

THE COSTS OF TREATING TERMINAL PATIENTS

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Abstract

Context

In addition to the effectiveness of terminal care, policy makers and health care payers are concerned about the costs of treating terminal patients in a context of spiralling health care costs and limited resources.

Objectives

This article aims to review the international literature on the costs of treating terminal patients.

Methods

Studies were identified by searching PubMed, Centre for Reviews and Dissemination databases, Cochrane Database, and EconLit up to April 2009. Studies were included that contrasted costs in different healthcare settings and that compared palliative care with alternative therapeutic approaches for terminal patients.

Results

The few studies that focused on treatment of terminal patients across health care settings showed that hospitalisation costs represent the principal component of palliative care costs. In the hospital setting, palliative care tends to be cheaper than usual care or care delivered in units other than the palliative care unit. Palliative care costs depend on patient characteristics such as diagnosis, status of disease and age. Also, different care models appear to target different patient groups and offer varied packages of services. Finally, there is some evidence pointing to cost advantages of palliative care at home as

compared to alternative care models, although this needs to be corroborated by further research.

Conclusion

Different approaches to delivering palliative care are not substitutes of each other and, thus, have different costs. From a cost perspective, hospitals need to pay attention to admitting patients to the palliative care unit at the right time.

Keywords: costs, terminal patients, palliative care, health resources.

Introduction

Treatment of terminal patients aims to improve the quality of life of patients with life-limiting conditions by emphasizing relief from pain and symptoms, by involving their family and friends, and by adopting a holistic, non-curative focus. However, health care systems have a limited ability to meet the needs of terminal patients and to keep a balance between costs and quality of care at the end of life. In addition to the effectiveness of care models for terminal patients, policy makers and health care payers are concerned about the costs of treating terminal patients in a context of spiralling health care costs and limited resources.

To date, little is known about the costs of treating terminal patients in terms of the level of costs, the distribution of costs between health care settings, and the cost drivers of treating terminal patients. First, few studies have quantified the economic burden of treating terminal patients. For instance, the Independent Sickness Funds in Belgium estimated that expenditure on palliative care increased from 42 million € in 2003 to 77 million € in 2007, an annual average increase of 16% (1). Palliative care accounted for 0.4% of Belgian health expenditure in 2007. Second, it is important to have insight into the distribution of costs of treating terminal patients between health care settings. For instance, public expenditure on ambulatory palliative care was incurred by home nursing (61% of expenditure), mobile palliative support teams (13%), the palliative home care allowance (12%), nursing homes (11%), and the abolition of the patient co-payment for consultation by the general practitioner (3%) in Belgium in 2003 (2). Third, there is little

evidence on the cost drivers of treating terminal patients. For instance, a Belgian retrospective analysis found that hospitalisation during the three final months of life was less likely if, amongst other things, the general practitioner provided palliative care and if treatment had a palliative rather than a curative focus (3).

The aim of this article is to review the international literature on the costs of treating terminal patients. The literature review was undertaken as part of a larger study on palliative care in Belgium commissioned by the Belgian Healthcare Knowledge Centre. The article focuses on the level, distribution and drivers of costs of treating terminal patients, and appraises the methodological quality of cost studies. The cost estimates and methodological perspective provided by this article may serve to determine priorities for and inform future research on terminal patients, and may be used in future economic evaluations exploring the cost-effectiveness of various care models for terminal patients.

Methods

Search strategy

Studies were identified by searching PubMed, Centre for Reviews and Dissemination databases (Database of Abstracts of Reviews of Effects, National Health Service Economic Evaluation Database, and Health Technology Assessments Database), Cochrane Database of Systematic Reviews, and EconLit up to April 2009. Additionally, the bibliography of included studies was checked for other relevant studies. Search terms

included 'palliative care', 'end of life', 'terminal patients', 'economics', 'costs', 'economic burden', 'cost analysis' alone and in combination with each other.

