

# Rethinking Cancer

The Big 'C': Quantifying the social and economic impact

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The International Longevity Centre - UK (ILC-UK) is an independent, non-partisan think tank dedicated to addressing issues of longevity, ageing and population change. It develops ideas, undertakes research and creates a forum for debate.

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## **Acknowledgement**

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# Executive Summary

Cancer is the cause of one in four deaths in the UK, ending the lives of over 160,000 people every year<sup>1</sup>. Incidence is set to increase significantly over the coming years, with diagnoses expected to rise from 330,000 per year to 430,000 by 2030<sup>2</sup>. This report investigates the wider social and economic impact of cancer in the UK, exploring the losses to our families, communities and economy, as well as the significant contributions made by those who live with, and survive, the disease.

## Cancer costs families and communities

Cancer deaths result in the loss of caregivers for children, older relatives, partners and friends. They also deprive communities of vital volunteers. The UK loses 4.9 million hours of volunteering and 25.3 million hours of informal caring each year as a result of cancer. We calculate that these losses have a combined annual value of £236 million.

## Cancer damages our economy

Cancer removes large numbers of productive employees from our labour force. In a single year over 50,000 people of working age lose their lives to the disease and we calculate that in 2014 these people could have contributed £585 million to the UK economy. Moreover, across the rest of their working lives they could have contributed £6.8 billion.

The losses associated with lung cancer are the highest for any individual tumour type. We estimate that each year the individuals who die from lung cancer could have contributed £125 million to the UK economy and that over the rest of their lifetimes they could have contributed £1.2 billion.

## Cancer survivors make a huge contribution

Those who beat cancer make an enormous contribution to their family, to their community and to the economy. There are 1.8 million cancer survivors in the UK and we estimate that through paid employment they contribute £6.9 billion to the economy every year. They also make social contributions valued at £15.2 billion per year by providing 258 million hours of informal care, 52 million hours of volunteering and 1.5 billion hours of domestic work.

## This is just the tip of the iceberg

Although many of the figures in this report are expressed in monetary terms, they are not intended to represent a valuation of cancer patients' lives. It is not possible to put a cost on the loss of a parent, a partner or a friend, nor can we assign a value to the emotional support an individual offers to those around them. We accept that our analysis will not capture the full damage caused by cancer, instead these figures are merely intended to illustrate the impact the disease has on our society, and the scale of the impact.

## How can we move forward?

Two key issues emerge from our analysis - the true cost of low survival rates and the need to better support cancer survivors.

### 1. We need to increase survival rates

The gap in cancer survival rates between England and the European average has remained at around 10% for the last two decades<sup>3</sup>. We calculate that if that gap was closed the additional survivors generated by such an improvement would contribute £117 million to the UK economy. Furthermore the additional survivors generated by just a single year of higher survival rates would contribute £1.2 billion to the UK economy across the rest of their lifetimes.

The NHS Five Year Forward View, published in late 2014, sets out a vision to improve cancer outcomes through better prevention; swifter diagnosis; and better treatment, care and aftercare. Additionally in early 2015 the Independent Cancer Taskforce was established with the aim of achieving world class

cancer outcomes in the UK. The outcomes of these initiatives have the potential to extend the lives of many people across the UK. Only time will tell how effective they are in ultimately improving cancer services, but we hope to see an increase in cancer survivorship in the UK in coming years.

## 2. We need to support cancer survivors

37% of those who return to work after cancer treatment say they experience some kind of discrimination from their employer or colleagues while 9% feel harassed to the point they feel they cannot stay in their job<sup>4</sup>. 1 in 10 of those returning to work said their employer failed to make reasonable changes to enable them to do their job.

Surviving cancer exposes an individual to continuing physical and mental health problems, and therefore not all cancer survivors will wish to return to paid employment. However, we must do more to better support those who want to. As an illustration of the impact of poor support, we calculate that if employment rates for cancer survivors were the same as for the rest of the population cancer survivors would contribute an additional £4 billion to the UK economy each year.

Cancer survivors need to feel confident that they will be supported when they return to the workplace. Employers need to have an open dialogue with their staff affected by cancer, providing opportunities for flexible working, changing roles and workplace adaptations. The government's Fit For Work programme, which provides advice for both employers and employees, is a good step towards facilitating this. The programme may be more successful if health professionals also engage with its agenda. Less than 2 in 5 cancer patients receive information from health professionals about the impact of their treatment on their ability to work<sup>5</sup>, yet such discussions can help give people confidence in returning to employment. All health professionals, not just GPs, should be encouraged to discuss issues around returning to work with patients.

**This report demonstrates the broad social and economic impact that cancer has on the UK. While it illustrates the damage the disease causes, it also emphasises the huge contributions made by those who survive cancer, both to their families and communities and to our economy. With a combination of improving clinical care and better support in the workplace, we are confident not only that a growing number of people can survive cancer, but that their contributions to society will continue to grow.**

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# Introduction

Cancer affects individuals, their families and the wider economy. In 1975, the lifetime risk of being diagnosed with cancer in the UK was one in four, by the 1990s it had risen to one in three<sup>6</sup>. Research published in early 2015 now indicates that 'over half of people who are currently adults under the age of 65 years will be diagnosed with cancer at some point in their lifetime'<sup>7</sup>.

Cancer results in over 160,000 deaths in the UK every year<sup>8</sup> and the cancer charity Macmillan reports that there are now 2.5 million people living with the disease in the UK<sup>9</sup>. The direct cost of cancer, in terms of healthcare spending, is substantial. The National Audit Office estimates that in 2012-13 the NHS spent at least £6.7 billion on cancer treatment<sup>10</sup>. However, its full costs extend far beyond the hospital gates. Cancer robs families of their loved ones, deprives communities of volunteers and activists, and takes millions of workers out of the UK labour market.

This report investigates the wider social and economic impact of cancer in the UK. We explore the damage to our economy and the loss of informal care, volunteering and domestic work. In addition we highlight the contributions made by survivors, exploring both their economic and social roles. It is our hope that by demonstrating the scale of the destruction caused by cancer, as well as the scale of the contributions made by survivors, more will be done to support the individuals, families and communities affected by it.

## Approach

In the analysis which follows we aim to quantify the scale of the losses as a result of cancer. We estimate the losses to the UK economy by looking at the effect on employment and we explore the impact on families and communities, estimating the value of lost informal care, volunteering and domestic work. We also explore the huge contribution of those who survive cancer, both in economic and social terms, highlighting the benefits to be gained from improvements to treatment and increased levels of support.

