Cost of cancer in the UK

June 2025

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Reference

This report should be referred to as follows: Cancer Research UK. Cost of cancer in the UK. 2025

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List of acronyms

COI	Cost of illness
EUR	Euros
GBP	British pounds
HES	Hospital Episode Statistics
NHS	National Health Service
OOP	Out of pocket
USD	United States dollars

Acknowledgments

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We also thank the patient and public involvement group which supported this study. They've highlighted several areas where the current literature doesn't adequately capture the patient experience and we're very grateful for this contribution. Beyond this, many of the studies included here use data that has been provided by patients and collected by the NHS as part of their care and support. We'd like to acknowledge and thank these individuals. Without the use of this routinely collected data, it isn't possible to undertake research that can robustly inform the delivery and improvement of cancer care for everybody across the UK.

About Cancer Research UK

We're the world's leading cancer charity, dedicated to saving and improving lives with our research, influence and information. In the last 50 years, our pioneering work has helped double cancer survival in the UK. And today it's continuing to save lives, here and around the world.

Our vision is a world where everybody lives longer, better lives, free from the fear of cancer. And step by step, day by day, our researchers are making this vision a reality thanks to our dedicated community of supporters, partners, donors, fundraisers, volunteers and staff.

Together we are beating cancer.

Foreword

In an era of budget constraints and competing priorities, it has never been more important to consider how money is spent in the health sector. Saving and improving lives remains Cancer Research UK's core purpose, but preventing, diagnosing and treating cancer also provides wider benefits to society and long-term economic growth. By understanding these economic dimensions, we can support policymakers to make better-informed decisions and make sure public money is used in the most effective way.

This report, commissioned by Cancer Research UK and led by academics at the University of Leeds, aims to provide an assessment of the economic cost of cancer in the UK based on the current literature. It brings together the existing evidence on the wider economic cost of cancer, highlighting not only the direct cost to our health system, but also the impact on patients, their families and the wider economy. It makes the case that cancer isn't just a health challenge, but also an economic one with significant implications for public policy.

Current evidence shows that focusing on prevention and early detection and diagnosis is both the right thing to do for people affected by cancer, and the smart thing to do in economic terms. This aligns with government efforts to prioritise prevention and early detection and diagnosis, and this report strengthens the economic case for continuing and expanding that focus.

The report highlights the lack of a strong evidence base for the cost of cancer in the UK. There are still gaps when it comes to the long-term costs to patients and carers, the impact on specific population groups and the consequences for public services and economic productivity. This needs to be resolved by organisations with a direct interest in collaborating to improve the evidence base. These include government, charities, research funders, the NHS and industry. Our collective ambition should be to provide clearer, more consistent economic insights into policy choices and improve policymaking.

Cancer Research UK will play its part. We want to work with partners to identify and agree on priorities to better inform the policy landscape, so we can improve cancer research and care, contribute to a healthy economy and improve the experiences of people affected by cancer.

Ian Walker PhD, MBA
Executive Director of Policy, Information and Communications, Cancer Research UK

Executive summary

Cancer is one of the most pressing health challenges facing the UK today. The NHS is facing significant budget constraints due to difficult economic times and demand for healthcare is rising, with the health system struggling to keep up.

In cancer care, inflationary rises are compounded by an ageing population and an ever-expanding portfolio of new treatments. The cumulative global economic cost of cancer is projected to reach £19.6 trillion from 2020 to 2050. Despite the high costs of cancer care and the wealth of routine healthcare data available, there's limited knowledge about the cost of cancer in the UK.

This report provides a picture of what's currently known about the economic cost of cancer in the UK. It is based on a systematic review of the published evidence between 2014 and 2024 in both the scientific and grey literature. It also includes the results of a scoping review, which identified methodologies and data sources that can support future analyses.

The identified studies demonstrate the high costs of cancer in the UK, not just to the NHS, but also to the wider economy and families. Premature death from **cancer costs the UK an estimated £7.54–11.6bn a year in lost productivity**, while **cancer-related morbidity and informal care for patients with cancer cost a further £1.70–1.99bn and £4.01–4.50bn per year, respectively.**

These costs represent both a substantial **economic impact** but also a **significant personal impact** for the people that bear them. The magnitude of these losses and their consequences for people affected by cancer provide strong support for the delivery of policy to prevent cancer and save more lives through earlier diagnosis.

Direct medical and non-medical costs of cancer are also significant, but harder to compare across studies due to inconsistent data, methods and definitions. Limited data exists to demonstrate how costs vary with factors such as age, social and economic status, ethnicity and cancer stage. This lack of detail and consistent reporting makes it challenging to use the presented results to inform policy analyses.

Finally, **the data assessing the costs of cancer experienced by patients and their families is very limited**. Where this has been assessed, it doesn't always include all costs that patients experience. Again, this limits the use of this data to inform policy that could mitigate the financial impact of cancer on patients and their families.

The report highlights the high costs of cancer to the NHS, social care and wider society, advocating for action on prevention, early diagnosis and comprehensive care, as well as further investment in research. **To support better policy development, there's an urgent need for a stronger understanding of these costs across the cancer pathway, between patients and including all devolved nations.**

Key definitions

Table 1: Key definitions

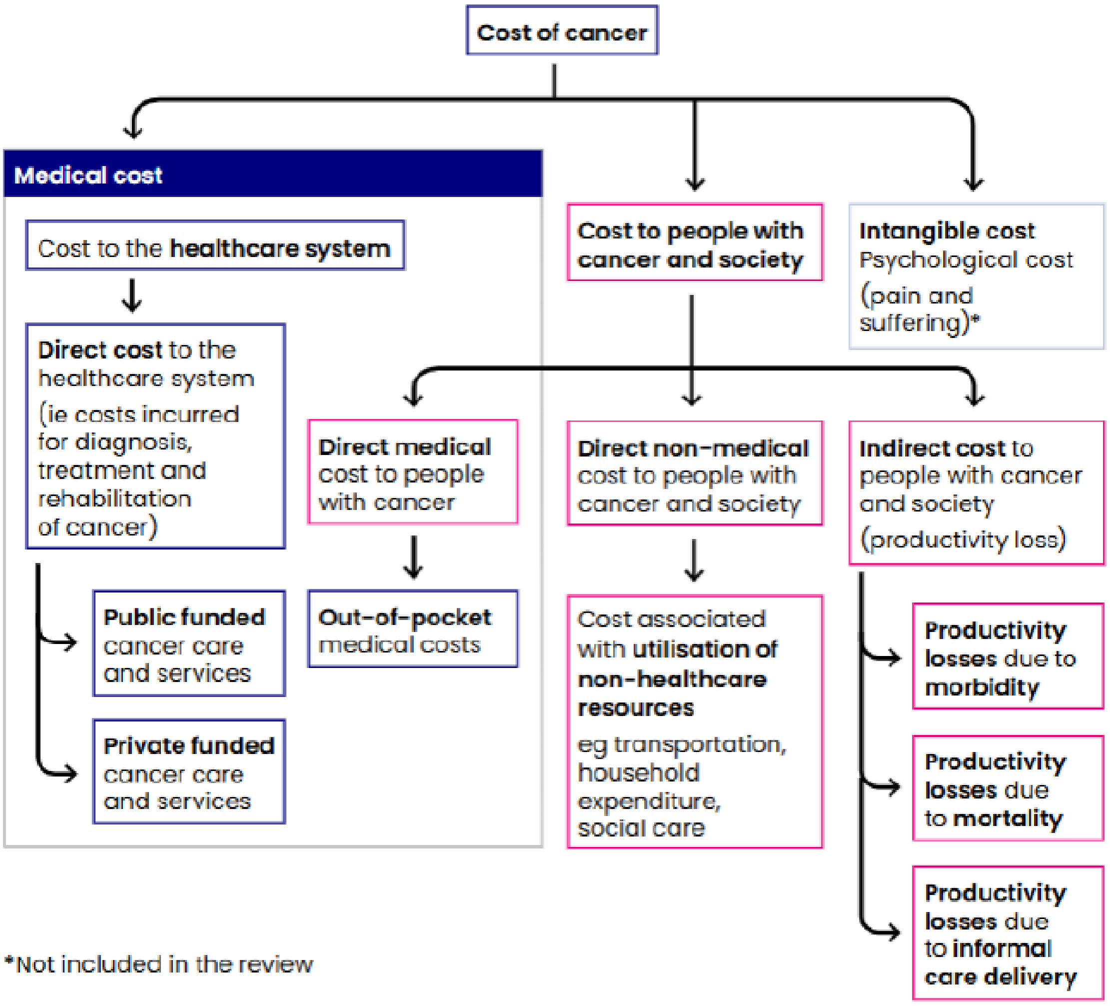
Term	Description
Direct cost	Costs relating directly to the delivery of health and social care services or experienced directly by the patients and their unpaid carers [1]. Direct costs can be either medical or non-medical.
Direct medical costs	Costs incurred for diagnosis, treatment and rehabilitation. These include publicly and privately funded services delivered to people with cancer, whether in the community or primary or secondary care [2].
Direct non-medical costs	Non-healthcare related costs as a result of cancer [3] such as transportation, household expenditures, home adaptation, childcare and non-medical care, which may be formal (delivered by social care services) or informal.
Patient-experienced costs	Costs experienced by the patient and their informal care network, whether direct or indirect [1].
Informal care costs	Costs associated with the delivery of care by the patient's informal care network [3], frequently reported as a productivity loss and may more accurately be considered an indirect cost (see below).
Formal care costs	The cost of delivering social care, as provided by formal care services, to support a person's non-medical care needs [1].
Indirect cost	Costs borne by other areas of the economy, including productivity losses due to morbidity and mortality incurred by the patient, family, employer or society [2]. This includes work or school absenteeism, time spent by informal caregivers and early retirement or death due to illness.
Incidence cost	Costs of illnesses that have their onset in a specific period [4].
Prevalence cost	Costs of an illness attributable to all cases present in a given year (although potentially diagnosed in a prior time period) [4].
Perspective	The viewpoint that an analyst adopts to define the types of costs and outcomes in their studies [5].
Time horizon	The period over which costs are either observed or modelled in a cost-of-illness study. For cancer, this will often start at the point of diagnosis [6].

Introduction

In line with international healthcare systems, the NHS in all the UK nations is grappling with budgetary constraints [7]. This is particularly challenging in cancer care, where an ageing population and an increasing range of innovative treatments drive increased costs [6,8]. Recent predictions show that between 2020 and 2050, the total cumulative global cost of cancer will be £19.6 trillion [9].

Cost of illness (COI) studies seek to understand the value of the resources expended or forgone due to an illness [10]. Generally, COI has been described as incorporating direct costs (resulting directly from the illness), indirect costs (most frequently resulting from reduced employment and consequent lost productivity) and intangible costs (the cost of pain and suffering, which is difficult to measure and is rarely assessed) [1,2].

Figure 1: The cost of cancer



*Not included in the review

The specific definitions used differ widely across the published literature; however, the direct costs can further be broken down into medical and non-medical costs [3]. The former includes costs incurred for diagnosis, treatment and rehabilitation. The latter consists of the formal and informal costs associated with the consumption of non-healthcare resources such as transportation, household expenditures and social care costs [3]. These may be borne by the patient and their informal care network or by social care services. Indirect costs include wider costs to the economy, specifically those that result from lost productivity, and can occur due to morbidity, mortality or displacement of productivity due to caring. These costs can be incurred by the patient, their family/informal care network, employer or society as a whole. Notably, productivity losses are usually considered based on paid labour; however, across society, much work is unpaid. Where appropriate, this can also be incorporated in calculations of indirect costs. The definitions used here are detailed in Table 1, and an illustration of these costs is shown in Figure 1.

An understanding of the cost of cancer is crucial for informing a wide range of policy decisions, from public health interventions and cancer screening programmes to local and national healthcare service delivery. Yet despite cancer's recognised high cost and the well-developed infrastructure for data collection in the NHS, current knowledge of the cost of cancer in the UK is fragmented. This review aims to establish what is known about the cost of cancer in the UK. Its focus is on the financial costs of cancer (both direct and indirect). It does not consider the intangible costs which are often difficult to quantify and whose role in decision-making is distinct from the monetary costs considered here [2].