The review was limited to studies published between 2000 and 2009. Earlier articles were considered of limited relevance because changes in the organisation and financing of palliative care over time are likely to influence cost estimates. There was no limitation on the language of the article.

Inclusion/exclusion criteria

The literature review targeted studies on the costs of treating terminal patients. Inclusion was limited to studies that contrasted costs in different healthcare settings, and to studies that compared palliative care with alternative therapeutic approaches for terminal patients. Studies that analyzed costs at end of life in general, but did not focus specifically on terminal patients were excluded. Our review did not incorporate economic evaluations investigating the cost-effectiveness of various therapeutic approaches for terminal patients. Another exclusion criterion was studies that failed to convert health care resource utilization into costs.

Inclusion was restricted to articles published in peer-reviewed journals. Congress abstracts were not considered because they do not provide sufficient details of methodology and results.

Data analysis

To compare costs between studies, costs were actualized to 2007 values using a rate of inflation based on the evolution of the Consumer Price Index. Costs were converted using purchasing power parities for Belgium, i.e. market exchange rates adjusted for differences in purchasing power between countries and Belgium.

It was not appropriate to synthesise cost estimates of treating terminal patients across studies due to the heterogeneity of the primary studies. This heterogeneity derives from the fact that the health care setting; type of hospital and hospital unit; nature and content of palliative care and usual care; time horizon of cost assessment; cost measures; and study design varied between cost studies. There was insufficient common ground for pooling cost estimates that would permit quantitative summarization and, hence, results are presented for each cost study separately.

Assessment of methodological quality

A qualitative appraisal was carried out of the methodological quality of cost studies. An appraisal form was filled in by the lead author for each study focusing on study sample, data sources, methods of data collection, scope of included costs and time horizon (4). With respect to the sample, studies can be based on a representative national sample or enroll a specific group of patients. Data can be collected prospectively / retrospectively from patient medical records, a survey, a claims database or the literature. Cost studies

can be designed as a case series following up terminal patients, a case-control study comparing terminal patients with control patients, or a cohort study contrasting treatment approaches or health care settings for terminal patients. Studies can measure direct health care costs (e.g. medicines, surgical procedures, visits to health care providers, hospitalization), direct non-health care costs (e.g. transportation to the health care provider), and indirect costs arising from productivity loss. Estimates can be presented as charges based on official list prices or costs based on actual resource use. Finally, the time horizon was identified over which costs of treating terminal patients were measured.

Results

Few studies have investigated the costs of treating terminal patients: the researchers identified 56 papers, for which the abstract was assessed. Based on the abstract, nine papers were excluded because they either measured costs at the end of life rather than costs of terminal patients, they quantified health care resource utilization but did not convert it into costs, or they carried out an economic evaluation rather than a cost study. The full manuscript of the remaining 47 articles was assessed. Of these articles, 32 articles were excluded for the same reasons as stated previously, and 15 articles were included in the review (see Figure 1).

Existing studies make up a disparate and varied body of evidence focusing on different aspects, including costs of treating terminal patients across health care settings, costs of various treatment approaches (e.g. palliative care, usual care) in different types of

hospitals (e.g. acute care hospital, university hospital) and in different types of hospital units (e.g. palliative care unit, other hospital unit), and costs of different models to treat terminal patients at home. No study was identified that measured costs of treating terminal patients in nursing homes. The characteristics of existing studies have been summarised in Table 1.