The effects of cancer are complex and wide ranging; therefore the figures coming out of this analysis should be treated as an important indication of the magnitude of the issue facing the UK, rather than a precise total.

This report begins with a section on **understanding cancer**, giving an essential background to the disease. It moves on to looking at the **impact of cancer on the UK economy** before investigating the **impact of cancer on families and communities**. It then looks ahead, considering **how the impact could be minimised** and concludes with some **policy recommendations** for improving the support for cancer survivors.

# Understanding cancer

## What is a cancer?

It is normal for our cells to grow, divide and form new cells - these cells replace others which have grown old or damaged. However when we develop cancer this process malfunctions. Some cells begin to divide and multiply when they are not needed and old or damaged cells survive when they should die. These extra cells can divide without stopping, ignoring the signals which usually control our cells, and may form growths called tumours.

A cancer can form almost anywhere in the body. Some tumours are malignant, meaning they can spread into other tissues nearby. As a tumour grows some cancer cells may break off and travel round the body, transported by the blood or lymph system. When this happens new tumours can form elsewhere in the body.

## What causes cancer?

Cancer is caused by changes to the genes that control cell functioning. Sometimes these genetic changes will be inherited while at other times they occur as a result of errors when cells divide or as a consequence of damage to the body's DNA through environmental exposures.

The environmental exposures which could contribute to a cancer are wide ranging. Cancer has been linked to UV rays, obesity, smoking, poor diet, alcohol, low levels of physical activity, certain infections (such as HPV) and a variety of chemicals<sup>11</sup>.

## How many people are affected by cancer?

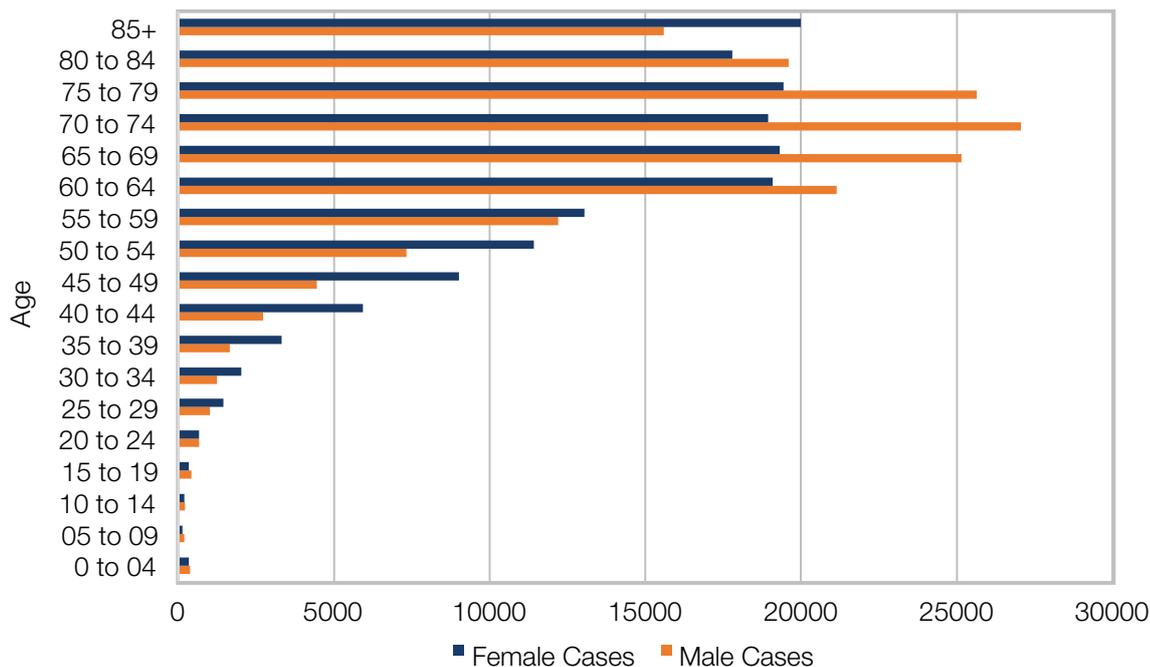
There are over 330,000 new diagnoses of cancer in the UK each year<sup>12</sup>. The majority of these are among older people, with over a third of diagnoses in people aged over 75. Cancer is more prevalent among women up to the age of 60, after which it is more prevalent among men.

Cancer is the cause of one in four deaths in the UK, ending the lives of over 160,000 people every year<sup>13</sup>. Cancer mortality rates increase with age, with over three-quarters (78% in the UK in 2010-2012) of cancer deaths occurring in people aged 65 years and over<sup>14</sup>.

## Cancer and socio-economic trends

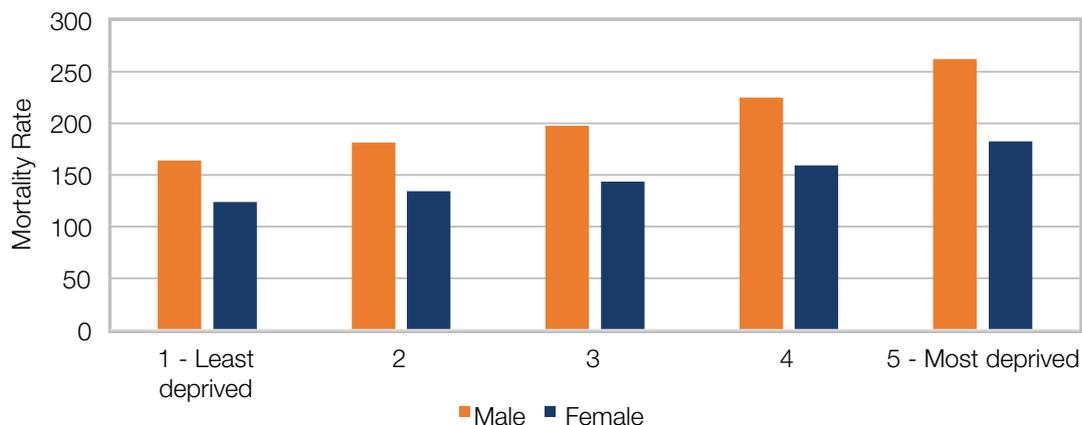
Both cancer incidence and cancer mortality have been linked to socio-economic status. For the majority of cancer types, incidence is higher among people from more deprived areas, particularly for smoking-related cancers such as laryngeal, lung and oral cavity cancers<sup>15</sup>. Cancer mortality also shows a positive association with socio-economic deprivation - mortality rates for all cancers combined (excluding non-melanoma skin cancer) are higher among more deprived groups than the least deprived groups<sup>16</sup>.

