intervention Lead and First Author					MD Only	
	Interdisciplinary						
	Temel ⁷ , Greer ²⁷ , and Temel ²⁸	Zimmermann ⁸	Temel ²⁹	Greenvoid ³⁰	do Carmo ³¹	Maltoni ^{32,33}	Scarpj ³⁴
Actual/planned for enrollment	151/120 + 30	461/380 + 70	350/350	306/300	63/150	207/240	186/240
Average No. of in-person PC visits	PC: 4 visits UC: 0.18 visits	PC: 90% ≥ 2 visits UC: 5% ≥ 2 visits	PC: 6.5 visits UC: 0.89 visits	PC: 51% ≥ 2 visits UC: 3% ≥ 2 visits	PC + psych and PC: 54% completed all visits	PC: 5.1 visits UC: 0.8 visits	PC: 4.3 visits UC: 0.5 visits
Outcomes							
Timing of primary outcome	3 months	3 months	3 months	2 months	3 months	3 months	3 months
Quality of life	PC > UC	PC > UC for some*	PC > UC for some†	No difference	No difference	PC > UC	No difference
Symptoms	—	PC > UC for some*	—	No difference (except nausea)	No difference	—	—
Depression	PC > UC	—	PC > UC for some†	—	No difference	No difference	No difference
Patient satisfaction	—	PC > UC	—	—	—	—	—
Communication	PC > UC	PC > UC	PC > UC for some†	—	—	—	—
End-of-life care	PC > UC for some†	—	—	—	—	PC > UC for some	No difference
Survival	PC > UC	—	—	No difference	—	No difference	No difference
Caregiver outcomes	—	—	—	—	—	No difference	No difference
Comments	First partially blinded study. GI groups had different baseline; contamination. Limited No. of visits; Under enrollment; contamination. Limited MD training; contamination.						

NOTE. The primary outcomes are shown in boldface.

Abbreviations: APN, advanced practice nurse; ECOG, Eastern Cooperative Oncology Group; GU, genitourinary; GYN, gynecologic; MD, medical doctor; NR, not reported; PC, palliative care; Psych, psychology; RCT, randomized controlled trial; RN, registered nurse; UC, usual care.

*At 3 months, quality of life as measured by Functional Assessment of Chronic Illness Therapy–Spiritual Well-Being Scale (FACIT–Sp) improved in the palliative care group and deteriorated in the control group (1.6 v -2.0, *p* = 0.07). This difference became statistically significant at 4 months (2.5 v -4.0, *p* = 0.006). Similarly, symptom burden as measured by the Edmonton Symptom Assessment System (ESAS) was not significantly different at 3 months (0.1 v 2.1, *p* = 0.33) but reached statistical significance favoring the palliative care group at 4 months (-1.3 v 3.2, *p* = 0.05).

†For the entire sample, the Functional Assessment of Cancer Therapy-General (FACT-G) score for palliative care group was not better than usual care at 3 months (80.1 v 77.7, *p* = 0.91); however, patients in the palliative care group had significantly better quality of life at 4 months (81.3 v 75.9, *p* = 0.002). Subgroup analyses showed that patients with lung cancer had significantly better quality of life at both 3 months and 4 months, but not patients with gastrointestinal malignancies. Similar patterns were observed for depression as measured by Patient Health Questionnaire-9 (PHQ-9). Some communication outcomes also improved with the palliative care group. For example, patients seen by palliative care were more likely to have a discussion with their oncologist about their end-of-life wishes (30% v 15%, *p* = 0.004) than control.

‡Fewer patients in the palliative care group had aggressive end-of-life care (33% v 54%, *P* = 0.05) and a greater proportion had resuscitation preferences documented (53% v 28%, *P* = 0.05) compared to usual care.