Costs of treating terminal patients across health care settings

Studies across health care settings are of particular importance as terminal patients often experience transitions between settings i.e. hospital, outpatient and home care settings. Still this review only identified two studies that compared the costs in those different health care settings. A prospective, multi-centre study undertook a cost analysis of 80% of Spanish palliative care services (5). Spanish palliative care services are diverse and include acute bed units in general hospitals, specialist cancer units, nursing homes, hospital support teams, and home care support teams. Cost data were gathered on 372 patients during the last six weeks of life by means of a weekly structured telephone interview. Hospital unit costs were derived from published sources, but unit costs for care other than hospital care were based on assumptions. Total costs per patient amounted to 2,774 € and could be broken down into hospitalisation costs of 2,390 € per patient and other costs (i.e. outpatient clinic and home care) of 384 € per patient. Cost estimates may have been influenced by the social context and the health care system in Spain. For instance, the high number of home care visits reflects the high emphasis placed on home care teams and the active support by family members in Spain.

A British study calculated palliative care costs for different types of advanced cancer patients from the time that they started strong opioid treatment until death (6). The study enrolled 547 patients and was conducted from the perspective of the National Health Service. The authors considered costs of drugs, general practitioner visits, palliative care physician visits, and hospital admissions, but did not include costs of specialist nursing and hospital-based prescribing. Mean costs of palliative care amounted to 3,418 € for colon cancer; 4,672 € for breast cancer; 4,936 € for lung cancer; 5,069 € for uterus cancer; 6,577 € for stomach/oesophagus cancer; 7,086 € for prostate cancer; and 9,014 € for ovarian cancer. However, this study did not control for confounding factors (e.g. patient age, survival time, time to start of palliative care, duration of palliative care) which differed between cancer types. Hospitalisation was the key driver of costs, accounting for 35%-77% of palliative care costs. The authors concluded that palliative care costs vary between different types of advanced cancer patients.

Costs of treating terminal patients in hospital

A case series measured and identified the determinants of palliative care costs of hepatocellular carcinoma in Hong Kong (7). Two hundred and four patients were enrolled. The analysis was undertaken from a societal perspective, including costs of formal and informal services incurred by payers, caregivers and patients. The mean cost for formal health services per patient amounted to 3,546 € from first hospitalisation until death. A regression analysis showed that severity and chemotherapy increased formal

service costs per day, but patient age, number of days of observation and survivorship decreased formal service costs per day. This study did not include a control group of patients and results were specific to patients suffering from inoperable hepatocellular carcinoma.

A prospective cohort study calculated costs of palliative care in two hospitals providing general medicine, surgical and obstetric care and in two hospitals offering extended care and rehabilitation in France (8). Predictive factors of palliative care costs were identified. The analysis enrolled 119 patients. Total costs per day amounted to 493 € for all patients, 547 € for patients admitted to hospitals providing general medicine, and 440 € for patients admitted to hospitals providing extended care. The cost difference between the two types of hospital was explained by the fact that palliative care units in hospitals providing general medicine employed more staff. Total costs consisted of staff salaries (62% of costs), logistical expenses (23%), overheads (5%), medicines (5%), depreciation of heavy equipment (3%), disposable devices (1%), and diagnostic tests (1%). The following variables were predictive of higher costs: degree of anxiety of patients and their family; proximity of death; extreme dependence; ear, nose and throat cancer; young patient age; and the provision of certain procedures. Although this study was carried out in a limited number of palliative care units and enrolled a small number of patients, the authors concluded that the population of patients in palliative care units is not homogeneous from an economic point of view. In other words, palliative care unit costs depend on patient characteristics.

A US case-control study included 38 patients admitted to a hospital palliative care unit and 38 patients who died outside the palliative care unit and who were cared for by other medical or surgical teams (9). The palliative care unit was a dedicated 11-bed inpatient unit staffed by a high-volume specialist team using standardised care. The analysis collected data on charges (based on official list prices) and on costs (based on actual resource use). The palliative care unit generated lower daily charges (-59%) and lower daily costs (-57%). Some of these savings originated from discontinuing costly interventions once patients were clearly identified as dying. It was not clear to what extent the high volume of the palliative care unit produced economies of scale and lowered costs.

