

Economic Impact of Hospital Inpatient Palliative Care Consultation: Review of Current Evidence and Directions for Future Research

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Abstract

Background: Maintaining the recent expansion of palliative care access in the United States is a recognized public health concern. Economic evaluation is essential to validate current provision and assess the case for new programs. Previous economic reviews in palliative care reported on programs across settings and systems; none has examined specifically the hospital consultative model, the dominant model of provision in the United States.

Objectives: To review systematically the economic evidence on specialist palliative care consultation teams in the hospital setting, to appraise this evidence critically, and to identify areas for future research in this field.

Data Sources: A meta-review (“a review of existing reviews”) was conducted of eight published systematic reviews and one relevant nonsystematic review. To identify articles published outside of the timeframe of these reviews, systematic searches were performed on the PubMed, CINAHL, and EconLit databases.

Study Selection: Articles were included if they compared the costs and/or cost effectiveness of a specialist hospital inpatient palliative care consultation for adult patients with those of a comparator.

Results: Ten studies were included and these demonstrate a clear pattern of cost-saving impact from inpatient consultation programs. Nevertheless, knowledge gaps still exist regarding the economic effects of these programs. Current evidence has been generated from the hospital perspective; health system costs, patient and caregiver costs, and health outcomes are typically not included.

Conclusions: Inpatient palliative care consultation programs have been shown to save hospitals money and to provide improved care to patients with serious illness. With a clear pattern of cost-saving using current methodology, it is timely to begin expanding the scope of economic evaluation in this field. Future research must address the measurement of both costs and outcomes to understand more fully the role that palliative care plays in enhancing value in health care. Relevant domains for such research are identified.

Introduction

MAINTAINING THE RECENT EXPANSION of palliative care access in the United States is a recognized public health concern, both to address insufficient provision in underserved regions and to develop national capacity in the context of aging populations and changing patterns of disease.^{1–5}

Evidence-based research is required, systematically appraising the outcomes of programs and identifying the key

processes and structures underpinning these outcomes.^{6–8} Payers and policymakers require evidence to validate current palliative care provision, to explore ways that this could be made more cost effective, and to assess the case for new programs.⁹

One essential component of such a research agenda is economic evaluation. Patients with serious illness and functional impairment account for a rapidly increasing share of medical expenditures in the United States and other high-income countries.⁵ Cost-effectiveness analysis of care

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Accepted May 17, 2014.

provided to people with serious illness has been identified as fundamental to controlling long-term costs.¹⁰

Despite the acknowledged significance of economic analyses in evaluating and informing care provision, the economic literature on programs is small and disparate, reflecting the complexity of palliative care assessment.¹¹ Where the clinical and economic impact of palliative care programs have been analyzed in previous systematic reviews, these have tended to report across different settings, diagnoses, levels of specialism, and national systems, highlighting patterns without focusing on specific programs or models of care.^{12–19}

There has been no economic review focused on specialist hospital inpatient consultation, the dominant model of provision in the United States hospital setting. Nonspecific approaches have been logical given the disparate and formative nature of economic evaluation in palliative care. But as the numbers of programs and of evaluations grow, so does the need for more focused analysis. A review was therefore undertaken to collect systematically the economic evidence on this model specifically, to appraise critically the evidence, and to identify areas for future research in the field.

Methods

Identifying studies for consideration in our review was performed primarily by systematic meta-review (“a review of existing reviews”); instead of collating studies from databases, researchers considered studies included in already published reviews. For time periods not covered by already published reviews, a systematic database search was undertaken.