**Figure 1:** Average number of new cases per year in the UK - all cancers (excluding non-melanoma skin cancer)



Source: Cancer Research UK

**Figure 2:** European age-standardised cancer mortality rates by deprivation quintile - England

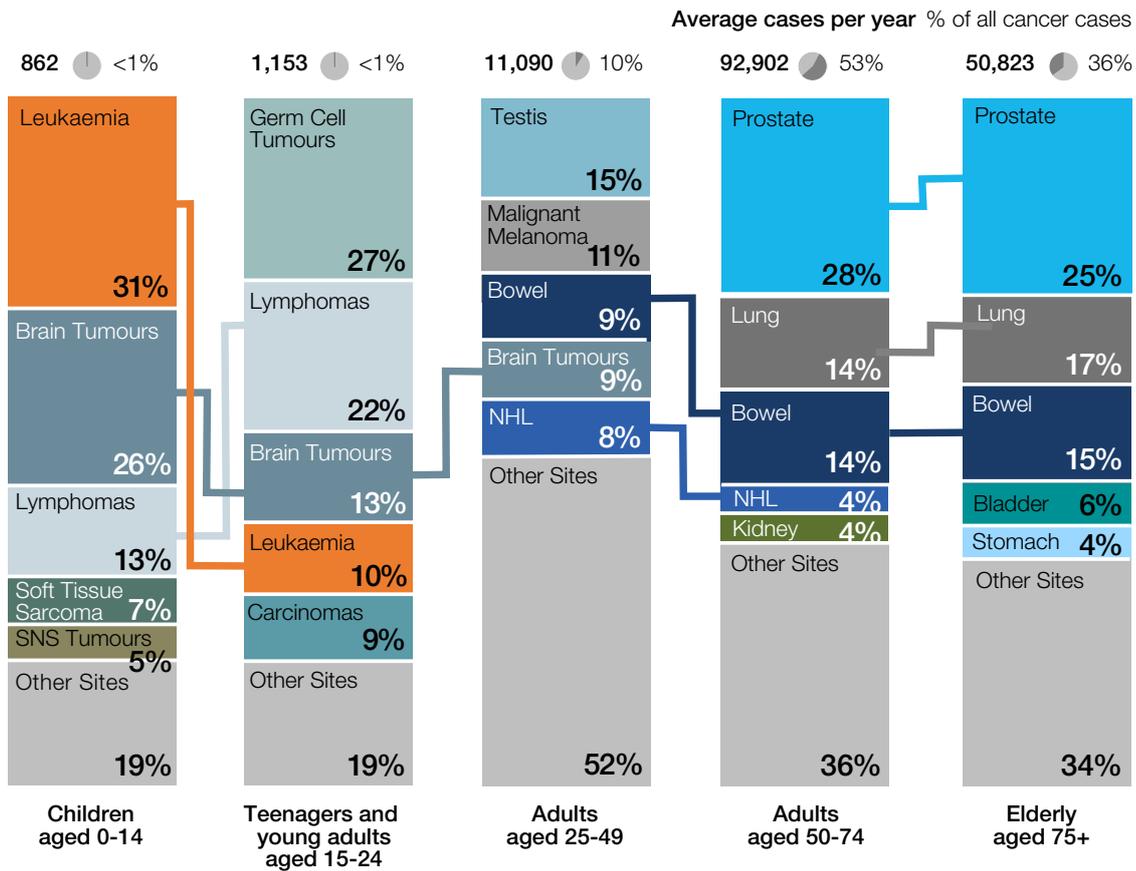


Source: Cancer Research UK

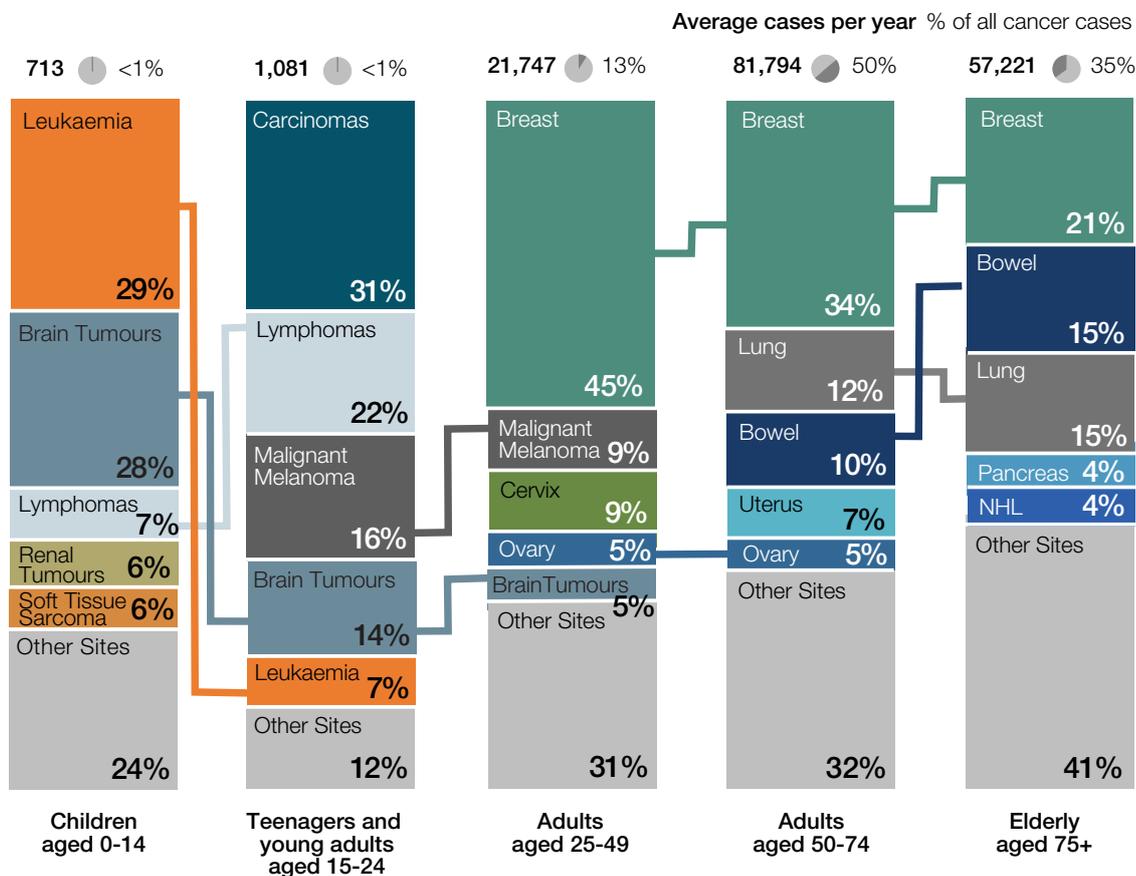
### What are the common forms of cancer?