A cohort study calculated costs of patients admitted to a hospital palliative care unit as compared to patients admitted to an intensive care unit or any unit other than palliative care in the United States (10). In addition to this, approaches to controlling costs of a palliative care unit were identified. The cost per day for hospitalised patients during the last 20 days leading to their death was significantly lower on the palliative care unit than on intensive care units and non-palliative care units. As a consequence, the authors emphasised the importance of admitting patients to the palliative care unit at the right time with a view to containing costs. Approaches to controlling costs included: a) appropriate admissions to the palliative care unit; b) direct admissions from the emergency department to the palliative care unit; and c) transfer of patients from more costly sites of care (e.g. intensive care unit) to the palliative care unit. Finally, palliative

care unit costs diminished as a result of better coordination of care and elimination of unnecessary tests.

A retrospective, observational study of 314 veterans in the United States compared costs of palliative care with those of usual care during a terminal hospitalization (11). Inpatient costs were broken down into ancillary (laboratory and radiology) costs and pharmacy costs. Hospital palliative care was associated with lower inpatient costs per day (-245 €) and lower ancillary costs per day (-100 €). There was no difference in pharmacy costs between palliative care and usual care. It should be noted that the specific organisation and financing of health care for veterans in the United States might hinder the transferability of those results to other health care settings.

The author of a US study adopted a case-control design to compare charges of 164 patients who received an inpatient palliative care consultation with charges of 152 inpatients who did not (12). As such, this study assessed a consultative palliative care programme rather than a programme providing overall care. The measurement of charges in lieu of costs is a limitation of this analysis because charges may not have a consistent relationship with costs. Mean daily charges amounted to 4,043 € for cases and 4,358 € for control patients. Daily charges for consultative palliative care related to supplies and equipment (29% of charges), pharmacy (28%), laboratory and imaging (22%), room and board (20%), and other therapy (2%). Patients who received a consultation because of non-physical symptoms (e.g. care planning, personal concerns, spiritual concerns) generated higher charges.

A similar US study investigated costs of patients who received an inpatient palliative care consultation with costs of inpatients who received usual care (13). However, this study enrolled a larger sample of patients (4,908 palliative care patients and 20,551 usual care patients), matched control patients to cases, included patients from eight diverse hospitals, and measured costs rather than charges. Also, this study distinguished between patients who were discharged alive and patients who died. Hospital costs related to costs of the intensive care unit, pharmacy, laboratory, and diagnostic imaging tests. Palliative care patients discharged alive had net savings of 1,684 € in costs per admission and 277 € in costs per day. Cost savings originated from reductions in laboratory and intensive care unit costs as compared with usual care patients. Palliative care patients who died had net savings of 4,872 € in costs per admission and 371 € in costs per day as a result of reductions in pharmacy, laboratory, and intensive care unit costs as compared with usual care patients. The authors concluded that hospital palliative care consultation teams generate savings.

Costs of treating terminal patients at home

The costs of palliative care at home were computed in an Italian case series (14). The home care service provided a telephone hotline to patients and the team consisted of oncologists and nurses with additional skills in cancer nursing. This service was restricted to patients with an estimated life span of two months or less as estimated by clinicians. Costs of the home care service amounted to 39.9 € per patient per day. This figure

covered costs of the support and coordination team (8.3 €), medicines (14.4 €), general practice fees (5.7 €), medical examinations (5.0 €), nursing (4.2 €), supplies (1.6 €) and specialist consultations (0.5 €).