TABLE 2B. RCTs on Outpatient PC (Continued)

Variable	Intervention Lead and First Author					
	APN Led		RN Led		Primary PC: APN Led	
	Bakitas ³⁵	Bakitas ³⁶ and Dionne-Odom ³⁷	Tattersall ³⁸	Vanbutsele ³⁹	Dyar ⁴⁰	McCorkle ⁴¹
Country	United States	United States	Australia	Belgium	United States	United States
Design						
Overall	RCT: PC + UC v UC	RCT: PC + UC v UC, wait list	RCT: PC + UC v UC	RCT: PC + UC v UC	RCT: PC + UC v UC	Cluster RCT: PC + UC v UC
Blinding	Not blinded	Blinded assessors	Not blinded	Not blinded	Not blinded	Not blinded
Centers	Multiple (n = 2)	Multiple (n = 2)	Single	Single (mostly)	Single	Single
Eligibility						
Advanced cancer type	Breast, lung, GI, GU	Solid tumors, hematologic	Solid tumors	Solid tumors	Solid tumors	PC: GYN, Lung UC: Head and neck, GI
Timing	Within 8-12 weeks of diagnosis	Life expectancy of 6-24 months	Life expectancy < 12 months	Life expectancy 12 months, within 12 weeks of diagnosis or progression	Expectation of hospice referral within next 12 months	Within 100 days of diagnosis
Performance status	—	—	—	ECOG 0-2	—	—
Enrollment	Nov 2003-May 2007	Oct 2010-Mar 2013	Apr 2003-Jan 2005	Apr 2013-Feb 2016	Nov 2008-Jul 2009	Aug 2010-Dec 2012
Median time from enrollment to death	PC: 14 months UC: 8.5 months	PC: 18.3 months UC: 11.8 months	PC: 7 months UC: 11.7 months	PC: 312 days UC: 343 days	NR	NR
No. of patients randomly assigned	PC: 161 UC: 161	PC (early): 104 UC (delayed): 103	PC: 60 UC: 60	PC: 92 UC: 94	PC: 12 UC: 14	PC: 66 UC: 80
Intervention						
PC staffing	APN, referral to PC as needed	APN, referral to PC as needed	RN, referral to PC as needed	RN-led MD may be consulted	Oncology APN-led	Oncology APN, PA, SW trained by APN
Visits	Four APN-led telephone sessions, then telephone visits monthly	Clinician assessment and six APN-led telephone sessions, then telephone visits monthly	In-person visit then telephone-based follow-up as needed	In-person consult then monthly	APN consult and second visit 1 month later	Five clinic visits and five telephone visits
PC referrals in UC group	32%	Approximately 66%	13%	19%	NR	NR
Retention at primary time point	PC: < 113 of 161 UC: < 105 of 161	PC: 71 of 104 UC: 76 of 103	At 3 months PC: 38 of 60 UC: 44 of 60	PC: 65 of 92 UC: 68 of 94	NR	PC: 36 of 66 UC: 56 of 80
Actual/planned for enrollment	322/400	207/360	120/150	186/182	26/100	146/NR
Average No. of in-person PC visits	NR	PC: 69 (66%) by day 24 UC: 68 (66%) by day 79	NR	PC: 3 visits UC: NR	NR	NR

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TABLE 2B. RCTs on Outpatient PC (Continued) (continued)

Variable	Intervention Lead and First Author					
	APN Led		RN Led		Primary PC: APN Led	
	Bakitas ³⁵	Bakitas ³⁶ and Dionne-Odom ³⁷	Tattersall ³⁸	Vanbutsele ³⁹	Dyar ⁴⁰	McCorkle ⁴¹
Outcomes						
Timing of primary outcome	NR	3 months	NR	3 months	Hospice referral	1 month and 3 months
Quality of life	PC > UC	No difference	No difference	PC > UC	No difference	No difference
Symptoms	No difference	No difference	UC > PC for some	No difference	—	No difference
Depression	PC > UC	No difference	No difference	No difference	PC > UC for some	No difference
Patient satisfaction	—	—	—	—	—	—
Communication	—	—	—	No difference	—	UC > PC
End-of-life care	No difference	No difference	No difference	—	No difference	—
Survival	No difference	PC > UC at 1 year	UC > PC	No difference	—	—
Caregiver outcomes	—	PC > UC for some	—	—	—	—
Comments	Focused APN intervention, under enrollment, contamination	Focused APN intervention, under enrollment, crossover, contamination	Focused APN intervention, no structured follow-up, under enrollment	Limited MD involvement, both inpatients and outpatients were recruited	Primary PC without MDs, limited follow-up, under enrollment	Primary PC without MDs, different patient groups between arms, cross-cluster contamination

NOTE. The primary outcomes are shown in boldface.