Research aims and objectives

This research involved:

- a **systematic review** that aimed to identify what's currently known about the direct and indirect costs of cancer in the UK, across all ages and malignant diagnoses
- a **scoping review** that sought to understand the methodologies and data sources used to assess the cost of cancer in the UK, as well as the gaps in current knowledge and best-practice methodologies for undertaking these analyses

Methods

Systematic review

Systematic searches were performed in health and multidisciplinary databases to identify studies assessing the costs of cancer that included patients of all age groups and their informal support networks in the UK, including England, Scotland, Northern Ireland and Wales. Studies were included if they reported the direct or indirect costs of cancer in monetary units but were also included if they reported indirect costs in terms of employment outcomes (such as the percentage of people returning to work after cancer).

Additional grey literature was identified through various sources, targeting specific governmental and third sector websites (see Appendix 2). Studies published from 1 January 2014 to 2024 using data from 2009 to the present were included. Studies were excluded if they involved patients without a diagnosis of cancer, didn't report UK-specific data, were published in languages other than English or only used data collected before 2009. A complete list of the inclusion and exclusion criteria can be found in Appendix 1.

Two reviewers independently checked each of the potential studies, and the included articles were double-checked. For each included study, data on patient population, time horizon, data sources, methods and results were extracted, and the study quality was assessed for risk of bias. The data were synthesised narratively due to the wide variation observed in the methods and data sources used.

Many studies assessing the costs of cancer presented results from other jurisdictions and reported costs in a single currency (EUR or USD), presenting challenges to interpretation if appropriate conversion back to GBP isn't undertaken. This is compounded by variations in the time period considered, with a need to recognise the impact of inflation. To reduce the challenge of interpreting variation in costs resulting from methodological differences versus inflation/currency conversion, we present results with currency and inflation adjustments. Whenever this is done, we specify it in the relevant section of the text. Currency conversions were calculated in a two-step process:

1. Values were converted into GBP of the same year using mean annual exchange rates calculated from Bank of England historical daily spot rate data.
2. Past GBP values were inflated to 2023/24 GBP using the health-specific consumer price index from the Office of National Statistics.

Scoping review

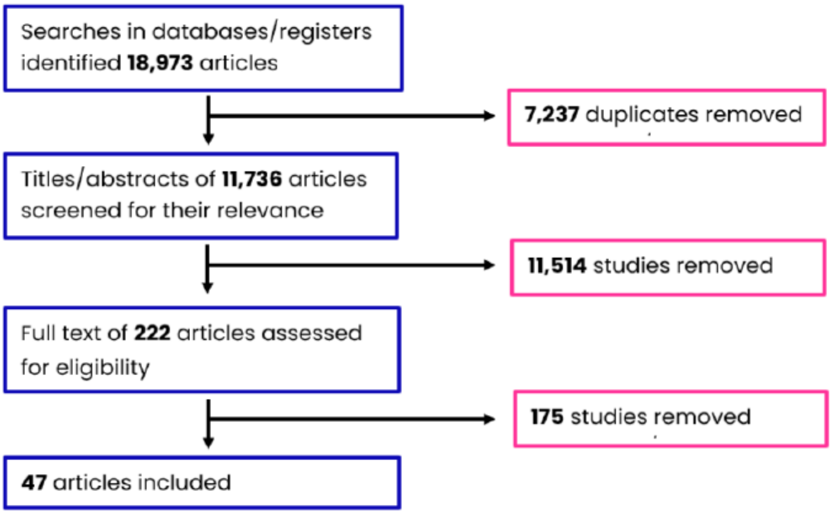
Systematic and targeted searches were conducted in health and multidisciplinary databases, as well as grey literature (websites of international organisations) to identify articles providing recommendations on how to conduct COI studies into non-communicable diseases. Articles published in languages other than English weren't considered, there were no time or country limitations and information about the recommendations made in each article was extracted and synthesised narratively. Limited results from this study are presented here.

Results

Systematic review

The initial searches identified 18,973 potentially relevant unique articles. Of these, we identified 47 articles meeting the inclusion criteria. A PRISMA flow diagram in Figure 2 summarises the search and screening process.

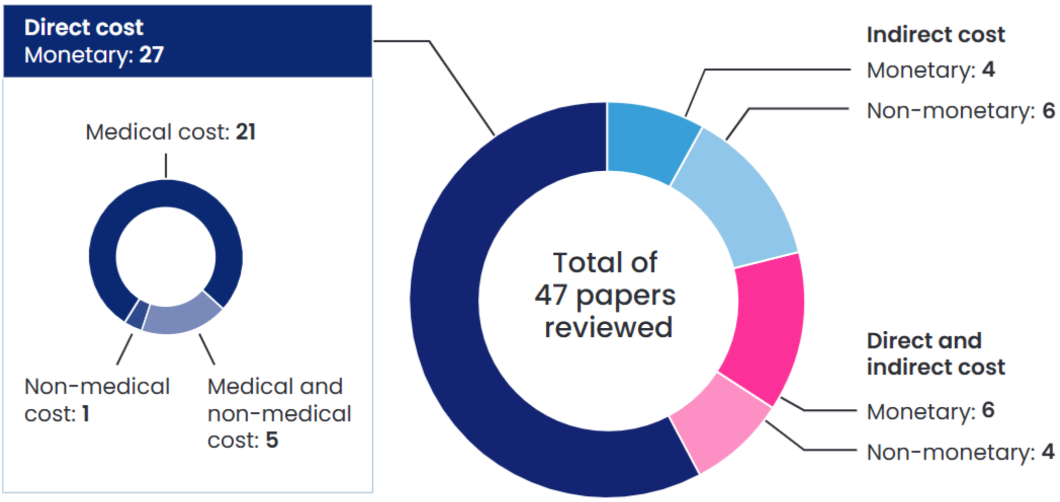
Figure 2: Flow diagram showing the search and screening process



Summary of study characteristics

Of the 47 papers, 27 reported the direct cost of cancer and 10 the indirect costs, with a further 10 including both. Of those considering the direct cost, 21 reported only direct medical costs with 1 reporting direct non-medical costs and 5 including both. Out of 20 studies assessing the indirect costs of cancer, 10 (50%) reported employment outcomes for patients and their carers (non-monetary outcomes). See Figure 3.

Figure 3: Number of studies incorporating specified cost type

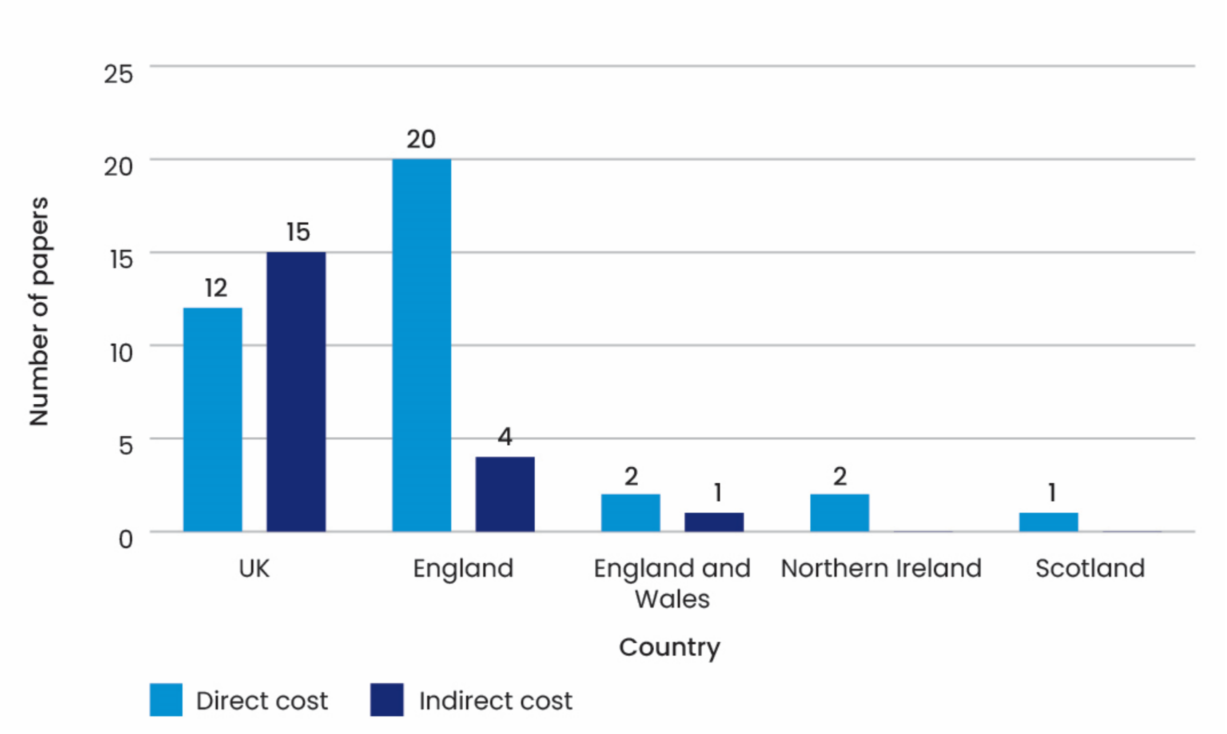


Study perspectives and populations

When evaluating the cost of cancer, it's critical to define the perspective of the analysis – for example, the healthcare payer, patient or society. This then guides the inclusion of all relevant costs and data sources and helps make sure the study results are appropriately positioned to inform the question the study aims to address. It was notable that of the 47 studies included here, only 12 (26%) explicitly stated the perspective of the analysis. For a further 24 (51%) it was implicit in the data used and wider methods.

Over half (57%) of the studies included data reflecting a national population (whether an individual devolved nation or the whole of the UK) whilst just under a fifth (18%) presented regional or institutional populations. A further quarter (25%) considered a larger international population, with UK outcomes presented separately. Approximately half of the studies examining the direct costs of cancer were conducted in England (54%). In contrast, the large majority of studies examining the indirect costs of cancer included the whole of the UK (75%) (see Figure 4). As UK-based studies, the costs were predominantly reported in GBP (62%).

Figure 4: Geographic region included in studies



Few studies reported costs for individual socio-demographic subgroups, with consideration given to age (nine studies) and very limited inclusion of socioeconomic deprivation (two studies) or regional variation (one study). Where age was considered, this was largely within adult populations (for example, considering older adults separately). The costs of childhood, adolescent and young adult cancers were considered specifically in only one report by CLIC-Sargent (now Young Lives vs Cancer) identified from the grey literature.

Cancer type

A third of all studies (38%) reported costs for all cancer diagnoses (rather than a single tumour type). This proportion was higher among studies that considered indirect costs (55%). Conversely, where the direct costs were reported, an individual or small group of diagnoses was more likely to be considered. Table 2 shows the number of studies reporting the costs of each specific cancer type separately.