An Italian retrospective, observational study analysed the costs of a home care programme according to the disease status and life expectancy of patients with haematological malignancies (15). One hundred and forty-four patients were assigned to one of the following groups: a) terminal phase requiring palliative care (89 patients); b) advanced phase requiring palliative care (31 patients); c) chronic phase requiring supportive therapy (9 patients); and d) curable phase requiring supportive therapy (15 patients). A multi-professional home care team provided for around the clock support and routine visits to patients by staff. The team consisted of haematologists, nurses, psychologists and social workers. The general practitioner was also involved. Mean monthly costs of health care providers, materials and medicines, transfusion support, laboratory and diagnostic procedures amounted to 4,533 € for the terminal phase; 2,468 € for the advanced phase; 1,594 € for the chronic phase; and 4,270 € for the curable phase. Higher costs of the terminal phase and of the curable phase could be attributed to the higher number of medical and nursing visits, and transfusions required by such patients. This study showed that home care costs depend on disease status of patients. However, other variables that may influence home care costs, such as age and diagnosis of patients, were not controlled for. Also, the number of patients included in some disease status groups was relatively small.

A retrospective, observational study enrolled all patients undergoing palliative care who died from cancer in a Spanish town in 1998 (16). Patients received either standard care management (111 patients) or home care support by a specialised team (44 patients). The perspective was that of the Catalan Health Service and the time horizon was one month. Mean costs per patient were lower for patients receiving home support than for patients receiving standard care management (-683 €). This cost advantage of home support originated from lower costs of hospitalisation, outpatient care use, emergency department visits, and days of stay in palliative care units in nursing homes. However, the authors could not rule out selection bias as possible differences in characteristics between patient groups (e.g. illness severity) may influence cost estimates. Cost estimates also reflected the practices of one specialised home support team and may not be applicable to other teams.

An Israeli analysis compared health care costs of two models of delivering palliative care at home to terminally-ill patients during their last year of life (17). Costs of 120 patients receiving home-specialised palliative care services were contrasted with those of 515 patients receiving home non-specialised palliative care services. No detailed description of home (non-)specialised palliative care services was provided by the authors. Health care costs of home-specialised services were 30% lower than those of non-specialised services during the last year of life. The cost difference increased nearer the time of death. Lower costs of home-specialised services could be attributed to lower costs of hospitalisations and of oncology treatments. The authors argued that this may be

explained by the nature of the specialised palliative care approach which provides for around the clock support and routine visits to patients by staff.

The cost impact of two new services allowing patients to be cared for at home was explored by a retrospective before-and-after study in England (18). The services consisted of a rapid response team and discharge community link nurses. The rapid response team is a community-based team that makes patient visits during out-of-hours periods and that provides support to patients over the telephone. The discharge nurses facilitate speedy discharge of patients with complex needs who are receiving palliative care. Cost data related to 40 cancer patients receiving palliative care prior to implementation of these services and 40 comparable patients who accessed programme services. The mean cost of acute and community services amounted to 8,888 € for patients who accessed programme services and 8,760 € for patients who did not. The authors did not exclude the possibility that programme services were accessed by patients who are able to and wish to die at home, thus introducing potential selection bias.

A British cohort study compared costs of 173 patients attending one of five palliative day care centres with those of 53 patients who received support from specialist palliative home care teams (19). The authors did not provide a detailed description of palliative day care and did not report costs of palliative home care. Data were collected by means of a questionnaire asking patients to report costs of health and social care use in the previous four weeks. No statistical analyses were undertaken due to the small sample size and sample attrition. Costs of palliative day care amounted to 106 € per person per day,

increasing to 146 € if unpaid resources (e.g. volunteers) were included. The authors also found that patients who attend palliative day care access a different package of care than those who do not. This may reflect differences in characteristics of these two groups of patients and imply that palliative day care and palliative home care are not substitutes.

Discussion

The body of evidence on the costs of treating terminal patients was small and varied. Although palliative care requires a multidimensional and interdisciplinary approach, few studies calculated palliative care costs across health care settings. These studies showed that hospitalisation costs represent the principal component of palliative care costs. A number of studies focused on palliative care in hospitals. The results consistently indicated that palliative care is cheaper than usual care or care delivered in hospital units other than the palliative care unit. Therefore, our analysis supports the policy recommendation that hospitals need to pay attention to admitting patients to the palliative care unit at the right time from a cost perspective. Also, there is some evidence pointing to cost advantages of palliative care at home as compared to alternative care models, although this needs to be corroborated by further research. If palliative care is viewed as a component of a broader care programme (e.g. a comprehensive oncology programme), no study has examined the cost impact of palliative care on the care programme.