Abbreviations: APN, advanced practice nurse; ECOG, Eastern Cooperative Oncology Group; GU, genitourinary; GYN, gynecologic; MD, medical doctor; NR, not reported; PA, physician assistant; PC, palliative care; Psych, psychology; RCT, randomized controlled trial; RN, registered nurse; SW, social worker; UC, usual care.

With a median survival of 10.3 months from time of referral, 72% of patients who attended this clinic believed that the timing of referral was appropriate.⁵¹

In an effort to standardize the processes for outpatient palliative care, investigators from several randomized trials have provided detailed descriptions of their interventions.^{7,8,29,39,52,53} Several groups also have characterized their outpatient clinic operations.⁵⁴ In a qualitative thematic analysis of medical records, Yoong et al⁵⁵ reported that palliative care was actively involved in managing symptoms, facilitating coping, establishing illness understanding, and engaging family members throughout the disease trajectory. The first two visits were more likely to involve relationship and rapport building and cancer treatment discussions and the last two visits were more likely to involve end-of-life planning and decision making around cancer treatments. Hoerger et al⁵⁶ found that addressing coping was associated with improved quality of life and depressive symptoms, addressing treatment decisions was associated with a lower likelihood of initiating chemotherapy at the end of life, and addressing advanced care planning was associated with greater hospice care use.

Much heterogeneity exists in the referral criteria for outpatient clinics.⁵⁷ Although clinical trials support universal referral on the basis of time since diagnosis or prognosis,

the current palliative care workforce may not be able to serve all patients with cancer, particularly when more patients are being seen earlier in the disease trajectory.⁵⁸ Instead of time-based criteria, need-based referral criteria have been proposed to identify patients who are most likely to benefit from palliative care.⁵⁹ Only one randomized trial has examined referral on the basis of symptom burden, and its interpretation was complicated by methodological issues³⁰ (Table 2A). A recent Delphi study highlighted 11 major criteria for referral on the basis of an international consensus^{59,60} (Table 4). Additional research is needed to validate these criteria.

Variations of Outpatient Palliative Care

Embedded clinics. In a 2015 survey, 52% of the specialist palliative care clinics at NCCN cancer centers reported having embedded clinics. Although embedded clinics generally suggest that the palliative care team and the oncology team share the same clinic space and see the same patients on the same day, the nature of embeddedness is not always clearly articulated in the literature, and the distinction between embedded and stand-alone clinics is sometimes blurred.⁶¹⁻⁶⁴ A few case series and non-randomized controlled studies, which mostly involved advanced practice providers, have been reported with mixed

TABLE 3. Methodological Challenges Related to Randomized Trials in Outpatient Palliative Care

Category	Specific Issues	Impact on Trial Outcomes
Standardization of intervention	Not all palliative care interventions were fully interdisciplinary* Variable level of training of palliative care specialists Variable intensity of consultation and follow-up Variable resources to support palliative care team	Negative outcomes if intervention not robust
Intervention fidelity and delivery	Intervention may not be provided as designed Difficulty with delivering the full dose of intervention because of patient preference and logistical issues	Negative outcomes if intervention cannot be fully delivered
Contamination	Sizable proportion of patients in usual care group received palliative care, albeit often delayed	False-negative findings
Recruitment	Studies unable to recruit the planned number of patients	Underpowered study False-negative findings
Attrition	Attrition as a result of death, deterioration, or relocation	Underpowered study False-negative findings
Co-interventions	Patients in both groups may receive primary palliative care, psychology, psychiatry, pain services, and other supportive care interventions	Greater experimental noise False-negative findings
Study outcomes	Patient-reported outcomes are subjective and difficult to assess Different studies used different outcome measures Responsiveness and minimal clinically important difference not always determined	Difficulty with trial outcome interpretation False-negative findings if outcomes not responsive to change
Statistical challenges	Imputation can be done for missing data, but all methods have limitations Symptoms often worsen as patients approach the end of life Complex statistical models needed to account for dynamic symptom profile	Incorrect assumptions may invalidate statistical inference
Blinding	A majority of the studies were not blinded Potential for bias particularly when primary outcome is often patient reported	False-positive findings
Reporting	Inadequate description of the palliative care intervention	Difficulty with interpreting the findings

