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NARRATIVE REVIEW

Implementation Models and Equity in the Early Integration of Palliative Care into Oncology: A Narrative Review

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Abstract

Background: Randomised evidence shows that early integration of palliative care alongside active oncological treatment improves quality of life and end-of-life care in patients with advanced cancer. Despite guideline endorsement, this model is inconsistently implemented, and its benefits may not be equally distributed across populations.

Methods: This is a narrative, critically appraised review rather than a systematic review. PubMed/MEDLINE, Embase, and the Cochrane Library were searched from January 2009 to July 2026 for trials, meta-analyses, and guideline statements on early palliative care integration, implementation science, and equity in oncology; search terms and selection criteria are detailed in Section 2.

Findings: Five delivery and implementation models are reviewed: early integrated specialist care, stepped needs-triggered care, telehealth-enabled delivery, primary/generalist care with task-shifting, and electronic patient-reported-outcome (ePRO)-triggered screening. Pooled analyses across 43 randomised trials show consistent quality-of-life benefit but no significant survival benefit. Two 2024 trials found that stepped care is non-inferior to intensive early integrated care with substantially fewer specialist visits, and that video-delivered care is equivalent to in-person care. Promising, though still early-stage, equity-oriented interventions include community-health-worker models, lay navigation, and culturally tailored decision aids. Disparities in utilisation by race, income, and geography are well documented in high-income settings, and the global burden of serious health-related suffering remains concentrated in low- and middle-income countries, where basic access to palliative care — not only specialist referral pathways — is the binding constraint.

Conclusions: Scalable delivery models can narrow the efficacy–implementation gap, but efficiency and equity are distinct goals: models that conserve specialist resources require deliberate, tested safeguards to avoid widening disparities rather than closing them.

Keywords: early palliative care; integrated oncology; implementation science; health equity; stepped care; telehealth; community health workers; serious health-related suffering.

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1. Introduction

Palliative care is holistic, interdisciplinary care directed at the relief of physical, psychosocial, and spiritual suffering across the illness trajectory. Over the past 15 years a body of randomised evidence has redefined its role in oncology from a terminal-phase service to a concurrent standard of care initiated soon after the diagnosis of advanced malignancy. The Project ENABLE II trial randomised patients with advanced cancer to a nurse-led,

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psychoeducational palliative care intervention or usual care, and found improved quality of life and lower symptom intensity in the intervention arm [1]. The pivotal trial by Temel and colleagues subsequently randomised patients with newly diagnosed metastatic non–small-cell lung cancer (NSCLC) to early integrated specialist palliative care or standard oncology care, and demonstrated superior quality of life, less aggressive end-of-life care, and a median overall survival advantage (11.6 vs 8.0 months) [2]. These findings were subsequently extended across tumour types and settings by a cluster-randomised trial in Toronto [3] and a telephone-based trial in rural New England [4].

Individual-trial estimates are heterogeneous, and the Temel 2010 survival signal in particular has not been consistently reproduced. A 2016 meta-analysis pooling 43 randomised trials found a consistent quality-of-life benefit at 1–3 months but no statistically significant association with survival [5]; a 2017 Cochrane review similarly found a small improvement in health-related quality of life (HRQoL; standardised mean difference 0.27, 95% CI 0.15–0.38), rated low-certainty, with uncertain effects on survival [6]. We use “quality of life” (QoL) as the general term throughout this review and note HRQoL only where a cited source used that specific instrument-based terminology. The distinction between individual-trial findings and pooled estimates matters: this review treats the replicated QoL and symptom benefit as the robust finding, and treats survival benefit as an intriguing but inconsistent secondary result, not an established causal effect.

On this evidence, the 2024 American Society of Clinical Oncology (ASCO) guideline update recommends that clinicians refer patients with advanced solid tumours — and, newly, those with haematologic malignancies and participants in early-phase trials — to interdisciplinary palliative care teams early in the disease course [7,8], extending the 2017 recommendations [9].

Yet an efficacy–implementation gap remains. Early integrated palliative care is resource-intensive, and the World Health Organization estimates that only about 14% of people who need palliative care currently receive it [10], a shortfall the 2014 World Health Assembly resolution called on member states to address [11]. Compounding under-implementation, the benefits that are delivered may not reach all populations equally. This review synthesises the principal delivery and implementation models for early palliative care in oncology, situates them within an implementation-science framework, and critically appraises their equity implications — distinguishing, throughout, between disparities that have been empirically demonstrated and mechanisms of inequity that are plausible but not yet directly tested.

