



National Audit Office

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## **Report**

by the Comptroller  
and Auditor General

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**Department of Health, NHS England and  
Public Health England**

# Progress in improving cancer services and outcomes in England

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Department of Health, NHS England and Public Health England

# Progress in improving cancer services and outcomes in England

Report by the Comptroller and Auditor General

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National Audit Act 1983 for presentation to the House of  
Commons in accordance with Section 9 of the Act

Sir Amyas Morse KCB  
Comptroller and Auditor General  
National Audit Office

13 January 2015

In 2014, the Committee of Public Accounts asked us to review progress in improving cancer services and outcomes since we last reported. This report sets out the results of our review, which examined progress in implementing the Committee's recommendations and progress against key measures of cancer services and outcomes.

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## Key facts

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**£6.7bn**

estimated cost to  
the NHS of cancer  
services in 2012-13

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**280,000**

people diagnosed  
with cancer in 2012

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**31%**

of people diagnosed  
with cancer in 2012  
died within a year

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- 3-in-5** new cancers are diagnosed in people aged 65 or over
- 1-in-5** cancers were diagnosed via an emergency presentation at hospital between July and December 2012
- 62%** of newly diagnosed cancers in 2012 had a record of how far advanced the cancer was at diagnosis
- 51%** increase in urgent GP referrals for suspected cancer between 2009-10 and 2013-14
- 64** NHS trusts and NHS foundation trusts failed to meet the standard that 85% of patients should start cancer treatment with 62 days of referral by a GP between July and September 2014

# Summary

**1** More than 1-in-3 people in England will now develop cancer in their lifetime. In 2012, around 280,000 people were diagnosed with cancer and an estimated 133,000 people died from cancer. There are more than 200 different types of cancer, but cancers of the breast, prostate, lung and bowel account for more than half of all newly diagnosed cancer cases. More than 3-in-5 cancers are diagnosed in people aged 65 or over.

**2** Cancer has been a priority for the Department of Health (the Department) since the publication of the NHS Cancer Plan in 2000. The Department's current cancer strategy,<sup>1</sup> published in 2011, set out an ambition to save an additional 5,000 lives a year by 2014-15 and halve the gap between survival rates in England and those in the best European countries.

**3** In January 2015, as we finalised this report, NHS England announced that it had set up a taskforce to develop a 5-year action plan for cancer services by summer 2015, with the aim of improving survival rates. The taskforce will be chaired by the Chief Executive of Cancer Research UK and will work across the health system. It will cover different aspects of cancer care, including prevention, diagnosis and treatment.

**4** **Figure 1** overleaf outlines the main diagnosis and treatment pathways for people with cancer, together with the waiting time standards that the Department has set. We estimate that, in 2012-13, the NHS spent at least £6.7 billion on cancer services. The Department is ultimately responsible for securing value for money for this spending. Responsibility for commissioning cancer services is shared between the Department's largest arm's-length body, NHS England, and the 211 local clinical commissioning groups. Public Health England, another of the Department's arm's-length bodies, is responsible for piloting new cancer screening programmes.

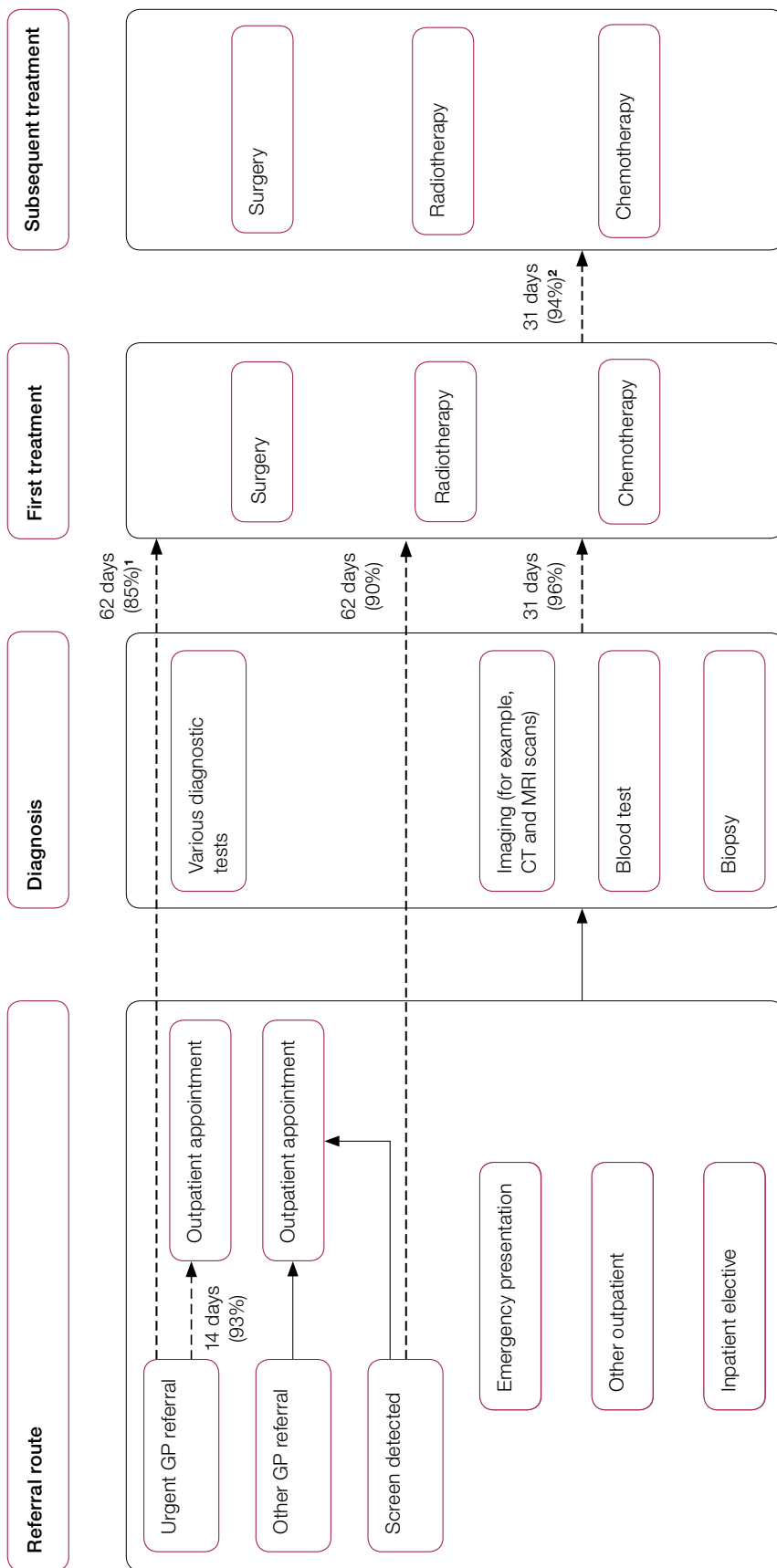
## Our report

**5** We have reported 4 times on cancer services in the past 11 years, most recently in November 2010 on delivery of the Department's 2007 *Cancer Reform Strategy*. The subsequent Committee of Public Accounts report,<sup>2</sup> published in March 2011, concluded that the NHS had made significant progress in delivering important aspects of cancer services, with falling mortality rates and consistent achievement of the cancer waiting time targets. A significant increase in resources had contributed to the improvements, but the progress had also been achieved through clear direction and high-profile leadership. However, the Committee was concerned that there remained wide, unexplained variations in performance across the country and significant gaps in information about important aspects of cancer services.

<sup>1</sup> Department of Health, *Improving Outcomes: A Strategy for Cancer*, January 2011.

<sup>2</sup> HC Committee of Public Accounts, *Delivering the Cancer Reform Strategy*, Twenty-fourth Report of Session 2010-11, HC 667, March 2011.

**Figure 1**  
Main cancer pathways to treatment and maximum waiting times



**Notes**

- 1 31 days for children's cancers, testicular cancer and acute leukaemia.
- 2 98% for second or subsequent treatment that is chemotherapy.
- 3 The days on the dashed arrows show the maximum waiting time and the percentage of cases that should meet this standard.
- 4 There are 2 other waiting time standards, which are not shown: 14-day wait for breast symptoms where cancer was not initially suspected (93%) and 62-day wait for first treatment following a consultant's decision to upgrade the priority of the patient (no percentage specified).

Source: National Audit Office



**6** In 2014, the Committee of Public Accounts asked us to review progress in improving cancer services and outcomes since we last reported. This report sets out the results of our review, which examined progress in implementing the Committee's recommendations and progress against key measures of cancer services and outcomes. The report covers: roles and responsibilities (Part One); information and evidence (Part Two); and services and outcomes (Part Three). Appendix One gives a summary of the Department's view on progress against the recommendations that the Committee made in 2011.

**7** We set out our evidence base in Appendix Two. Our analysis of progress drew heavily on data that were already available. Appendix Three summarises performance against a range of indicators in 4 areas: incidence and outcomes; referrals and diagnosis; access to treatment; and service management. For each indicator, we highlight trends over time, variations by geographic area and demographic group, and international comparisons where data are available.

## **Key findings**

**8 Outcomes for cancer patients, including estimated survival rates, continue to improve.** Since we last reported, national performance has improved against a range of indicators. For example, the proportion of people surviving for 1 year and 5 years after diagnosis has increased to 69% (for those diagnosed in 2012) and 49% (for those diagnosed in 2008) respectively. And cancer awareness campaigns have increased awareness of cancer signs and symptoms (paragraph 3.3).

**9 However, there remains considerable scope to improve outcomes for cancer patients further.** Of particular concern are that:

- 1-in-5 people are diagnosed via an emergency presentation, as those diagnosed in this way are, on average, around twice as likely to die within a year compared with those diagnosed via an urgent GP referral, because their cancers are generally more advanced (paragraph 3.4); and
- the waiting time standard that 85% of patients should be treated within 62 days of being referred urgently by their GP has not been achieved since September to December 2013 (paragraph 3.5).

**10 Significant variations and inequalities in outcomes and access to services persist.** Outcomes and access to services are generally poorer for older patients, and those from more deprived socio-economic groups are more likely to experience worse outcomes compared with those from less deprived groups. For example, cancer patients aged 55–64 are 20% more likely to survive for at least 1 year after diagnosis than those aged 75–99. While survival rates for older people are expected to be lower, because, for example, they are frailer and less likely to cope with the treatment, this is unlikely to explain fully the significant variation between age groups. There would also be nearly 20,000 fewer deaths from cancer each year if mortality rates for all socio-economic groups were the same as for the least deprived (paragraph 3.7).

**11 People in England are less likely to develop cancer than in other high-income countries in Europe but, according to the most recent data, cancer outcomes in England have generally been worse.** Data on 5-year survival rates published in 2013 (for those diagnosed between 2000–2007) showed that, while survival rates in England have improved, they remained about 10% lower than the European average. Outcomes are particularly poor in relative terms for older patients. Benchmarking studies indicate that the worse outcomes in England may be due to poorer access to treatment or poorer quality of care, as well as lower rates of early diagnosis. Survival rates for children diagnosed with cancer in the United Kingdom and Ireland are close to the European average (paragraphs 3.9 to 3.13).

**12 Better information is becoming available to strengthen the evidence base for cancer services.** The Department, its arm's-length bodies and the NHS have made good progress in implementing the Committee of Public Accounts' recommendations, including introducing new datasets and improving the coverage of existing datasets. For example, the proportion of newly diagnosed cancers with staging data (a record of how advanced a patient's cancer is at diagnosis) increased from 33% to 62% of cases between 2007 and 2012 (paragraphs 2.3 to 2.5 and Figure 5).

**13 However, important gaps in cancer data remain.** Data on the cost and efficiency of cancer care have not improved in line with the development of data on cancer treatments and outcomes, and information on activity is not routinely linked to cost data for some cancer treatments. This means that commissioners still cannot make informed decisions about value for money. It also means there is limited assurance about whether resources are being used to best effect. Data gaps also make it difficult to evaluate in a meaningful way the £733 million spent through the Cancer Drugs Fund since October 2010 (paragraphs 1.11 to 1.13, 2.6 to 2.8 and Figure 4).

**14 There is a risk that the significant progress that has been made in improving cancer services and information will stall as a result of recent changes and pressure on resources.** The commissioning arrangements for cancer services are now more complex, and are still bedding in following the reforms to the health system in 2013. It is unclear how in practice NHS England is monitoring performance against the outcomes indicators relating to cancer. Organisations that we interviewed raised concerns that the health system does not have sufficient capacity to exploit the data that are available and that analysis and insight are being hampered because data are now flowing less freely around the health system. The Health and Social Care Information Centre tightened its data-sharing processes in 2014 following concerns about patient confidentiality (paragraphs 1.6, 1.7, 2.9 to 2.13 and Figure 3).

## Conclusion

**15** The Department, its arm's-length bodies and the NHS have made progress in improving cancer services since we last reported on this subject in 2010. Overall, outcomes for cancer patients continue to improve. The better information that is becoming available to strengthen the evidence base for cancer services should support improvements in performance, although important gaps in data remain.

**16** The significant variations within England indicate that there is considerable scope to improve cancer services and outcomes further. In addition, the most recent data (published in 2013) showed that the gap between England and the European average had not closed and 5-year survival rates for people diagnosed up to 2007 have remained well below the European average. Because of the time lag in survival data becoming available, it is too early to tell whether the improvements in cancer services, made since we reported in 2010, are helping to close the gap between England and the best performing European countries.

**17** Addressing the significant variations that exist between different parts of the country and different groups of patients will be crucial to closing the gap between outcomes in England and those in better performing European countries. In addition to this, the Department, its arm's-length bodies and the NHS need to work together to make sure that the momentum in service improvement is not lost as a result of the recent changes to NHS commissioning arrangements and the on-going pressure on resources.

## Recommendations

- a** **The Department, NHS England and Public Health England should investigate further the reasons for inequalities in outcomes and access to services between different groups of cancer patients.** A good starting point would be to develop a better understanding of the nature of the variation between different age groups and to establish the scope for improvement. They should then set out the actions they will take to reduce these variations and a timetable by which these should be achieved.
- b** **NHS England should improve the information that is available to support those who commission cancer services.** Important cancer datasets, such as those for chemotherapy and radiotherapy, do not analyse or benchmark these treatments for each clinical commissioning group, although they have potential to do so. NHS England should work with Public Health England to ensure that analysis of these treatments meets the needs of commissioners. In addition, NHS England should work with Monitor to ensure that robust data on costs for all cancer treatments are available and routinely linked to data on outcomes so that commissioners can make informed decisions about value for money.