Cost studies vary in terms of how a terminal patient is defined. This variety in definitions is also observed in the epidemiological and clinical literature. Based on a literature

review, different approaches have been proposed to define the 'terminal' status: a) by the patient 'readiness' i.e. the patient is ready to address terminal issues when he/she is aware of his/her prognosis; b) by the severity of illness: 'Is this patient sick enough that it would not be a surprise if he or she would die within 6 months (or 3 or 12 months)?'; and c) by the prognosis expressed by the physician as the risk of dying at a time in the future (20). Other authors have identified terminal patients by adding the content of care given: when curative or life-prolonging treatments are decided not to be pursued (21). Given the observed variety of definitions, our analysis did not propose a definition of a 'terminal patient' as a criterion to include/exclude cost studies, but summarized the available studies on terminal patients, recognizing that they used different definitions. This variety in definitions implies that inclusion/exclusion criteria and, hence, cost estimates differ between studies.

The reader must be careful when comparing costs of treating terminal patients between studies for a number of reasons (22). First, the organisation and financing of health care systems vary between countries, implying that therapeutic services, their availability and associated costs differ. Second, as stated above, the definition of a terminal patient differs between studies. Third, the definition, nature and content of palliative care and usual care vary between studies. Fourth, studies generally did not consider patient out of pocket expenses, which vary between countries.

Caution needs to be exercised when comparing the costs of different approaches to delivering palliative care to terminal patients. This is because the results of the literature

review indicate that palliative care costs depend on patient characteristics such as diagnosis, status of disease and age. The population of patients receiving palliative care is heterogeneous from a cost perspective. Also, different care models appear to target different patient groups and offer varied packages of services. This implies that different approaches to delivering palliative care are not substitutes of each other.

The literature on the costs of treating terminal patients suffers from a number of methodological shortcomings. In the absence of randomised controlled trials, selection bias where patients self-select into a specific care model is an issue that is likely to influence cost estimates. Some sample sizes were too limited to draw generalisable conclusions. A combination of survey and claims data was used in studies to obtain information about the costs of treating terminal patients. The reliability of survey data is hindered by patients' ability to recall health resource utilization and costs. Claims data may suffer from missing data and incorrect coding of claims. Studies enrolling a specific group of patients tend to be carried out prospectively using survey data. This type of analysis can be considered to be more reliable than studies based on a retrospective analysis of claims databases. Cost estimates were derived for specific patient samples and are unlikely to be applicable to the population of terminal patients.

Studies need to move away from using charge data based on official list prices towards measuring costs based on actual resource use. This is because, for instance, charges for treating terminal patients in hospital may not accurately reflect actual expenditure on administration, billing, capital depreciation, maintenance, laundry and other hospital

services. Alternatively, in studies that measure charges, these need to be converted into costs by means of cost-to-charge ratios. Such adjustment by cost-to-charge ratios is regularly used in cost studies set in the United States (4).

The scope of included costs was generally restricted to direct health care costs associated with treating terminal patients. This refers to costs of medicines, contacts with health care professionals and hospitalization. Table 2 identifies the major cost items that need to be considered when calculating the costs of treating terminal patients from a societal perspective. In addition to direct health care costs, studies need to focus on eliciting direct non-health care costs associated with transportation to the health care professional and indirect costs arising from lost productivity. With respect to the latter, attention needs to be paid to calculating the indirect costs of reduced ability to attend school, work or carry out usual daily activities.

There was substantial variation between studies in how an episode of care was defined and in the time horizon over which costs were measured. The majority of studies quantified costs over a fixed time period prior to death or from the start of a specific health care service (e.g. hospitalization) until the time of death. In practice, this meant that the time horizon could range from 20 days to two years. Other studies focused on a specific hospitalization episode. Ideally, costs need to be computed from the time of diagnosis of a terminal patient until the time of death.