2. Methods: Scope, Search Strategy, and Selection

This is a narrative review and was not prospectively registered. PubMed/MEDLINE, Embase, and the Cochrane Central Register of Controlled Trials were searched from January 2009 (the publication year of ENABLE II) through July 2026. Search terms combined, within each database’s syntax, the concepts: (“palliative care” OR “supportive care”) AND (“early integration” OR “early palliative care” OR “concurrent care”) AND (“implementation” OR “implementation science” OR “equity” OR “disparities” OR “access”) AND (“oncology” OR “cancer” OR “neoplasm”). Guideline repositories (ASCO, National Comprehensive Cancer Network, European Society for Medical Oncology) and World Health Organization policy pages were searched directly using equivalent terms. Randomised controlled trials, meta-analyses, Cochrane systematic reviews, guideline statements, and Lancet Commission reports were prioritised for inclusion; single-arm cohort studies were included selectively where no higher-quality evidence existed, most often for low- and middle-income country (LMIC) delivery models. Reference lists of retrieved articles, and of a 2026 editorial synthesis of advances in

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palliative and supportive oncology [12], were hand-searched for additional sources. Screening and selection were performed by a single reviewer rather than two independent reviewers, and no formal risk-of-bias tool was applied to included studies; this approach does not meet systematic-review standards and should be read as an expert narrative synthesis, with conclusions about intervention efficacy deferring to the meta-analyses and Cochrane review cited where available.

3. Foundational Evidence Base: Landmark Trials and Quantitative Synthesis

Table 1 summarises the trials and pooled analyses that anchor this review. Two features merit emphasis. First, the quality-of-life and symptom benefit of early palliative care is the most consistently replicated finding across both meta-analyses cited above and the individual trials in Table 1; by contrast, the overall-survival advantage observed in the original Temel trial has not been consistently reproduced in later trials or in pooled analysis, and should not be presented as an established causal effect of the intervention. Second, the landmark trials share generalisability limitations — predominantly academic-centre, English-speaking, insured, white populations, and a narrow range of tumour types — a limitation Section 10 develops in detail.

Table 1. Pivotal trials and quantitative syntheses shaping early palliative care integration in oncology.

Study (year)	Design / N	Model tested	Key outcomes
Bakitas et al., ENABLE II (2009) [1]	RCT; n=322; single centre	Nurse-led psychoeducational PC vs usual care	Improved QoL and symptom intensity; no significant mood benefit
Temel et al. (2010) [2]	RCT; n=151; single centre	Early integrated specialist PC vs standard care	Improved QoL and mood; less aggressive EOL care; median OS 11.6 vs 8.0 mo — survival finding not consistently replicated (see text)
Zimmermann et al. (2014) [3]	Cluster RCT; n=461; 24 clusters	Early integrated outpatient PC vs usual care	Improved QoL, symptoms, and satisfaction at 4 months; no survival difference
Bakitas et al., ENABLE III (2015) [4]	RCT; n=207; telephone-based	Early vs delayed concurrent PC	Survival and mood benefits favouring early initiation; no QoL difference between arms
Kavalieratos et al., meta-analysis (2016) [5]	Meta-analysis; 43 RCTs, n=12,731	Pooled specialist PC vs usual care	QoL benefit at 1–3 months; improved symptom burden; no significant survival association
Haun et al., Cochrane review (2017) [6]	Cochrane SR; 7 RCTs	Pooled early PC vs usual/delayed care	Small HRQoL benefit (SMD 0.27, 95% CI 0.15–0.38), low-certainty; survival/ mood effects uncertain
Temel et al., STEP-PC (2024) [13]	Non-inferiority RCT; n=507; 3 academic centres	Stepped, needs-triggered PC vs early integrated PC	Non-inferior QoL (FACT-L 100.6 vs 97.8); visits 2.4 vs 4.7 (P<.001)
Greer et al., REACH-PC (2024) [14]	Non-inferiority RCT; n=1,250; 22 US sites	Telehealth (video) vs in-person early PC	Equivalent QoL at 24 weeks; caregiver participation modestly lower via telehealth
Basch et al., PRO-TECT (2025) [15]	Cluster RCT; n=1,191; 52 community practices	ePRO-triggered symptom monitoring vs usual care	No OS benefit (HR 0.99); delayed time to ED visit (HR 0.84) and functional decline (HR 0.73)

PC, palliative care; QoL, quality of life; HRQoL, health-related quality of life; EOL, end of life; OS, overall survival; RCT, randomised controlled trial; SR, systematic review; SMD, standardised mean difference; FACT-L, Functional Assessment of Cancer Therapy–Lung; ePRO, electronic patient-reported outcome; ED, emergency department.