Specific cancer prevalence is dependent on age. Among children, leukaemia, brain tumours and lymphomas are the most common, while cancers of the ovaries, uterus and cervix among women, and of the testis among men, become more common in adulthood. However just four cancers – breast, lung, bowel and prostate – account for over half of cancer incidence. These are most common in adults over the age of 50.

**Figure 3: Common cancers by age - male**



**Figure 4: Common cancers by age - female**



Source: Cancer Research UK, Common Cancers by Age and Gender

## **Why is cancer becoming more prevalent?**

Cancer incidence is set to increase significantly over the coming years, with diagnoses expected to rise to 430,000 per year by 2030<sup>17</sup>. This is an increase of 100,000 cases per year from the current level of 330,000. The rise is a result of both population ageing, cancer is more common among older age groups, and increases in the total UK population.

However while the total number of diagnoses is rising, cancer mortality is falling. For all cancers combined one-year age-standardised net survival rates have risen from 45% in 1971-1972 to 67% in 2010-2011 for men and from 55% to 74% for women<sup>18</sup>. These improvements have been driven by a combination of earlier detection and diagnosis and advances in treatment.

## **The human impact of cancer**

Cancer has a huge impact on people's lives, both physically and emotionally. Cancer treatments can result in fatigue, nausea, hair loss, diarrhoea or constipation, infection, weight loss and scarring. Cancer diagnosis is often met with shock, followed by fear, sadness, a feeling of loneliness or isolation, or anger and bitterness.

Cancer also affects family and friends, both while caring for someone and when they lose a loved one to the disease. The emotional effects of cancer often continue to affect families for many years.

# The impact on the UK economy

Cancer affects the UK economy in a number of ways, not all of which are easily quantifiable. Firstly there are the effects of cancer deaths to consider – around 35,000 people of working age die from cancer each year and this removes many productive workers from the labour force.

Then there are also the consequences of non-fatal cancers. 120,000 people under the age of 65 are diagnosed with cancer each year. These people are likely to leave the labour force for a period, for treatment and recuperation, if not longer. Indeed many cancer survivors do not return to work because of the after effects of cancer and cancer treatments. Many survivors struggle with pain, fatigue, and mental health problems, in addition to secondary health problems as a result of chemotherapy or radiation therapy. Furthermore, while some survivors will return to their previous working arrangement others may change jobs, or move to working part time, as a result of their illness. These changes may reduce a cancer survivor's economic productivity.

Finally there are also the indirect, or third party, effects of cancer. There are over one million people in the UK caring for someone with cancer, 19% of whom say it has affected their working lives<sup>19</sup>. In this way, cancer may also have an impact on the economic productivity of friends and family members.

In this section we focus on the direct employment effects of cancer as these are more reliably quantified. Therefore the figures generated by the analysis below may be seen as conservative estimates – the true wider impact of cancer on the economy is likely to be higher.

## Cancer deaths among working age people

To examine the economic losses as a result of cancer deaths we take a human capital approach. This approach, widely used in the health economics literature, calculates 'the expected life-time earnings that would have been realised had the disease or death been avoided'<sup>20</sup>. This methodology acknowledges that when someone dies from cancer the economy loses them not only in that year, but for the rest of their potential working life, thereby compounding the economic loss.

Taking data from the Labour Force Survey on employment and earnings we calculate the expected earnings for each working age individual who dies from cancer in a given year, adjusting for their age and gender, across the rest of their lifetime had they not died from cancer<sup>i</sup>.

In a given year we can expect close to 54,000<sup>21</sup> people under the age of 70 to lose their lives to cancer. **In a single year we estimate that these 54,000 individuals would have contributed £585 million to the UK economy. Across the rest of their working lives we estimate that these individuals would have contributed £6.8 billion in real terms<sup>ii</sup>.** This is just a single year's worth of cancer deaths. If current rates of cancer incidence and mortality persist, the UK economy will lose well over 200,000 potential workers over the next five years and over 500,000 over the next decade, resulting in economic losses for the UK economy that could run to tens of billions of pounds.

## Interpreting the economic impact

The losses calculated in this section, the result of the removal of thousands of people from the labour market, are significant. However it is also important to recognise that they do not represent the whole picture – they have been calculated solely by looking at the forgone employment of those who die from cancer. There are likely to be wider effects on employment, through cancer's effect on survivors and the families of those with the disease. Indeed we will address the impact of cancer on survivor's employment later in this report.

<sup>i</sup> For further details on these calculations see Appendix 1.

<sup>ii</sup> As we use Labour Force Survey data from 2014 this figure is in 2014 prices.

## Cancer deaths from specific tumours

Common cancers vary by age and by gender. Among people of working age Lung, Breast, and Bowel cancers are some of the most common.

Common Causes of Cancer Deaths Among Women		
	Age 25-49	Age 50-74
1	Breast	Lung
2	Lung	Breast
3	Cervix	Bowel
4	Bowel	Ovary
5	Brain	Pancreas

Common Causes of Cancer Deaths Among Men		
	Age 25-49	Age 50-74
1	Lung	Lung
2	Brain	Bowel
3	Bowel	Oesophagus
4	Oesophagus	Prostate
5	Malignant Melanoma	Pancreas

Source: Cancer Research UK

Taking the same human capital approach as in the previous section, below we calculate the economic losses as a result of deaths from specific tumour types. The table below reports the losses as a result of losing individuals for the rest of their working lives. Losses from lung cancer are by far the highest, at around £1.2 billion they are double that of the next highest, breast cancer, at £635 million.

The Economic Cost of Common Cancers Among Working Age People			
Cancer Type	Annual Deaths*		Annual Economic Loss
	Male	Female	
Lung	7003	5553	£1.2 billion
Breast	0	5104	£635 million
Brain	1613	1090	£578 million
Bowel	2837	1854	£571 million
Pancreas	1655	1281	£321 million
Leukaemia	854	555	£270 million
Skin	621	425	£195 million
Ovary	0	1830	£160 million
Oesophagus	2260	632	£369 million
Prostate	1520	0	£117 million
Cervix	0	574	£110 million

\* Annual number of deaths of those aged 70 or under

The economic losses stemming from cancers of the brain and from leukaemia are particularly high relative to the numbers of deaths recorded as these cancers are among the most common in children and young adults. Deaths among these groups result in the loss of an individual for the entirety of their

working life, representing a large blow to the economy.