- c NHS England and Public Health England should coordinate how they use their analytical staff with the aim of generating the most insight they can from the available data.** Greater pooling of resources should allow more and better analysis. In particular, there is scope to link more cancer datasets. For example, data on treatment and diagnostic activity recorded within hospital episode statistics and the Diagnostic Imaging Dataset could be linked to the outcomes data in the National Cancer Registration Service. This would help to assess which types of treatment are the most effective for patients.
- d The Health and Social Care Information Centre should introduce a system through which it can be held to account for how effectively it is discharging its responsibility to disseminate data to help drive improvements in health and social care.** As a minimum, it should seek, and publish the results of, regular feedback from NHS data users. The effective flow of data around the system is important for strengthening the evidence base for cancer services and other healthcare. However, the Centre has to balance its obligation to disseminate data with the need to safeguard patient confidentiality.
- e To support evaluation of the Cancer Drugs Fund, NHS England should check that NHS providers are recording details of the cancer drugs prescribed through the Cancer Drugs Fund within the chemotherapy dataset, managed by Public Health England.** In the year to March 2014, when the recording of these drugs in the chemotherapy dataset was not mandated, approximately half of patients receiving drugs paid for by the Cancer Drugs Fund were not recorded in this dataset.

# Part One

## Roles and responsibilities

**1.1** This part of the report sets out the arrangements for commissioning cancer services and for approving new cancer drugs and treatments.

**1.2** The Department of Health (the Department) is ultimately responsible for securing value for money for spending on healthcare, including cancer services. Following the reforms to the health system in April 2013, the Department is the steward of the system as a whole. It relies on a system of assurance around the commissioning, provision and regulation of healthcare.

### Commissioning cancer services

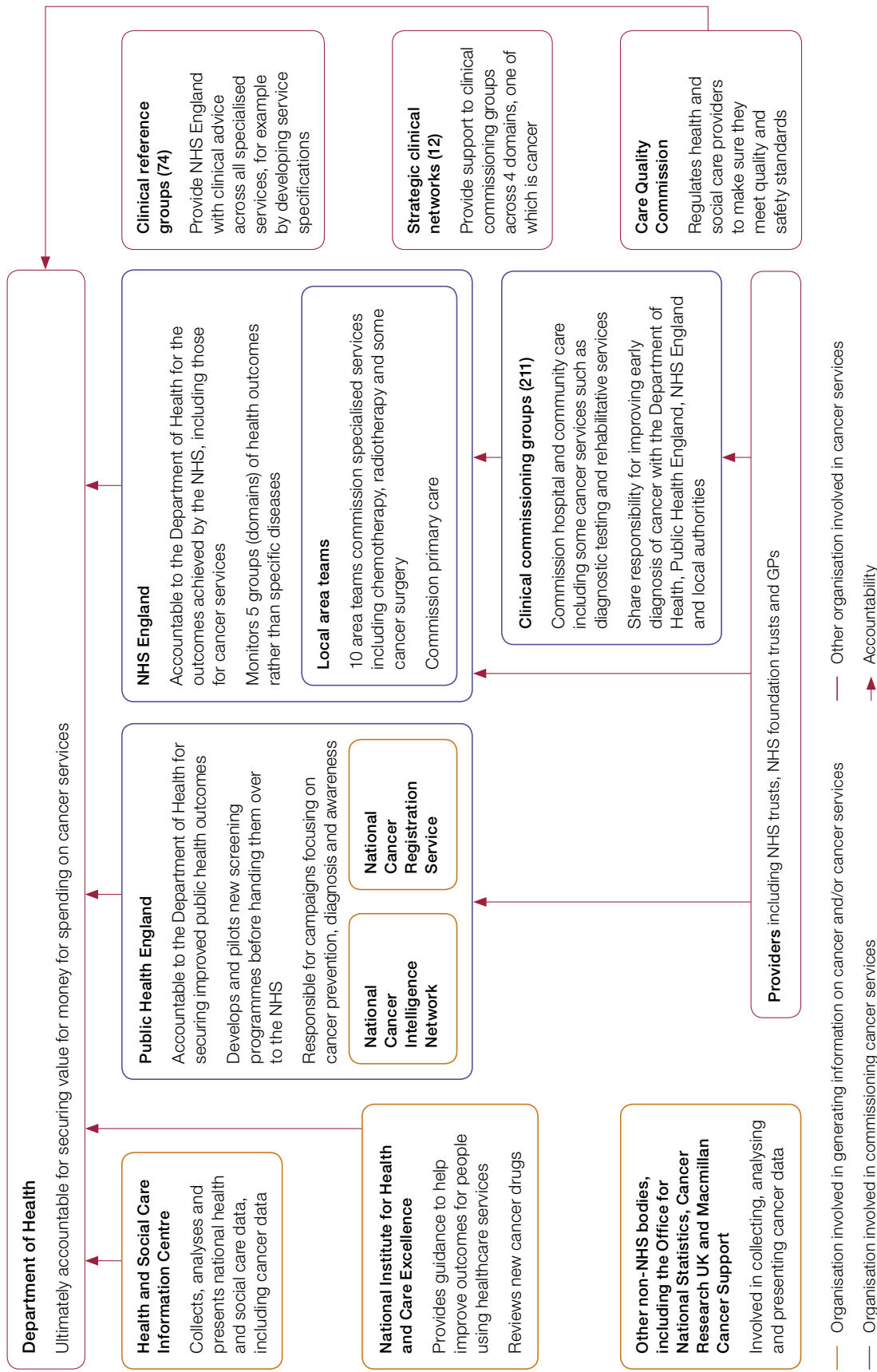
**1.3** The arrangements for commissioning cancer services have changed since we last reported on this topic in 2010. The Health and Social Care Act 2012 abolished primary care trusts and introduced new structures for commissioning healthcare. Responsibility for commissioning cancer services is now split 3 ways (**Figure 2** overleaf):

- Clinical commissioning groups commission diagnostic testing and some routine cancer treatment such as non-specialist surgery.
- NHS England commissions specialised services through 10 of its area teams. These services include chemotherapy, radiotherapy and some cancer surgery which is defined as specialised. Giving NHS England responsibility for commissioning these services is intended to reduce variations in access across the country.
- NHS England commissions established screening programmes. Public Health England develops and pilots new screening programmes before handing them over to the NHS.

**1.4** The accountability arrangements for the health system are set out in the Department's *Accounting Officer system statement*.<sup>3</sup> The Department sets objectives for NHS England through an annual mandate, and for Public Health England through a remit letter setting out expectations. The Department intends to measure progress against these objectives through indicators set out in outcomes frameworks for the NHS and public health. The frameworks include a variety of indicators relating to cancer (**Figure 3** on page 13).

<sup>3</sup> Department of Health, *Accounting Officer system statement*, October 2014.

**Figure 2** Arrangements for commissioning and generating information for cancer services since April 2013



**1.5** NHS England, in turn, supports and holds to account, through an assurance process, the 211 clinical commissioning groups for delivering their statutory functions, including improving outcomes for their populations. This assurance feeds into NHS England's own delivery of the objectives set out in the mandate. NHS England has developed a clinical commissioning group outcomes indicator set (see Figure 3 for the cancer-related indicators) which provides a direct line of accountability back to the mandate and reinforces each clinical commissioning group's duty to exercise its functions consistently with the mandate. The *Accounting Officer system statement* notes that reviewing progress against these indicators forms part of NHS England's ongoing assurance of clinical commissioning groups. Performance against the outcomes indicator set can also be used as part of clinical commissioning groups' local accountability to their boards and to health and wellbeing boards.

**Figure 3**  
Cancer-related outcomes indicators

<b>NHS outcomes framework</b>	<b>Public health outcomes framework</b>	<b>Clinical commissioning groups outcomes framework</b>
Under-75 mortality rate for cancer	Under-75 mortality rate for cancer	Under-75 mortality rate for cancer
1-year and 5-year survival rates for all cancers	Cancer diagnosis at stages 1 and 2	1-year and 5-year survival rates for all cancers
1-year and 5-year survival rates for breast, lung and bowel cancer together	Cancer screening coverage for breast and cervical cancer	1-year and 5-year survival rates for breast, lung and bowel cancer together
5-year survival rate for all cancers in children		Cancer diagnosis via emergency routes
		Record of stage of diagnosis for all cancers
		Record of stage of diagnosis for lung cancer
		Cancer diagnosis at stages 1 and 2
		Mortality rate for breast cancer

**Note**

1 Cancer survival rates are estimates, after adjustment for deaths not caused by cancer.

Source: National Audit Office

**1.6** The arrangements for commissioning cancer services are more complex now than when we last reported and more organisations are involved. The new arrangements have been in place for more than 18 months, although our evidence indicates that they are still bedding in. For example, we found that it is unclear how in practice NHS England is monitoring performance against the various outcomes indicators. It is also unclear whether any one organisation, at a national level, has oversight of cancer commissioning across a range of complex treatment pathways. Previously, the National Clinical Director for Cancer had this oversight. Recent research has also found confusion among commissioners and healthcare professionals about responsibilities and accountabilities for planning and commissioning cancer services.<sup>4</sup>

**1.7** Our 2010 report on the *Cancer Reform Strategy* found that the Department had made progress in improving key aspects of cancer services through strong direction and high-profile leadership, underpinned by increased resources.<sup>5</sup> However, fewer dedicated resources are now available to support the improvement of cancer services:

- The National Clinical Director for Cancer has become a part-time advisory post within NHS England, whereas previously it was a full-time policy post within the Department. NHS England now monitors 5 groups (domains) of health outcomes. Each domain is led by a full-time director who is responsible for improving outcomes under their domain. Outcomes for cancer services fall under the domain of 'preventing people from dying prematurely', led by a clinician.
- Both the National Cancer Action Team, which provided support to commissioners and coordinated policy implementation, and the 28 regional cancer networks were disbanded at the end of March 2013. The cancer networks sought to ensure the delivery of consistent, efficient and effective care to all patients within each region. They also gave advice and support to the providers of cancer services. From April 2013 NHS England established strategic clinical networks to support commissioners in 4 areas of healthcare, one of which is cancer. It has also set up clinical reference groups, which bring together clinicians, commissioners, public health experts, patients and carers, for example, to develop specifications for specialised health services, including some treatments for cancer.

**1.8** There have also been changes in responsibilities for generating data and information to inform commissioners and help improve cancer services. Public Health England now takes the lead and has brought together a number of organisations involved in cancer data, including the National Cancer Intelligence Network and the National Cancer Registration Service. They work with a range of other organisations, for example the Health and Social Care Information Centre, the Office for National Statistics and cancer charities, to provide access to cancer data and information. Public Health England is also responsible for campaigns focusing on cancer prevention, diagnosis and awareness.

4 For example, University of Birmingham & ICF GHK Consulting (commissioned by Cancer Research UK), *Measuring up? The health of NHS cancer services*, September 2014; and Macmillan Cancer Support, *Lost in transition: A review of cancer commissioning*, September 2014.

5 Comptroller and Auditor General, *Delivering the Cancer Reform Strategy*, Session 2010-11, HC 568, National Audit Office, November 2010.



## Approving new cancer drugs and treatments

**1.9** All medicines, including cancer drugs, must receive a regulatory licence from the European Medicines Agency (Europe-wide licence) and the Medicines and Healthcare products Regulatory Agency (UK licence) confirming their safety and medical effectiveness, before they can be prescribed by NHS clinicians. A cancer drug is usually licensed to treat a specific type of cancer.

### National Institute for Health and Care Excellence

**1.10** In addition, the National Institute for Health and Care Excellence reviews new cancer drugs to assess whether they should be available on the NHS.<sup>6</sup> It uses a ‘technology appraisal’ to assess clinical and cost-effectiveness by reviewing the available clinical and economic evidence. This appraisal compares the drug with those currently used in the NHS and assesses how well it might work for all patients. Once the Institute has recommended a drug, NHS commissioners must then fund it. Between 2000 and 2014, the Institute approved 92 of the 148 cancer medicines that it appraised (62%).

### The Cancer Drugs Fund

**1.11** The Department set up the Cancer Drugs Fund in 2010 to enable patients with cancer to access drugs that are not routinely funded by their local NHS commissioners. The Fund is now managed by NHS England and will run until March 2016, with a lifetime budget of £1.2 billion. It funds medicines before and during appraisal by the National Institute for Health and Care Excellence or following the Institute’s rejection. It also funds drugs that will not be appraised by the Institute because the number of patients who might benefit is too small. At January 2015, 85 drugs were available through the Fund.

**1.12** Between October 2010 and September 2014, some 60,000 patients accessed medicines through the Cancer Drugs Fund. The number of applications approved and total spending have increased each year (**Figure 4** overleaf). In 2013-14, NHS England overspent the allocated budget by 15%. In November 2014, NHS England decided to take account of a drug’s cost alongside its clinical benefits in prioritising drugs available through the Fund, with a view to ensuring the Fund’s future sustainability. This means that drugs which offer the lowest levels of clinical benefit, or which are particularly expensive in relation to their clinical benefit, may be removed from the funding list.

6 Except cancer drugs that will benefit only a very small number of cancer patients.

**Figure 4**

## Cancer Drugs Fund – number of patients funded and cost

	2010-11	2011-12	2012-13	2013-14	2014-15 (6 months)	Total
Number of patients funded	2,780	11,800	15,460	19,560	11,310	60,900
Cost (£m)	38	108	175	231	180	733
Budget (£m)	50	200	200	200	140	790
Cost as a percentage of allocated budget (%)	77	54	88	115	129	

**Notes**

1 Data have been rounded. Totals may not sum due to rounding.

2 Data for 2010-11 represent in-year funding provided by the Department of Health in October 2010.

Source: National Audit Office analysis of Department of Health and NHS England data

**1.13** In 2014, NHS England commissioned Public Health England to evaluate access to the Cancer Drugs Fund and outcomes for patients. Although some data have been collected on the use of drugs paid for by the Fund, NHS providers were not mandated to collect this data until April 2014. In 2013-14, approximately half of patients receiving drugs paid for by the Fund were not recorded within Public Health England's main chemotherapy dataset, making meaningful evaluation difficult. Despite a lack of evaluation to date, in 2013 the government extended the Fund to 2016 and in 2014 NHS England increased the Fund's annual budget from £200 million to £280 million per year.

### Proton beam therapy

**1.14** The Department and NHS England are funding centrally the development of proton beam therapy services in England. Currently, patients have to go abroad for this treatment. Proton beam therapy is a form of radiotherapy designed to target tumours more precisely than conventional radiotherapy. It therefore reduces the likelihood of damage to surrounding healthy tissue. The Department plans to fund the development of 2 proton beam therapy centres, to be in service by 2018. These centres will be used mainly to treat children and young adults with brain cancer.

**1.15** In July 2013, HM Treasury approved an initial business case for the proton beam therapy programme, at a cost of up to £250 million, to start the procurement process. It attached a number of conditions to the approval, including collecting more evidence on likely demand for these services. HM Treasury is expected to give final approval to proceed with the programme in 2015.

# Part Two

## Information and evidence

**2.1** This part of the report examines progress in generating better information and evidence to support improvements in cancer services and patient outcomes.