*In an international Delphi study, an interdisciplinary team was defined as consisting of at least a physician, nurse, and psychosocial oncology professional (eg, chaplain, social worker, psychologist).¹¹¹

findings.⁶¹⁻⁶⁴ The strengths and weaknesses of the embedded model have been discussed in depth elsewhere.^{19,24}

Telehealth interventions

Telehealth interventions may be the primary model of outpatient palliative care delivery, particularly for patients in

rural areas where access to tertiary care is more challenging. In the Project Educate, Nurture, Advise, Before Life Ends (ENABLE) II study, Bakitas et al³⁵ compared patients randomly assigned to a nurse-led, predominantly telehealth-based palliative care intervention and usual care. The structured palliative care intervention was found

TABLE 4. Referral Criteria for Outpatient Palliative Care Consultation Teams

Criterion	Need or Time Based	Category
Severe physical symptoms (eg, pain, dyspnea, nausea scored 7-10 on a 10-point scale)	Need	Severe distress
Severe emotional symptoms (eg, depression or anxiety scored 7-10 on a 10-point scale)	Need	Severe distress
Request for hastened death	Need	Severe distress
Spiritual or existential crisis	Need	Severe distress
Assistance with decision making or care planning	Need	Additional support
Patient request	Need	Additional support
Delirium	Need	Neurologic complications
Brain or leptomeningeal metastases	Need	Neurologic complications
Spinal cord compression or cauda equina syndrome	Need	Neurologic complications
Within 3 months of diagnosis of advanced or incurable cancer for patients with median survival of ≤ 1 year	Time	Time from cancer diagnosis
Diagnosis of advanced cancer with progressive disease despite second-line systemic therapy (incurable)	Time	Progression from treatment

NOTE. From Hui et al.⁵⁹

TABLE 5. Referral Criteria for Inpatient Palliative Care Consultation Teams for Patients With a Life-Limiting or Life-Threatening Condition

Primary Criteria*	Secondary Criteria†
The surprise question: You would not be surprised if the patient died within 12 months or before adulthood	Metastatic or locally advanced incurable cancer
Frequent admissions (eg, more than one admission for same condition within several months)	Admission from long-term-care facility or medical foster home
Admission prompted by difficult-to-control physical or psychological symptoms (eg, moderate to severe symptom intensity for > 24-48 hours)	Elderly patient, cognitively impaired, with acute hip fracture
Complex care requirements (eg, functional dependency; complex home support for ventilator, antibiotics, and feedings)	Long-term home oxygen use
Decline in function, feeding intolerance, or unintended decline in weight (eg, failure to thrive)	Out-of-hospital cardiac arrest
	Current or past hospice program enrollee
	Limited social support (eg, family stress, chronic mental illness)
	No history of completing an advance care planning discussion/document

NOTE. From Weissman and Meier.⁷⁵

*Global indicators that represent the minimum that hospitals should use to screen patients at risk for unmet palliative care needs.