This was agreed among the authors as an appropriate method given the prior literature and our objectives. In the context of multiple relevant prior reviews, we did not feel that a full systematic review was justified: broadly considered, the economic evidence on palliative care programs has been assembled. What the prior reviews do not provide is a detailed examination of the economic evidence on any specific model of care delivery, or a critical assessment of that evidence. In systematically reviewing relevant previous reviews using clear criteria focusing specifically on economic evaluation of one model, we provide meaningful information that can guide decision making—the primary purpose of a systematic literature review in health care.²⁰ Formal meta-analysis combining these results using statistical modeling is precluded by persistent differences in methods and approach in economic studies of palliative care.¹⁹

Reviews were identified by systematic searches on the PubMed, CINAHL, and EconLit databases. Relevant search terms for palliative care, review, and economics (e.g., palliative, hospice; review, systematic; economic*, cost*) were combined to search titles, abstract, and subject headings to July 31, 2013. A review was included the meta-review only if it reported (1) a systematic search strategy, (2) examining (but not necessarily limited to) inpatient hospital palliative care programs, (3) treating adult patients, and (4) identified outcomes of interest as including (but not necessarily limited to) economic analysis. Only English-language journal articles were considered.

The meta-review returned nine published reviews with a relevant focus,^{12–19,21} summarized in Table 1.

TABLE 1. SYSTEMATIC REVIEWS OF PALLIATIVE CARE PROGRAM EVALUATIONS

Ref #	Review	Number of included papers
(12)	Higginson et al., 2002, UK	13
(13)	Douglas et al., 2003, UK	17
(14)	Higginson et al., 2003, UK	15 ^a
(15)	Zimmermann et al., 2008, US	7 ^b
(21)	Smith and Cassel, 2009, US ^c	21 ^c
(16)	Higginson and Evans, 2010, UK	59
(17)	Simoens et al., 2010, BEL	15
(18)	El-Jawahri et al., 2011, US	22
(19)	Smith et al., 2014, ^d IRL	46

^aSixty-five included in total; 15 reported separately in economic analysis.

^bTwenty-two included in total; 7 reported separately in economic analysis.

^cNot reported as a systematic review; 21 papers discussed in cost analysis.

^dEpub 2013, within the timeframe of the review.

Of these, eight systematic reviews variously focused primarily or exclusively on economic factors in palliative care provision^{13,17,19}; reported economic impact as one outcome of interest separately alongside clinical and other factors^{14,15}; or evaluated palliative care services without particular emphasis on economic considerations.^{12,16,18} An additional review, not reporting a systematic search strategy but with a highly relevant focus, was included in the meta-review following discussion among the authors.²¹ The reviews had a balance between different systems and perspectives in high-income countries with four written by teams based in the United Kingdom,^{12–14,16} three in the United States,^{15,18,21} and one each from Belgium¹⁷ and Ireland.¹⁹

The timeframe of these nine reviews provided full coverage of the relevant published literature to the end of 2011. To supplement these findings and identify papers published since 2011, systematic searches were performed on the PubMed, CINAHL, and EconLit databases. Key search terms from the clinical and economic domains (e.g., palliative, hospice; economic*, cost*) were combined to search titles, abstracts and subject headings from January 1, 2012 to July 31, 2013.

Study selection

All studies included in any of the nine relevant previous reviews and all studies returned by systematic database search were considered for inclusion in our review.

The lead author reviewed all unique titles/abstracts against the inclusion criteria; all deemed irrelevant or not meeting the criteria were removed, all others were read in full against the inclusion criteria. Where there was uncertainty about an article’s suitability for inclusion this was discussed with co-authors.

A study was included in our review only if it contained a credible economic evaluation of a specialist-led multidisciplinary palliative care consultation team to adult patients in the hospital inpatient setting, measuring and comparing the costs and/or cost effectiveness of this intervention against a usual care comparator. Only English-language journal articles were considered.

The rationale for these criteria were agreed among the authors, adapted from the gold standard guidelines for health economic evaluation.²² Drummond and Jefferson's²² full checklist for economic evaluations is far greater; these components were identified as constituting a fair bare minimum threshold in a field in which economic evaluation is at a very early stage. A full breakdown of the appraisal processes are illustrated in Figures 1 and 2.

Findings

Ten economic evaluations of specialist palliative consultation teams in a hospital setting were included in our review.²³⁻³³ These are summarized in Table 2.