Future studies need to set up a prospective collection of primary data on healthcare resource use and costs of treating terminal patients. This type of analysis can be considered to be more reliable than retrospective analyses of patient medical records or claims databases. Alternatively, modeling approaches can be considered that are based on high-quality data, closely reflect real-life practice and the evolution of terminal patients, and test the robustness of cost estimates through extensive sensitivity analyses.

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Table 1. Characteristics of studies measuring costs of terminal patients

Sample	Perspective	Interventions	Data collection	Design	Scope of costs	Time horizon	Year of costing	Costs	Ref
<i>Costs of treating terminal patients across health care settings</i>									
372 patients	National Health Service	Palliative care services across hospital, outpatient, home care settings	Prospective, multi-centre analysis of interview data	Case series	Health care costs	Last 6 weeks of life	2001	Total costs per patient amounted to 2,774 € hospitalisation costs of 2,390 € and other costs (i.e. outpatient clinic and home care) of 384 €	(5)
547 patients with advanced cancer	National Health Service	Palliative care services across hospital, outpatient and home care settings	Retrospective analysis of claims data	Case series based on modeling	Health care costs	From start of opioid treatment until death	2001	Mean costs of palliative care amounted to 3,418 € for colon cancer; 4,672 € for breast cancer; 4,936 € for lung cancer; 5,069 € for uterus cancer; 6,577 € for stomach/oesophagus cancer; 7,086 € for prostate cancer; and 9,014 € for ovarian cancer. Hospitalisation accounted for 35%-77% of palliative care costs.	(6)
<i>Costs of treating terminal patients in hospital</i>									
204 patients with hepatocellular carcinoma	Society	Palliative care services	Prospective analysis of interview data	Case series	Health care costs (hospital and outpatient care), costs of informal services, indirect costs	From first hospitalization until death	1998	Mean cost for formal health services per patient amounted to 3,546 € Severity and chemotherapy increased formal service costs per day, but patient age, number of days of observation and survivorship decreased formal service costs per day.	(7)
119 patients	Hospital	Palliative care in two hospitals providing general medicine, surgical and obstetric care; and in two hospitals offering extended care and rehabilitation.	Prospective analysis of survey data	Cohort study	Hospital costs	From hospitalization until death	2000	Total costs per day amounted to 493 € for all patients, 547 € for patients admitted to hospitals providing general medicine, and 440 € for patients admitted to hospitals providing extended care. Degree of anxiety of patients and their family; proximity of death; extreme dependence; ear, nose and throat cancer; young patient age; and the provision of certain procedures increased costs.	(8)