**2.2** High-quality information provides a basis for better decision-making and more effective performance monitoring. The Department of Health's (the Department) 2007 *Cancer Reform Strategy* highlighted the importance of information to supporting the improvement of cancer treatment and survival rates.<sup>7</sup> With this in mind, in 2011 the Committee of Public Accounts made 10 recommendations aimed at improving the quality, availability and timeliness of information on cancer.<sup>8</sup>

### Progress to date

**2.3** Overall, the Department, its arm's-length bodies and the NHS have made good progress in developing cancer datasets in line with the commitments made to the Committee of Public Accounts in 2011 and 2012. Appendix One sets out the position against each of the Committee's recommendations. As a result, better information is becoming available to strengthen the evidence base for cancer care and to monitor the performance of cancer services.

**2.4** **Figure 5** on page 19 shows the cancer datasets that we reviewed as part of our work. Key improvements since we last reported include:

- **The introduction of new datasets to capture information on common cancer treatments and diagnostic activity.** For example, in 2012 the Department introduced the Diagnostic Imaging Dataset following the Committee's recommendation that a dataset covering the use of MRI (magnetic resonance imaging) and CT (computed tomography) machines should be put in place to enable local clinical commissioning groups to drive improvements.

<sup>7</sup> Department of Health, *Cancer Reform Strategy*, December 2007.

<sup>8</sup> HC Committee of Public Accounts, *Delivering the Cancer Reform Strategy*, Twenty-fourth Report of Session 2010-11, HC 667, March 2011 and HC Committee of Public Accounts, *Managing high value capital equipment in the NHS in England*, Fifty-third Report of Session 2010-2012, HC 1469, October 2011.

- **Improved coverage of existing datasets.** For example, the proportion of newly diagnosed cancers with staging data in the National Cancer Registration Service improved from 33% to 62% of cases between 2007 and 2012. For the 4 most common types of cancer,<sup>9</sup> 84% of cases had staging data in 2012.<sup>10</sup> Staging data record how advanced a patient's cancer is at diagnosis. It is important in monitoring the timeliness with which cancers are being diagnosed, and can be used to improve planning and the use of resources. The Committee's recommendation that staging data should be complete in at least 70% of cases in each region by the end of 2012 was missed (by 8%). However, separate commissioner-level data shows that coverage varied substantially by clinical commissioning group area (from 24% to 83%).
- **NHS trusts and NHS foundation trusts are now required to record their cancer care activity in a standardised way.** This should enable meaningful comparisons to be made between trusts. Most cancer datasets draw on information returns that are populated by trusts via automated systems.

**2.5** The Department has continued to take part in international comparisons, which generate information on variations in cancer survival rates between countries and provide insights into why these variations occur.<sup>11</sup> The International Cancer Benchmarking Partnership, which the Department initiated in 2009, covers 6 countries with comparable wealth, universal access to healthcare and a longstanding and high-quality cancer registration service.<sup>12</sup> We present results from the available comparative data in Part Three and Appendix Three of this report.

## **Areas for further improvement**

**2.6** Despite the significant progress that has been made in recent years, important gaps in cancer data remain, particularly in the availability of robust cost data. As a result, commissioners have only limited assurance that they are buying services that offer the best outcomes for patients or that they are achieving value for money. This limits the assurance that they in turn can provide to the Department. There are also concerns about whether the health system is in a position to exploit effectively the wealth of data that are available.

<sup>9</sup> Breast, prostate, lung and colorectal cancer.

<sup>10</sup> By December 2014, the National Cancer Registration Service had processed 86% of 2013 cases. Of these cases, 70% had staging data.

<sup>11</sup> For example, EURO CARE and CONCORD.

<sup>12</sup> Australia, Canada, Denmark, Norway, Sweden and the United Kingdom.

**Figure 5**  
Key national cancer datasets

Dataset	Date introduced	Insight provided
<b>Introduced since 2010</b>		
Cancer Outcomes and Services Dataset	2013	Ensures that data on activity are recorded consistently, enabling meaningful comparisons between providers to be made.
Diagnostic Imaging Dataset	2012	Captures data about diagnostic testing activity, including MRI (magnetic resonance imaging) and CT (computed tomography) scans. Allows evaluation of the impact of NHS screening campaigns.
Systematic Anti-Cancer Therapy Dataset	2012	Captures data on the number of people treated with chemotherapy and the type of chemotherapy regime prescribed. It allows analysis of the outcomes achieved by types of chemotherapy regime and of access to chemotherapy by different demographic groups.
<b>Introduced before 2010</b>		
National Radiotherapy Dataset	2009	Captures data on radiotherapy machines and on every patient treated with radiotherapy, from the 51 trusts that provide radiotherapy services. Allows analysis of demand and capacity, national trends and variations in treatment, and local benchmarking of efficiency.
Cancer Commissioning Toolkit	2008	Brings together a wide range of high-level activity and outcomes data at national, commissioner and provider level. Allows commissioners to identify patterns of care and to benchmark performance.
National Cancer Registration Service	1962	Brings together data from more than 500 local and regional datasets to build a picture of an individual's treatment from diagnosis. Contains 11 million cancer records. Supports the planning and evaluation of treatment and could inform personalised medicine in the future.

**Note**

- 1 These datasets are managed by the National Cancer Intelligence Network, part of Public Health England, except the Diagnostic Imaging Dataset, which is managed by NHS England, and the National Radiotherapy Dataset, which has been jointly managed by NHS England, the National Cancer Intelligence Network and the National Clinical Analysis and Specialised Applications Team hosted by Clatterbridge Cancer Centre NHS Foundation Trust.

Source: National Audit Office

## Data gaps

**2.7** Data on the cost and efficiency of cancer care have not improved in line with the development of data on cancer treatments and patient outcomes. Key gaps include:

- **Linked data to benchmark spending on cancer treatments.** Many of the national cancer datasets (for example, the chemotherapy data held by Public Health England) collect data on the treatments given to patients and the prices paid for this activity. However, these data are not routinely analysed together to allow commissioners to compare performance, make informed decisions about which treatments to purchase, and press providers to improve the efficiency of cancer services.
- **Data to benchmark the efficiency of diagnostic activity.** The Diagnostic Imaging Dataset, managed by NHS England, reports information about diagnostic tests that may diagnose cancer, as well as other health conditions. However, a lack of cost or efficiency data, such as the number of machines being used by each trust, means that the NHS is unable to benchmark rates of machine use effectively.
- **Data to monitor the total cost of NHS cancer services.** The Department and NHS England do not have a robust estimate of the total cost of cancer care. This is because the main way of monitoring these costs, programme budgeting data, does not capture all elements of cancer spending. Programme budgeting data for cancer exclude the cost of: cancer-related GP consultations; most outpatient referrals for cancer diagnosis including diagnostic and pathology testing; and cancer-related accident and emergency attendances.

The limited cost data means that we cannot conclude on whether spending on cancer services has increased since we last reported. For our 2010 report, we estimated that the total cost of NHS cancer services was £6.3 billion in 2008-09. For 2012-13, we estimate that the cost was at least £6.7 billion.<sup>13</sup> However, these two figures are not comparable because of changes in the methodology for calculating programme budgeting costs and inconsistencies in the underlying data.

**2.8** There are also a lack of activity data for some elements of cancer care. For example, data on primary care (such as follow-up appointments) and social care (such as support provided to people with cancer in the community) are either incomplete or missing.<sup>14</sup> There have been no reliable data on the total number of cancer patients receiving chemotherapy treatment (see paragraph 1.13). In addition, data on the administration of oral chemotherapy treatments are incomplete. This is often because of the use of paper-based rather than electronic prescribing systems.

<sup>13</sup> These costs do not include any indirect spending (including £133 million per year of research spending) by the Department or any capital expenditure by the NHS. They also do not include spending of more than £700 million per year by cancer charities on research and services.

<sup>14</sup> Local authorities have, for the first time, been asked to submit data on reported health conditions (for example, a diagnosis of cancer) in 2014-15.

## Exploiting the available data

**2.9** Most of the organisations that we interviewed were concerned that the NHS does not have the capacity to carry out analysis to maximise the potential of the available data. A recent report commissioned by Cancer Research UK also highlighted this issue.<sup>15</sup> Staff who analyse cancer data are spread across a range of organisations, including Public Health England, NHS England, the Office for National Statistics and cancer charities. Analysts in these national bodies often draw on advice from clinicians in deciding what analysis to carry out and in interpreting the results. We heard concerns that hospital trusts are increasingly less likely to allow clinicians time to support national teams due to pressure on resources.

**2.10** A number of organisations that we interviewed also highlighted that the flow of cancer data around the health system had reduced since 2013, following concerns about patient confidentiality and the release of patient-level information by the Health and Social Care Information Centre. The reduced flow of data has made the timely linking of datasets for further analysis, and insight to improve care, more difficult.

**2.11** The role of the Health and Social Care Information Centre includes disseminating the data it collects to help drive improvements in health and social care. Most data are published in aggregated and anonymised form. Where data are not fully anonymised, organisations must apply to the Centre for the data to be released. All data releases have an accompanying data agreement to say what the information provided can be used for.

**2.12** In 2014, the Health and Social Care Information Centre tightened its data-sharing processes and introduced stricter controls over data use. These changes followed an independent review of data releases by its predecessor body, the NHS Information Centre, which found significant administrative lapses in recording the release of data.<sup>16</sup> At the time of our work, the Centre was also consulting on a new code of practice for protecting confidential information.

**2.13** Organisations that we spoke to told us that, in 2013-14, they had experienced longer than usual waits to gain access to data and linked datasets from the Health and Social Care Information Centre. The Centre approved 294 data requests in 2013-14, compared with 646 in 2012-13.<sup>17</sup> It told us that it had now simplified the process for applying to access data and was clearing a substantial backlog of applications. At the end of November 2014, the Centre was dealing with just over 300 data requests, down from more than 800 in June 2014. The Centre is taking longer than expected to clear the backlog of data requests, but aims to have done so by the end of January 2015.

<sup>15</sup> University of Birmingham and ICF GHK Consulting (commissioned by Cancer Research UK), *Measuring up? The health of NHS cancer services*, September 2014.

<sup>16</sup> PricewaterhouseCoopers, *Data Release Review*, Health and Social Care Information Centre, June 2014.

<sup>17</sup> There were also 332 releases of data that were approved by the NHS Information Centre prior to April 2013 but released by the Health and Social Care Information Centre in 2013-14.

## Part Three

### Services and outcomes

**3.1** This part of the report examines progress in improving cancer services and patient outcomes. It also considers how access to services and patient outcomes in England compare with those in other countries.

**3.2** Appendix Three provides supporting data for this part. It summarises performance against a range of indicators in 4 areas: incidence and outcomes; referrals and diagnosis; access to treatment; and service management. For each indicator, we highlight trends over time, variations by geographic area and demographic group, and international comparisons where data are available.

#### Performance of cancer services

**3.3** Since we last reported, the performance of cancer services has improved across a range of indicators. For example:

- Estimated survival rates have improved. The percentage of people surviving for 1 year after diagnosis increased to 69% for those diagnosed in 2012, up from 65% in 2007; and the percentage of people surviving for 5 years after diagnosis increased to 49% for those diagnosed in 2008, up from 45% in 2003.<sup>18</sup> However, this means that nearly one-third of people still die within a year of diagnosis.
- The overall mortality rate from cancer has fallen from 295 deaths per 100,000 people in 2009 to 290 deaths per 100,000 people in 2012.<sup>19</sup>
- Most cancer awareness campaigns have resulted in a statistically significant increase in awareness of cancer signs and symptoms, and almost half have resulted in a statistically significant increase in GP attendances to discuss potential symptoms.<sup>20</sup>

<sup>18</sup> This comparison is based on the most recent survival data available at the time of this report and our 2010 report. Office for National Statistics, *Index of cancer survival for Clinical Commissioning Groups in England*, December 2014. Because of the time lag in data becoming available, the Office for National Statistics also publishes estimates of expected 5-year survival rates, most recently for patients diagnosed between 2008 and 2012. These figures are projections, and assume that current patterns in survival trends will continue. These estimates do not cover all types of cancer.

<sup>19</sup> This mortality rate is age-standardised, meaning that the differences over time do not simply reflect variations in the age profile of the population. This is important because cancer is a disease that predominantly affects older patients.

<sup>20</sup> Cancer Research UK, *Be clear on cancer evaluation update*, May 2014.



- Urgent GP referrals for suspected cancer increased by 51% between 2009-10 and 2013-14 from 0.90 million referrals a year to 1.36 million referrals a year.
- The percentage of cancer patients rating their overall level of care as excellent or very good has remained high (89% in 2014).

**3.4** Despite these overall improvements in national performance, there remains considerable scope for further progress. In particular, about 1-in-5 people are still diagnosed via an emergency presentation, either in an A&E department or following an emergency admission to hospital, rather than via a routine screening or GP referral to hospital. Those diagnosed via emergency presentation are, on average, around twice as likely to die within a year of diagnosis as those diagnosed via an urgent GP referral, because their cancers are generally more advanced. More research is needed to understand better how many emergency presentations are avoidable and how they can be avoided.

**3.5** The NHS maintained performance in respect of cancer waiting times until 2014, despite the 51% increase in referral activity between 2009-10 and 2013-14. However, there are signs that hospital trusts are now finding it difficult to cope with this rising demand in relation to one of the waiting time standards:

- For the first three quarters of 2014, the NHS did not achieve the standard that 85% of patients should be treated within 62 days of being urgently referred by their GP. January to March 2014 was the first time that the standard had not been met since it was introduced in 2009-10. A total of some 5,500 patients waited more than 62 days for treatment between July and September 2014.
- Between July and September 2013 and July and September 2014, the number of trusts breaching this waiting time standard doubled from 32 to 64 (44% of all trusts that provided cancer treatment to more than 40 patients per quarter) (**Figure 6** overleaf).

## Variations in performance

**3.6** The Department of Health's (the Department) 2011 cancer strategy recognised that there were a range of inequalities in the outcomes and experience of cancer patients, including in: awareness; incidence; access to treatment and care; patient experience; survival; and mortality.<sup>21</sup> The strategy noted that tackling these inequalities would be essential to improving cancer outcomes.