Summary

Design and approach

All 10 studies are from the United States. Observational designs dominate with 9 cohort studies^{23-26,28-31,33} and 1 randomized controlled trial.²⁷ Among observational studies there is a wide variation in size with 5 having intervention groups of between 27 and 164 patients,^{23-26,28} and 1 study having 4908 intervention patients.²⁹

Nine of the studies restrict their perspective to the hospital and do not evaluate patient or caregiver outcomes,^{23-26,28-31,33} The remaining article analyzes total health care costs for 6 months postdischarge as well as some patient outcome measures but does not quantify the relationship between the two.²⁷

While there is variation in terms of hospital type and the label given to multidisciplinary teams, the composition of

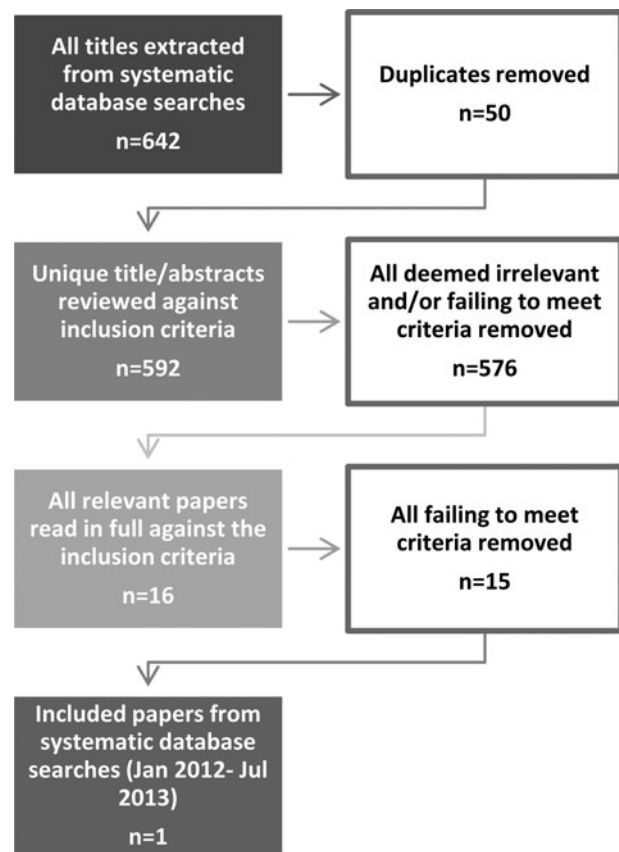


FIG. 2. Database search (January 2012 to July 2013).

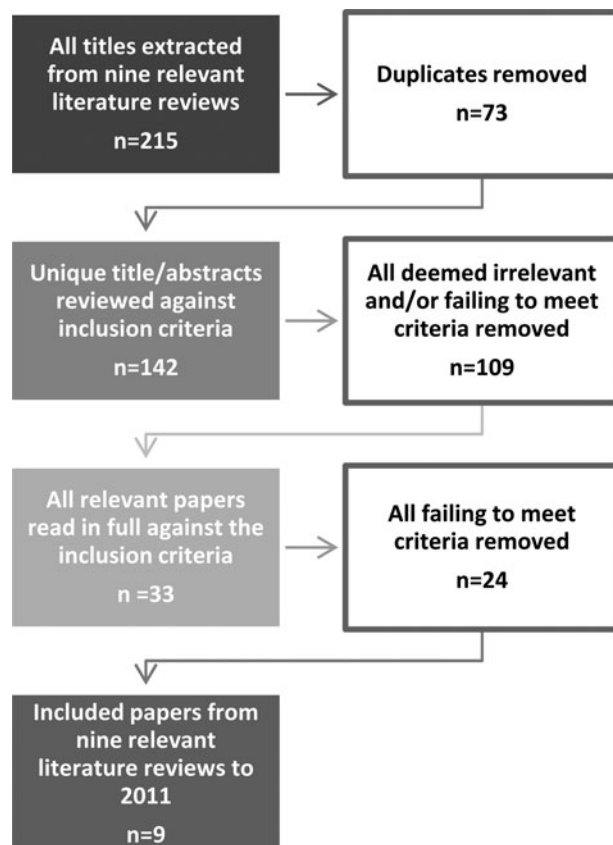


FIG. 1. Meta-review appraisal (to 2011).