## Lung Cancer

Unsurprisingly, as it is one of the most common cancers among both men and women, lung cancer has the biggest economic impact of any specific tumour. **We estimate that each year the individuals who die from lung cancer could have contributed £125 million to the UK economy and that over the rest of their lifetimes they could have contributed £1.2 billion.**

Unlike many other cancers, survival rates for lung cancer have not significantly improved in recent decades. Five-year age-standardised net survival for lung cancer in men has risen from 5% in the early 1970s to just 8% in 2010-11 in England and Wales<sup>22</sup>. For women, five-year survival has increased from 4% to 12%. For both genders combined five-year age-standardised lung cancer survival rates in the UK are significantly lower than the European average, 9% compared to 13%. Two countries with universal health coverage comparable to that in the UK, Australia and Canada, have even better five-year survival rates of 15% and 17% respectively.

Low survival rates in the UK have been attributed to late diagnosis, with a recent study of over 20,000 lung cancer deaths showing that 30% did not live 90 days past their diagnosis and 10% had died within 30 days of diagnosis<sup>23</sup>. The same study found that patients who died early from lung cancer were more likely to have visited their GP in the months preceding their death, but less likely to have had a chest x-ray, than those who survived for longer, potentially indicating that opportunities to diagnose them earlier had been missed. Further research has identified delays in patients presenting their symptoms to a doctor as an important factor in late diagnosis. Patients have been found to present late for a number of reasons including; a lack of awareness; fear; and the worry of blame or stigma as a result of being a smoker<sup>24</sup>.

While investment in lung cancer research has risen over the past decade, data from the National Cancer Research Institute shows that spending remains behind that of other cancers. In 2012, breast cancer received £41m in research funding, Leukaemia received £32m, bowel cancer received £35m, and prostate cancer got £21m. By comparison lung cancer received less than £15m<sup>25</sup>. To put these figures in to perspective, while breast cancer receives just over £3,500 of research funding per death from the disease, and leukaemia over £7,000 per fatality, lung cancer receives just over £400 per death<sup>26</sup>.

## The cost of cancer treatments

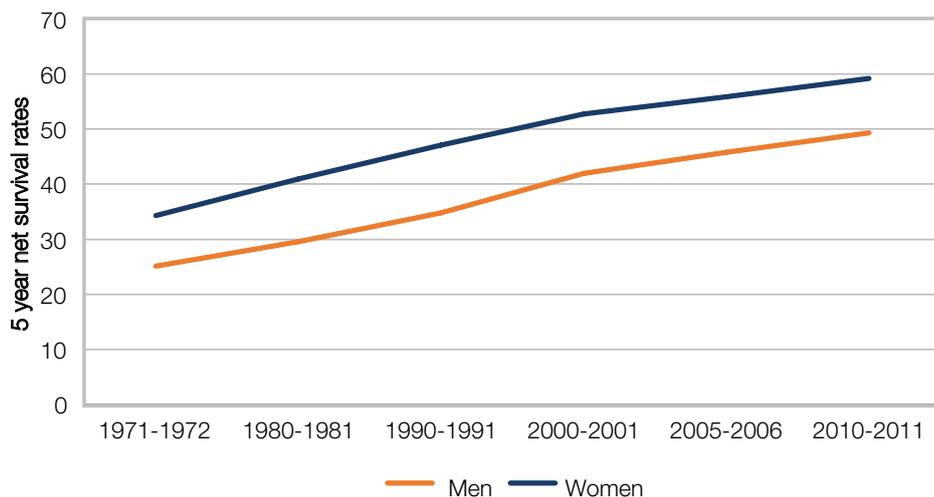
Cancer spending is one of the top three areas of NHS spending, representing over 5% of the health budget. Despite this the Department of Health and NHS England do not actually have a robust estimate of total spending on cancer care. This is because programme budgeting data does not fully account for all aspects of spending, which include cancer-related GP consultations, full diagnostic and pathology testing and cancer-related accident and emergency attendances. Furthermore the National Audit Office highlights that data is missing on primary care and follow up appointments for cancer patients, social care spending and even the total number of patients receiving chemotherapy.

Despite these difficulties, the National Audit Office estimates that in 2012-13 the NHS spent at least £6.7 billion on cancer treatment. Included in this figure is the £1.5 billion per year spent on chemotherapy and spending on the Cancer Drugs Fund, for which annual funding has increased from £200 million in 2013 to £340 million in 2015.

## Understanding the economic contribution of cancer survivors

In addition to estimating the economic cost of cancer, we also think it is important to emphasise the economic contributions that those who have beaten cancer continue to make. As the graph below shows, cancer survival rates have improved substantially over the past four decades. Indeed age standardised five year net survival rates have almost doubled for both men and women. This has resulted in an explosion of the number of cancer survivors living, and working, in the UK.

**Figure 5:** Improvements in cancer outcomes, age-standardised five year net survival rates



Source: Cancer Research UK Cancer Survival Group at the London School of Hygiene and Tropical Medicine

While there is plenty of data on cancer survival rates, getting a figure for the total number of people who have survived cancer at some point in their life is more difficult. The latest data from Macmillan, published in 2013 but relating to 2010, shows that there are at least 1.8 million cancer survivors in the UK<sup>27</sup>. Of these 953,000 were under the age of 70 in 2010.

Using a similar human capital approach as outlined earlier we can estimate the economic contribution of these survivors: combining cancer survival and Labour Force Survey data, broken down by age and gender, to quantify their expected earnings across their working lives<sup>iii</sup>.

However when we look at the contribution made by survivors we must also take in to account the difficulties they face when returning to the workplace. A large number of cancer survivors ‘experience physical, emotional, and social problems such as fatigue, pain, cognitive deficits, anxiety, and depression’<sup>28</sup>, as well as secondary health problems as a result of chemotherapy or radiotherapy, which can greatly impact upon their ability to return to paid employment. Following Mehnert (2010), which reviews 28 academic studies on the likelihood of cancer survivors returning to work, we assume that 63.5% of those who survive cancer return to employment<sup>29</sup>.