Table 2: Number of studies reporting the costs of specific cancer types

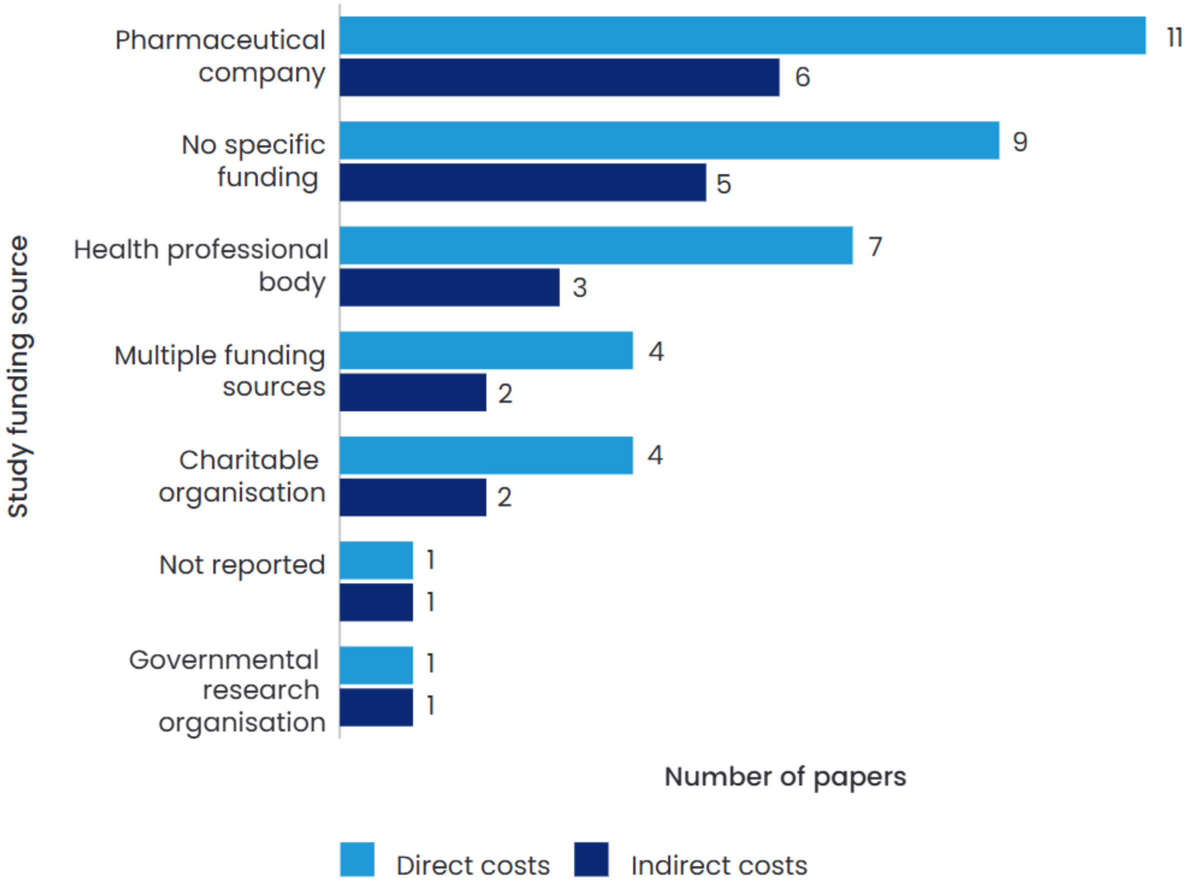
Diagnosis	Direct cost number	Indirect cost number
Breast cancer	12	4
Lung cancer	11	1
Bowel cancer	9	2
Prostate cancer	7	1
Haematological malignancies	5	1
Melanoma skin cancer	5	2
Kidney cancer	3	0
Non-melanoma skin cancer	3	0
Pancreatic cancer	3	0
Stomach/gastroesophageal cancer	3	0
Anal cancer	2	0
Bladder cancer	2	1
Brain/head and neck cancer	2	0
Malignant mesothelioma	2	1
Penile cancer	2	0
Vulval vaginal cancer	2	0
Cervical cancer	1	0

Study funding

When interpreting the results of any research, it’s necessary to consider how the work was funded. This represents one element that may contribute to a risk of bias due to a conflict of interest. Reassuringly, over three-quarters of studies reported their funding source and conflicts of interest; however, the remaining quarter didn’t include this information. Based on the aim of the study and specified funding, we identified that a conflict of interest was present in approximately a third of the studies.

Notably, 11% of studies reported no specific funding, with a further 11% funded by a professional body or higher education institution and 17% relying on funding from multiple sources. A further 28% were funded by pharmaceutical or insurance companies, while 19% were funded by charitable organisations. Governmental research bodies funded only 11% of included studies and 3% didn't report the funding sources (Figure 5).

Figure 5: Study funding sources



Risk of bias assessment

Beyond the funding source, we systematically assessed the potential risk of bias of the included studies. To do this, we assessed each study using a previously published checklist [11]. This included key domains, such as whether the study perspective and population were clearly reported, if the length of follow-up was documented and how costs of care were identified.

We found that 87% of studies had a risk of bias in at least one domain. The reason for this risk varied between studies but included a failure to report key information such as the study population definition, perspective or time horizon. A risk of bias was also seen where studies failed to undertake sensitivity analyses, did not discount future costs and neglected to report outcomes for relevant groups.

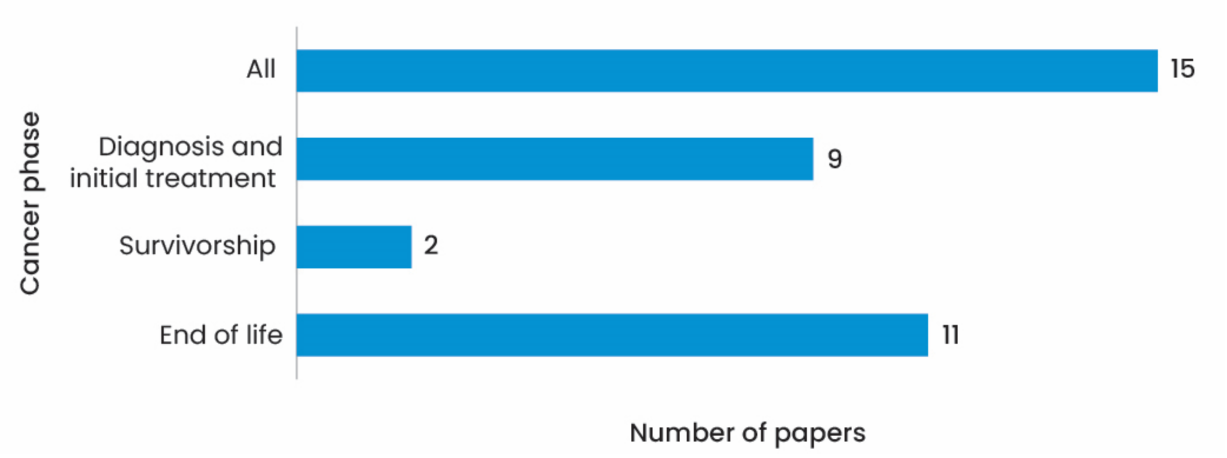
The cost of cancer to the healthcare system and patients: direct costs

Cancer phase

The studies included in this section all report the direct costs of cancer. A major challenge to interpretation lies in the significant variation observed in the phase of cancer studied. Nearly half (41%) considered all cancer phases, 30% considered the end-of-life period, and 24% considered the period immediately after diagnosis (Figure 6). It's notable that only two studies focused on the survivorship phase, this phase includes patients living beyond cancer and those with recurrent disease not within the final year of life. As such, the relative lack of studies in this area is a significant limitation in the context of increasing survival for many cancers.

Within this, there is further variation, with studies reporting varying time periods from 3, 6 and 12 months or longer after diagnosis or before death. This variation in the reporting period, combined with differences in the populations considered and methods used, makes it impossible to combine the figures from different studies to provide an overall estimate. As such, costs are reported from individual studies and, where possible, as ranges. Only six studies considered the costs of cancer based on how advanced the cancer was at diagnosis (the stage). These are considered separately below.

Figure 6: Cancer phase



Data sources

To assess the direct medical costs of cancer for an individual, patient information is needed about the treatments they've received and the cost of each one. In this bottom-up approach, these are then combined to provide the total cost of a patient's care over a defined period. Where only aggregate data are available (for example, the total costs of a cancer to the healthcare system), a top-down approach can be used to estimate expenditure at population and subsequently patient level. This latter option can be simpler and avoids under-estimation through missing costs, but inevitably makes more assumptions – for example, assuming all included patients have the same costs, resulting in a lack of information about any variation between individuals.

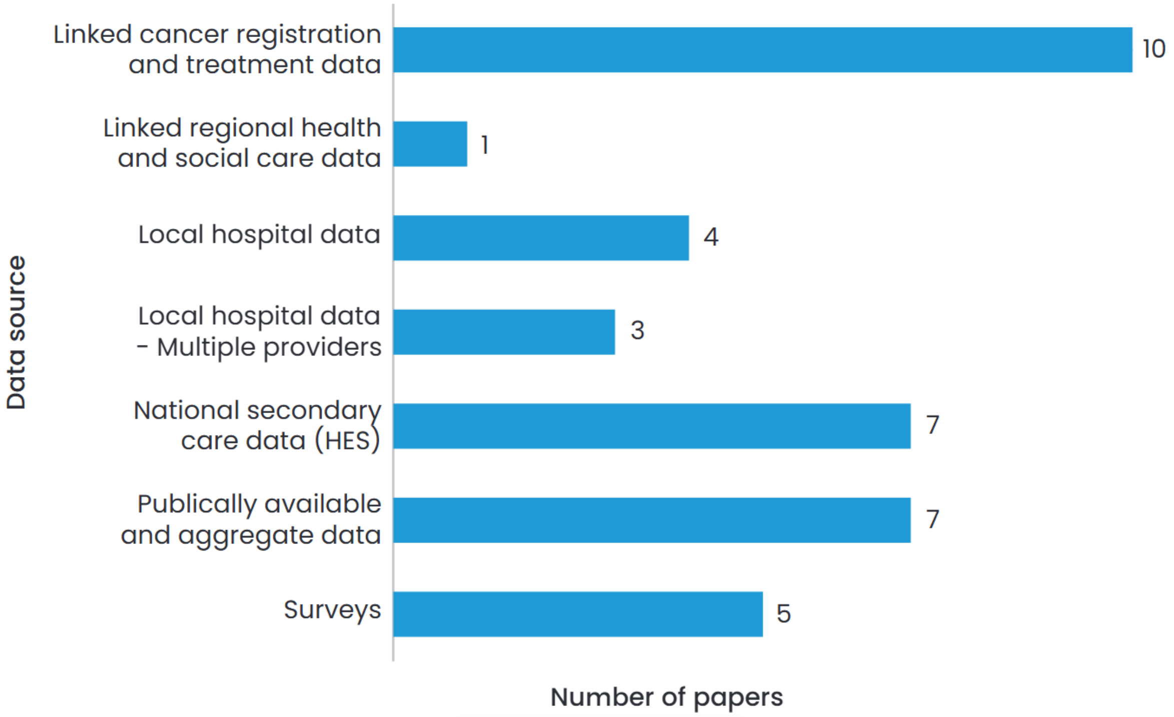
An alternative modelling approach provides a cost per patient by combining information on the cost of each treatment with a model that defines the likelihood that a treatment is received. Increasing model complexity can enable recognition of variation between subgroups and while this might be expected to provide a reasonable estimate of the costs of cancer treatment, it's unlikely to provide detailed information about variation. It also has limited scope to capture medical costs that aren't directly attributable to cancer.

In the UK, the necessary data to undertake a bottom-up analysis is available from multiple sources. The most used source in the studies included here (27%) was cancer registration data linked to treatment datasets. This provides an excellent ascertainment of the patient population with robust data to inform delivered care.

A smaller proportion (19%) of studies used only Hospital Episode Statistics (HES) data. Whilst providing robust information about inpatient hospital care, this may not capture outpatient procedures such as chemotherapy and radiotherapy as reliably. HES is known to miss approximately 15% of cancer diagnoses and doesn't contain information about the cancer stage [12].

Notably, 59% of studies assessing the direct costs of cancer used local or regional data, raising potential concerns about how well the results can represent a national population. Only a single regional study was able to use linked health and social care data. See Table 3.

Figure 7: Data sources used in studies assessing the direct medical costs of cancer



Direct medical costs

The direct medical costs of cancer are those that are incurred for diagnosis, treatment and recovery. These may be borne by public or private services. In the UK, it’s anticipated that a majority will be borne by the NHS and in the studies included here, no information was identified regarding the medical costs of cancer care delivered specifically in the private sector.

Two studies have attempted to quantify the annual direct cost of cancer to the healthcare system. Hofmarcher et al. [13] take a top-down approach. They present an estimate of the UK Government’s health expenditure on cancer care of €11.7bn (2018) (2024 GBP: £14.6bn), of which €3.25bn (2024 GBP: £4.1bn) is on cancer drugs. The definition of health expenditure follows the Organization for Economic Co-operation and Development (OECD) guidelines and includes long-term care [14]. A second study taking a largely bottom-up approach considered the English NHS’s costs in 2018 and estimated the direct medical cost of cancer to be £8.1bn (2024 GBP: £10.1bn), rising to £9.95bn (2024 GBP: £12bn) when social care costs were included [15].