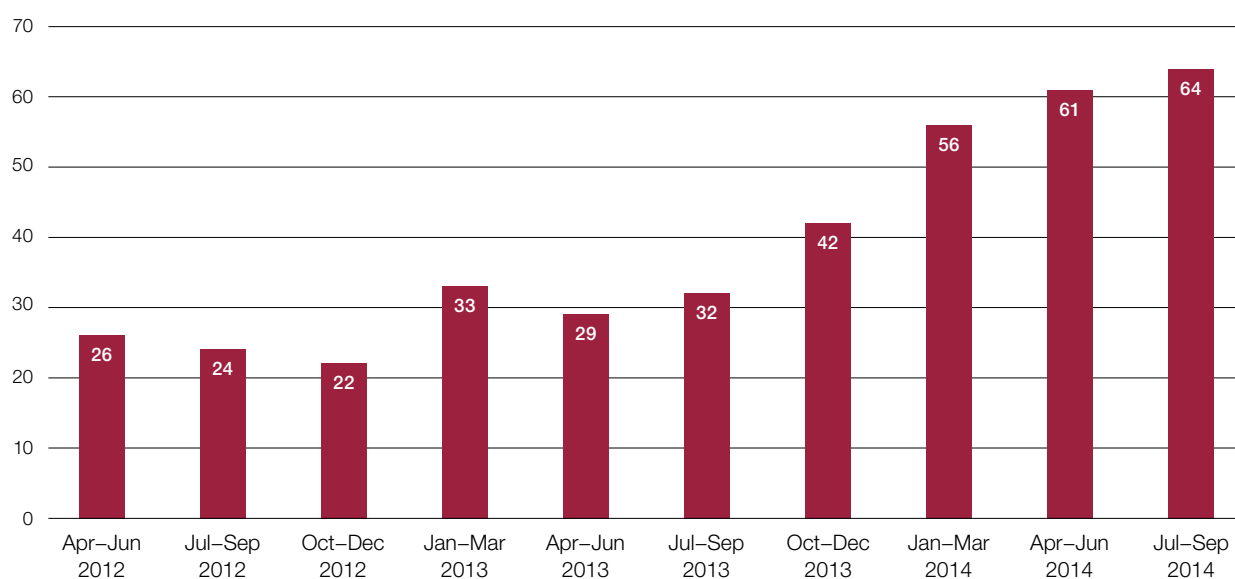
<sup>21</sup> Department of Health, *Improving Outcomes: A Strategy for Cancer*, January 2011.

**Figure 6**

Number of NHS trusts and NHS foundation trusts breaching the 62-day cancer waiting time standard, 2012 to 2014

The number of trusts breaching the standard that 85% of patients should be treated within 62 days of being referred by their GP has increased

Number of NHS trusts and NHS foundation trusts

**Note**

1 Only trusts treating 40 or more cancer patients per quarter are included in this analysis.

Source: National Audit Office analysis of NHS England data

**3.7** However, despite the overall improvements in cancer care and outcomes, significant variations persist and many of the inequalities have not reduced. In general:

- Outcomes and access to services are worse for older people. For example, patients aged 60 or over are much less likely to receive chemotherapy treatment. And, the gap in the likelihood of surviving for at least 1 year after diagnosis between patients aged 55–64 and patients aged 75–99 remained broadly constant at 20% between 1997 and 2012.<sup>22</sup> Some of the variation in access may be explained by reasons such as patient choice, and some variation in survival between age groups is to be expected because, for example, older people are frailer and less likely to cope with the treatment. However, these factors are unlikely to explain fully the significant variation between age groups and more research is needed to understand the extent to which these differences can be reduced.

- Outcomes are poorer for more deprived socio-economic groups. For example, the gap in the likelihood of getting cancer between the most deprived groups and the least deprived groups widened by around 10% between 1996 and 2010. And, if mortality rates for all socio-economic groups had been the same as for the least deprived, there would have been around 19,200 fewer deaths from cancer each year between 2007 and 2011.<sup>23</sup>
- In addition, there are geographic variations that cannot be explained by variations in incidence. For example, in 2013-14, for every newly diagnosed cancer patient, the average number of urgent referrals by GPs varied across clinical commissioning groups between 3.9 and 6.2 (after excluding the lowest and highest 10% of groups).

**3.8** Better evidence is now available on variations in services and outcomes, through the Cancer Commissioning Toolkit, developed by the National Cancer Intelligence Network. In addition, other research has offered insights into some of these variations.<sup>24</sup> However, limited work has been carried out to investigate the relationship between variations in activity levels (for example, GP referrals and access to treatments) and variations in outcomes (for example, 1-year survival rates) across clinical commissioning groups. Better understanding of the relationship between the variations in these factors should help commissioners to improve efficiency and outcomes.

## International comparisons

**3.9** Although more than 1-in-3 people in England will now develop cancer in their lifetime, people in England are less likely to develop cancer compared with most other high-income countries. The Department's 2011 cancer strategy recognised, however, that there is a gap between cancer outcomes in England and those of the best performing European countries. The strategy set an aim of saving an extra 5,000 lives a year by 2014-15, based on work that estimated the gap in survival between England and the best performing countries in Europe to be equivalent to 10,000 deaths per year. It is too early to assess progress in closing the gap to the best performing countries in Europe because the most recent international comparisons only cover patients diagnosed up to the end of 2007.

**3.10** Although it is unable to assess improvement in England relative to other European countries, the Department has analysed the performance of the NHS and projected future trends to indicate progress. It estimates that on average between 6,500 and 17,500 more patients per year, diagnosed between 2011 and 2015, will survive for 5 years than patients diagnosed between 2006 and 2010. However, the Department recognises that these figures need to be treated with caution because they are projections and rely on multiple assumptions.<sup>25</sup>

<sup>23</sup> National Cancer Intelligence Network, *Cancer by Deprivation in England: Incidence, 1996–2010; Mortality, 1997–2011*, May 2014.

<sup>24</sup> For example, L Elliss Brookes et al., 'Routes to diagnosis for cancer – determining the patient journey using multiple routine datasets', *British Journal of Cancer*, Vol. 107, September 2012, pp. 1220–26.

<sup>25</sup> Department of Health, Public Health England, NHS England, *Improving Outcomes: A Strategy for Cancer – Fourth Annual Report*, December 2014.

**3.11** Despite the improvements in survival rates, the outcomes for adult cancer patients in England generally have been worse than in other high-income countries covered by international benchmarking exercises. For example, cancer patients in England, diagnosed between 1990 and 2007 (the latest available data), were consistently less likely to survive for 5 years compared with patients in Sweden, Germany, Norway or Italy. The gap in survival rates between England and the European average over that period remained at about 10%, and for those aged 75 and over the gap remained higher than 10%.<sup>26</sup>

**3.12** In contrast, outcomes for children with cancer in the United Kingdom and Ireland are close to the European average. The likelihood of children with cancer diagnosed between 1999 and 2007 in the UK and Ireland surviving for 5 years has remained close to the European average. In addition, for lymphoid leukaemia, the most common childhood cancer, the likelihood of children in the United Kingdom and Ireland surviving for 5 years after diagnosis increased from 82% between 1999 and 2001 to 89% between 2005 and 2007, moving above the European average.<sup>27</sup>

**3.13** International benchmarking studies are starting to provide insights into the reasons for the differences in outcomes between countries. Later diagnosis has previously been identified as a particular cause of poorer survival rates in England.<sup>28</sup> However, more recent work has found that, even when cancer patients in England were diagnosed at similar stages to patients in other countries, they still had worse survival rates. This suggests that access to treatment or poorer quality of care in England may also contribute to the gap in outcomes.<sup>29</sup>

26 EURO CARE: survival of cancer patients in Europe.

27 G Gatta et al., 'Childhood cancer survival in Europe 1999–2007: results of EURO CARE-5 – a population-based study', *Clinical Oncology*, Vol. 15, Issue 1, January 2013, pp. 35–47.

28 For example, Department of Health, *Cancer Reform Strategy*, December 2007.

29 International Cancer Benchmarking Partnership, *International benchmarking study module 1: Does diagnosing cancer earlier help explain why people are more likely to survive cancer in some countries?*, 2013.

# Appendix One

## Summary of the Department of Health's view of progress against Committee of Public Accounts' recommendations

Summary of Committee of Public Accounts' recommendations on cancer services	Department's view of progress – July 2014
1 In the transition to a new NHS structure, the Department must maintain the momentum it has recently established in improving information on cancer-related activities.	● Work in progress
2 The Department should report back by 2011 on the progress to improve earlier diagnosis and investigate the differences in GP practices' referral rates.	● Implemented
3 The Department should work with commissioners to understand the reasons for variations and their impact on patient outcomes. It should identify and implement clear and practical actions that can be taken to spread good practice quickly so that the worst performing areas can be brought up to the standards of the best.	● Implemented
4 The Department should develop a cancer information strategy which includes common standards for the quality and timeliness of data on cost, activity and outcomes.	● Implemented
5 The Department should ensure that staging data are complete and timely in at least 70% of cases in each region by the end of 2012.	● Work in progress
6 Cancer registries should be required to provide data to the Office for National Statistics within 6 months of the end of the relevant calendar year to enable the Department to speed up the provision of comprehensive national and regional outcomes data to commissioners.	● Implemented
7 The Department should work with NHS England to set out clear standards requiring commissioners to demonstrate how they are obtaining value for money. The Department should say how it will measure improvements and what incentives and penalties will be used to ensure that value for money is at the heart of commissioning decisions.	● Implemented
8 The Department should require activity data on outpatients and other forms of follow-up care to be properly coded. The Department should also identify and disseminate examples of good practice on follow-up care.	● Work in progress
9 NHS England should ensure a dataset covering the use of MRI (magnetic resonance imaging) and CT (computed tomography) machines is in place in 2012-13 to enable local clinical commissioning groups to drive improvements.	● Implemented

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**Summary of Committee of Public Accounts' recommendations on cancer services** *continued*

**Department's view of progress – July 2014**

- 10** The Department and NHS England should evaluate and ensure capacity matches needs while securing more efficient use of the machines to achieve savings where possible.

● Implemented

**Note**

- 1 Recommendations 1 to 8 are from House of Commons Committee of Public Accounts, *Delivering the Cancer Reform Strategy*, Twenty-fourth Report of Session 2010-11, HC 667, March 2011. Recommendations 9 and 10 are from House of Commons Committee of Public Accounts, *Managing high value capital equipment in the NHS in England*, Fifty-third Report of Session 2010-12, HC 1469, October 2011.

Source: National Audit Office analysis of Treasury Minute responses, 2012 to 2014

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# Appendix Two

## Our evidence base

**1** We reached our independent conclusion on progress in improving cancer services and outcomes after analysing evidence collected between July and October 2014.

**2** We undertook this review in response to a request from the Committee of Public Accounts for an update on progress since we last reported on cancer services in 2010. We covered the progress made in implementing the Committee's 2011 recommendations, and progress against key measures of cancer services and outcomes. Our work focused on: roles and responsibilities in the reformed health system; information and evidence; and services and outcomes. It did not cover services aimed at helping to prevent cancer or end-of-life care for those affected by the disease. The work was not designed to support a value for money conclusion.

**3 We reviewed key documents.** These included strategy documents, performance monitoring frameworks, performance reports, and data standards published by the Department of Health (the Department), NHS England, Public Health England, the Health and Social Care Information Centre and the Office for National Statistics. We reviewed the findings from international comparisons work on cancer care and outcomes, including the International Cancer Benchmarking Partnership, EURO CARE and the CONCORD programme. We also reviewed reports from Cancer Research UK and Macmillan Cancer Support.

**4 We interviewed staff from a range of organisations.** The interviews were designed to help us understand:

- responsibilities and accountabilities for improving cancer services and outcomes, including for collecting and analysing data;
- progress in developing information and evidence to support the improvement of cancer services and outcomes; and
- progress in improving cancer services and outcomes.

**5** The organisations included: the Department; NHS England; Public Health England; the Health and Social Care Information Centre; the National Institute for Health and Care Excellence; local NHS commissioners; Cancer Research UK; Macmillan Cancer Support; Breast Cancer Campaign; the King's Fund; and academics working for the CONCORD programme at the London School of Hygiene and Tropical Medicine.

**6** We also interviewed staff involved in developing and maintaining key datasets aimed at supporting improvements in cancer services and outcomes. We explored how these datasets are being used and their limitations.

**7 We reviewed key cancer data systems.** This exercise was designed to assess the status of a number of national cancer datasets. Our review covered: quality assurance arrangements; data coverage; consistency; and insights offered. We reviewed the following: the Cancer Commissioning Toolkit; the Cancer Outcomes and Services Dataset; the Diagnostic Imaging Dataset; the National Cancer Registration Service; the National Radiotherapy Dataset; and the Systematic Anti-Cancer Therapy Dataset.

**8** We did not review a number of other cancer datasets, such as the national clinical audits that monitor standards of care and outcomes for lung, colorectal, and head and neck cancer patients, because these datasets were not covered by the recommendations made by the Committee of Public Accounts in 2011.

**9 We analysed existing data.** The analysis was designed to establish the progress made by the NHS in improving cancer services and outcomes. In Appendix Three of this report, we have summarised performance across a range of health indicators, grouped by: incidence and outcomes; referral and diagnosis; access to treatment; and service management. We drew on analysis already undertaken, and data already collected, by the Department, NHS England, Public Health England and other parties such as the Office for National Statistics and the Health and Social Care Information Centre. For each indicator, where data were available, we highlighted trends, variation by geographic area, variation by demographic group and international comparisons.



# Appendix Three

## Performance against a range of indicators

### Introduction

This appendix summarises the performance of the NHS in England against a range of indicators in 4 areas:

- a Incidence and outcomes:
  - incidence 32
  - survival 37
  - mortality 42
  - patient experience 47
- b Referrals and diagnosis:
  - staging data 51
  - referrals via GP 56
  - emergency presentation 60
  - diagnostic imaging testing 62
- c Access to treatment:
  - waiting times 67
  - surgery 71
  - radiotherapy 73
  - chemotherapy 79
- d Service management by hospitals:
  - admissions to hospitals 83

For each indicator, we highlight trends over time, variations by geographic area and demographic group, and international comparisons where data are available. The data presented are the most recent available. All data are for England unless otherwise stated.

## A Incidence and outcomes

### Incidence

#### Why it is important

Planning and managing cancer services effectively starts with an understanding of the burden of the disease among the population and the likelihood of people being diagnosed with cancer. Cancer incidence is a measure of the risk of developing cancer within a specific period of time.

#### Trends

The number of people diagnosed with cancer each year is increasing by 2% a year on average. However, the number of people diagnosed with cancer each year standardised for the age of the population has remained roughly the same over recent years. This indicates that the increase in the number of people being diagnosed with cancer each year is driven by the ageing population and population growth (**Figure 7**). More than 3-in-5 new cancers are diagnosed in people aged 65 or over.

The likelihood of getting cancer in England has started to level off for men, but men were about 26% more likely to get cancer than women in 2012.<sup>30</sup>

#### Variation by area

There are wide geographic variations in the likelihood of getting cancer, even after accounting for age. From 2010 to 2012, the average number of people diagnosed with cancer each year ranged from just under 500 to more than 700 per 100,000 people across the 211 clinical commissioning groups (**Figure 8** on page 34).