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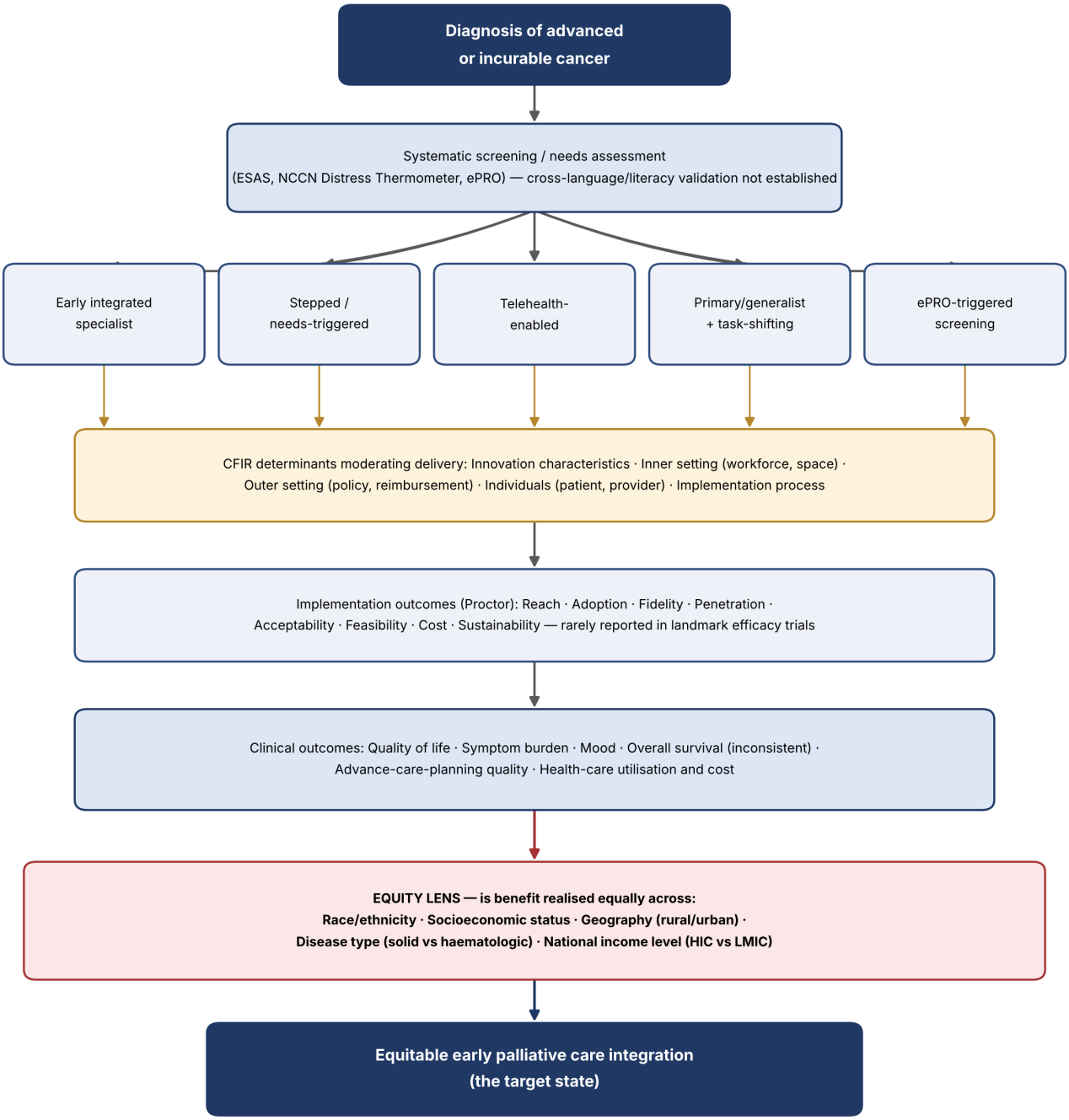
4. Conceptual Framework: An Implementation-Science Lens

A recurring limitation of the early-palliative-care literature is that trials report clinical efficacy without engaging the vocabulary of implementation science, leaving readers unable to judge how findings will translate outside a trial infrastructure. Three frameworks are used throughout this review. RE-AIM evaluates public-health impact along five dimensions — Reach, Effectiveness, Adoption, Implementation (fidelity), and Maintenance [16]. The Consolidated Framework for Implementation Research (CFIR) organises contextual determinants of implementation success into innovation characteristics, inner setting, outer setting, individual characteristics, and implementation process [17]; a mixed-methods case study of three National Cancer Institute–designated cancer centres found that inner-setting constraints — limited specialist staffing, scattered clinic schedules that impeded co-location with oncology, and the absence of formal referral triggers — were the dominant barriers to early specialty palliative care integration, more so than financial or reimbursement factors [18]. Proctor's taxonomy specifies eight implementation outcomes — including acceptability, adoption, fidelity, penetration, and sustainability — as conceptually distinct from clinical effectiveness [19], and Curran's typology of hybrid effectiveness–implementation designs describes how a single trial can test clinical effectiveness and implementation strategy together rather than sequentially [20].