those teams are broadly consistent. Six of the 10 evaluations were described as comprising at least a physician, a nurse, a social worker, and a chaplain²³⁻²⁸; in some cases these were also described as including a psychologist and/or an oncology nurse specialist and/or nursing assistants. Of the other 4, 2 were multisite studies in which all teams included a physician and nurse but not all included a social worker and chaplain,^{29,31} and another assessed a newly implemented service that initially comprised a physician and nurse before later incorporating a chaplain.³³ The specific composition of the team was not described in one study,³⁰ but is indicated to be consistent with a prior related study.²⁴

A further source of potential variability between studies is the process and nature of referral. All consultation teams saw patients following referral from another team in the hospital but it is not possible to ascertain how comparable these processes were.

All studies addressed programs that treated a range of diagnoses, although following matching for economic evaluation one study was restricted to patients with cancer.²⁵ Typically the study populations are patients near end of life; the survival rate during the study period for the intervention group varies between 0% and 80%, with a median of 55%.

Results

Overall costs

All 10 studies report that palliative care interventions result in lower costs than their usual care comparators. There

TABLE 2. ECONOMIC EVALUATIONS OF SPECIALIST INPATIENT PALLIATIVE CARE CONSULTATION TEAMS

Ref #	Study	Hospital(s) Team label	Design	Sample size Intervention/control	Principal diagnosis ^a	Outcomes of interest	Key findings
(23)	Cowan, 2004	Hospital not categorized by authors ----- Advanced Illness Assistance Team (AIA)	Cohort	164 PC patients 152 UC patients	Cancer 27% Neurologic 18% Pulmonary 17% Cardiovasc. 12% Organ failure 7% Gastrointestinal 7% Chronic pain 6% Infection 4% Other 2%	Hospital charges; LOS	Lower (~7%) mean daily charges for PC than UC ($p=0.006$) For patients with LOS > 7 days, PC reduces LOS
(24)	Penrod et al., 2006	Two Veterans Administration (VA) facilities ----- Palliative Care Consultation Team (PCCT)	Cohort	82 PC patients 232 UC patients	Cancer 50% Infectious disease 10% Cardiovascular 7% Pulmonary 10% Gastrointestinal 7% Genitourinary 4% Other 12% Cancer 100%	Hospital costs; ICU	PC patients 42% less likely to be admitted to ICU Lower (~22%) daily direct costs for PC than UC ($p<0.0001$) Laboratory & radiology also lower; no difference for pharmacy
(25)	Ciemins et al., 2007	Large, private, not-for-profit medical center ----- Palliative Care Consultation Service (PCCS) Public hospital ----- Palliative Care consultation (PCC)	Cohort	27 PC patients 128 UC patients		Hospital costs	Lower (~13% ^b) mean daily costs for PC than UC ($p<0.01$) Lower (~16%) mean total costs for PC than UC ($p<0.0001$)
(26)	Bendaly et al., 2008	Three managed care organization hospitals ----- Interdisciplinary Palliative Care Service (IPCS)	RCT	275 PC patients 237 UC patients	Pulmonary disorders and/or MV 30% Cardiovascular disorders 23% Neoplasms 16% Infections with or without sepsis 15% Other 16% Cancer 27% CHF 9% MI 1% Other heart disease 3% COPD 13% Other pulmonary disease 1% ESRD 4% Organ failure 12% Stroke 9% Dementia 3% ^c Cancer 61% Cardiopulmonary diseases 11% Neurologic diseases 5% Hepatic/renal failure 4% Acute infections 14% ^d	Hospital charges; LOS	Lower (~16%) median total charges for PC than UC ($p<0.001$) No significant difference in LOS ($p=0.57$)
(27)	Grade et al., 2008	Tertiary academic medical center ----- Palliative Care Consultation Service (PCCS)	Cohort	104 PC patients 1,813 UC patients		Hospital costs, LOS	No difference in total variable costs ($p=0.78$) Lower (~10%) daily variable costs for PC than UC ($p=0.03$) Larger proportional cost savings per day for PC where LOS is greater
(28)	Hanson et al., 2008	Tertiary academic medical center ----- Palliative Care Consultation Service (PCCS)	Cohort	104 PC patients 1,813 UC patients		Hospital costs, LOS	No difference in total variable costs ($p=0.78$) Lower (~10%) daily variable costs for PC than UC ($p=0.03$) Larger proportional cost savings per day for PC where LOS is greater