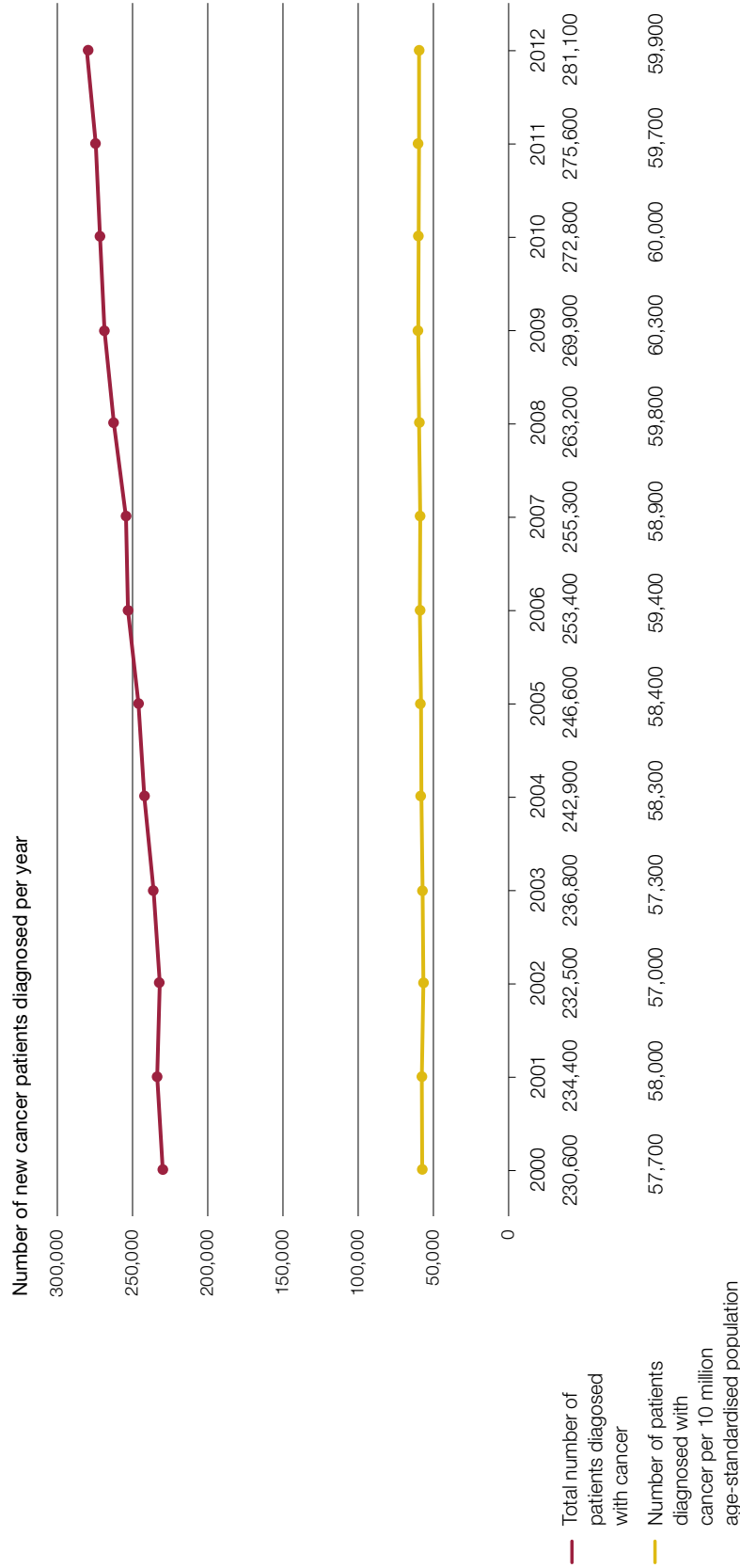
#### Variation by demographic group

There is a persistent gap in the likelihood of getting cancer between the most and least deprived groups. Between the periods 1996–2000 and 2006–2010, this gap widened by around 10% (**Figure 9** on page 35).

#### International comparison

People living in the United Kingdom are less likely to get cancer than in comparator countries. The United Kingdom has one of the lowest age-standardised cancer incidence rates (273 per 100,000 people) compared with other selected high-income countries (**Figure 10** on page 36)

**Figure 7**  
Cancer incidence and age-standardised cancer incidence, 2000 to 2012



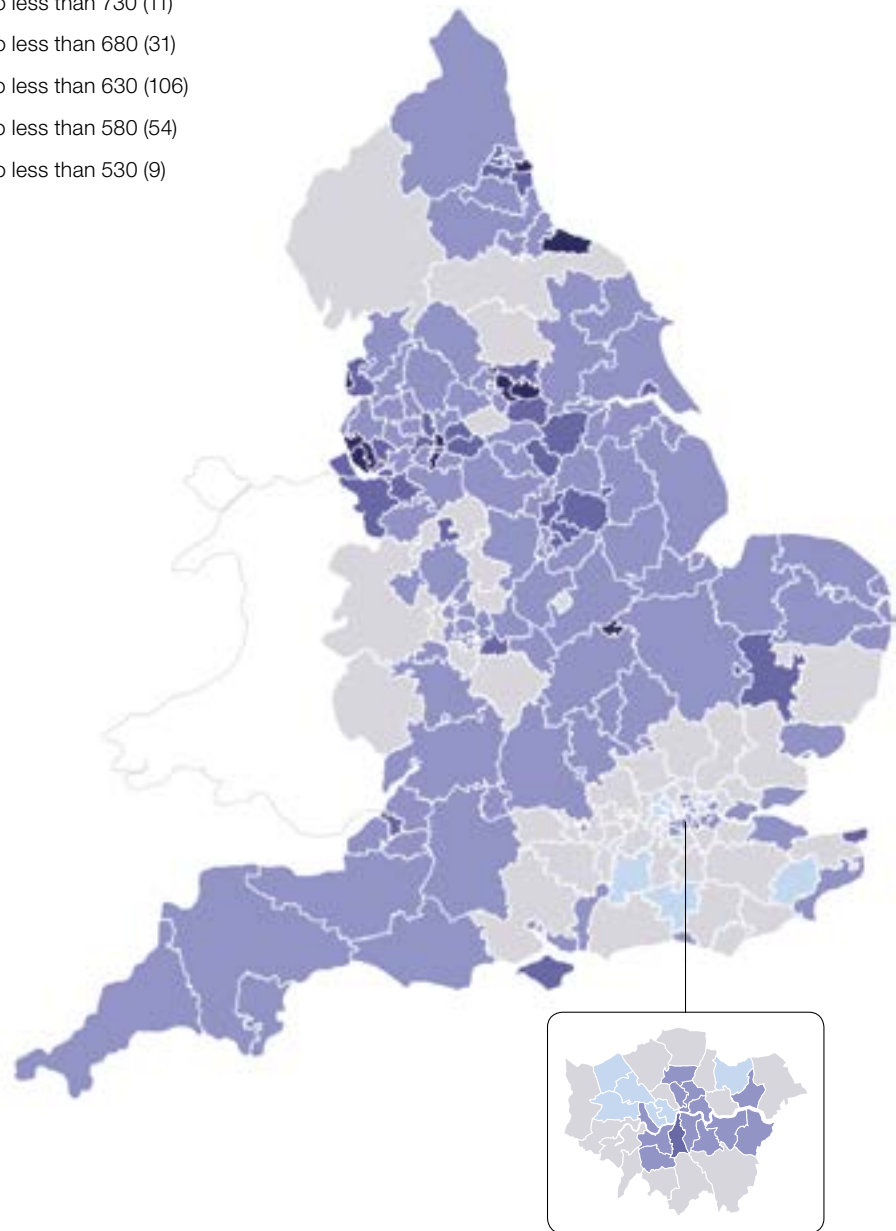
**Notes**

- 1 Age-standardised incidence is the number of cancer patients newly diagnosed within a calendar year based on a fixed population. Age-standardisation allows populations to be compared when the age profiles of the populations are different. It means that differences in rates over time or between geographical areas will not simply reflect variations in the age profile of the populations. This is important when comparing cancer rates or hospital activities, because cancer is a disease that predominantly affects older patients who are more likely to use health services.
- 2 Incidence, survival and mortality rates in this appendix are age-standardised to the 2013 European standard population, unless otherwise stated.

**Figure 8**

Cancer incidence rate per 100,000 people (age-standardised) by clinical commissioning group, 3-year average (2010 to 2012)

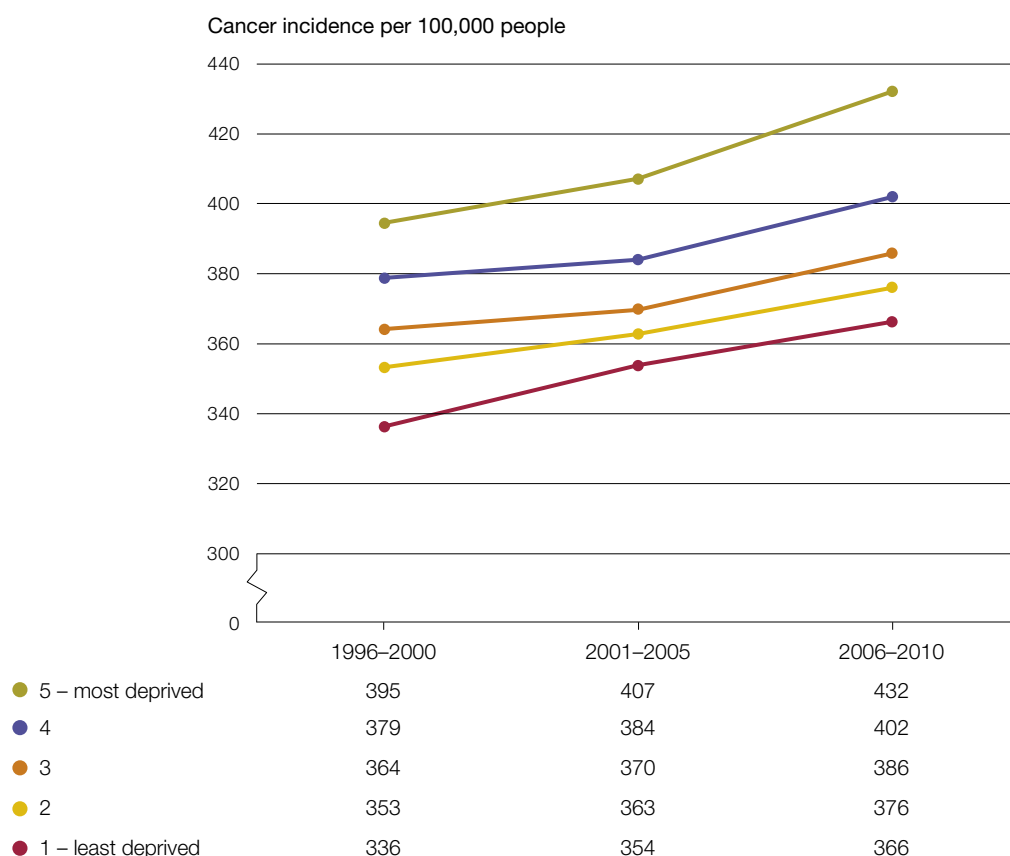
- 680 to less than 730 (11)
- 630 to less than 680 (31)
- 580 to less than 630 (106)
- 530 to less than 580 (54)
- 480 to less than 530 (9)



Source: National Audit Office analysis of data from the Cancer Commissioning Toolkit, produced by Public Health England

**Figure 9**

Cancer incidence rate per 100,000 people (age-standardised) by socio-economic deprivation level, 1996–2000 to 2006–2010



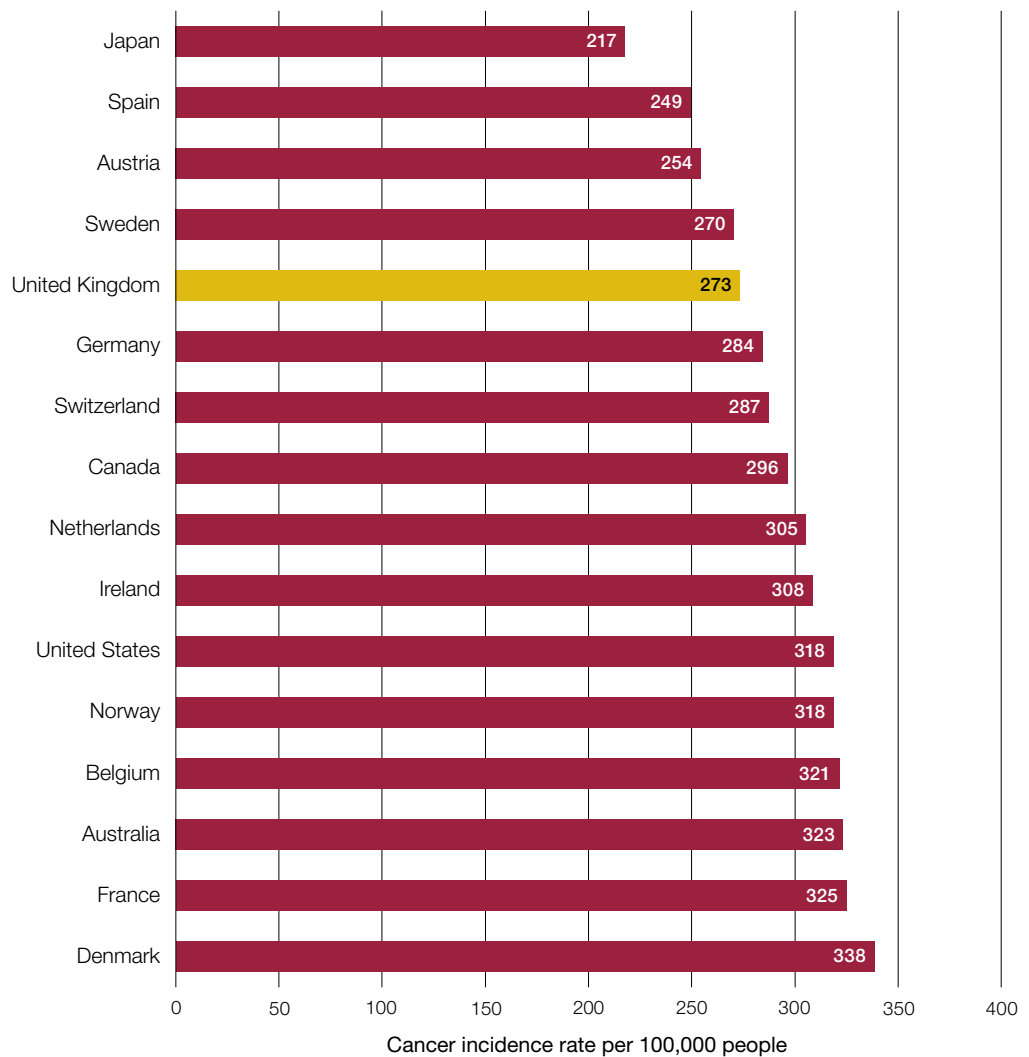
**Notes**

- 1 Includes all cancers except non-melanoma skin cancer.
- 2 Rates are age-standardised to the 1976 European standard population.