Figure 1 situates the five models reviewed in Section 5 within this framework: screening and needs assessment select patients into a delivery model; CFIR determinants (workforce, reimbursement, digital infrastructure, patient and provider characteristics) moderate how faithfully that model is implemented; implementation outcomes in Proctor's taxonomy determine whether the model reaches, and is sustained for, the intended population; and only then do clinical outcomes accrue — filtered, finally, through an equity lens asking whether benefit is realised equally across race, socioeconomic status, geography, disease type, and national income level. Table 4 (Section 10) applies this framework retrospectively to the trials in Table 1 and shows that implementation outcomes are, in fact, rarely reported.

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Figure 1. Conceptual framework linking delivery/implementation strategy, CFIR determinants, Proctor implementation outcomes, and clinical outcomes, filtered through an explicit equity lens. CFIR, Consolidated Framework for Implementation Research; ePRO, electronic patient-reported outcome; HIC, high-income country; LMIC, low- and middle-income country.



5. Delivery and Implementation Models

Contemporary strategies can be organised into five models, summarised in Table 2. These are not equivalent concepts: the first four describe how care is delivered (by whom, in what setting, at what intensity), while the fifth — ePRO-triggered screening — describes a referral and

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triggering mechanism rather than a delivery format in its own right. We group it alongside the delivery models because, in practice, it functions as the entry mechanism that determines whether and when a patient reaches any of the other four; the models are not mutually exclusive, and mature programmes typically combine a delivery format with a screening or triggering mechanism.

5.1 Early integrated specialist (embedded/co-located) care

This is the model validated in the foundational trials introduced in Section 1: monthly (or more frequent) longitudinal visits with a specialist palliative care clinician embedded within, or co-located alongside, the oncology clinic. It produces the most consistently reported quality-of-life effect, but is the most resource-intensive model and, at scale, is rate-limited by specialist supply. None of the foundational trials reported adoption, penetration, or sustainability outside the trial infrastructure; its efficacy created the implementation problem the subsequent models attempt to resolve.

5.2 Stepped, needs-triggered care

Stepped care rations specialist intensity to demonstrated need. In the multisite non-inferiority STEP-PC trial, 507 patients with advanced lung cancer were randomised to early integrated care (visits every four weeks) or stepped care, in which an initial visit was followed by further specialist contact only when triggered by a clinically meaningful decline in quality-of-life score or by hospitalisation [13]. Stepped care was non-inferior for quality of life while approximately halving specialist visits (Table 1). This offers a compelling efficiency proposition, though the trial population — enrolled at three well-resourced academic centres in a single tumour type — leaves reach and external validity in community and resource-limited settings to be established.

5.3 Telehealth-enabled delivery

Telehealth directly addresses geographic and mobility barriers. The REACH-PC trial randomised 1,250 patients with advanced NSCLC across 22 US sites to early palliative care delivered by video versus in person; quality of life, mood, and satisfaction were equivalent between arms [14]. Video delivery therefore expands reach without measurable loss of benefit among patients who were successfully enrolled and connected. Two caveats apply. First, caregiver participation was modestly lower in the telehealth arm, and the trial's own investigators noted the relative homogeneity of the enrolled sample as a limitation on generalising equity conclusions. Second, equivalent efficacy among digitally connected patients does not by itself resolve the upstream digital divide: broadband access, device availability, and digital literacy are socially patterned, and it remains a plausible but currently untested hypothesis — not a demonstrated finding — that telehealth delivery disadvantages patients on the wrong side of that divide. No equity-stratified analysis of REACH-PC outcomes by broadband access or digital literacy has yet been published.

5.4 Primary/generalist palliative care and task-shifting

Extending capacity beyond specialists is indispensable where specialist density is low. Quill and Abernethy distinguish *specialist* palliative care, delivered by dedicated interdisciplinary teams, from *primary* (generalist) palliative care, in which core symptom-management and communication skills are exercised by oncology clinicians themselves [21] — a distinction the 2024 ASCO guideline explicitly adopts. This distinction matters for the equity discussion that follows: a population can lack access to *specialist* palliative care while still receiving adequate *primary* palliative care from a well-trained oncology team, and the policy response to each gap is different. Task-shifting to community health workers (CHWs) and patient navigators extends the same logic further and is discussed with its evidence base in Section 6.5.