A further study considered the total annual direct cost to the NHS of all preventable cancers in the UK [16]. This was estimated to be £3.7bn in 2023 (2024 GBP: £3.9bn). This represents a significant sum which could potentially be reduced through improved public health measures, although it should be recognised that even highly effective interventions are unlikely to prevent all potentially preventable cancers.

Where the patient-level costs are considered, only a single study considered the period from one month prior to diagnosis to six months post-diagnosis for all cancers (excluding non-melanoma skin cancers) in England in 2018/19 [17]. This study focused on the extent to which NHS costs differed between those living in the community versus those in prison. The average costs per person for the observed seven months were £7,154 (2024 GBP: £8,707) and £6,589 (2024 GBP: £8,019) respectively [17].

End-of-life costs

Multiple studies have considered the cost of the end-of-life (EoL) period for patients dying from cancer. The costs per patient in the final year of life in 2020 were identified to be higher for patients dying in hospital (£17,799 (2024 GBP: £21,182)) than for those dying out of hospital (£11,621 (2024 GBP: £13,830)) in England [18]. A separate study reported the mean per patient NHS hospital expenditure in England for all cancers (excluding skin cancer) during the last 180 days of life to be approximately $10,003 (2024 GBP: £15,301), with a mean cost per hospital day of $542 in 2010 (2024 GBP: £829) [19].

Similarly, Yi et al. [20] used a follow-back survey sent to family and carers of both people who had died from cancer and people who had died from other causes to estimate the mean cost of hospital and social care in the last three months of life in England. They estimated a cost of $13,206 (2024 GBP: £15,716) with a skewed distribution – the top 10% of patients had average costs of $41,790 (2024 GBP: £49,732). The year of cost estimation was not clear in this study.

Finally, in Northern Ireland, the total cost of just unscheduled inpatient NHS care for all cancers in the last year of life was estimated in 2015 to be £28.7m (2024 GBP: £38.4m), an average of £9,200 (2024 GBP: £12,328) per patient in the final year of life [21].

Limited comparisons of EoL care costs are available between cancer and non-cancer populations. A Scottish population-wide administrative data linkage study by Diernberger et al. [22] which included only individuals with a cancer diagnosis, concluded that comorbidities and cancer type, rather than age, drove variation in EoL NHS costs for people over 65. Variation between cancer types appeared to stem from response rates to treatment, with ovarian cancer boosting EoL secondary care use due to higher response and treatment rates and brain tumours having lower use, likely due to the more limited treatment options. However, a significant limitation of this study was the lack of data on social care, specialist palliative care and cancer drugs.

Extending beyond cancer, the follow-back survey by Yi et al. [20] found that dying of cancer was not associated with higher EoL costs in the last three months of life, including hospital, community and social care costs. In fact, UK EoL costs were lower for cancer populations compared to non-cancer populations, at $13,200 (2024 GBP: £15,709) versus $13,800 (2024 GBP: £16,423) respectively. Furthermore, Yi found that 86% of England’s cancer EoL costs (86%) stem from hospital care as opposed to community and palliative care. It’s not clear if hospital-administered cancer drug costs are captured in this study, which is a significant limitation.

Conversely, a further Scottish study by Diernberger et al. [22] found that patients near the EoL with cancer have high outpatient-led secondary care resource use relative to other disease groups, though they didn’t present the costs of this care.

While a cancer diagnosis doesn’t appear to lead to higher EoL costs relative to other diseases, it does impact health resource use patterns. Furthermore, the accuracy of these conclusions can be significantly challenged by the exclusion of drug costs from these papers, as this could potentially result in a substantial underestimate of EoL costs for patients with cancer.

Figure 8: Cost of cancer to the healthcare system

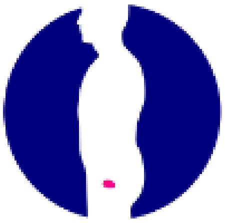
Cost of cancer to the healthcare system

Breast cancer

Overall:	First year after diagnosis*:
£472m (2014)- £505m (2010)	£6,774 (early stage only, 2016)- £9,450 (all breast cancers 2018)

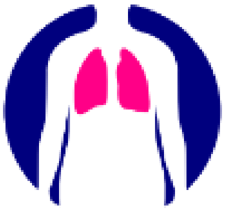
Bowel cancer

Overall:	First year after diagnosis*:
£333m (2014)- £524m (2010)	£7,865 (2018)- £12,643 (15 months, 2012)



Prostate cancer

Overall:	First year after diagnosis:
£160m (2010)	£3,166 (2018)- £3,722 (2012)



Lung cancer:

Overall:	First year after diagnosis:
£132m (2014)- £307m (2016)	£4,054 (2018, 18 months)- £10,009 (2014)

Final year of life

£9,200* (2015)-
£17,799 (People dying in hospital in 2020)

*per person

Costs vary with cancer stage, age, socio-economic deprivation, co-morbidity, route to presentation and region of the country.

Direct medical costs of individual cancer diagnoses

Breast cancer

Using routine healthcare data linked to cancer registry data, Laudicella et al. [23] calculate that in 2010, the total direct secondary care NHS cost of breast cancers diagnosed over the preceding five years (net costs, excluding non-cancer costs) in England was £505m (2024 GBP: £772m). This aligns reasonably well with a study by Briggs et al. [24] who used a combination of high-level data and modelling to estimate the total NHS cost for breast cancer in England in 2014 to be £472m (2024 GBP: £645m), with an annual cost per prevalent breast cancer case of £573 (2024 GBP: £783). Capturing costs over fifteen years beyond diagnosis (including breast cancer screening), a more recent modelling study estimates the total NHS cost of all incident cases in 2019 in the UK to be £727m (2024 GBP: £884m) [25].

Multiple studies reported the cost of the first year beyond diagnosis for an incident breast cancer case in England. This ranged from £6,774 (2016, 12 months, early stage only (1-3A) (2024 GBP: £9,077) [27], through £9,450 (2018, 12 months, all stages) (2024 GBP: £11,791) [27] to £12,595 (2011-2012, 15 months, patients receiving curative treatment only and alive, relapse-free at 15 months) (2024 GBP: £18,109)[28]. In the former two studies, only costs clearly related to breast cancer were included. Notably, the proportion of direct medical costs attributable to the delivery of systemic anti-cancer therapy varied widely between these two studies from 14% to 46%, respectively. This marked difference may in part be due to the different populations included – the study where the proportion was lower only included patients with early-stage disease. [26,27]

Wide variation was demonstrated with age. For example, there were reported first-year costs of £11,109 (2024 GBP: £16,993) for patients aged 18 to 64 and £7,788 (2024 GBP: £11,913) for those aged 65 and older in 2010 in England [23]. Variation was also demonstrated across other characteristics by Sun et al. [27]. These included cancer stage (increasing from 1 to 3A and mirrored by Wills et al. [27] findings on breast cancer); co-morbidity (reducing with increasing co-morbidity); socioeconomic deprivation (increasing with affluence); cancer grade (increasing with increasing grade); HER2 and hormone receptor status (higher in HER2 positive disease and oestrogen receptor-negative disease); the route to diagnosis (lower with screen-detected disease) and the region of the country in which the patient was diagnosed.

In a population near the EoL, Diernberger et al. [22] observed that the mean cost of hospital care to the NHS in Scotland per patient with breast cancer in the last year of life was £11,089.2 (2024 GBP: £11,756) in 2017. Conversely, Round et al. [29] modelled the community, palliative care and secondary care costs of an EoL period, defined by the patient’s need for palliative care services and reflecting a mean survival of 6–12 months. They identified a mean cost per patient for this period of £4,346 in 2013/14 (2024 GBP: £5,936).

Bowel cancer

The overall direct medical costs of bowel cancer were estimated in two studies. Henderson et al. [30] modelled the total UK healthcare cost for bowel cancer in 2015 at €361m (2024 GBP: £484m). Briggs et al. [24] used a combination of modelling and population-level data to estimate that in 2013/14, bowel cancer cost NHS England £333m (including primary and secondary care) (2024 GBP: £455m), equating to an annual cost of £810 (2024 GBP: £1,106) per prevalent case.

Hall et al. [28] observed mean cumulative hospital costs per patient in an English region of £10,038 at six months beyond diagnosis (2024 GBP: £14,432), £11,809 at nine months (2024 GBP: £16,979), and £12,643 at 15 months in 2011/12 (2024 GBP: £18,178). A further study in England by Wills et al. [27] included only the costs of cancer care and identified a cost of £7,865 for bowel cancer in 2017/18 (£7,437 for colon and £8,988 for rectal cancer) (2024 GBP: £9,813). Conversely, Diernberger et al. [22] use Scottish data to identify a cost of £12,395.40 for hospital-based NHS care during the last year of life in 2017 (2024 GBP: £13,140).

Prostate cancer

Only one study investigated the total cost of hospital-based NHS care for prostate cancer in England in a single year, identifying a cost of £160m in 2010 (2024 GBP: £245m). This was found to be considerably lower than the cost of breast cancer or bowel cancer, possibly reflecting the active surveillance approach taken in the care of many people with prostate cancer [23].

No studies focused solely on how much it costs to treat an individual patient with prostate cancer. This was, however, reported separately in three studies investigating the hospital-based NHS costs in the initial treatment phase across multiple cancers in England. These identified mean costs of £3,166 (data-driven initial treatment phase, 2017–2018) (2024 GBP: £3,950) [27], £3,722 (over 15 months, 2011-12) (2024 GBP: £5,351) [29] and £5,171/£4,540 (over 12 months, aged 18–64/65 and older, 2010) (2024 GBP: £7,910/£6,945) [23]. The latter two included all healthcare costs, whilst Wills et al. incorporate only cancer treatments. Age and treatment approach were both identified as predictors of cost, although no detailed multivariable analysis has been undertaken to investigate this (Laudicella et al. [27]).

Lung cancer

Three studies sought to identify the total direct medical cost of lung cancer in England. In 2010, these were identified by Laudicella et al. [23] to be £307m (cancer treatment costs only) (2024 GBP: £470m) whilst McGuire et al. [31] estimated these to be €638m for the first year of care for patients diagnosed with non-small cell lung cancer in 2012 (2024 GBP: £917m). Both studies included only hospital-based NHS costs, whilst Briggs et al. [24] used a top-down approach to identify an overall spend of £132m in 2013/14, including primary care costs (2024 GBP: £180m).

The total cost per patient of NHS hospital-based care in England was estimated to be £10,009 in the year after diagnosis in 2013/14 (2024 GBP: £13,672) [32]. Similar results were presented by Laudicella et al. [23] of £12,083 in 2010 for those aged 18-64 (2024 GBP: £18,483) and £9,061 (2024 GBP: £13,860) for those aged 65 and above.

For non-small cell lung cancer specifically, similar estimates of hospital-based costs are presented by Verleger et al. [33] (€17,761 over one year from diagnosis in England, 2018) (2024 GBP: £22,160) and McGuire et al. [31] (€17,777 over two years after a diagnosis in England, 2011/12) (2024 GBP: £25,559). Conversely, Wills et al. [27] report an average cost of £4,054 per patient over 18 months from diagnosis in England (2024 GBP: £5,058), including only anti-cancer treatments. Finally, the mean cost in the final year of life in Scotland was found to be £10,812.5 in 2017 (2024 GBP: £11,462) [22].

Other cancer diagnoses

Multiple other studies were identified that considered the direct medical costs of a wide range of other less frequent cancer diagnoses. These will be presented fully in a forthcoming peer-reviewed publication.

Haematological malignancies and skin cancers were specifically reported in multiple studies. Haematological malignancies were found to incur the highest hospital-based costs of all cancers in the final year of life in Scotland of £24,358 in 2017 (2024 GBP: £31,145) [22]. There were separate studies modelling the lifetime hospital-based cost of treating myeloma (£146,261 for those diagnosed in 2019/20 in the UK) (2024 GBP: £174,058) [35] and diffuse large B-cell lymphoma in England (£18,000 in 2013) (2024 GBP: £25,257) [35]. The total healthcare cost for malignant blood disorders in the UK in 2012 was estimated to be €991m (2024 GBP: £1.42bn) [36].