Source: National Cancer Intelligence Network, *Cancer by Deprivation in England – data workbook*, June 2014

**Figure 10**

Cancer incidence rate per 100,000 people (age-standardised) for selected high-income countries, 2012



**Note**

1 Rates are age-standardised to the World Health Organization's world standard population. They cannot be compared with analysis standardised to other populations.

Source: GLOBOCAN 2012: Estimated cancer incidence, mortality and prevalence worldwide in 2012

## Survival

### Why it is important

A key outcome for cancer patients and services is the percentage of people who survive the disease for a specified amount of time after being diagnosed (the survival rate). The Department's 2011 cancer strategy set a specific aim to improve cancer survival rates and match those in the best performing countries in Europe.

### Trends

1-year and 5-year survival rates continue to improve year-on-year.<sup>31</sup>

- The percentage of people diagnosed with cancer in England surviving for at least 1 year increased from 59.7% of patients diagnosed in 1997 to 69.3% of patients diagnosed in 2012 (**Figure 11** overleaf).
- The percentage of people diagnosed with cancer in England surviving for at least 5 years increased from 41.9% of patients diagnosed in 1997 to 49.0% of patients diagnosed in 2008 (Figure 11).

### Variation by area

In 2012, the percentage of people diagnosed with cancer in England who survived for at least 1 year varied across the 211 clinical commissioning groups from 63.7% to 73.5% (**Figure 12** on page 39). This geographic variation has persisted over time.

### Variation by demographic group

The likelihood of surviving cancer for at least 1 year has improved for all age groups. However, the 1-year survival rate for older people with cancer is lower than for other age groups. Between 1997 and 2012, the gap in outcomes between patients aged 55 to 64 and patients aged 75 to 99 remained broadly constant at 20 percentage points (**Figure 13** on page 40).

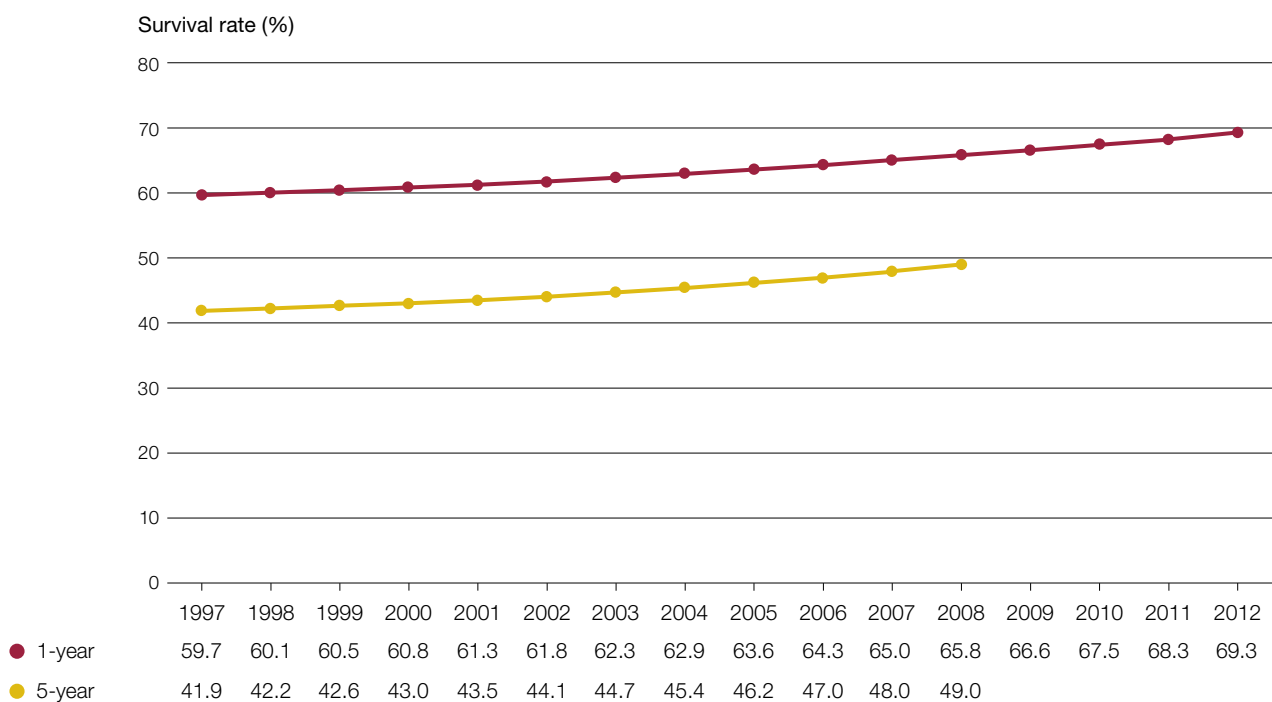
### International comparisons

The outcomes for adult cancer patients (aged 15 to 99) in England have generally been worse than in other high-income countries in Europe (**Figure 14** on page 41). For example, the 5-year survival rate for patients diagnosed in England between 2000 and 2007 was 49% compared with 64% in Sweden. The gap in 5-year survival rates between England and the European average has remained at about 10% since 1994.

<sup>31</sup> Cancer survival rates are estimates, after adjustment for deaths not caused by cancer.

More recent data, for selected groups of cancer patients, diagnosed between 2005 and 2009, indicate that the 5-year survival rates were still lower in England than in other high-income European countries. For example, for 10 common adult cancers, the 5-year survival rates for patients aged 15 to 99 in Sweden were higher than those in England by between 1.8 and 12.2 percentage points.<sup>32</sup>

**Figure 11**  
1-year and 5-year survival rates for all cancers for all people aged 15 to 99 by year of diagnosis, 1997 to 2012



**Notes**

- 1 Survival rates for people with cancer have been adjusted for deaths not caused by cancer.
- 2 Rates are standardised against the population of England and Wales, 1996 to 1999.

Source: Office for National Statistics, *Index of cancer survival for Clinical Commissioning Groups in England*, December 2014

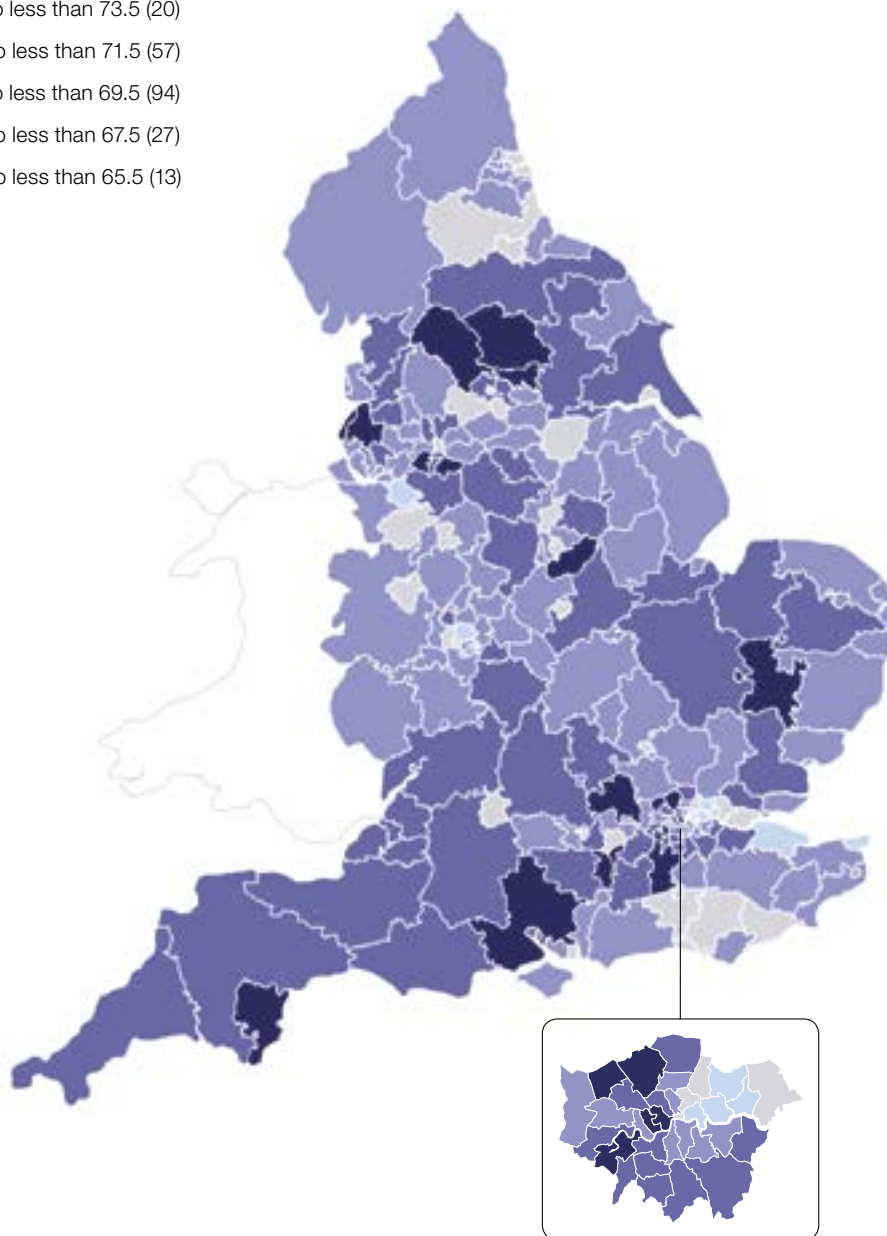
<sup>32</sup> C Allemani et al., *Global surveillance of cancer survival 1995–2009: analysis of individual data for 25,676,887 patients from 279 population-based registries in 67 countries (CONCORD-2)*, November 2014.



**Figure 12**

1-year survival rate for all cancers diagnosed in 2012 for all people aged 15 to 99 by clinical commissioning group

- 71.5 to less than 73.5 (20)
- 69.5 to less than 71.5 (57)
- 67.5 to less than 69.5 (94)
- 65.5 to less than 67.5 (27)
- 63.5 to less than 65.5 (13)



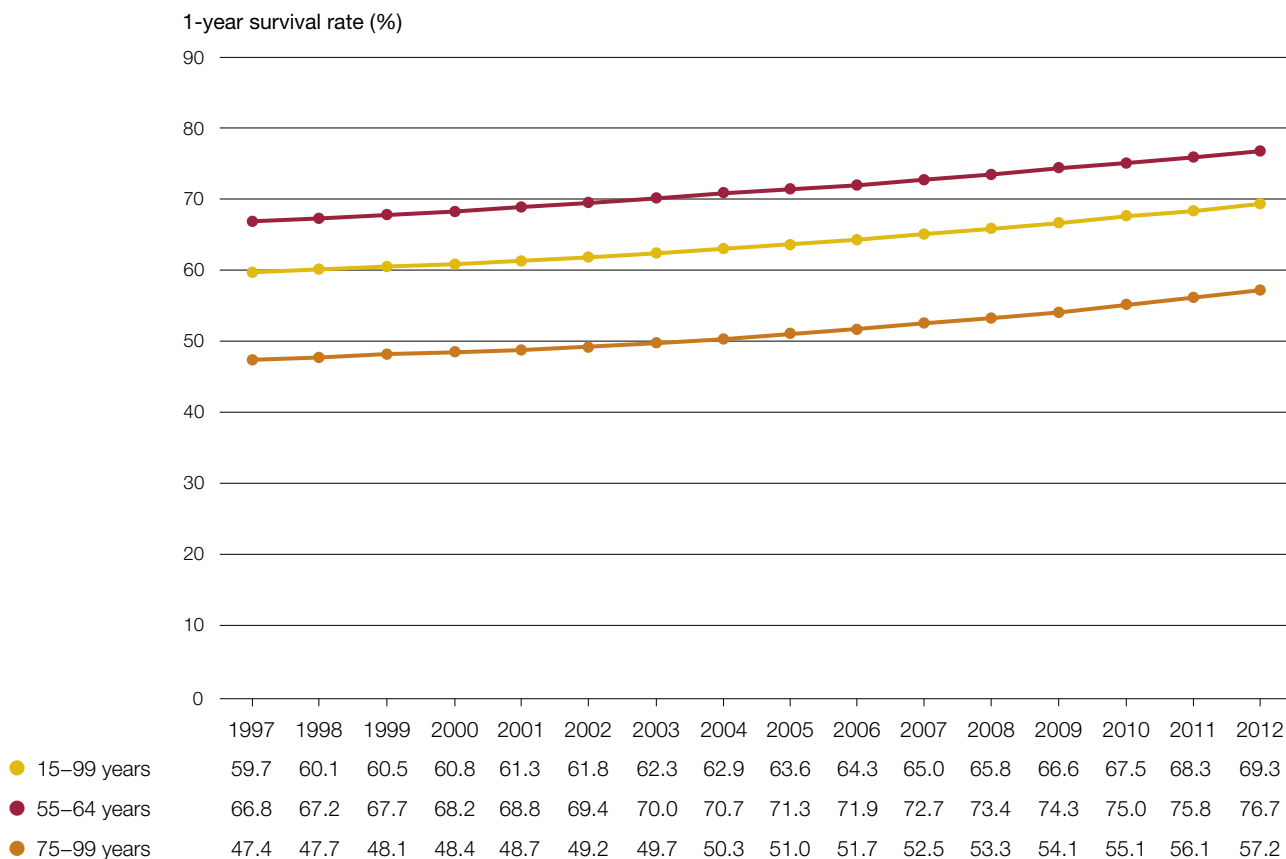
**Notes**

- 1 Survival rates for people with cancer have been adjusted for deaths not caused by cancer.
- 2 Rates are standardised against the population of England and Wales, 1996 to 1999.