Using this adjusted human capital approach we calculate that in 2010 the **annual contribution of cancer survivors to the UK economy was £6.9 billion**. This figure is an estimate of the additional contribution that working age cancer survivors are able to make thanks to their treatment and rehabilitation. It is also a contribution that cancer survivors are able to make every year. As the number of cancers survivors in our society continues to grow, due to increases in incidence and survival rates, this contribution is set to increase further over the coming years.

iii See Appendix 2 for full details of these calculations

# The impact on families and communities

Looking at the economic impact of cancer only tells us one side of the cancer story. Someone with cancer may work, but that person might also be part of a family and part of a community. Cancer's impact extends well beyond its direct impact on the economy – in this section we explore its wider social effects.

## Measuring social impact

To assess the social impact of cancer we investigate three key areas of non-economic contributions individuals make to their families and communities: informal care, domestic work and volunteering. We classify these contributions as follows:

- **Informal care**
  - Caring for/looking after and playing with children
  - Helping or caring for adults
- **Domestic work**
  - Preparing food and drinks, cooking, and washing up
  - Cleaning and tidying the house
  - Washing, ironing or mending clothes
  - Home maintenance, DIY, and gardening
  - Pet care
- **Volunteering**
  - Work for or on behalf of an organisation, charity or sports club which is unpaid

Using the Time Use Module of the Office for National Statistics (ONS) Omnibus Survey<sup>iv</sup> we can get information on the amount of time people typically spend on these activities. The time use data shows significant variation across age groups and by gender. For example, women aged 25-49 are the biggest providers of informal care, providing 145 minutes per day or around 17 hours per week, compared to men aged 15-24 who give around 2 ½ hours per week. When it comes to domestic work women do significantly more than men, but there is also a gender split in terms of tasks undertaken with men engaged more in home maintenance while women tend to spend more time cooking and cleaning. The gender divide is much smaller when it comes to volunteering, the main point of comparison here being across age groups. Those in their 60s and 70s spend significantly more time volunteering than those in their 20s and 30s.

## Lost care and volunteering

By combining the time use data with information on cancer mortality rates we can estimate the UK's social losses as a result of cancer deaths. **We calculate that the UK loses 4.9 million hours of volunteering and 25.3 million hours of informal caring each year as a result of cancer deaths.** These losses represent an enormous loss to families, who are left without key caregivers, and to communities who lose essential volunteers. These figures have been calculated using an estimate of the annual number of deaths from cancer. These numbers account only for the loss in a given year as a result of 159,000 cancer deaths<sup>v</sup>; if we were to consider how the deaths compound over time then the losses would be much higher.

In order to put the scale of these losses into perspective we have calculated an estimate of their value in monetary terms. Drawing on data on median hourly pay by specific occupation, given in the Annual Survey of Hours and Earnings, we were able to estimate the average pay that might be received had

<sup>iv</sup> Unfortunately the most recent form of this data is from 2005. However given that since then there have been no major inventions which might dramatically change time use, such as the washing machine 100 years ago, we are confident that the 2005 data is appropriate. A new wave of the Time Use Survey has recently been completed, the data for which should be available for analysis in late 2015 or early 2016.

<sup>v</sup> These figures do not include deaths from childhood cancers as the time use data doesn't cover people under the age of 14.

these activities received financial compensation. For time spent engaged in housework and informal care, we use wages for ‘Housekeepers and related occupations’ and ‘Care workers and home carers’ respectively. As volunteering can cover a wide range of activities we use the national minimum wage for people aged 21 and over as a value for this.

Given that the UK loses 4.9 million hours of volunteering and 25.3 million hours of informal caring each year, taking prevailing wage rates in 2014 **we calculate these losses have a combined worth of £236 million.**

### Lost domestic work

When someone dies of cancer a household loses out on their domestic contribution, in terms of cooking, cleaning, DIY etc. However it could also be argued that with fewer people now living in the household the domestic workload is less. Therefore to avoid overstating the social losses stemming from cancer deaths we have thus far not taken in to account lost domestic work. However some domestic tasks, such as repairs, gardening and pet care, remain the same regardless of the number of members in the household. Using the same methodology we used above with informal care and volunteering we calculate that **the UK loses 35.9 million hours of domestic work, worth £237 million, each year.**

### Total social losses

Total losses as a result of lost informal care, volunteering and domestic work can be found by combining the estimates above. We calculate that the UK loses **66.1 million hours of unpaid work, worth £473 million, each year.**

Annual social losses as a result of cancer deaths		
	Annual Hours Lost	Estimated Value
<b>Volunteering</b>	4.9 million	£32 million
<b>Informal care</b>	25.3 million	£204 million
<b>Domestic work</b>	35.9 million	£237 million
<b>Total</b>	66.1 million	£473 million

Source: Authors' calculations using ONS Omnibus Survey 2005 and Annual Survey of Hours and Earnings

£473 million is a significant underestimate of the total social losses associated with cancer. This figure captures the loss of unpaid work but it does not account for the loss of the individuals themselves. It is impossible to put a cost on the loss of a parent, a partner or a friend nor can we assign a value to the emotional support an individual offers to those around them. We accept that figures generated in this section do not capture the full social damage caused by cancer deaths.

However so long as we understand this caveat, the figures generated here are still useful as they draw attention to the social losses associated with cancer. Indeed in terms of scale, even this underestimate of the social losses is on a par with the economic losses. In the first section we estimated that each year the people who die from cancer could have contributed £585 million to the UK economy through paid work. Knowing that they could also have contributed £473 million through unpaid work highlights the importance of looking beyond direct effects on employment when considering the impact of a serious disease.

### The impact on carers

The preceding analysis has primarily focused on the impact of cancer via its effect on patients themselves – cancer stops them providing informal care and domestic work and removes their volunteer services. But cancer can also have a more direct impact on families and friends. There are over one million people in the UK caring for someone with cancer, on average providing around 15 hours of support each week<sup>30</sup>. 1 in 6 carers provide more than 35 hours of care and 100,000 report that they provide over 50 hours of care to someone with cancer each week.

62% of cancer carers are women, most commonly aged between 45 and 54, with 22% falling into this band<sup>31</sup>. Carers offer emotional and practical support – they run errands, provide transport, accompany people on hospital visits and help around the house. Almost half of carers

say it has affected their emotional wellbeing or mental health, two fifths say it has impacted their social life and one fifth say it has impacted their relationships<sup>32</sup>.

It is difficult to put a true cost on the care provided by friends and family. They give so much and their support to those with cancer is invaluable in many different ways. However researchers from the University of Oxford estimate that unpaid care to cancer patients by friends and family is worth £2.6 billion per year<sup>33</sup>.