Both melanoma and non-melanoma skin cancers were considered in multiple studies. For cutaneous melanoma, a wide range of estimates are reported for the direct medical cost per patient: £1,781 per month (2024 GBP: £2,499) in advanced disease based on combined clinician and patient surveys (UK, 2013) [37]; £31,300 per case in 2021/22 (2024 GBP: £35,726) in Northern Ireland based on modelling of all NHS healthcare interactions [38] and £2,607 per patient in England in 2008 (2024 GBP: £4,219) based on modelling of all NHS healthcare costs [39]. Less variation was seen in the estimated costs of non-melanoma skin cancers: £784 per case in 2021/22 (2024 GBP: £895) in the NHS in Northern Ireland [38]; £889 per case in 2008 (2024 GBP: £1,439) in England, based on modelling of all NHS healthcare costs [39].

Impact of cancer stage on direct medical costs

Beyond the assessment of costs by cancer phase, a breakdown of costs by cancer stage is necessary, for example, when the cost-effectiveness of a novel screening intervention is assessed. In the studies considering the direct medical costs, three (8%) focused on the costs of early-stage cancers, whilst six (16%) focused on advanced-stage disease. Only six studies provided information on the variation in cost with cancer stage (see Table 3).

Hall et al. [28] considered the hospital-based NHS costs for patients undergoing curative treatment and alive, relapse-free, at 15 months beyond diagnosis with multiple cancers. They demonstrate increasing cost with stage in bowel cancer and with grade in breast cancer and prostate cancer.

These findings in breast cancer are mirrored by those of Sun et al. [26], who go on to find that the hospital-based NHS costs of early invasive breast cancer in the first year beyond diagnosis increased from £5,167 for stage 1 (2024 GBP: £6,924) to £13,330 (2024 GBP: £17,862) for stage 3A disease in England. This finding is replicated by Wills et al. and Laudicella et al., who demonstrate a further increase in costs for patients with metastatic breast cancer at diagnosis. Laudicella et al. also note that this increase is particularly marked in younger patients with advanced disease. The cost of bowel cancer is also seen to increase from stage 1 to 4 in Wills et al.'s study.

But this finding isn't consistent across all cancer types. Kennedy et al. [40] demonstrated that an advanced stage in lung cancer predicted lower cost at 90 days and one year, whilst active cancer treatment was associated with higher costs than best supportive care. This finding mirrors that of Wills et al. [27] who identified that the cost of NHS-based cancer care in the initial treatment phase was higher for stage 2–3 disease lung cancer than either stage 1 or 4, with a similar finding demonstrated in prostate cancer. Conversely, McGuire et al. [31] reported first-year hospital costs in England of £8,478 (2024 GBP: £12,189) for metastatic non-small cell lung cancer and £6,686 (2024 GBP: £9,613) for non-metastatic disease.

Overall, based on the limited data available, the variation in costs observed with cancer stage appears to differ between cancer types and requires further investigation.

Table 3: Impact of cancer stage on direct medical costs*

Study	Diagnoses	Time horizon	Stage	Cost
Kennedy et al. (2016)	Lung cancer	First 90 days and one year	3–4	- Advanced stage predicted lower costs at 90 days and one year. - Palliative and radical treatment were associated with increased costs compared to best supportive care.
Hall et al. (2015)	Breast, prostate and bowel cancer	15 months from diagnosis	Patients treated with curative intent	- Increasing clinical stage/grade predicted higher costs
Sun et al. (2020)	Early invasive breast cancer	One year from diagnosis	1–3A	- Average per-patient hospital-related costs were: £5,167 at stage 1, £7,613 at stage 2, £13,330 at stage 3A
Wills et al. (2023)	Breast, lung and bowel	18 months from diagnosis	1–4	- Costs increased with stage in breast and bowel cancer, whilst in lung and prostate cancer they were lower at stages 1 and 4 versus stages 2 and 3
Laudicella et al. (2016)	Bowel and breast cancer	9 years	1–4	- **For 18–64**: Bowel £33,728 stage 1–2 £46,306 stage 3–4 Breast £25,693 stage 1–2 £39,353 stage 3–4 - **For 65+:** Bowel £38,876 stage 1–2 £43,170 stage 3–4 Breast £27,059 stage 1–2 £34,871 stage 3–4

McGuire et al. (2015)	Non-small cell lung cancer	One year	Non-metastatic disease vs metastatic disease	- Year 1 Non-metastatic: €6,686 Metastatic: €8,478 - Year 2: Non-metastatic: €783 Metastatic: €1,321

*Where costs are presented, these are unconverted.

The direct non-medical costs of cancer

Whilst studies considering the direct medical costs of cancer are relatively numerous, only ten assessed the direct non-medical costs. As defined previously, direct medical costs are those which are incurred directly as a result of the diagnosis, treatment or rehabilitation of cancer and will predominantly (but not exclusively) be borne by the healthcare system. Conversely, direct non-medical costs can be incurred by the patient, their informal support network or social care services as a direct consequence of the cancer.

Where care costs are considered, there's a need to distinguish between formal and informal care costs. Formal care costs are those relating to care delivered by social care services and are considered here as direct non-medical costs (which may be patient-experienced). Conversely, informal care is that delivered by the patient's informal care network.

Social care costs

Few studies have examined the costs of delivering formal social care for patients with cancer. These have focused on the EoL period, with only one study using patient-level routine data. In this study, Wang et al. [18] linked primary, secondary and social care data from a single local government region to estimate the costs of care in the final year of life for people over the age of 50. Based on regression modelling, those who died in hospital had higher social care costs (£1,528) (2024 GBP: £1,818) than those who died at home (£614) (England, 2020) (2024 GBP: £731) [18]. Notably, this excluded patient-funded social care.

Based on modelling, another study estimated the average cost of social care at £1,829 per patient during the EoL period (England and Wales, 2013/14) (2024 GBP: £2,498) and the total overall cost of social care for patients dying of lung, breast, colorectal and prostate cancer to be £118m (2024 GBP: £162m) with charity care costing a further £30m (2024 GBP: £41m) [29].

Finally, looking only at preventable cancers, Bell et al. [16] estimated the total ongoing social care costs for all preventable cancers diagnosed in 2023 (modelling costs from 2023–2040) in the UK at £1.26bn (2024 GBP: £1.81bn), of which £727.1m (2024 GBP: £770.8m) was for publicly funded care, £339.7 million (2024 GBP: £360.1m) for privately funded care and £191.3m for EoL care (2024 GBP: £203m).

Patient-experienced costs

Studies attempting to measure the patient-experienced costs are often small-scale and don't distinguish between whether these are out-of-pocket (OOP) medical expenses (for things like prescriptions, medical prosthetics and incontinence pads) or non-medical expenses (for things like home heating, clothing and travel).

Given this limitation, we present the patient-experienced costs as direct non-medical costs, recognising these often include a combination of both medical and non-medical costs. Further, whilst informal care costs are borne by the patient and their informal network, their calculation across studies reflects the opportunity cost of time spent caring, usually in the form of productivity loss resulting from displaced paid work. We therefore present these costs below alongside those relating to the wider productivity losses of cancer.

Notably, studies considering patient-experienced costs have heavily focused on a limited number of cost elements. These are detailed in Table 4. Informal care costs (13 studies), OOP expenses for travel (7 studies), and additional food costs including dietary supplements (5 studies) were most frequently considered. A range of other elements were infrequently assessed and only in the grey literature. No peer-reviewed publications provided details of patient-experienced direct non-medical costs beyond informal care. In studies that did report other OOP costs, the included elements and time periods considered were very variable, with some reports providing very limited information, making interpretation challenging.

Table 4: Included patient-experienced costs and their frequency of inclusion

Patient-experienced cost	Number of studies
Informal care costs*	13
OOP expenses on travel	7
Extra money on food/dietary supplements	5
Parking	4
Clothing	4
Heating	3
Prescriptions/over-the-counter medication**	3
Childcare	3
Medical aids and prosthetics (including wigs) **	2
Private healthcare treatment**	1
Accommodation (paediatrics only)	1
Toys/treats (paediatrics only)	1
Cleaner/domestic support	1
Counselling/therapy	1
Spiritual care person	1
Incontinence pads**	1

*These informal care costs largely reflect carer productivity losses and might best be considered indirect costs. See below.

**Whilst these costs are patient-experienced, they are more accurately considered direct medical rather than non-medical costs.

Based on survey data, Marti et al. [41] report monthly average OOP costs of £25.20 (2024 GBP: £36) in the 12-15 months post diagnosis (UK, 2012) for patients with lung, breast, bowel and prostate cancers. A similar figure of £24 (per month) was identified by Grange et al. [37] for those with melanoma (UK, 2013) (2024 GBP: £34). These figures predominantly reflect a survivorship period and in neither study is it clear what the included cost elements were.

Conversely, Demos and Zurich financial reports identify that people with cancer incur an average additional cost of £570 (in England) and £541 (in the UK, 2022) a month, respectively, due to their illness [42,43]. These costs were during the treatment period and included a wide range of expenses, which is likely to in part explain the higher estimates.

Modelling these at a population level, Bush et al. [25] estimate that patients with breast cancer and their carers incurred OOP costs of £20m in 2019 in the UK, although it’s unclear how this was determined or what was included [25]. Similarly, the estimated cumulative OOP costs of preventable cancers diagnosed in the UK in 2023 (projected out to 2024) were £135.1m [16].

Notably, a single report from CLIC Sargent [44] assessed the costs incurred by parents in the UK during their child's active treatment for cancer. Based on survey data, they estimate an average of £600 in additional monthly expenses. Furthermore, 61% of parents accumulated debt due to their child's diagnosis, with 17% borrowing over £5,000.

The patient perspective

Patient and public involvement (PPI) representatives working with the team undertaking this current work call attention to the fact that the nature and range of patient-borne costs captured by the current research significantly underestimates the financial cost of cancer to patients and families as they understand and experience it.

The PPI group expressed surprise at the relatively small number of patient-cost studies retrieved by the review, commenting: “Gosh that’s not a lot”. They also said it’s “worrying in many ways”, “a big shame” and serves to highlight that “they don’t consider the patient cost, only the cost to the NHS”.

Current studies have predominantly examined travel and informal care costs, and whilst the group agreed these were very important cost areas, they strongly urged that they constitute only “a small peak above the surface of the iceberg” which “doesn’t give you the full picture”.

Patient representatives drew attention to the substantial impact of lost income (work earnings), noting that for many people, cancer-related income loss eclipses additional spending (such as travel) and that “not being able to work after a cancer diagnosis, or after your child has been diagnosed, could completely uproot people’s lives at an already extremely stressful time”.

One group member highlighted the risk that “a form of researcher bias” is present when considering the impact of cancer on work, noting that self-employed and private-sector workers are underrepresented on research teams. The PPI group also called attention to the uneven distribution of research across the cancer trajectory, noting that “more research should be conducted to consider enduring costs of cancer after active treatment” and highlighting that this can include ongoing income loss.

The PPI group urged the importance of avoiding headline figures and presenting patient-borne costs data “with more context” as to the specific patient group, cost areas and time period examined (for example, older breast cancer patients spend £XX per month on travel in the year post-diagnosis). The group felt this is important as the financial impact of cancer can vary considerably (for example for working versus retired patients) and “lumping everyone together” can give an inaccurate picture which unfairly conceals subgroups of patients who bear the highest costs.

The cost of cancer to society: indirect costs

Cancer not only results in human consequences, with premature mortality and reduced quality of life, but also economic losses as a result of lost productivity. This is the indirect cost of illness.

These productivity losses are considered an important consequence of illness. At a patient level, these may result not only from premature mortality but also from morbidity, with people being unable to undertake the same work they previously would have done prior to diagnosis. This leads to reduced hours, changes in employment, time off work and reduced productivity at work as a consequence of the cancer and its treatment. Similarly, for caregivers, time spent caring may reduce the individual's available time to undertake other work. As such, productivity losses can occur as a result of premature mortality, morbidity or displacement due to caregiving.