Sample	Perspective	Interventions	Data collection	Design	Scope of costs	Time horizon	Year of costing	Costs	Ref
76 patients	Hospital	Care in palliative unit; care outside palliative unit provided by other medical or surgical teams.	Retrospective analysis of claims data	Matched case-control study	Hospital costs	First 6 months after palliative unit opened	2000	The palliative unit generated lower daily charges (-59%) and lower daily costs (-57%).	(9)
1,744 patients	Hospital	Care in palliative unit; care in any unit other than palliative unit.	Retrospective analysis of claims data	Cohort study	Hospital costs	Last 20 days of life	2004	The cost per day was lower on the palliative care unit than on any other unit. Admitting patients to the palliative care unit at the right time is important to contain costs. Palliative care unit costs diminished due to better coordination of care and elimination of unnecessary tests.	(10)
314 veterans	Hospital	Palliative care or usual care	Retrospective analysis of claims data	Cohort study	Hospital costs	Terminal hospitalization	2003	Hospital palliative care was associated with lower inpatient costs per day (-245 €) and lower ancillary costs per day (-100 €). There was no difference in pharmacy costs between palliative care and usual care.	(11)
25,459 patients	Hospital	Consultative palliative care programme versus usual care	Retrospective analysis of claims data	Matched case-control study	Hospital costs	30 days	2004	Palliative care patients discharged alive had net savings of 1,684 € in costs per admission and 277 € in costs per day compared with usual care patients. Palliative care patients who died had net savings of 4,872 € in costs per admission and 371 € in costs per day compared with usual care patients.	(13)
316 patients	Hospital	Consultative palliative care programme versus usual care	Retrospective analysis of claims data	Case-control study	Hospital costs	Hospitalization episode	2001	Mean daily charges amounted to 4,043 € for cases and 4,358 € for control patients. Patients who received a consultation because of non-physical symptoms (e.g. care planning, personal concerns, spiritual concerns) had higher charges.	(12)
<i>Costs of treating terminal patients at home</i>									
256 patients	National Health Service	Home care service consisted of telephone hotline and team of oncologists and nurses.	Prospective analysis	Case series	Health care costs	Last 2 months of life	2002	Costs of the home care service amounted to 39.9 € per patient per day. This figure covered costs of support and coordination team (8.3 €), medicines (14.4 €), general practice fees (5.7 €), medical examinations (5.0 €), nursing (4.2 €), supplies (1.6 €) and specialist consultations (0.5 €).	(14)

Sample	Perspective	Interventions	Data collection	Design	Scope of costs	Time horizon	Year of costing	Costs	Ref
144 patients with haematologic malignancies	National Health Service	Home care service according to disease status; terminal phase requiring palliative care; advanced phase requiring palliative care; chronic phase requiring supportive therapy; curable phase requiring supportive therapy.	Retrospective analysis of clinical records and claims data	Cohort study	Health care costs	2 years	2005	Mean monthly costs of health care providers, materials and medicines, transfusional support, laboratory and diagnostic procedures amounted to 4,533 €for the terminal phase; 2,468 €for the advanced phase; 1,594 €for the chronic phase; and 4,270 €for the curable phase.	(15)
155 patients with cancer	National Health Service	Standard care management or home care support by specialized team.	Retrospective analysis of claims data	Cohort study	Health care costs	1 month	1998	Mean costs per patient were lower for patients receiving home support than for patients receiving standard care management (-683 €). This cost advantage originated from lower costs of hospitalisation, outpatient care use, emergency department visits, and days of stay in palliative care units in nursing homes.	(16)
635 patients	Health maintenance organization	Home-specialised palliative care services or usual care.	Retrospective analysis of claims data	Cohort study	Health care costs	Last year of life	2000	Health care costs of home-specialised services were 30% lower than those of usual care. The cost difference increased nearer time of death. Lower costs of home-specialised services were due to lower costs of hospitalisations and of oncology treatments.	(17)
80 patients	National Health Service	Rapid response team or discharge community link nurses.	Retrospective analysis of claims data	Before-and-after study	Health care costs	From access to service until death	2006	The mean cost of acute and community services amounted to 8,888 €for patients who accessed programme services and 8,760 €for patients who did not.	(18)
226 patients	National Health Service	Palliative day care centre or support from specialist palliative home care team.	Prospective analysis of survey data	Cohort study	Health and social care costs	4 weeks	1999	Costs of palliative day care amounted to 106 €per person per day, increasing to 146 €if unpaid resources (e.g. volunteers) were included.	(19)

Table 2. Items to consider when calculating costs of treating terminal patients

Medication	Direct health care costs		Direct non-health care costs	Indirect costs
	Health care providers	Other		
...	General practitioner	Diagnostic tests	Transportation to health care provider	Time lost from school
	Specialist physician	Social worker	Child care costs	Time lost from work
	Psychologists	Accident and Emergency visit	Home adaptations	Reduced ability to carry out usual daily activities
	Nurse	Alternative medicine		

Figure 1. Flow chart of literature search