(continued)

TABLE 2. (CONTINUED)

Ref #	Study	Hospital(s) Team label	Design	Sample size Intervention/control	Principal diagnosis ^a	Outcomes of interest	Key findings
(29)	Morrison et al., 2008	Five community hospitals & three academic medical centers ----- Palliative Care Consultation Team (PCCT)	Cohort	Live discharges 2630 PC patients 18,427 UC patients Hospital deaths 2278 PC patients 2124 UC patients	Live discharge Cancer 29% Infection 4% Cardiovascular 19% Pulmonary 15% Gastrointestinal 7% Genitourinary 4% Other 22% Hospital death Cancer 19% Infection 11% Cardiovascular 24% Pulmonary 18% Gastrointestinal 9% Genitourinary 4% Other 14%	Hospital costs	Live discharges Lower total costs (~14%; $p=0.02$), total costs per day (~19%; $p<0.001$), total direct costs (~15%; $p=0.004$), direct costs per day (~21%; $p<0.001$) for PC than UC Hospital deaths Lower total costs (~18%; $p=0.001$), total costs per day (~22%; $p<0.001$), total direct costs (~22%; $p=0.003$), direct costs per day (~25%; $p<0.001$) for PC than UC
(30)	Penrod et al., 2010	Five Veterans Administration (VA) facilities ----- Palliative Care Consultation Team (PCCT)	Cohort	606 PC patients 2715 UC patients	Cancer 62% ^e COPD 36% CHF 28% HIV/AIDS 3%	Hospital costs, ICU use	PC patients 44% less likely to be admitted to ICU Lower ^f daily direct costs for PC than UC ($p<0.0001$) Pharmacy, laboratory, & nursing also lower; no difference for radiology
(31)	Morrison et al., 2011	A community hospital, two academic medical centers, and a safety-net hospital ----- Palliative Care Consultation Team (PCCT)	Cohort	Live discharges 290 PC patients 1427 UC patients Hospital deaths 185 PC patients 149 UC patients	Cancer 58% AIDS 2% CHF 12% COPD 2% Advanced liver disease 19% Prolonged ICU stay 6.9%	Hospital costs, ICU use, LOS	Live discharges Lower total costs (~11%; $p<0.05$), total costs per day (~18%; $p<0.001$) for PC than UC Lower laboratory (~16%) & imaging (~13%) costs though not statistically significant Slightly higher ICU LOS but significantly lower (~42%; $p<0.001$) ICU cost per admission for PC than UC Hospital deaths Lower total costs (~11%; $p<0.05$), total costs per day (~9%; $p<0.01$) for PC than UC Lower pharmacy (~21%; $p<0.001$) for PC than UC; no difference for laboratory or imaging Lower ICU LOS (10.2 days against 13.8; $p<0.01$) for PC than UC; no significant cost difference

(continued)

TABLE 2. (CONTINUED)

Ref #	Study	Hospital(s) Team label	Design	Sample size Intervention/control	Principal diagnosis ^a	Outcomes of interest	Key findings
(33)	Whitford et al., 2013	Integrated medical center comprising two hospitals ----- Palliative Care Consult Service (PCCS)	Cohort	Live discharges 1177 PC patients 3531 UC patients Hospital deaths 300 PC patients 900 UC patients	Live discharge Infectious 8% Neoplasm 21% Endocrine 2% Nervous 3% Circulatory 30% Respiratory 16% Digestive 8% Musculoskeletal 9% Other 3% <i>Hospital death</i> Infectious 4% Neoplasm 32% Endocrine 3% Nervous 4% Circulatory 23% Respiratory 10% Digestive 7% Musculoskeletal 3% Other 14%	Hospital costs, incorporating ICU costs	<i>Live discharges</i> Lower total costs (~5%; $p < 0.05$) for PC than UC Lower procedure costs; higher evaluation, imaging, pharmacy costs for PC than UC (no % or p value given) <i>Hospital deaths</i> Lower total costs (~31%; $p < 0.05$) for PC than UC Lower procedure, evaluation, imaging, laboratory, pharmacy costs for PC than UC (no % or p value given)

^aFor PC group at time of consultation.