The calculation of productivity losses in COI studies aims to provide a representation of the costs of disease to the wider economy. In this context, paid productivity is the primary consideration, aligning with the calculation of gross domestic product. However, not all work is paid, and as such the wider impact on economic output can be considered by incorporating the estimated monetary value of unpaid work. The extent to which unpaid work is a substantial component will often depend upon the demographics of the population under consideration – for example, people over the retirement age may undertake more unpaid than paid work.

Productivity losses resulting from premature mortality due to cancer

Amongst other factors, the calculation of indirect costs is sensitive to the methods used for estimation and the inclusion (or not) of unpaid productivity. The most common approach taken to calculate productivity losses is the human capital approach. This assumes that an individual continues to deliver output at the average level for their age and sex until retirement. If death occurs before the expected retirement age, then every year lost is considered in the productivity loss calculation.

An alternative approach assumes that employees can always be replaced and so assumes that for a relatively short 'friction' period, there is a productivity loss before a replacement employee is in post. This friction cost approach delivers a lower estimate of productivity loss.

Five studies modelled the paid productivity losses in the UK resulting from cancer-related premature mortality observed in a single year. The identified costs varied from £6.2bn to €8.1bn (2024 GBP: £7.54bn to £11.6bn) (see Table 5). As expected, over a longer period, these costs rise with estimated losses of €180bn (2024 GBP: £224bn) for all cancer deaths over the modelled period (2018–2040) (paid employment only) [45].

Conversely, considering only potentially preventable cancers diagnosed in 2023, Bell et al. [16] reported the paid productivity losses related to premature mortality to be £3.5bn (2024 GBP: £3.76bn) (UK, 2023). Broken down by cancer type, the losses are: lung cancer £1.42bn (2024 GBP: £1.50bn); bowel cancer £388m (2024 GBP: £411m); melanoma £75.9m (2024 GBP: £80.4m); breast cancer £80.5m (2024 GBP: £85.3m).

Unpaid productivity is only considered in two studies; however, its impact differs widely as a result of methodological and population differences. Ortega-Ortega et al. estimate the value of unpaid work lost due to premature mortality from all cancers in 2018 in the UK (excluding non-melanoma skin cancers) to be €6.2bn (2024 GBP: £7.72bn) [46].

Conversely, Bell et al. estimate this only for people dying due to preventable cancers in the UK in 2018 and present a total figure of £25.7bn (2024 GBP: £27.3bn). For specific cancer types, the losses are: lung cancer £10bn (2024 GBP: £11bn); bowel cancer £2.8bn (2024 GBP: £2.97bn); melanoma £429m (2024 GBP: £455m); breast cancer £430m (2024 GBP: £456m).

Figure 9: Cost of cancer to the economy

Cost of cancer to the economy

Paid productivity* lost due to:

premature mortality

£7.54–11.6

cancer-related morbidity

£1.70–1.99

caring responsibilities

£4.01–4.50

*Range in billions

Based on Bell's analysis, 88% of mortality-related productivity losses resulting from preventable cancers are the result of lost unpaid work, whilst based on Ortega-Ortega et al.'s analysis, this is only 47%. Despite the population differences, these starkly different results suggest there's a need for much greater methodological standardisation when considering unpaid productivity losses.

Estimates of annual paid productivity losses due to early mortality, relating to individual cancers, have been made in multiple studies: Henderson et al. [30] estimated early mortality losses due to bowel and anal cancer in the UK in 2015 at €425m (2024 GBP: £569.5m) – a relatively low estimate compared to that presented by Bell et al. (£388m) (2024 GBP: £411m) given that the Bell et al. estimate reflects only 54.3% of bowel cancer diagnoses (UK, 2023). Burns et al. [36] reported €308m (2024 GBP: £404m) in productivity losses from malignant blood disorders (UK, 2012), Leal et al. [47] estimated the productivity losses from bladder cancer in 2012 at €126.2m (UK, 2012) (2024 GBP: £181.4m) and Bush et al. [25] projected breast cancer productivity losses in the UK for 2024 to reach £1.8bn (2024 GBP: £2.59bn). This figure is substantially higher than that of Bell et al., but it includes both mortality and morbidity-related losses (estimated at £477m (2024 GBP: £506m) by Bell et al.) which were not reported separately. It also incorporates all patients with breast cancer, not just the proportion of diagnoses which are considered preventable (23% in Bell et al.).

Table 5: Indirect cost of mortality due to all cancers in the UK*

Study	Population	Year of cost estimate	Productivity losses due to early mortality	Converted to (£) 2024
Ortega-Ortega et al. (2023)	All deaths (UK)	2018–2040	€180bn (paid)	£224bn (paid)
Hanly et al. (2022)	All deaths (UK)	2020	€7bn (paid)	£8.28bn (paid)
Ortega-Ortega et al. (2022)	All deaths (UK)**	2018	€6.9bn (paid) €6.2bn (unpaid)	£8.61bn (paid) £7.72bn (unpaid)
Hofmarcher et al. (2020)	All deaths (UK)	2018	€6.63bn (paid)	£8.28bn (paid)
Leal et al. (2016)	All deaths (UK)	2012	€8.1bn (paid)	£11.6bn (paid)
Demos (2019)	All deaths (UK)	Unclear	£6.2bn (paid)	£7.54bn (paid)
Bell et al. (2023)	Deaths due to preventable cancers in 2023 (UK)	2023–2040	£3.5bn (paid) £25.7bn (unpaid)	£3.76bn (paid) £27.3bn (unpaid)

*Where available, the estimated monetary value of unpaid work is presented in addition to that of paid work. **Excluding non-melanoma skin cancers.

Productivity losses from cancer morbidity

For people with cancer, the disease and its treatment can result in changes to their ability to work, leading to reduced working patterns, early retirement and a reduction in work output relative to their pre-cancer levels. As a consequence, there are further productivity losses for people who survive their cancer.

Like losses due to mortality, this impacts the wider economy, but also people affected by cancer and their dependents. In the literature, these losses are referred to as morbidity-related productivity losses. This doesn't include productivity losses which may arise amongst the patient's informal care network, which are considered separately below.

For all cancer diagnoses combined, four separate studies provide relatively consistent estimates for the total paid productivity losses resulting from morbidity: £1.39bn (2024 GBP: £1.99bn)(UK, 2012) [47]; €1.47bn (2024 GBP: £1.83bn) (UK, 2018) [13]; £1.4bn (2024 GBP: £1.7bn) [42] and £0.81bn (2024 GBP: £0.85bn) for preventable cancers alone (UK, 2023) [16]. Considering these figures alongside those reflecting paid productivity losses due to premature mortality (see Table 5) reveals that approximately a fifth of all paid productivity losses are attributable to morbidity, as opposed to mortality (see Table 6).

Table 6: Indirect cost of morbidity due to cancer

Study	Population	Year of cost estimate	Productivity losses due to morbidity	Converted to (£) 2024	% of total paid losses*
Hofmarcher et al. (2020)	All cancers in the UK	2018	€1.47bn (paid)	£1.83bn (paid)	18%
Leal et al. (2016)	All cancers in the UK	2012	€1.39bn (paid)	£1.99bn (paid)	15%
Demos (2019)	All cancers in England – one year	Unclear	£1.40bn (paid)	£1.70bn	18%
Bell et al. (2023)	Preventable cancers in the UK	2023–2040	£806m (paid) £9.9bn (unpaid)	£854m (paid) £10.5bn (unpaid)	19%

*Total paid productivity losses that are attributable to morbidity as a percentage of total losses due to both morbidity and mortality.

Multiple studies considered paid productivity losses due to individual cancer types in the UK. These report €992m (2024 GBP: £1.33bn) in morbidity-related productivity losses from bowel and anal cancer in 2015 [30], €185m (2024 GBP: £266m) from malignant blood disorders in 2012 [36] and €30m (2024 GBP: £43m) from bladder cancer in 2012 [47]. Separately, Bell et al. [16] reported the total productivity losses linked to morbidity due to preventable cancers in 2023, presenting the following breakdown by diagnosis: lung cancer £310m (2024 GBP: £329m), bowel cancer £65.9m (2024 GBP: £69.9m), melanoma £39.3m (2024 GBP: £41.7m), and breast cancer £68.6m (2024 GBP: £72.7m).

A member of our patient involvement group shares their story

I was diagnosed with bowel cancer at the age of 58. Staging was uncertain due to the location of the tumour. There was no chance of keyhole (laparoscopic) surgery, and I would need to undergo major surgery. Therefore, I was advised that it might be sensible to get my affairs in order.

My personal affairs were in reasonable shape already – I had an up-to-date will and I kept a list of bank and savings accounts.

However, at the time, I was running a small business with two employees, and this occupied a large proportion of my attention. How do I factor in an uncertain future when running a business where employees, customers and suppliers are seeking some certainty?

It seemed unlikely that I would be able to work for quite a few months, if not for a year or more. Given that my planned retirement was only two years away, it made sense to wind up the company. Leaving aside the sometimes highly emotional task of sharing my decision with my employees, customers and_suppliers, there were the financial impacts to consider.

Two employees lost their income and I had no other source of income or insurance cover that I could claim on for having cancer. At that time, I was able to claim Employment Support Allowance (ESA). However, even at today's rates of between £90.50 and £138.20 a week, it would barely cover the weekly grocery bill. There were still the essential costs for electricity, gas, water, and council tax to be paid, plus motoring costs such as travel for treatment. Luckily, my children had already grown up and left home, and my mortgage was paid off.

Clearly, it was not financially viable for us to continue like this. So, I took an early pension and the ESA payments stopped. Taking an early pension means that the amount paid each year is reduced. If I get to live until age 80, the total reduction amounts to a six-figure sum. Add in two years of lost income, plus the income lost by the two employees and the total amount becomes a very sizable one. This is a real-world example of the financial cost of cancer.

Productivity losses related to caring for people with cancer

Although most frequently reported as direct non-medical costs, the costs associated with the delivery of informal care are frequently calculated as the opportunity cost of time spent delivering this care, for example, in the form of a productivity loss as paid work is displaced. At a UK level, the informal care costs directly resulting from cancer have been estimated in four studies. Two identified similar costs at €3.1bn (UK, 2012) (2024 GBP: £4.5bn) [47] and €3.2bn (UK, 2018) (2024 GBP: £3.99bn) [13], whilst Bell et al. estimated this at £3.4bn (UK, 2023) (2024 GBP: £3.6bn) for all preventable cancers. At an individual patient level, this has been estimated by Urwin et al. [48] to be £948.86 (2024 GBP: £1,155) per week at the end of life (England, 2019) and £69.40 (2024 GBP: £100) during the three months from 12–15 months after diagnosis in 2012 [41].

The cost of informal care for all haematological cancers was identified as €116m (UK, 2016) (2024 GBP: £218m) [36], with bowel and anal cancer estimated at €236m (UK, 2015) (2024 GBP: £316m) [30] and bladder cancer at €101m (UK, 2012) (2024 GBP: £145m) [47]. The challenges of calculating these estimates are reflected in the two estimates presented by Bush et al. for breast cancer, reporting carer productivity losses of £20 or £215m (2024 GBP: £24 or £262m) depending on the methodology used. The former incorporates a shadow wage rate for assumed hours of care provided, while the latter assumes the carer is not receiving their regular wage throughout the time a patient is alive.

The extent to which informal care is substituting for a lack of formal social care cannot be disentangled from the available studies. Informal caregiving may at times be necessary due to an absence of formal caregiving; however, for many people it's unrealistic to think that all informal caregiving could be replaced by formal caregiving (for example, where a family member is supporting a person through cancer treatment).

Non-monetary labour market participation outcomes

A key element of calculating cancer morbidity-related productivity losses is defining the extent to which patients with cancer return to their previous employment status. In addition to identifying studies reporting the indirect costs of cancer, we sought to identify those reporting labour market outcomes for people with cancer. These outcomes not only provide valuable economic information but are also hugely important to patients and their dependents, for whom a change in employment beyond diagnosis may have a significant impact. Studies reporting these outcomes present widely differing results.

Three studies reported in the grey literature assessed non-monetary labour market outcomes. A survey by Zurich Financial [43] (a life insurance company) revealed that in the UK, 26% of patients with cancer stopped working and 32% moved to part-time hours. Similarly, Demos [44] found that 48% of patients altered their work patterns, with 53% facing a significant income decline, particularly outside London.