DOI: 10.67692/IODT.26.9092

5.5 ePRO-triggered screening

Rather than relying on clinician judgement to prompt referral — a step vulnerable to inconsistency — programmes increasingly use systematic distress screening and electronic patient-reported outcomes (ePROs) to trigger entry into palliative care. A single-centre trial found that ePRO-based symptom monitoring during routine chemotherapy was associated with a survival benefit [22]; the subsequent PRO-TECT cluster-randomised trial across 52 US community oncology practices found no overall survival benefit but confirmed delayed time to first emergency-department visit and better symptom control and quality of life [15]. The shrinkage of effect size, and shift from a survival to a process/quality-of-life benefit, between a single academic centre and a multisite community rollout is itself an implementation finding. PRO-TECT's published subgroups did not identify a differential benefit by race, income, or rurality; ePRO-triggered screening should therefore be regarded as a promising but equity-neutral innovation whose ultimate value depends on whether its underlying instruments are validated across languages and literacy levels (Section 7).

Table 2. Taxonomy of delivery and implementation models for early palliative care integration.

Model	Core features	Evidence base	Equity implications / limitations
Early integrated specialist	Longitudinal embedded/co-located specialist visits from diagnosis	Strongest, most consistent QoL effect [2]	Rate-limited by specialist supply; least scalable; implementation outcomes unreported
Stepped / needs-triggered	Initial visit then specialist contact triggered by symptom decline or hospitalisation	Non-inferior in STEP-PC [13]	Efficient; trigger reliance may plausibly under-detect need in low-literacy/language-discordant groups (untested)
Telehealth-enabled	Video-delivered visits replacing or supplementing in-person care	Equivalent QoL in REACH-PC [14]	Extends geographic reach but exposed to digital divide (plausible, untested); lower caregiver participation (demonstrated)
Primary/generalist & task-shifting	Oncology-clinician, APP, nurse, CHW, and navigator delivery	Framework of Quill and Abernethy [21]; CHW evidence in Section 6.5	Central to LMIC and safety-net scale; distinguishes general PC access from specialist PC access
ePRO-triggered screening	Systematic distress screening and ePRO monitoring, used to trigger the above models	Basch 2017 [22]; PRO-TECT [15]	Standardises access in principle; cross-language/literacy instrument validity is an open question

PRO, patient-reported outcome; QoL, quality of life; APP, advanced-practice provider; CHW, community health worker; LMIC, low- and middle-income country; ePRO, electronic patient-reported outcome.

6. The Equity Dimension

Under-implementation and inequity are distinct but interacting problems: even where early palliative care is available, access and benefit may be stratified along social lines. Five areas

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are considered below. Where the underlying evidence shows a measured disparity in utilisation or outcome, we describe it as demonstrated; where a mechanism is plausible but has not been directly tested against a comparator, we say so explicitly.

6.1 Racial and ethnic disparities

Systematic reviews document lower utilisation of palliative and hospice services among Black and Hispanic patients relative to White patients in the United States, alongside disparities in advance care planning [23,24]. A 2025 retrospective cohort study further linked race, ethnicity, and neighbourhood-level deprivation to differential utilisation [25]. These are demonstrated disparities in utilisation, not merely hypothesised ones. The mechanisms behind them are more varied in their evidentiary support: limited awareness and health literacy, mistrust rooted in structural racism, and language discordance are commonly cited and plausible contributors, while the relative contribution of direct clinician-level referral bias versus between-hospital variation (i.e., minoritised patients being concentrated in under-resourced facilities) remains an active empirical question rather than a settled one.

6.2 Socioeconomic and geographic disparities

Palliative care utilisation is patterned by neighbourhood deprivation and socioeconomic status (Section 6.1), and rural populations face demonstrated specialist scarcity. Telehealth (Section 5.3) and task-shifting (Sections 5.4, 6.5) are the models most directly responsive to these barriers, though as noted above their differential equity impact remains more plausible than directly measured.

6.3 Disease-type and setting inequities

Access has historically been uneven across malignancy types: patients with haematologic malignancies and those enrolled in early-phase trials have received palliative care later and less often than patients with advanced solid tumours, despite comparable symptom burden. The 2024 ASCO update explicitly names these groups, a deliberate correction of this structural inequity within oncology itself.