^bThere is inconsistency in reporting of cost difference as a percentage. Ciemins et al. use the cost of palliative care as the base cost in calculations, i.e., $[\% \Delta C = ((C_{PC} - C_{UC}) / C_{PC}) \times 100]$ while others (e.g., Hanson et al.) use the cost of usual care, i.e., $[\% \Delta C = ((C_{PC} - C_{UC}) / C_{UC}) \times 100]$. In this table and throughout the text all $\% \Delta C$ have been calculated using the latter method.

^cGade et al. report a diagnosis for 196 PC patients (=71.3%)

^dPrimary diagnoses for all PC patients in overall sample ($n = 304$); authors do not report corresponding figures for sub-sample in economic analysis ($n = 104$).

^ePatients could have more than one advanced disease diagnosis; therefore does not add up to 100%.

^fNo UC cost given so not possible to calculate proportional saving.

PC, palliative care; UC, usual care; LOS, length of stay; ICU, intensive care unit; RCT, randomized controlled trial; MV, mechanical ventilation; CHF, congestive heart failure; MI, myocardial infarction; COPD, chronic obstructive pulmonary disease; ESRD, end-stage renal disease; HIV/AIDS, human immunodeficiency virus/acquired immune deficiency syndrome.

are differences in study design, setting, intervention and population. Formal meta-analysis is also prevented by differences in approach to expressing costs; outcomes of interest are variously direct, variable and total costs, *per diem* and *in toto*.

Studies that report costs from the hospital perspective find statistically significant savings through palliative care in the 9%–25% range.^{24,25,28,29,31} The three studies that stratify by survivors and decedents report consistently higher costs for patients who died but an inconsistent treatment effect on costs between the two groups; two studies find similar differences in proportional savings (11%–20%) with slightly higher treatment impact for decedents^{29,31}; the other reports a large discrepancy with a 5% cost-saving from palliative care for survivors and 31% for decedents.³³

Of the two studies reporting hospital charges, one reported mean daily charges around 7% lower for palliative care²³ and the other median total charges around 16% lower for palliative care.²⁶ The only study to take a postdischarge health costs perspective finds costs for palliative patients 32% lower than those for usual care patients over 6 months.²⁷ One study's reporting method precluded calculating a proportional difference.³⁰

Ancillary costs

Where ancillary costs are reported separately, the results are inconsistent. Where statistically significant differences have been identified, costs are typically lower for palliative care interventions, but differences are not always identified. A study²⁴ reports ancillary (laboratory and radiology) costs 43% lower and no difference in pharmacy; a larger follow-up study found differences in laboratory and pharmacy but not in imaging.³⁰ Another study²⁹ finds differences in pharmacy but not imaging; study³¹ finds no difference in pharmacy. Another study³³ finds palliative care to be less costly across ancillary categories among patients who died, and different treatment effects by category for patients discharged alive.

ICU costs

Of the six studies to report ICU use as an outcome of interest, the results have a clear pattern toward lower use among palliative patients.^{24,27,29,30,33} One found no significant difference, possibly due to lack of power.²⁸

Discussion

The findings of this review demonstrate that inpatient specialist palliative care consultation teams are consistently found to be less costly than usual care comparators in the range 9%–25% for hospital costs, while one study estimated a 32% reduction for all health care costs over 6 months postdischarge. These differences are statistically significant.