## Understanding the social value of cancer survivorship

In the previous chapter we investigated the economic value that cancer survivorship can provide through higher employment rates. However, as already highlighted in this chapter, an individual's value extends beyond what they contribute through their job. People who survive cancer provide huge additional value to society in the form of social and unpaid contributions.

There are at least 1.8 million cancer survivors living in the UK - using the same ONS time use data on informal caring, domestic work and volunteering we can estimate their social contribution. We calculate that cancer survivors **contribute 258 million hours of informal care and 52 million hours of volunteering each year**. Furthermore they do **1.5 billion hours of domestic work**. The monetary value of all this unpaid work comes to almost £15.2 billion per year.

This unpaid work is worth significantly more than the £6.9 billion cancer survivors contribute through paid employment. This is partly because all cancer survivors, regardless of their age, take part in some form of unpaid work. This underlines the importance of the approach taken in this report which looks at both the economic *and* the wider social impact of cancer.

# How can we move forward?

This report has illustrated the huge impact cancer has on the UK. We show not only that cancer can destroy the lives of individuals and their families every year, but that it has wider societal and economic consequences. We believe there needs to be greater awareness of these broader implications.

Two key issues emerge from our analysis. First, our work demonstrates the true cost of low survival rates. We show that cancer deaths deprive families and communities of millions of hours of informal care, volunteering and domestic work while costing our economy billions in terms of forgone employment. Second, in drawing attention to the contributions made by cancer survivors, our analysis highlights the need to ensure that they are properly supported.

This report concludes by considering these two issues in greater depth, exploring the potential gains from increasing survival rates and improving support for survivors and considering how such gains might be realised.

## 1. We need to increase survival rates

Since the early 1970s, median survival time for all cancer types has increased from just one year to close to six<sup>34</sup>. Unfortunately the UK still lags behind its European counterparts in terms of cancer outcomes with a study of 29 countries showing survival rates for almost all common cancers are worse in the UK than the overall European average<sup>35</sup>.

It is our hope that survival rates will continue to improve significantly. The gap in cancer survival rates between England and the European average has remained at around 10% for the last two decades<sup>36</sup>. We calculate that if that gap was closed, and cancer survival rates were 10% across the UK as a whole, each year the additional survivors generated by such an improvement would contribute £117 million to the UK economy<sup>vi</sup>. Furthermore the additional survivors generated by just a single year of higher survival rates would contribute £1.2 billion to the UK economy across the rest of their lifetimes.

### How can we get there?

In autumn last year the NHS Five Year Forward View set out a vision to improve cancer outcomes centred on better prevention; earlier diagnosis; and better treatment, care and aftercare. Subsequently an independent taskforce has been set up to tackle low survival rates, along with a programme testing innovative ways of diagnosing cancer more quickly at more than 60 sites across the country and changing the way in which cancer is monitored at a local level to ensure Clinical Commissioning Groups focus on cancer outcomes.

Given the wide disparities across Europe in cancer diagnosis rates, as part of this drive to increase survival rates we call on NHS England to conduct a comparative review of the leading countries in cancer diagnosis to inform service development in the UK. This work should focus on best-practice in those countries which ensure high attendance rates for diagnostic testing.

The changes proposed by the NHS are important and have the potential to extend the lives of many people across the UK. Only time will tell how effective they are, but we hope to see an increase in the number of cancer survivors in the UK in coming years.

## 2. We need to support cancer survivors

Surviving cancer can expose an individual to continuing physical and mental health problems, either as a result of cancer treatments or due to other serious health conditions. Macmillan reports that 'at least 500,000 people in the UK are facing poor health or disability after treatment for cancer - approximately one in four (25%) of those who have been diagnosed with cancer at some point in their lives'<sup>37</sup>. Given this, lower rates of employment among cancer survivors compared to the rest of the population are to be expected.

<sup>vi</sup> See Appendix 4 for details of all the calculations in this section.

However, low re-employment rates among cancer survivors are also low due to poor support. A survey by Macmillan found that 37% of those who return to work after cancer treatment said they experienced some kind of discrimination from their employer or colleagues while 9% felt harassed to the point they felt they could not stay in their job<sup>38</sup>. 13% of those returning to work said their employer failed to make reasonable changes to enable them to do their job. Research also shows that less than 40% of cancer patients receive information from health professionals about the impact of their treatment on their ability to work.

While it is unrealistic to expect all cancer survivors to return to paid employment, much more could be done to improve the experiences of survivors. As an illustration of the impact of poor support, we calculate that if employment rates for cancer survivors were the same as for the rest of the population, cancer survivors would contribute an additional £4 billion to the UK economy each year.

### **How can we get there?**

As already stated it is unrealistic to expect all cancer survivors to return to work, but we must do more to help those who want to. Cancer survivors need to feel confident that they will be supported when they return to the workplace. Employers need to have an open dialogue with their staff affected by cancer, working with them to manage their transition back in to the workforce. Opportunities for flexible working, changing roles and workplace adaptations should be discussed.

The government's Fit For Work programme, which provides advice for both employers and employees, is a good step. Roll out of this service only began in early 2015, and it does not yet cover the whole of the UK, but we hope that it will have a positive impact on re-employment rates. The programme may be more successful if health professionals also engage with its agenda. Less than with two in five cancer patients receive information from health professionals about the impact of their treatment on their ability to work<sup>39</sup>, yet such discussions can help give people confidence in returning to employment. All health professionals, not just GPs, should be encouraged to discuss issues around returning to work with patients.

### **The future**

This report has demonstrated the broad social and economic impact that cancer has on the UK. While it has illustrated the damage the disease causes it has also highlighted the huge contributions made by those who survive cancer, both to their families and communities and to our economy. With a combination of improving clinical care and better support in the workplace we are confident not only that a growing number of people can survive cancer, but that their contributions to society will continue to grow.

## Appendix 1-The economic loss associated with working age cancer deaths

For any given individual:  $E(\text{Annual Earnings}) = P(\text{Employment}) \times (\text{Earnings} \mid \text{Employed})$

Taking detailed data on employment and earnings rates from the Labour Force Survey (2014) we estimated the expected annual earnings of individuals dying of cancer, taking in to account their age and their gender, using the following: Expected annual earnings = Age and gender specific employment rate x Age and gender specific average earnings.

Using this we estimate that the sum of expected annual earnings for those dying of cancer in 2014 was £585 million.