6.4 Global and low- and middle-income country access

The starkest inequities are international, and here the distinction between *general* palliative care access and *specialist* palliative care access (Section 5.4) is especially important: in most LMICs the binding constraint is not a shortage of specialist referral pathways but the absence of basic symptom control, essential medicines, and trained frontline personnel at any level of care. The Lancet Commission on Global Access to Palliative Care and Pain Relief termed this an “access abyss,” estimating that the great majority of the global burden of serious health-related suffering (SHS) — suffering severe enough to require a health response — falls in LMICs with minimal or no access even to inexpensive, off-patent oral morphine [26]. A 2025 update found the global SHS burden rose 74% between 1990 and 2021, to approximately 73.5 million people, with LMICs accounting for roughly 80% of the total [27]. Earlier projections anticipated that by 2060 nearly half of all deaths worldwide will involve SHS, most of them in LMICs [28]. A public-health strategy — combining policy, opioid-availability reform, education, and primary-level implementation rather than specialist referral networks — has long been advocated by the World Health Organization as the feasible route to closing this gap [29].

6.5 Promising equity-oriented interventions

Documenting disparities is necessary but insufficient; a review of equity in early palliative care integration should also consider interventions intended to narrow the gaps it describes. Three strands are notable, though their maturity varies and should not be overstated. First,

DOI: 10.67692/IODT.26.9092

community health worker (CHW) models: the DeCIDE PC study is a hybrid type 1 effectiveness–implementation randomised trial *protocol* (not yet a completed outcomes trial at the time of this review) testing a CHW-delivered intervention designed to reduce disparities in palliative care access for African American patients with advanced cancer [30]; its results should be awaited before drawing conclusions about effectiveness. Second, lay patient navigation: a Medicare-cost analysis of a lay-navigation programme found that navigated patients' costs declined faster than matched controls', a difference the authors attributed substantially to reduced acute-care use in the last year of life [31] — a completed, if observational, analysis suggesting non-specialist delivery models can be economically sustainable. Third, culturally tailored decision support: a randomised trial of a video decision-support tool for cardiopulmonary resuscitation decision-making found that patients who viewed the video were more likely to decline CPR and scored higher on treatment-relevant knowledge than those receiving verbal narrative alone [32], illustrating that low-literacy-accessible tools can improve the quality of advance care planning discussions. These are promising, evidence-informed directions rather than an established equity solution; the underlying evidence base is considerably thinner than the delivery-efficiency literature reviewed in Section 5.

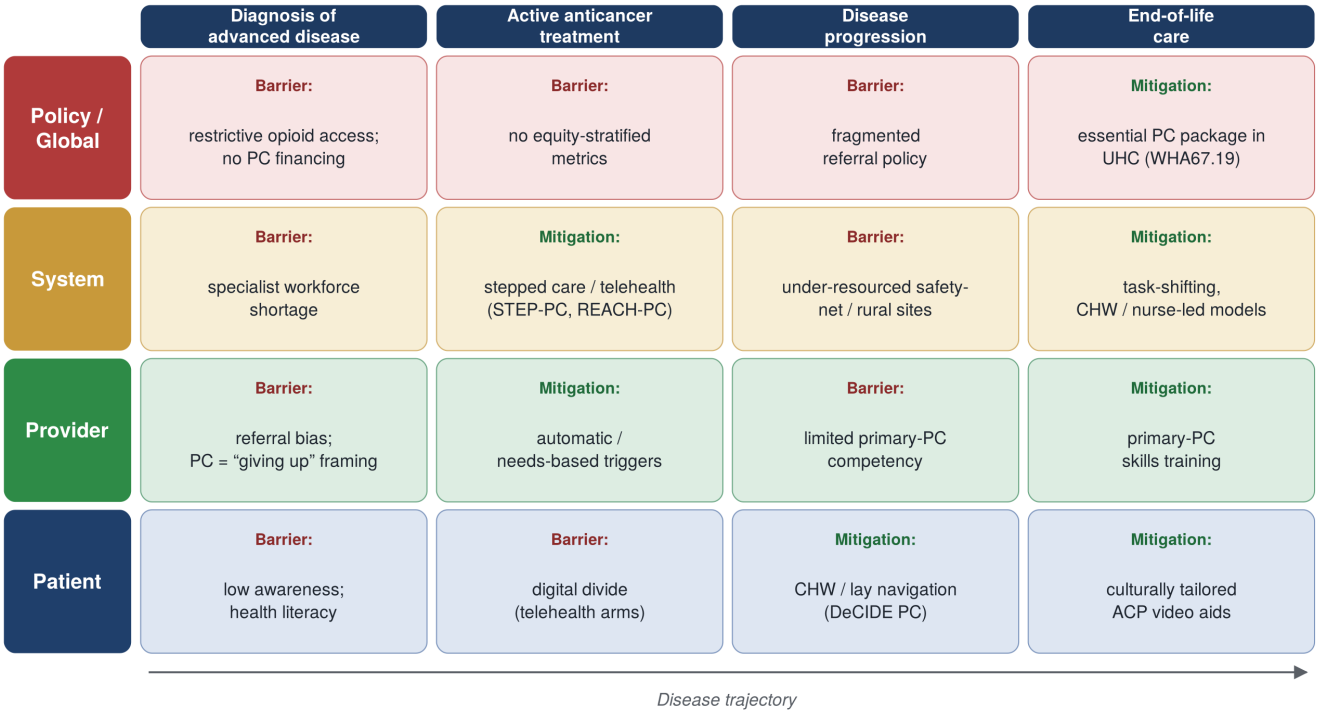
Table 3. Multi-level barriers to equitable early palliative care and candidate mitigations.