However, methodology to date has implications for our understanding of the role that palliative care plays in enhancing value in health care, where value is defined as the relationship between quality and cost. In assessing current provision and validating new programs, payers and policy-makers are not only concerned with the immediate direct costs of providing hospital treatment. Specifically, questions remain as to whether reductions in hospital costs are passed on to other care settings or to family or informal caregivers,

the effect of palliative care teams on hospice expenditures, and the effect of palliative care teams on overall health care expenditures.^{34,35} And ensuring that cost reduction does not reflect reduced quality of care is best achieved by a full cost-effectiveness analysis quantifying the relationship between cost effects and treatment efficacy.³⁴

Knowledge gaps

From first principles, cost-effectiveness analysis in health care is defined as a “comparative analysis of alternatives in terms of both costs and consequences.”²²

With regard to costs, the focus has been on the hospital “silo.” Seven examine only costs to the hospital providing care.^{24,25,28–31,33} while two use only hospital charges,^{23,26} generally considered a poor approximation of hospital costs.³⁴ One study examines all health care costs post-discharge but not costs to patients, caregivers, or wider systems and society.²⁷

With regard to consequences, there is no evidence base to date. No study has quantified the relationship between treatment efficacy and cost in a cost-effectiveness measure.

What is needed?

Limitations to the current literature reflect practical real-world challenges in both the collection of data and the measurement of intangible outcomes such as satisfaction with care among a rapidly changing and extremely sick patient population.⁸ However, with a clear pattern of hospital cost-saving using current methodology, it is timely to begin expanding the scope of economic evaluation in this field. The improvement of economic evaluation of palliative care teams requires that evaluators identify a greater proportion of relevant components in a full cost-effectiveness analysis, establish what is already known about these through existing datasets and published research, and considers the best way to measure and incorporate these in future.

Components of cost analysis

There are four major categories of resource use for cost-effectiveness analysis (CEA), summarized in Table 3.³⁵

As this summary makes clear, current economic evaluation has excluded key components of the cost effects of palliative care teams. Increasing the scope and thus reliability of economic evaluation of palliative care teams requires addressing these shortfalls.

First, future studies need to expand their perspective in examining health care resources beyond the perspective of direct hospital costs. These studies need to incorporate all relevant health care costs paid by patients, their families, and other payers, including pharmacy, and formal caregivers, and incorporate all disease-relevant system costs (“total spend”) following the initial intervention, both to hospitals and the health system, and to patients, families, and other payers.

A full cost-effectiveness analysis would examine and incorporate non-health care system costs, such as hours lost from work, caregiver comorbidity, financial consequences of serious illness to families, and patient and family caregiver time. As our review shows, no evaluation of in-hospital consultation teams has included these costs. Given the lack of

TABLE 3. COMPONENTS BELONGING IN THE NUMERATOR OF A COST-EFFECTIVENESS ANALYSIS³⁴

<i>Cost component</i>	<i>Use in evaluation of palliative care teams</i>
Health care resources: The costs of tests, drugs, supplies, health care personnel and medical facilities, in providing intervention and in all subsequent interventions relevant to the disease or condition.	Health care resources have been partially included in the evaluations of palliative care teams to date: nine studies have used hospital costs only; Gade et al. ²⁷ incorporates all formal health care costs for a 6-month period. Future studies therefore need to expand their perspective in examining health care resources: Broaden perspective beyond hospital costs to incorporate all relevant health care costs paid by patients, their families and other payers, including pharmacy, formal caregivers. Lengthen perspective beyond initial hospital stay to incorporate all disease-relevant system costs following the initial intervention, both to hospitals and the health system, and to patients, families and other payers.
Non-health care resources: The costs of other consumption entailed in the intervention and follow-up, e.g., transport to and from hospital; child care bills while a parent receives treatment	Non-health care resources were not included in the evaluations of palliative care teams to date. There is no established literature on this area to provide indicative magnitudes of these costs and, by definition, there is no central dataset. It seems likely that these can only be measured and incorporated in CEA through well-designed original primary research projects.
Patient time: Time expended by the patient seeking, participating in, and undergoing an intervention	Patient time costs were not included in the evaluations of palliative care teams to date. There is only a limited literature on this area to estimate the magnitude of these costs. It seems likely that these can only be measured and incorporated in CEA through well-designed original primary research projects.
Informal caregiver time: Unpaid time spent by family members or volunteers to provide homecare	Informal caregiver time costs were not included in the evaluations of palliative care teams to date. There is only a limited literature on this area to estimate the magnitude of these costs. It seems likely that these can only be measured and incorporated in CEA through well-designed original primary research projects.