Source: Office for National Statistics, *Index of cancer survival for Clinical Commissioning Groups in England*, December 2014

**Figure 13**

1-year survival rate for all cancers by year of diagnosis, by age group, 1997 to 2012



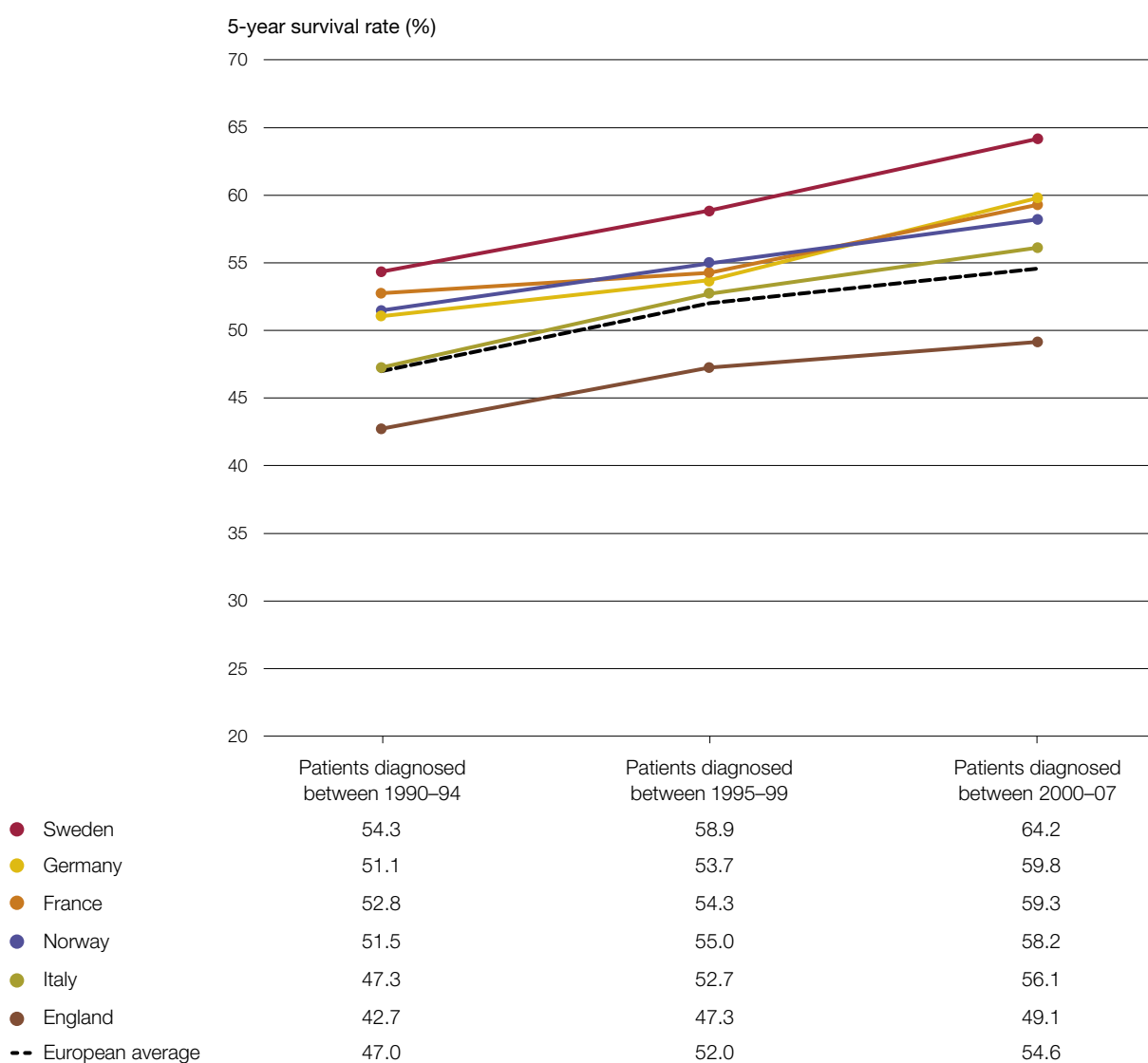
**Notes**

- 1 Survival rates for people with cancer have been adjusted for deaths not caused by cancer.
- 2 Rates are standardised against the population of England and Wales, 1996 to 1999.
- 3 Age groups used are those reported by the Office for National Statistics.

Source: Office for National Statistics, *Index of cancer survival for Clinical Commissioning Groups in England*, December 2014

**Figure 14**

5-year survival rates for all cancers for all people aged 15 to 99 (age-standardised), for selected European countries, by period of diagnosis, 1990–1994 to 2000–2007



**Notes**

- 1 Data for those diagnosed between 2000–2007 were published in 2013.
- 2 This figure uses relative survival, which compares the observed survival with what would be expected for people without cancer. This helps to correct for deaths caused by something other than cancer.
- 3 Rates are age-standardised to the International Cancer Survival Standard population.

Source: Eurocare survival data

## Mortality

### Why it is important

Another key outcome measure is the proportion of people dying from cancer. Cancer mortality is defined as the number of deaths from cancer in a given area or period, expressed as a proportion. The Department's 2011 cancer strategy included a specific aim to reduce cancer mortality rates and match those in the best performing countries. The strategy set an ambition to save an additional 5,000 lives a year by 2014-15.

### Trends

**All ages:** The cancer mortality rate in England (age-standardised to a European standard population) decreased by 4% between 2008 and 2012, from 301 to 290 deaths per 100,000 people (**Figure 15**).

**Under 75s:** The Department's NHS mandate for 2014-15 set an objective to reduce mortality from cancer in those aged under 75. The cancer mortality rate in England (age-standardised) for this group decreased by 6% between 2008 and 2012, from 154 to 145 deaths per 100,000 people (**Figure 15**).

### Variation by area

Between 2010 and 2012, the cancer mortality rate (age-standardised) varied by 73% across the 211 clinical commissioning groups from 226 to 390 deaths per 100,000 people (**Figure 16** on page 44).

### Variation by demographic group

Although cancer mortality rates have decreased in both more and less deprived areas, persistent inequalities in cancer mortality remain. Between 2007 and 2011, the cancer mortality rate for the most deprived socio-economic group was more than one and a half times the rate in the least deprived group (**Figure 17** on page 45).

If all socio-economic groups had the same mortality rates as the least deprived, around 19,200 deaths from cancer could be prevented each year in England (based on figures from 2007–2011).

### International comparisons

Although mortality rates in England have fallen in recent years (**Figure 15**), rates in other high-income countries have fallen to a similar extent.<sup>33</sup>

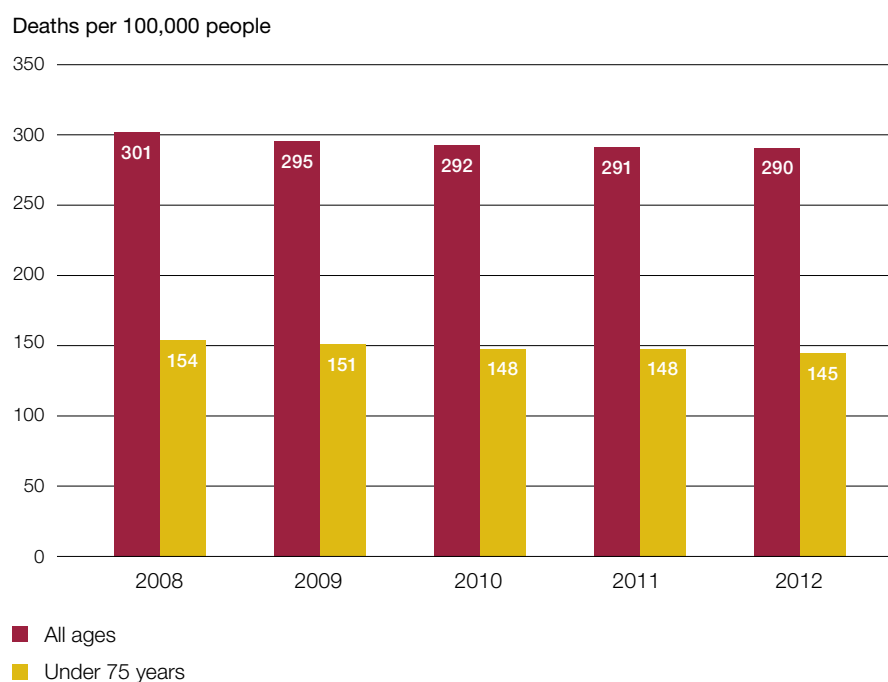
<sup>33</sup> National Audit Office analysis of mortality data published in *Health at a Glance 2013: OECD indicators*, November 2013. Rates are for the United Kingdom.

In 2012, the United Kingdom had the fourth highest age-standardised mortality rate (standardised to a World Health Organization population) with 110 deaths per 100,000 people against selected comparator countries around the world (**Figure 18** on page 46). Denmark had the highest age-standardised mortality rate with 125 deaths per 100,000 people and Sweden had the lowest with 92 deaths per 100,000 people.

The relatively high mortality rate from cancer in the United Kingdom is mainly due to a higher than average mortality rate for those aged 70 and over. For those aged under 70, the United Kingdom's mortality rate is close to average when compared with 15 other high-income countries.

### Figure 15

Cancer mortality rate per 100,000 people for all cancers for all ages and for those aged under 75 (age-standardised), 2008 to 2012



#### Note

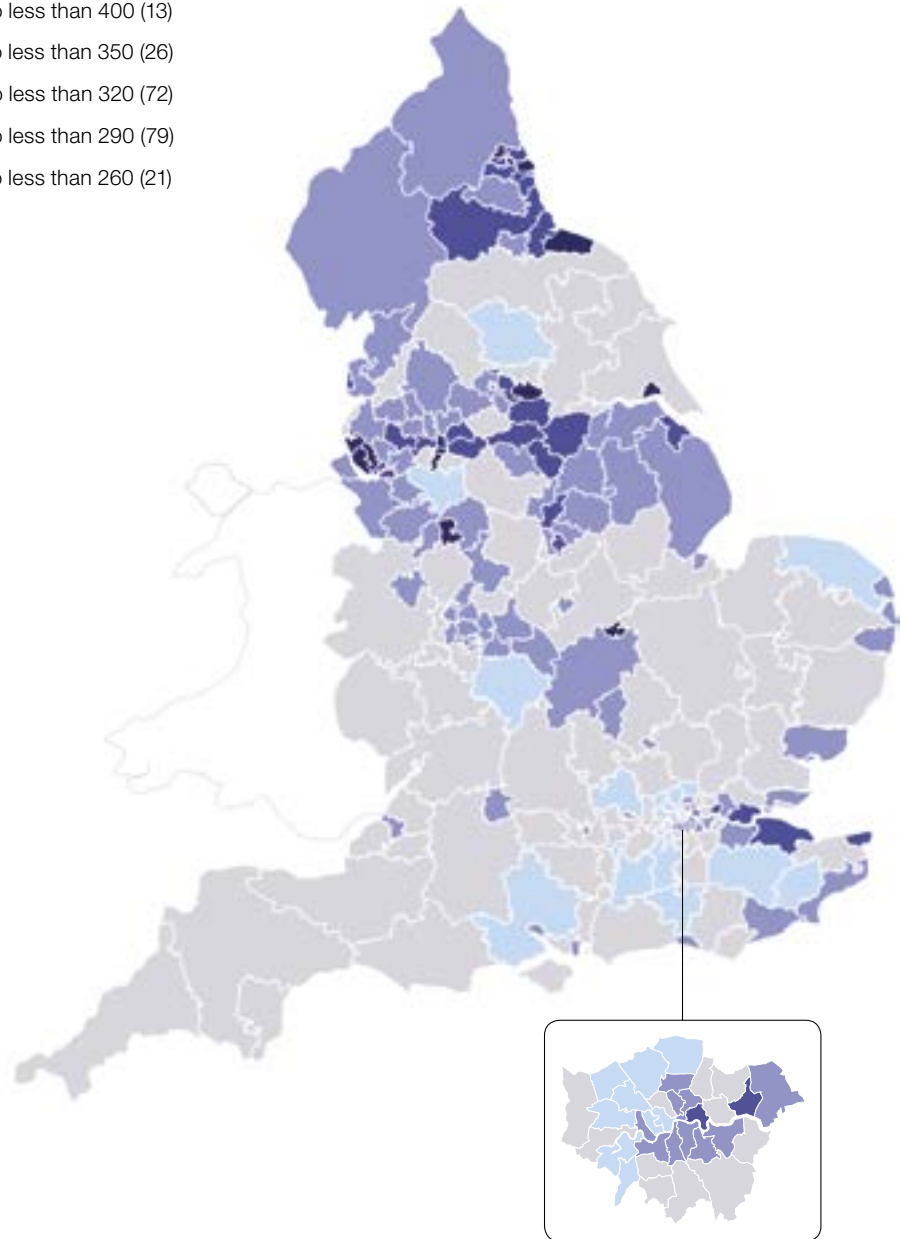
1 Rates are age-standardised to the 2013 European standard population. They cannot be compared with analysis standardised to the 1976 European standard population.

Source: Cancer Commissioning Toolkit, produced by Public Health England

**Figure 16**

Cancer mortality rate per 100,000 people (age-standardised) for all cancers and for all ages, by clinical commissioning group, 3-year average (2010 to 2012)

- 350 to less than 400 (13)
- 320 to less than 350 (26)
- 290 to less than 320 (72)
- 260 to less than 290 (79)
- 220 to less than 260 (21)



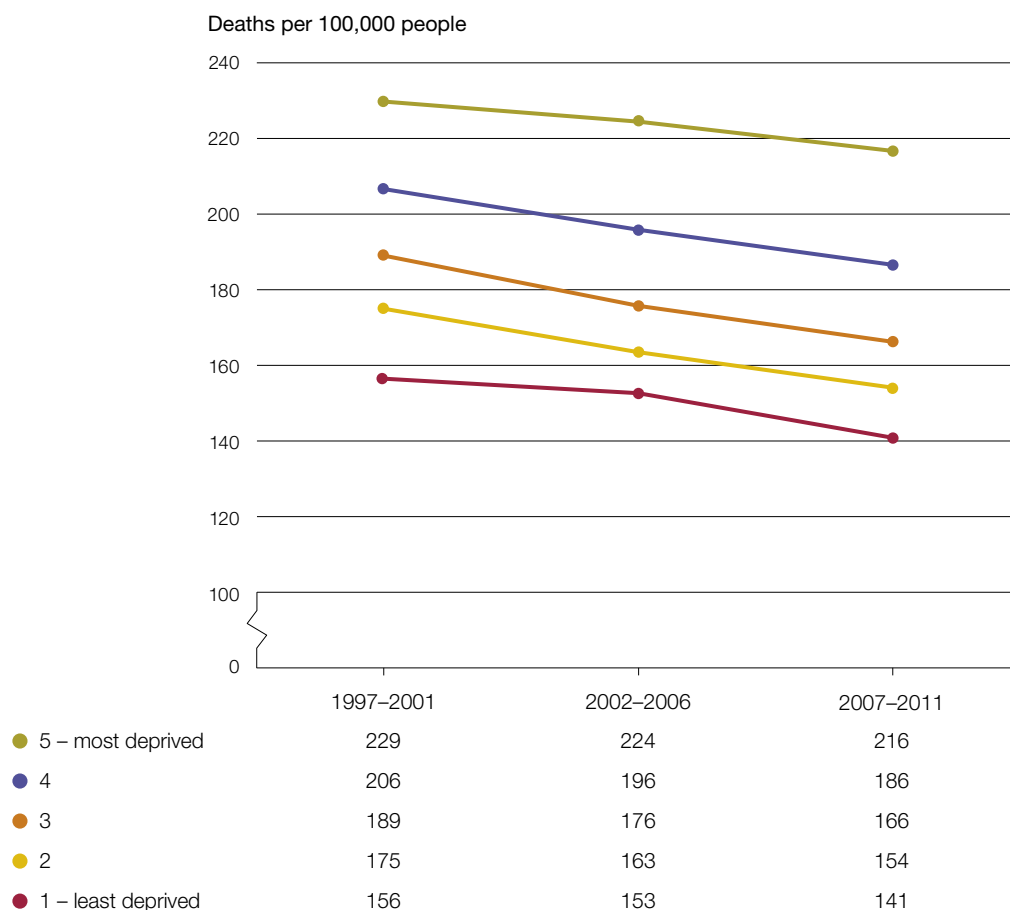
**Note**

1 Rates are age-standardised to the 2013 Eurostat population. They cannot be compared with analysis standardised to the 1976 European standard population.