Level	Representative barriers	Candidate mitigations (with evidence source)
Patient	Low awareness/health literacy; mistrust; digital access gaps (demonstrated utilisation disparity; mechanism partly plausible)	Culturally tailored decision aids [32]; CHW/navigator support [31]
Provider	Referral bias; limited primary-PC skills; stigma framing PC as "giving up" (plausible contributors, relative weight untested)	Primary-PC competency training [21]; standardised referral criteria [33]
System	Specialist workforce shortage (demonstrated); fragmented records	Stepped and telehealth models [13,14]
Policy / global	Restrictive opioid access; absence of basic (not only specialist) PC infrastructure in LMICs	Essential PC package within universal health coverage [11,26]

PC, palliative care; CHW, community health worker; LMIC, low- and middle-income country.

DOI: 10.67692/IODT.26.9092

Figure 2. Multi-level barriers and facilitators mapped across the cancer care trajectory, corresponding to the levels and sources detailed in Table 3.



7. Needs-Stratified Screening and Referral Criteria

Both the stepped-care model (Section 5.2) and ePRO-triggered screening (Section 5.5) presuppose that an instrument can reliably identify unmet need. An international consensus identified criteria for outpatient specialist referral, including severe symptom burden and limited prognosis [33], operationalised through instruments such as the Edmonton Symptom Assessment System and the NCCN Distress Thermometer [34]. These tools were validated predominantly in English-speaking patients in high-income health systems. Whether their psychometric properties — sensitivity to distress, cultural idioms of symptom expression, and comprehensibility at varying literacy levels — hold across more diverse populations is, to our knowledge, an unresolved empirical question rather than a demonstrated limitation; we were unable to identify a study directly quantifying this gap, and name it here as a priority for future validation research (Section 11) rather than treating referral-trigger validity as either settled or disproven.

8. Delivery Models in Low- and Middle-Income Countries

In LMICs the primary question is often not which of the five models in Section 5 to select, but whether basic palliative care infrastructure and essential medicines exist at all — the general-access, not specialist-access, problem introduced in Section 6.4. Nurse-led and community-based models are frequently the only feasible route to scale. A randomised trial of nurse-led palliative care for HIV-positive patients in Kenya improved mental-health-related quality of life, though it did not significantly reduce pain [35], a nuance worth reporting rather than presenting the trial as an unqualified success. The Neighbourhood Network in Palliative Care in Kerala, India, is a widely cited community-owned model in which trained volunteers and primary-care

DOI: 10.67692/IODT.26.9092

staff deliver most care, with specialist input reserved for complex cases [36] — an approach that anticipates, in a resource-constrained setting, the task-shifting logic discussed for high-income systems in Section 6.5.

Economic evidence for these models is markedly thinner than for their high-income counterparts. A mixed-methods systematic review of cost-effectiveness in LMICs identified only four studies containing genuine cost-effectiveness analyses, and while available data suggested palliative care was generally less costly than the alternative, the authors characterised the evidence base as inadequate and called for dedicated research [37]. This review therefore treats the oft-cited “US$3 per capita” essential-package figure (Section 6.4) as a costed policy target rather than evidence of demonstrated cost-effectiveness, and cautions against extrapolating high-income utilisation-cost findings (Section 6.5) to LMIC settings where health-system context and baseline access differ categorically.

9. Reconciling Scalability and Equity

The central tension of this review is that stepped and telehealth-enabled care are efficiency innovations whose equity consequences remain largely untested rather than demonstrated, in either direction. Stepped care depends on patient-reported triggers; if the instruments that gate specialist escalation prove, on future testing, to be less sensitive among patients with limited literacy or language discordance (Section 7), a nominally equitable algorithm could under-refer precisely the groups already disadvantaged — a plausible risk that current evidence neither confirms nor excludes. Telehealth extends reach only to those already on the connected side of the digital divide (Section 5.3). The promising equity-oriented interventions reviewed in Section 6.5 point toward a design principle rather than a finished solution: efficiency models and equity considerations should be co-designed and co-tested from the outset, rather than evaluated in separate literatures as they largely have been to date.