†More-specific indicators of a high likelihood of unmet palliative care needs and should be incorporated into a systems-based approach to patient identification if possible.

to improve quality of life and mood but not symptom burden or quality of end-of-life care. Using a waitlist design, Project ENABLE III reported no difference in quality of life and symptom control between palliative care and usual care; 1-year survival was significantly longer in the palliative care group but not overall survival (Table 2B). However, Project ENABLE III was complicated by under enrollment and contamination.³⁶ An ongoing randomized clinical trial aims to address whether face-to-face palliative care visits are equivalent to telehealth (ClinicalTrials.gov identifier: NCT03375489).

Telehealth palliative care also may be provided as an outreach to augment existing outpatient clinics.⁶⁵ Specifically, clinicians may be able to provide education, counseling, and symptom monitoring in a cost-effective manner with the potential to improve adherence, increase hospice referrals, and minimize acute care visits.⁶⁶ Additional studies are needed to examine these outcomes.

Enhanced primary palliative care

Instead of referral to specialist palliative care teams, two randomized trials have examined the alternative model of enhanced primary palliative care provided by nurse practitioners in the oncology clinic.^{40,41} Neither trial provided clear evidence of benefits compared with usual oncologic care; however, both trials had significant methodological issues that complicated their interpretation (Table 2B). At this time, this model of care without specialist palliative care is not supported by available evidence.

INPATIENT CONSULTATION SERVICES

Inpatient palliative care consultation teams represent the backbone of palliative care. In the United States, approximately 90% of NCI-designated cancer centers reported having inpatient consultation teams.^{22,67} In 2010, 56% of non-NCI-designated cancer centers had an inpatient consultation service, and this proportion has been rising steadily.⁶⁷ Palliative care consultants, including physicians,

advanced practice providers, nurses, and/or psychosocial professionals, typically have daily rounds with hospitalized patients. In contrast to outpatient palliative care, the median survival from referral to death is shorter, ranging from days to weeks and sometimes months.⁶⁷

Several randomized studies have been conducted to examine the benefits of inpatient palliative care for patients with cancer. In a single-blind randomized trial, Grudzen et al⁶⁸ compared inpatient palliative care consultation and routine care for patients with advanced cancer admitted through the emergency department. The palliative care team, which consisted of a physician, a nurse practitioner, a social worker, and a chaplain, focused on symptom management and care planning and followed patients daily while in the hospital. The palliative care group was associated with a significant improvement in quality of life at 12 weeks compared with usual care. This finding was interesting given the relatively short duration of the inpatient palliative care intervention during a short hospital stay (mean, 6 days), although some patients also received outpatient palliative care after discharge. No statistically significant difference was found in secondary outcomes, such as rates of depression, intensive care unit admissions, hospice discharge, and survival, albeit a trend favored the palliative care group.

The role of inpatient palliative care consultation also has been examined in patients admitted for hematopoietic stem-cell transplantation. In a groundbreaking randomized clinical trial, El-Jawahri et al⁶⁹ found that patients who received a palliative care referral had a better quality of life, lower depression, lower anxiety, and lower symptom burden at 14 days than patients who received care only from their transplantation team. During the hospitalization period with a median of 20 days, the palliative care team provided a median of eight visits. Only two patients in the control group had palliative care consultation. This beneficial effect was persistent at 3-month follow-up, and patients in the palliative care group also reported lower post-traumatic

stress disorder.⁶⁹ Caregivers also had lower rates of depression and post-traumatic stress disorder at 6 months post-transplantation.⁷⁰ This study is unique because it involved the introduction of palliative care to patients with hematologic malignancies, some with curative potential. It highlights the added benefits of palliative care even when patients were already receiving intensive supportive care from a transplantation team. Moreover, palliative care had a positive impact on caregivers.

Inpatient palliative care referrals improve not only patient outcomes but also cost of care. Using propensity score analysis, multiple studies have reported that inpatient palliative care referral is associated with lower cost of hospitalization.⁷¹⁻⁷³ A recent meta-analysis that combined data from six studies found that an inpatient palliative care consultation within 3 days of admission was associated with a cost savings of \$4,251 per admission for patients with cancer.⁷⁴

At this time, the existing palliative care infrastructure cannot accommodate universal referral of all hospitalized patients with advanced cancer. The Center to Advance Palliative Care has outlined several criteria for referral of patients to inpatient palliative care⁷⁵ (Table 5). Continuity of care after discharge can be provided by outpatient palliative care and/or community-based palliative care (Fig 1).