A single study assessed the costs of childhood, adolescent and young adult cancers [44]. Their survey results demonstrate that 42% of parents stopped working due to their child's cancer diagnosis, while 49% experienced a loss of earnings. While 79% reported being employed at the time of their child's diagnosis, 67% reported being employed at the time the survey was conducted. The timelines for these changes in all three studies were unclear.

Beyond the impact on parental employment, 61% of parents agreed that the cancer had resulted in barriers to their child's education, with significant concerns about future employment. Studies assessing this outcome were not explicitly included here.

A member of our patient involvement group shares their story

I was diagnosed with acute lymphoblastic leukaemia at the age of four and received chemotherapy for more than two years. During treatment, I faced many hospital stays and appointments. My family experienced increased travel, food and clothing costs, and it's good to see these patient costs are captured by the existing literature.

However, I think that more research should highlight the income loss faced by families after a cancer diagnosis. My mum was unable to work while I was undergoing treatment, and my dad often had to take time off work to look after my younger sister.

After my treatment finished, life slowly went back to 'normal' and our costs of cancer decreased. However, I subsequently experienced late effects of cancer/treatment, which led to new costs. At age 10 I developed a rare lung condition, resulting in more hospital trips and medications. Then, when I was 18, one of the vertebrae in my neck fractured and collapsed on its own. We now know this happened due to my previous leukaemia, but at the time doctors were worried it could be due to a new cancer. We were suddenly plunged back into a world of hospital stays, appointments, medications, surgery and all of the associated costs. I was unable to attend university, and my mum had to take more time off work.

After receiving surgery, I was left with lots of neck/back pain. I returned to university but realised I may need to reconsider my career plans – for example, I wouldn't be able to do a job that requires lots of standing up and might need to work part-time. I finished university at the start of the COVID-19 pandemic. Due to my lung condition, I had to shield and was unable to work initially.

One positive consequence of the pandemic for me was an increase in remote working – I feel this has helped level the playing field. Being able to work from home regularly has enabled me to undertake a PhD in health psychology and start a full-time job in research, which I really enjoy, all without being in lots of pain.

I think future research should consider ongoing income loss after a cancer diagnosis, as well as costs associated with late effects. This should include interviewing people affected by cancer to explore their unique experiences, which can't be captured by quantitative research.

In the peer-reviewed literature, five studies were identified that considered labour market outcomes for adults with cancer. Two used existing data sources to undertake secondary analyses.

Candon [49] found that older individuals (aged 50–67) diagnosed with cancer within the last two years were 14.3% less likely to be employed and worked 16.3% fewer hours compared to their counterparts without cancer. This effect was pronounced in the first six months after diagnosis, increasing further in the second six-month period (20.7%), and then diminishing. Conversely, Jones et al. [50] noted a 2.6% decline in labour market participation for adults (aged over 15) who were in work at the time of their cancer diagnosis, although the number of individuals with cancer included in the analysis was small.

A further study, based on occupational health data from a single large UK hospital [51] found that 95% (111) of healthcare workers with breast cancer were able to return to work, while only 4% (5) opted for ill-health retirement, 5% (6) had a permanent role adjustment and another 5% (6) transferred to an alternative job. The extent to which these figures reflect the employment roles of these individuals, occupational health support and public-sector employers can't be assessed.

Finally, two studies report the outcomes of separate surveys involving people with prostate cancer and melanoma. Among people with prostate cancer in Northern Ireland who were working at the time of diagnosis in 2016, 89% of self-employed cancer survivors and 86% of salaried cancer survivors were still working at the time of the survey [52]. 18% and 16% respectively reduced their working hours. Similarly, 20% (11 out of 56) of people with cutaneous melanoma in the UK in 2012/13 reported a change in job status following their diagnosis, although the specific time of this change was unclear [37].

Scoping review

The scoping review sought to identify existing guidance about how to conduct a COI study in non-communicable diseases. A total of 16 relevant studies (of 2,398 identified studies) were included in the scoping review (Appendix 3).

Three studies were published before 2000, providing valuable historical context and foundational guidance. Four studies were published during the early 2000s, while the remaining studies were published after 2011, with the most recent study dated 2020. The studies and reports were distributed across several countries, including the US, UK, Canada, Australia, Germany and the Netherlands.

Studies were categorised according to study type. Eight methodological papers were identified and a further six general guideline papers offered overarching frameworks for conducting economic burden analyses. A further two studies reviewed best practice and focused on estimating economic burden in a single country.

Of the six guidelines reviewed, those published before the 2000s [53–55] provided more comprehensive recommendations across the various domains of importance when conducting COI analyses. In contrast, the more recent guidelines tended to focus on specific aspects, offering limited guidance on a narrower set of categories. Several key categories received little to no guidance across the reviewed studies, in part explaining the extensive variation in methods used between studies reporting COI in the wider literature.

Discussion

This systematic review demonstrates the substantial costs of cancer to the UK economy. These costs are seen within the health service, but are also borne by patients, carers and social services. Beyond this, they extend to the wider economy, with likely even larger losses resulting from the lost productivity attributable to cancer-related premature mortality, morbidity and informal caregiving.

These findings are based on relatively limited data and the methods used vary widely. In line with this, the results reported differ extensively, particularly where direct medical costs are reported. As a consequence, it isn't possible to report a combined figure based on the existing studies, and the relevant figure will differ depending on its use – the information required to inform a cost-effectiveness model of a novel screening intervention differs dramatically to that which might inform the annual cost of NHS care delivered for a specific cancer, or the wider cost to society.

Cancer prevention

Despite the variability between studies, this report provides clear evidence of the high cost of cancer both to the NHS (in secondary care in particular) and wider society. These high costs are expected to rise over the coming decades. This reflects a combination of rising incidence, increasing survival (requiring greater investment over time) and technological progress, which may increase survival while also separately increasing cost per individual beyond that expected from inflation alone 6].

Cross-governmental policies to prevent cancer are needed to reduce the increasing costs of cancer. Successful policies in areas such as smoking cessation and reducing obesity are expected to deliver benefits across a range of other non-communicable diseases and as such, building the case for these interventions requires collaboration beyond cancer.

Cancer early detection

Where the impact of stage on cancer costs has been considered, the evidence is mixed. For some diagnoses, there's evidence of higher costs to the health service with increasingly advanced disease. This isn't uniform across all cancers, though it is striking that the costs of advanced stage are lower in diagnoses where prognosis is particularly poor. In other words, limited survival results in lower healthcare costs, which isn't an acceptable strategy.

Recent progress has been made in diagnosing lung cancers at earlier stages through the rollout of national lung health checks. This screening has been demonstrated to be cost-effective and has resulted in a reduction in late presentations, particularly in more socioeconomically deprived populations [56]. Assessing cost-effectiveness ahead of widespread implementation requires robust, granular data on the costs of cancer and understanding the equity impacts is only possible if this data is available for different socio-demographic groups.

Several limitations to this currently exist. As demonstrated, few studies have reported the variation in costs with stage and no studies have provided this data with a breakdown by demographic characteristics. Accurate data on the costs is required, necessitating transparency about expenditure on high-cost drugs, which is particularly important in advanced disease. This information is currently unavailable due to commercial confidentiality agreements, but these agreements can be respected while delivering the necessary analyses to inform future policy.

End-of-life care

High costs are particularly demonstrated in the final year of life. Palliative care services have historically been funded predominantly by charities, but in 2022 the delivery of palliative care services became a statutory requirement for Integrated Care Boards [57].

Increased public investment in palliative care is welcome. But given the high costs of care in the final year of life, which are largely attributable to hospital care, greater investment may well be justified to deliver high-quality EoL care for more patients, while also reducing costs to the wider healthcare system by moving care out of hospitals and into the community.

Such investment requires robust research to understand the effectiveness of any funded intervention alongside the likely costs and consequences. It’s striking that whilst modelling tools exist to identify the return on investment from EoL care, these costs are poorly captured in the existing literature and linked data to inform such analyses is limited to relatively small regions [58]. The lack of national, linked primary, secondary and social care data to inform policy analyses is a longstanding research concern and one that requires political intervention to be fully addressed.

Patient-experienced costs

Beyond the costs of cancer to the healthcare system, only a small minority of studies captured non-medical or patient-experienced costs, which impact not just patients but also their families. This is compounded by the fact that many of the studies attempting to address this gap haven't reported clear methodology. However, it's clear from the charity-led studies that the direct costs of cancer extend well beyond those considered in many peer-reviewed studies, where often only informal care costs are captured.

An unpublished study from Macmillan Cancer Support estimates that a cancer diagnosis places a financial burden of up to £900 a month on people with cancer [59]. Beyond this, the limited available data suggests this is a particular problem for the families of children and young adults with cancer.

This review highlights the need for methodological work to identify all the patient-experienced costs of cancer and develop patient-facing questionnaires that capture these costs robustly. Until this knowledge gap about the patient-experienced costs is filled, it will be challenging to prioritise and deliver policy change that supports patients and their families.

Employment and economic consequences

Multiple studies highlight the substantial indirect costs of cancer resulting from lost productivity due to premature mortality, morbidity and caregiving. Considerable debate exists about whether these costs should be included in analyses that inform the prioritisation of NHS investment. This isn't currently routine.

It must also be recognised that behind every premature death and curtailed work role is an individual and their family. These losses are personal and social, not simply economic, and the ripple effects for patients, their families and networks haven't been fully explored.

Policies to address these productivity losses are required. As outlined above, cancer prevention strategies are needed to reduce mortality. Interventions to deliver early diagnosis may also contribute to reducing premature mortality and the morbidity associated with treatment for more advanced disease, although the lack of information assessing how work outcomes vary with cancer stage makes the role of the latter extremely uncertain.

The impact of cancer on informal caregiving requires a much stronger focus given the significant assumptions made in modelling these losses currently. Anonymised health and social care datasets linking individual-level cancer data, income and benefits receipt would provide excellent opportunities to better understand the scale of losses due to morbidity and where targeted support could best be delivered. Qualitative work to understand patient's experiences of work following a cancer diagnosis is also required if interventions to support patients in achieving their work-related goals are to be developed.

These strategies can support individual people with cancer and their families, while mitigating the impact of cancer on the wider economy.

Data availability

Clearly, many of the policy interventions outlined above require improved routine data to define their potential benefits and optimal design. Future work assessing direct medical costs should move away from what has frequently been an opportunistic approach to COI analyses.

Across devolved UK nations we have extensive and high-quality national patient-level data which should be more readily available and frequently used to support these analyses. This needs to incorporate cancer registration records that provide high ascertainment and granular data (including socio-demographic and tumour characteristics), linked to treatment datasets and relevant costing estimates, with clear documentation of dataset curation to guide researchers and ensure reproducibility.

Within the NHS, improved access to information about high-cost drug expenditure is needed to improve the accuracy of costings, while capturing the costs of primary care, social care and indeed privately funded care is also necessary to better understand the costs of care delivered within and beyond the NHS.

With rising levels of private healthcare provision in cancer, there is also a need to consider the collection of data from private providers. This can ensure that a complete picture remains available of the care, costs and outcomes of cancer for all patients. Without this, there's a risk that routinely collected data is only able to inform the care delivered to a subset of people with cancer whose treatment is delivered in the NHS, risking underestimation of the costs and an inability to assess variations across the whole population [60].

In addition to improving the availability and use of datasets to inform the direct costs of cancer, linkage to income and benefits data would provide substantial further advantages in understanding the indirect costs of cancer. These datasets are of clear value to academics and policymakers alike.

Research guidance

From an academic perspective and to better inform policy, further work is required. The studies included here are extremely varied in their perspectives, methodologies and data sources. The time periods reported, costing, epidemiological and discounting approaches taken and sensitivity analyses considered differ widely.

This, in part, reflects the lack of current guidance to inform researchers on the optimum approach to delivering COI studies in non-communicable diseases using the increasingly available routine healthcare data. The scoping review undertaken here will partially address this gap; however, further work will be required to provide consensus guidance in areas that aren't well informed by the limited existing literature.