Right-sizing palliative care to need is sound stewardship only when the measurement of need is itself shown, not merely assumed, to be equitable — which is precisely the evidence that is currently missing.

10. Critical Appraisal of the Evidence Base

Four limitations qualify the conclusions of this review.

- **Generalisability of the landmark trials.** The trials described in Sections 1 and 3 enrolled predominantly white, English-speaking, insured populations at academic or well-resourced centres; PRO-TECT and REACH-PC likewise did not demonstrate a differential equity benefit in subgroup analyses, and REACH-PC’s investigators themselves noted sample homogeneity as a limitation. Efficacy demonstrated in these populations should not be assumed to generalise to minoritised, rural, low-literacy, or LMIC populations.
- **Low-certainty and sparse LMIC cost data.** The economic case for palliative care rests substantially on observational cost-reduction data in high-income settings rather than randomised cost-effectiveness trials, and true cost-effectiveness evidence in LMICs is limited to four identified studies [37]. Claims that palliative care “saves money” should be qualified accordingly outside the health-system context in which most such data were generated.
- **Implementation outcomes are rarely reported.** Table 4 shows that reach, adoption, penetration, and sustainability — as distinct from clinical effectiveness — are inconsistently or never reported across the pivotal trials in Table 1, limiting inference about real-world scalability.

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- **Screening/referral-tool validation gap.** No definitive study was identified quantifying the cross-language or cross-literacy validity of the referral criteria and symptom-screening instruments that stepped-care and ePRO-triggered models depend on (Section 7); this is treated here as an open question, not a resolved one.

Table 4. Implementation outcomes (Proctor taxonomy) reported by pivotal early palliative care trials.

Trial	Reach	Adoption	Fidelity	Penetration	Sustainability / cost
Temel 2010 [2]	Not reported	Not reported	Partial (protocol visits)	Not reported	Not reported
Zimmermann 2014 [3]	Not reported	Not reported	Partial	Not reported	Not reported
ENABLE II/III	Not reported	Not reported	Partial	Not reported	Not reported
STEP-PC 2024 [13]	Partial (3 sites)	Not reported	Yes (visit counts)	Not reported	Not formally costed
REACH-PC 2024 [14]	Partial (22 sites)	Not reported	Yes (mode tracked)	Not reported	Not reported
PRO-TECT 2025 [15]	Yes (52 practices)	Partial	Yes (ePRO completion)	Not reported	Not reported

Assessments reflect the review authors' interpretive appraisal of each publication against Proctor's implementation-outcomes taxonomy (Section 4), not a validated coding instrument; this is an interpretive judgement rather than a systematic audit, and "partial" indicates a proxy measure was reported without formal framing as an implementation outcome.

11. Future Directions and Research Agenda

- **Pragmatic hybrid trials in real-world settings**, following the Curran typology, in community oncology, safety-net systems, and LMICs — not only academic centres.
- **Equity-stratified outcome reporting** by race/ethnicity, socioeconomic status, geography, language, and disease type as a standard requirement, not a post hoc subgroup afterthought.
- **Direct empirical tests of the plausible-but-untested equity mechanisms** named throughout this review — digital-divide effects in telehealth, and literacy/language bias in screening triggers — rather than continued reliance on inference from mechanism alone.
- **Completion and dissemination of equity-targeted intervention trials** such as DeCIDE PC, and rigorous evaluation of CHW/navigator/nurse-led models for effectiveness, fidelity, and cost.
- **LMIC-specific cost-effectiveness research** addressing the gap identified by Reid and colleagues, rather than extrapolation from high-income-country data.
- **Routine reporting of implementation outcomes** (Proctor taxonomy) alongside clinical effectiveness in future trials.

12. Conclusion

Early integration of palliative care into oncology improves quality of life and symptom burden, though its effect on survival is inconsistent across trials. Recent pragmatic trials in stepped care and telehealth offer credible, scalable delivery models, while a smaller, still-maturing evidence base of community-health-worker, navigation, and culturally tailored interventions suggests that equity itself can be designed for and tested, rather than assumed. Because efficiency and

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equity are distinct goals, the models best able to conserve specialist resources are also those most capable of widening disparities if deployed without deliberate, tested safeguards. The priority for the next decade is less to re-demonstrate that early palliative care works than to determine, empirically, whether it reaches and benefits all patients equally — and to report the implementation outcomes that make that determination possible.

Declarations

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