APCUs

Similar to the concept of intensive care units where medically complex patients receive life-sustaining therapies from highly specialized teams, APCUs are dedicated inpatient units where the interdisciplinary palliative care teams assume primary responsibility to deliver comprehensive care that addresses the physical, emotional, and spiritual domains of suffering for patients in severe distress. In addition to conventional acute care, the APCU teams often conduct complex interventions, such as rapid analgesic titration/rotation for intractable pain, palliative sedation for refractory agitated delirium, and facilitating difficult goals-of-care discussions and discharge planning.⁷⁶⁻⁷⁸

Because of the intensive nature of care, APCUs are likely to be found in larger hospitals with adequate resources to support larger palliative care teams. APCUs are currently only available in approximately 20% to 30% of cancer centers in the United States; in contrast, 70% of European Society for Medical Oncology–designated Centers of Integrated Oncology and Palliative Care have APCUs.^{21,79} This discrepancy may be related to differences in health care culture and reimbursement policies.

Patients admitted to APCUs often have severe distress that would benefit from more intensive interdisciplinary management than what a typical inpatient consultation team can provide. The median survival of patients admitted to APCUs is typically in terms of days to weeks, with an in-hospital mortality rate of 30% to 50%.²¹ In one cohort of

2,568 APCU patients, 958 (33%) died during admission, 1,259 (43%) were discharged to hospice, 592 (20%) returned home without hospice, and 89 (3%) were discharged to health care facilities.⁶⁷ Among those with a home discharge without hospice, 22% were alive at 6 months.⁶⁷ A small proportion of patients received cancer therapy simultaneously.⁸⁰

To our knowledge, no randomized controlled trial has specifically examined the outcomes associated with APCUs. However, findings from postdischarge surveys have been encouraging. In a large telephone survey of bereaved caregivers, Casarett et al⁸¹ compared the proportion of caregivers who perceived care received in the last month of life as excellent among patients treated in APCUs, consulted by an inpatient palliative care team, and who did not receive palliative care. APCUs were viewed more favorably than inpatient palliative care consults (propensity adjusted proportions, 63% v 53%; $P = .04$), which was, in turn, better than no palliative care (51% v 46%; $P = .04$). A cluster randomized trial found that institution of a comfort care pathway alone without specialist palliative care involvement did not result in better outcomes.⁸² Taken together, these studies suggest that APCUs may play a unique role in the delivery of care to patients at the end of life. In addition to comprehensive patient care, APCUs represent a unique setting for research to answer some critical questions at the end of life, such as signs of impending death and agitated delirium.⁸³⁻⁸⁵ More research is needed to examine which patients would most benefit from APCUs.

COMMUNITY-BASED PALLIATIVE CARE

Community-based palliative care programs provide in-person visits, equipment, supplies, and telephone support for patients at home or in community-based care facilities, such as nursing home and skilled nursing facilities. Only approximately 25% of cancer centers operate community-based palliative care teams, and other centers may contract palliative care services in the community.²¹ Patients enrolled in such programs typically are clinically stable and have a poor performance status, short expected survival, and a desire to continue care at ambulatory clinics (Fig 1; Table 1). Community-based palliative care programs differ from typical home care programs because they are staffed by palliative care teams and have a stronger expertise in end-of-life care.⁸⁶

Multiple randomized controlled trials have examined variations of community-based palliative care.⁸⁷⁻⁹⁶ A majority of the studies were conducted before 2010, and the palliative care interventions have not been standardized. Meta-analyses found that home-based palliative care significantly increases the rate of home death.^{86,97} Moreover, community-based palliative care improves symptom control and satisfaction, although its impact on other outcomes, such as caregiver well-being and cost of care, is less

conclusive.^{86,97} Similar to outpatient and inpatient models of palliative care, earlier involvement of community-based palliative care was associated with improved outcomes.⁹⁸ More common in Europe, palliative day-care programs are available in the community setting to provide physical, psychological, social, and spiritual support for patients and respite and bereavement care for caregivers.⁹⁹ These programs often are attached to an inpatient hospice unit.¹⁰⁰ However, few studies have systematically evaluated the outcomes of such programs.^{100,101}