Collaboration between health economists, cancer epidemiologists, clinicians and policymakers is required to develop guidance that incorporates best practices from differing perspectives and informs clinically relevant analyses that can support future policy.

Research funding

One driver of the opportunistic approach observed in many studies included here may be the limited availability of research funding to support this work. Of the studies, 39% received no specific funding, were funded by a higher education institution or professional body or pulled together funding from multiple sources. Conversely, 28% were funded by industry and 19% by charities, while only 11% received governmental research funding.

Pharmaceutical companies contribute significantly to clinical research, but in the context of studies using COI information to determine the cost-effectiveness of novel interventions, there's a clear need to make sure potential conflicts of interest don't affect, or aren't perceived to effect, the objectivity of results. To support this, governmental and major charitable funders need to ensure greater investment is available to address the extensive identified knowledge gaps and avoid the risks associated with conflicts of interest resulting from current funding mechanisms.

Research priorities

Once methodological guidance is available, there's an urgent need to bring together a full range of stakeholders to define research priorities in this area. Such work from a patient perspective is regularly undertaken by the James Lind Alliance and similar processes are required across a broader stakeholder group.

The following key knowledge gaps could be considered:

- **Patient-experienced costs have received no significant focus in existing peer-reviewed studies**, with limited information available from grey literature. There is a need to better understand the financial consequences of a cancer diagnosis on the individual and their networks. Assessing the ripple effects will require both methodological work and subsequent assessment of the costs across a wide population.

- **The need for a detailed understanding of the varying direct and indirect costs of cancer across tumour and socio-demographic characteristics**. This variation is identified but underexplored in the current literature, limiting its value for informing impact assessments of policy and healthcare interventions, particularly in terms of inequalities.

- **Limited data exists about the costs of less common cancers**. This is particularly the case for cancer in young people. The prioritisation of these less common diagnoses requires consideration in any planned research prioritisation exercise.

- **The lack of transparent data to support the incorporation of drug costs into studies assessing the direct medical costs of cancer care** risks distorting results and subsequent analyses.

- **UK studies assessing the direct medical costs of cancer have focused on costs to the NHS**. Though understandable, this fails to capture the increasing use of private health services in cancer care. A greater understanding of this is required and may necessitate improved collection of cancer data from private healthcare providers.

- **The extent to which changes in expenditure over time are influenced by innovation as opposed to inflation**. It's inevitable that data reflects previous cohorts, but using it to inform analyses of the expected impact of interventions requires understanding not only of the impact of inflation, but of the constant evolution and progression of cancer care over time.

- **The degree to which unit costs derived in England can justifiably be applied to analyses of healthcare spending across the devolved nations**. Empirical understanding of this can better support analyses in devolved nations, while also potentially offering valuable insights to inform policy across jurisdictions based on the efficiency of delivered services.

- **Studies identified here have focused heavily on the costs of cancer from the point of diagnosis and before death**, but consideration of the costs of survivorship, recurrence and prevention/screening programmes may be of value for future policy development.

Key conclusions

1 **Preventing cancer where possible is the most cost-effective approach**

The economic cost of cancer includes substantial expenditure on medical care, and productivity losses due to cancer are approximately £10bn per year in the UK. One study estimates the cost of preventable cancers to result in around £4.6bn in productivity losses each year in the UK. Smoking and overweight and obesity still contribute to the largest numbers of cancer cases each year in the UK [61].

The government should prioritise effective public health measures that support a move from treating to preventing illness, including cancer. Strategies should focus on reducing smoking and addressing obesity as the main preventable risk factors for cancer.

2 **Earlier diagnosis reduces overall economic costs in most cases**

The costs of cancer care increase by stage (although for diagnoses where metastatic disease carries a particularly poor prognosis, the costs are reduced due to rapid mortality).

Government and health system leaders should invest in measures to shift from late-stage to earlier-stage diagnosis, which in turn will increase survival and reduce overall costs. A better understanding of the variation in cost and outcomes of interventions, as well as their equity impacts, can inform the design and implementation of targeted interventions.

3 **Investing in community services and integrated palliative care would improve the EoL experience and efficiency of healthcare spending**

Healthcare costs are generally highest during the final year of life and are predominantly related to the delivery of hospital-based care.
Greater investment in community-based and integrated palliative care services can reduce unnecessary hospital admissions, lower healthcare costs and improve the overall EoL experience for people with cancer and their families.

4 **Improving data access and linkage will accelerate progress in cancer research and inform better policymaking**

The data collected across the UK for patients with cancer is world-leading; however, the high-quality national patient-level data available across the UK is under-utilised. This is illustrated by the relatively limited number of studies on the medical costs of cancer using the wealth of data available.

There is a clear need to further streamline access processes to support more timely, secure and efficient use of cancer data and find solutions for the challenges of linking relevant datasets within and beyond healthcare. To better inform the indirect costs of cancer, linkage to income, benefits and educational datasets would open up new insights for policymakers.

5 Public and independent research funders need to invest more into understanding the cost of cancer

There are significant gaps in our understanding of the full costs of cancer and their distribution, particularly in relation to specific tumour types, rare cancers, survivorship and patient-experienced costs. Further, a sizeable minority of studies are funded by the pharmaceutical sector and may focus on areas that have commercial benefits.

Government and major charitable funders should ensure adequate investment to address the evidence gaps identified in this review to ensure a balanced and comprehensive knowledge base to inform policy and practice.

Collaboration and partnership would be beneficial to strengthen research. A structured research prioritisation exercise – engaging stakeholders such as patients, policymakers and funders – to identify and rank the most urgent evidence needs would ensure future research is focused, relevant and aligned with the main challenges faced by people affected by cancer, the health system and wider society.

6 Standardising methods and definitions for COI studies in cancer would improve cost estimates to inform effective policy choices

Existing assessments of the direct medical and non-medical costs of cancer vary significantly, in part due to a lack of methodological consistency. Accurate and comparable figures are critical to support robust, evidence-based policymaking and efficient allocation of resources in healthcare.

It’s important to foster multi-disciplinary collaboration between health economists, cancer epidemiologists, clinicians and policymakers to agree on consistent methodological guidance relevant to cancer across the four UK nations. This will ensure future cost analyses are accurate, comparable and relevant for both research and policy.

Appendices

Appendix 1: Inclusion and exclusion criteria

	Inclusion	**Exclusion**
Population	Patients with cancer of all age groups and their informal support networks. Setting UK, including England, Scotland, Northern Ireland, Wales (national, regional, local) or any combination thereof. Multiple countries, including the UK, with disaggregated UK outcomes.	Non-cancer patients. Setting Countries other than the UK. Multiple countries, including the UK, with only aggregated outcomes.
Intervention/ Exposure	Cancer diagnosis and its subsequent treatment.	Non-cancer interventions or care in the absence of cancer diagnosis.
Comparator	Not applicable	Not applicable
Outcome	For direct costs • Medical cost – Studies examining the overall cost to the health service of all interventions or care, including publicly and privately funded services delivered to patients with cancer and reported at either patient or population level (reported in monetary unit). • Non-medical cost – Studies examining the patient- and unpaid carer-experienced costs of a cancer diagnosis, treatment and subsequent sequelae (reported in monetary unit). Examples include funeral cost, home adaptation, childcare, transport and OOP expenses. Studies examining social care costs (reported in monetary units). For indirect costs • Studies reporting the indirect costs of a cancer diagnosis. This includes	• Direct cost of cancer without a monetary value. • Cost of providing a specific/individual intervention (such as surgery) to treat a specific type of cancer or specific treatment complication. • Studies reporting cancer cost in terms of life years, quality of life, and quality-adjusted life years. • Comparison of the costs of interventions. • Economic evaluations of the marginal impact of specific drugs or treatment pathways. • Studies looking at the cost of cancer on environment and education.

	those resulting from a pathway of care (such as absenteeism/presentism during cancer treatment) and wider economic impacts not related to a care pathway but simply to the diagnosis (such as early retirement, reduced working hours, uptake of welfare benefit and unemployment). These may be reported in either monetary or non-monetary units. • Impact of mental health sequelae on employment.	
Study characteristics	Study types • Quantitative studies including observational and modelling studies estimating the direct or indirect costs of cancer. • Mixed-methods studies looking at the costs of cancer care and reporting direct costs in monetary units or indirect costs in monetary or non-monetary units. Publication types • Published articles in English, including pre-prints, grey literature and conference papers. • Timeframe: - Articles published in the last 10 years (1 January 2014 to present). - Articles that use data from 2009 to present, including those that use data spanning over 2009.	• Studies reporting only qualitative analyses. • Systematic reviews, meta-analysis and scoping reviews will only be used for reference citation. Where these are identified content relevant or uncertain relevance, they will be captured in the shared document and excluded in Covidence. • Studies conducting comparative and non-comparative economic evaluation of individual cancer treatments. • Studies in a language other than English. • Conference abstracts. • Study protocol. • Articles published before 1 January 2014 • Articles that use data from before 2009.

Appendix 2: List of databases and grey literature sources searched

Academic databases:

CINAHL (EBSCOhost)

EconLit (EBSCOhost)

Embase Classic + Embase (Ovid)

HMIC Health Management Information Consortium (Ovid)

Ovid MEDLINE(R)

APA PsycINFO (Ovid)

Scopus

Core Collection (Web of Science)

Grey literature databases:

Econ papers (RePeC)

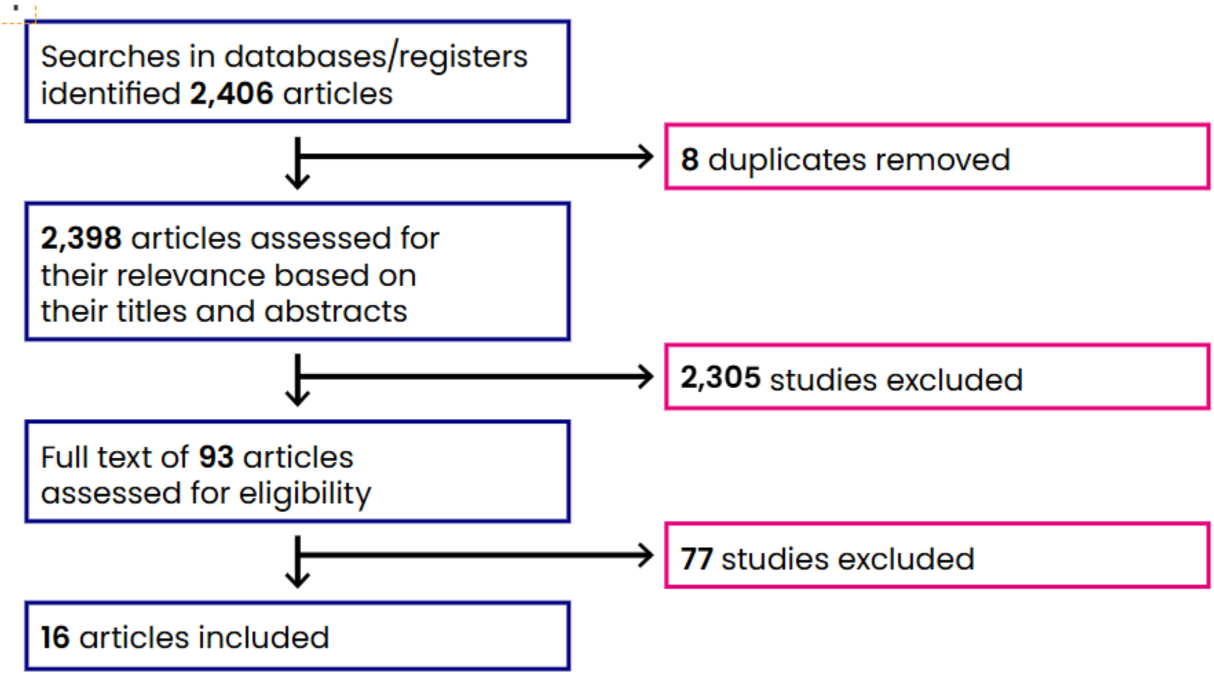
Europe PMC

Google Scholar

Google

Gov.uk (via **https://www.google.com/advanced_search**)

Appendix 3: PRISMA diagram - the scoping review screening process



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