Given that the data on individuals dying of cancer, taken from Cancer Research UK, gave information on their age and gender we were also able to estimate the number of years of their working life lost as a result of their death. Using this we were able to project the individuals' total lost earnings, taking in to account that as they progressed through the rest of their working life their expected annual earnings would have changed (due to variation in age and gender specific employment and earnings rates).

When considering the effects on employment we consider the deaths of individuals under 70, rather than just under 65, because of the growing number of people choosing to work in to later life. NB – this does not mean that we assume everyone works to this age as we use age specific employment rates in our calculations so this extension will not artificially bias our estimates.

We estimate that the sum of lost earnings for those dying of cancer in 2014, across the rest of their lives, amounts to £6.8 billion in 2014 terms.

By looking at lost earnings we are implicitly assuming that wages are a good proxy for an individual's contribution to the economy, or their productivity. In fact simply looking at an individual's earnings may understate their economic contribution; indeed in 2014 while average earnings were £27,200, the average level of GDP per person employed in the UK economy was £51,460. Thus these calculations may be considered to give a conservative estimate of the economic contributions lost as a result of cancer deaths.

When calculating the losses associated with specific tumour types we followed the same method, simply substituting the data on total cancer deaths for tumour specific cancer deaths.

## Appendix 2 -The economic contribution of cancer survivors

For any given individual:  $E(\text{Annual Earnings}) = P(\text{Employment}) \times (\text{Earnings} \mid \text{Employed})$

Taking detailed data on employment and earnings rates from the Labour Force Survey (2014) we estimated the expected annual earnings of individuals who had survived cancer at some point in their lifetime, taking in to account their age, gender and the fact that they have had cancer.

Following Mehnert (2010), which reviews 28 academic studies on the likelihood of cancer survivors returning to work, we base our calculations on the assumption that 63.5% of those who survive cancer return to employment. This gives us the following: Expected annual earnings of a cancer survivor = Age and gender specific employment rate x Probability of cancer survivor being re-employed x Age and gender specific average earnings. To further account for the lower rates of employment amongst cancer survivors we assume that all survivors retire by the age of 65.

Data from Macmillan provides information on those living with or beyond cancer based on time passed since first diagnosis<sup>40</sup>, which in their dataset ranges from one year to twenty years. Taking the total number of survivors over the last 20 years we estimate the sum of their annual earnings to be £6.9 billion.

An important caveat to this methodology is that it doesn't adjust for a change in average earnings among cancer survivors and therefore assumes that individuals do not alter their job or working hours as a result of their illness. Thus the figures generated could be an overestimate. However in order to counterbalance this we have deliberately selected a low re-employment rate for cancer survivors. Mehnert (2010) finds that in some instances re-employment rates can be as high as 89%, which is significantly greater than the rate of 63.5% that we use.

Furthermore the data from Macmillan only provides information on those who have survived cancer in the last 20 years, there are likely to be many more cancer survivors contributing to the economy who are not included in this data set as their diagnosis was before 1980. Therefore overall we do not think that the figures generated are likely to be either too high or too low.

## Appendix 3 - Calculating the social impact

The Time Use module of the ONS Omnibus Survey provides information on the amount of time people spend on various activities. Time Use data is an incredibly rich resource; in addition to a number of standard questions, Time Use Surveys ask participants to keep a diary. Participants make note of the details of their day, broken down into small periods (10-minute intervals in the ONS data) where they identify their activities, where they took place, and with whom they occurred. Time Use data is available broken down by both age and gender.

Average number of minutes per day						
	Men			Women		
	Housework	Caring	Volunteering	Housework	Caring	Volunteering
15-24	27.07	21.18	1.22	64.8	30.45	0.88
25-49	65.38	35.17	1.94	136.28	75.09	2.61
50-64	84.86	18.36	4.22	162.11	27.77	5.78
65-69	108.57	19.48	9.54	179.65	34.02	3.59
70-74	115.84	15.03	5.5	179.23	16.06	3.31
75+	118.28	17.84	5.03	153.05	4.86	5.02

Source: ONS Omnibus Survey 2005

Using this data we take the daily number of minutes spent on informal caring activities, volunteering and domestic work and aggregate them to give the annual amount of time spent by individuals on these activities, accounting for age and gender. We then combined these figures with data on cancer mortality to estimate the total number of hours lost as a result of cancer deaths. When calculating this figure we did not take in to account all forms of housework. While someone's domestic contribution will be lost as a result of a cancer death, so will their contribution to the domestic workload, for example there will be less laundry. Therefore to avoid overstating the social losses stemming from cancer deaths we just looked at domestic tasks, such as repairs, gardening and pet care, which remain the same regardless of the number of members in the household.

We calculate the UK loses 66.1 million hours of unpaid work per year. Using data on median hourly pay by specific occupation, given in the Annual Survey of Hours and Earnings, we put a value on this lost work. We use the pay of housekeepers to put a value to domestic work, the pay of care workers to put a value on informal caring and the minimum wage to estimate the value of volunteering.

Median hourly pay excluding overtime		
	Men	Women
Housekeepers and related	£7.05	£7.51
Care workers, home carers and senior care workers	£8.14	£7.98
Minimum wage (21+)	£6.50	£6.50

Source: Annual Survey of Hours and Earnings 2014

Using the hourly rates in the table above we calculate the value of unpaid work lost as a result of cancer to be £473 million per year.

When investigating the social contribution of cancer survivors we use the same estimates of time spent on unpaid activities and the same estimates of their value. Data from Macmillan provides information on those living with or beyond cancer by time since first diagnosis. Taking the total number of survivors over the last 20 years (the longest timeframe possible in the data) we estimate that survivors contribute 258 million hours of informal care and 52 million hours of volunteering each year. Furthermore they do 1.5 billion hours of domestic work (in this estimate we include all forms of domestic work). The monetary value of all this unpaid work comes to approximately £15.2 billion per year.

## Appendix 4 -The future

English cancer patients, diagnosed between 1990 and 2007 (the latest available data), were less likely to survive for 5 years compared with patients in other European countries. The gap in survival rates between England and the European average during that time was around 10%<sup>41</sup>. We investigate what the economic impact of increasing survival rates by 10%, for all cancers combined for each five year age band, might be.

To ensure we do not overestimate the benefits we assume that these additional cancer survivors are less likely to be in employment than the rest of the population. Following Mehnert (2010) we assume only 63.5% of these survivors return to paid employment and we further assume that none work past the age of 60. Incorporating these assumptions we use the same methodology used in Appendix 2 to assess the economic contribution of the additional 32,000 cancer survivors which would be generated each year under survival rates which were 10% higher.

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