CEA, cost-effectiveness analysis.

routine data collection in these domains, addressing these knowledge deficits may be best addressed by future primary research incorporating these domains in design.

Where future analysis remains focused on cost from the hospital perspective, our review highlights two particular priorities. First, studies to date have not analyzed in detail patient-level determinants of resource use. But factors such as socioeconomic status, functionality, and diagnosis may determine a high proportion of hospital costs in providing care to patients with serious illness.^{17,36,37} Identifying relevant patient-level factors may offer new and valuable information for understanding variations in cost and so delivering care that is both more appropriate to patient needs and less resource-intensive. However, few studies in any setting have attempted this.^{38,39} Second, the literature to date is skewed toward patients near end of life; as palliative treatment is increasingly introduced earlier in the care trajectory, it is important to develop evidence on treatment effects for patient groups with longer life expectancy at the time of consultation.

Future analysis will also be helped by more detailed cost reporting. Recent studies have tended to report both direct and total costs, *per diem* and *in toto*. This approach, alongside a definition of what each category comprises and how the figures were reached, is the best way to enable formal comparison and statistical analysis of results in future as well as to improve understanding of the data under discussion.

Approaches to estimating effectiveness

There is no consensus on methodology for measuring effectiveness in the economic evaluation of palliative care.

Standardized guidelines for health economics research in the United States identify the quality-adjusted life year (QALY) as the fundamental outcome measurement for all evaluations.³⁵ However, equivalent guidelines specifically for palliative care have resisted this position.^{8,40} The QALY approach has been criticized as inappropriate for patients with serious illness and is an ongoing subject of debate among economists in this field.^{41–43}

Evaluators must make their own decision in research design to identify the contextually appropriate measures of physiological and health-related quality of life (HRQL) effects to be incorporated in cost-effectiveness analysis. Given the emerging state of the field, initial approaches do not need to be methodologically complex to make a substantial contribution. An example of a simple approach was illustrated in a U.K. study of short-term palliative care for multiple sclerosis.⁴⁴ The authors generated two cost-effectiveness planes, plotting the relationship of costs with patient outcomes (as measured by Palliative Care Outcome Scale [POS]-8) and caregiver burden (using Zaret Caregiver Burden [ZBI]-12).

In combining cost and effectiveness analysis for the same patient group the authors present more thorough and robust evidence to compare the impact of an intervention and a

comparator. This ought to be the goal of an increasing number of studies in future.

Conclusion

The published evidence shows a clear pattern of specialist inpatient palliative care consultation teams reducing hospital costs. This finding is consistent with other reviews of the positive impact of palliative care programs on multiple outcomes across a range of settings.

By methodological norms in economic evaluation, the evidence base has been generated using a narrow approach. These limitations are defensible given practical challenges and available data but, with a clear pattern of cost saving using current methodology, it is timely to begin expanding the scope of economic evaluation in this field. The evidence now suggests that specialist inpatient palliative care both reduces costs and improves patient outcomes. Unifying this evidence in robust cost-effectiveness analysis will strengthen our understanding of the role that palliative care plays in enhancing value in health care.

There is a consensus on the appropriate approach to measuring costs, and this paper identifies the relevant domains. There is no consensus on the appropriate approach to measuring outcomes, but it ought to be possible to generate evidence using different approaches and so strengthen the evidence base amidst methodological debate. Given the lack of routine data collection in these domains, addressing knowledge deficits may be best addressed by future primary research.

Where future analysis remains focused on cost from the hospital perspective, research priorities should include the patient-level determinants of cost difference between palliative and usual care, and the economic impact of treatments earlier in the care trajectory.

Author Disclosure Statement

No competing financial interests exist.

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