HOSPICE CARE

The Medicare Hospice Benefit program was established in 1982 and covers hospice care at home or inpatient facilities. According to the Dartmouth Atlas Project, 63% of patients with cancer enrolled in hospice before death in 2012.¹⁰² Hospice care represents one of five service models of palliative care, although many clinicians and patients still have the misconception that the two are synonymous.^{46,47,103} In contrast to community-based palliative care, hospice care recipients are no longer seeking care at acute care facilities. Although patients with incurable cancer and a life expectancy of 6 months or less would qualify for hospice, the reality is that many postpone enrollment until the final weeks or days of life. Indeed, 16% died within 3 days of hospice enrollment in 2012.¹⁰⁴ Of note, palliative care referral is associated with greater frequency and earlier hospice referral.⁶¹

Hospice care allows patients to be supported in the community and provides an alternative to dying in the hospital. In a randomized trial, Kane and colleagues¹⁰⁵⁻¹⁰⁷ reported that hospice care results in less depression and greater satisfaction with care compared with no hospice care but found no difference in other outcomes, such as pain management, hospital stay, or cost of

care. Subsequently, large population-based studies found that hospice care was associated with lower rates of hospitalizations, emergency department visits, intensive care unit admissions, and costs of care in the last year of life.^{108,109}

In conclusion, from hospice care to inpatient palliative care and outpatient clinics, palliative care has evolved over the past five decades as a professional specialty and refined its expertise to serve a greater population of patients and earlier in the disease course. The five models of palliative care complement one another to optimize care along the disease continuum for patients with cancer and their caregivers.

Existing evidence supports that early referral to interdisciplinary palliative care teams can improve patient and caregiver outcomes when added onto primary palliative care provided by the oncology team. Going forward, it is critical to define the standards and components of palliative care interventions while tailoring each to unique patient needs, care settings, and countries.¹¹⁰ For example, an international Delphi study reached the consensus that the minimum standard for an interdisciplinary palliative care team should consist of a physician, nurse, and a psychosocial team member.¹¹¹ Active efforts are also under way to examine the impact of service model variations. Telehealth has the potential to provide greater palliative care access in a cost-effective manner. Furthermore, clinical initiatives and research studies are exploring how palliative care can be best positioned to deliver supportive care earlier in the disease trajectory (eg, patients with curable cancers) and to other groups less often seen by palliative care (eg, patients with hematologic malignancies or pediatric malignancies). More research also is needed to understand how primary palliative care delivered by oncologists and primary care teams can be integrated with specialist palliative care.

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SUPPORT

Supported in part by National Cancer Institute grants (1R01CA214960-01A1, 1R21NR016736-01) (D.H.), an American Cancer Society Mentored Research Scholar Grant in Applied and Clinical Research

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(MRS-14-1418-01-CCE) (D.H.), and the Andrew Sabin Family Fellowship (D.H.).

AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST AND DATA AVAILABILITY STATEMENT

Disclosures provided by the authors and data availability statement (if applicable) are available with this article at DOI <https://doi.org/10.1200/JCO.18.02123>.

AUTHOR CONTRIBUTIONS

Conception and design: All authors

Manuscript writing: All authors

Final approval of manuscript: All authors

Accountable for all aspects of the work: All authors

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AUTHORS' DISCLOSURES OF POTENTIAL CONFLICTS OF INTEREST

Models of Palliative Care Delivery for Patients With Cancer

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Research Funding: Helsinn Therapeutics (Inst), Insys Therapeutics (Inst), TEVA Pharmaceutical Industries (Inst)

Eduardo Bruera

Research Funding: Helsinn Therapeutics