Source: National Audit Office analysis of data from the Cancer Commissioning Toolkit, produced by Public Health England

**Figure 17**

Cancer mortality rate per 100,000 people (age-standardised) for all cancers and for all ages, by socio-economic deprivation group, 1997–2001 to 2007–2011



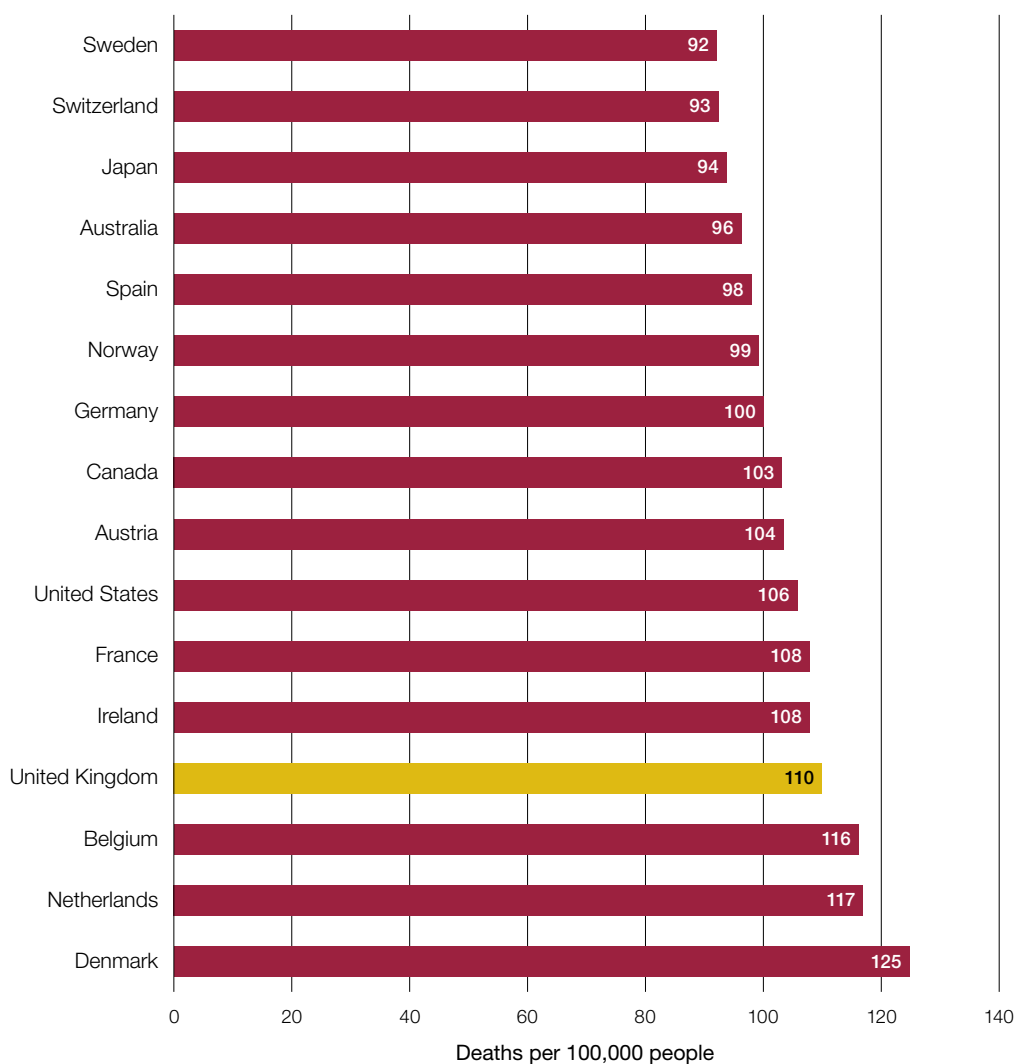
**Note**

1 Rates are age-standardised to the 1976 European standard population.

Source: National Cancer Intelligence Network, *Cancer by deprivation in England – data workbook*, June 2014

**Figure 18**

Cancer mortality rate per 100,000 people (age-standardised) for all cancers and for all ages, for selected comparator countries, 2012



**Note**

1 Rates are age-standardised to the World Health Organization's world standard population. They cannot be compared with analysis standardised to other populations.

Source: GLOBOCAN 2012: Estimated cancer incidence, mortality and prevalence worldwide in 2012



## Patient experience

### Why it is important

A positive patient experience is considered to be linked to better health outcomes. NHS England undertakes an annual survey to monitor the experience of cancer patients and help local services to improve. The survey contains more than 60 questions covering a range of issues including the provision of information, communications and quality of service. The survey also provides insights into equality issues, as patients are asked to provide details on their age, gender and ethnicity. Patients are also asked about other health conditions they may have.

### Trends

The percentage of patients rating their overall level of care as excellent or very good remained at the same level between 2012 and 2014 (88% to 89%).

In the last 3 surveys, the average score for more than 40% of survey questions has improved, when compared with the answers from the previous year's survey. Scores have fallen on a maximum of 15% of survey questions (**Figure 19** overleaf).

Examples of improvements between 2010 and 2014 include: the percentage of patients reporting that they were treated with respect and dignity increased from 82% to 84%; and the percentage of patients reporting that they were given written information about their operation increased from 68% to 76%.

### Variation by area

Excluding London, variation in reported patient experience by geographic region is small, especially when compared with other demographic factors (**Figure 20** on page 49).

### Variation by demographic group

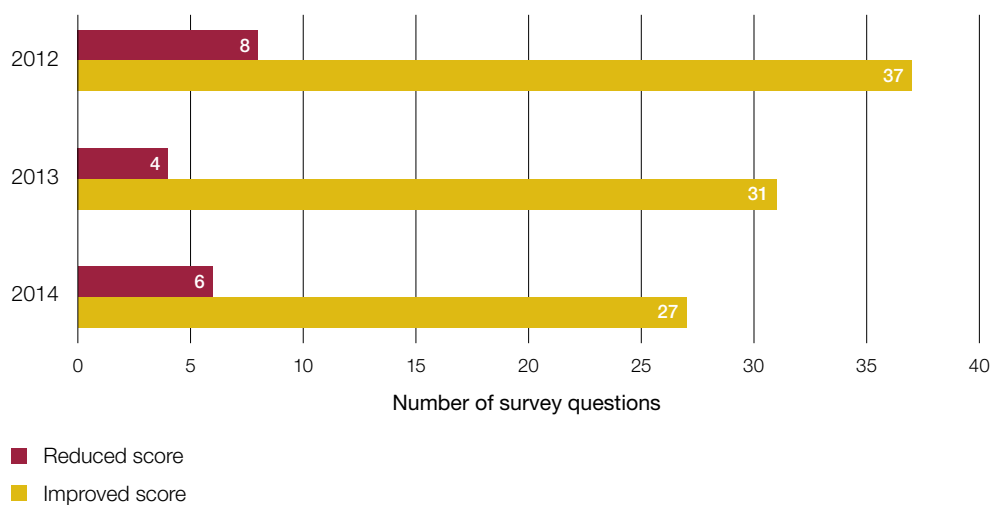
In 2014, there was wide variation in the experience reported by different groups of cancer patients. The variation was most pronounced for those with long-standing physical conditions or mental-health conditions compared with those without.

There was less variation between people of different genders, sexual orientation and ethnic groups. Asian (75.4%) and 'other' (70.4%) ethnic groups had the lowest proportions of patients rating their overall care as excellent or very good. Patients from white ethnic groups were the most positive (89.6%) about their care (**Figure 21** on page 50).

### International comparisons

No comparative data available.

**Figure 19**  
Cancer patient experience: number of survey questions with an improved or reduced score compared with the previous year, 2012 to 2014



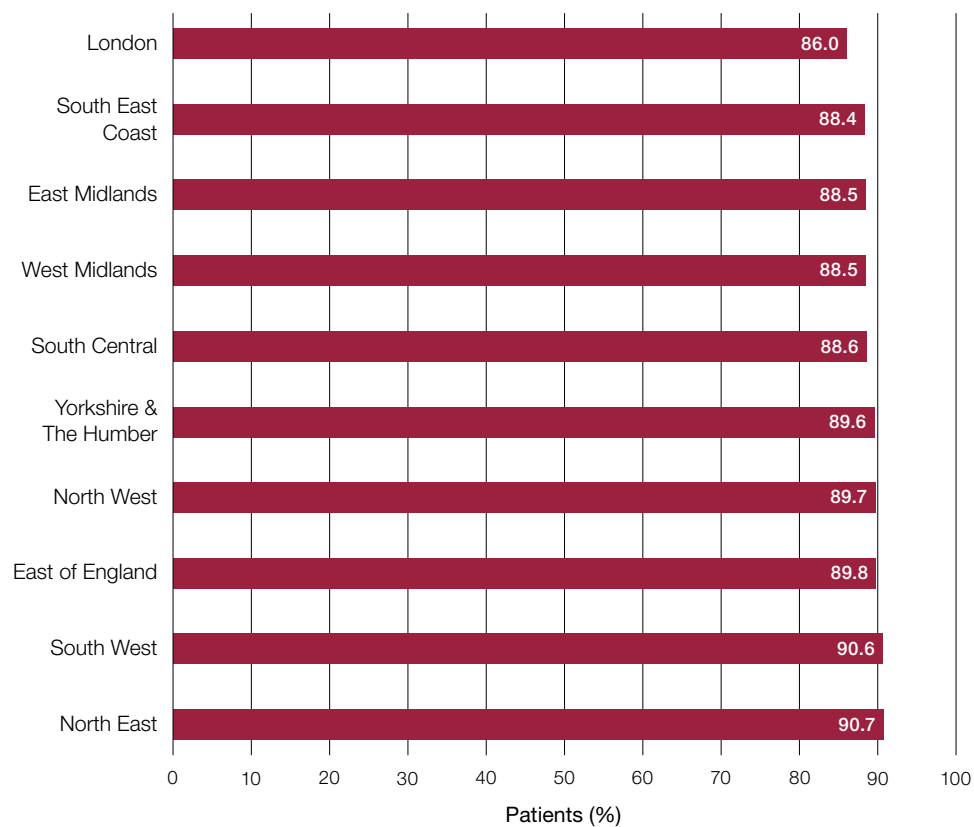
**Note**

1 A minimum of 53 questions were compared across survey years. Questions with no statistically significant score changes between surveys are not shown.

Source: National cancer patient experience surveys, 2010 to 2014

**Figure 20**

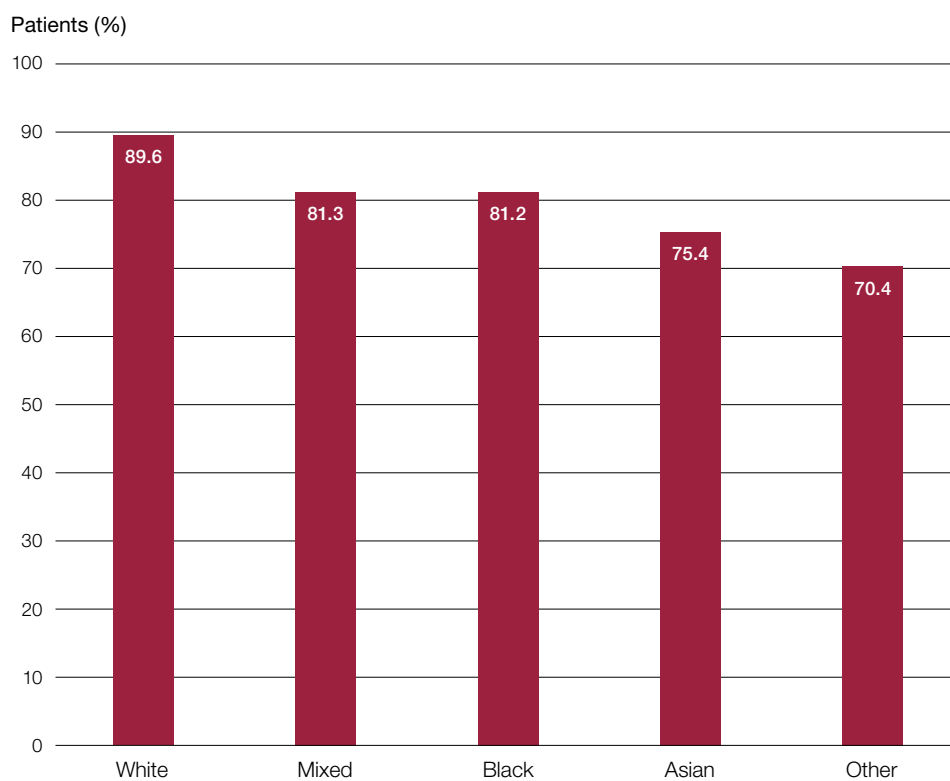
Cancer patients rating their care as 'excellent' or 'very good' by area, 2014



Source: National cancer patient experience survey, 2014

**Figure 21**

Cancer patients rating their overall care as 'excellent' or 'very good', by ethnic group, 2014



Source: National cancer patient experience survey, 2014

## B Referral and diagnosis

People have a better chance of surviving cancer if the disease is diagnosed early. There are 4 main factors that affect early diagnosis:

- people's level of awareness of signs and symptoms and how quickly they report them to their GP or another health professional;
- how many people take up available screening services;
- how quickly and accurately GPs refer people for further investigation; and
- how quickly people are tested once they have been referred for investigation.

This section covers: staging data; GP referrals; emergency presentation; and diagnostic testing.

### **Staging data**

#### Why it is important

Staging data record how advanced a person's cancer is at diagnosis. These data can help to improve resource allocation through a better understanding of the relative proportions of patients diagnosed at the different stages. They also support more sophisticated analysis and understanding of outcomes for people with cancer. Diagnosis at an early stage of the cancer's development improves the chances of survival.

#### Trends

The percentage of cancers diagnosed with staging data recorded increased from 40% in 2010 to 62% in 2012.

#### Variation by area

In 2012, the percentage of cancers diagnosed with staging data varied across the 211 clinical commissioning groups from 24% to 83% (**Figure 22** on page 53).

In 2012, the percentage of tumours diagnosed at stages 1 and 2 varied across the 211 clinical commissioning groups from 18% to 60% (**Figure 23** on page 54).

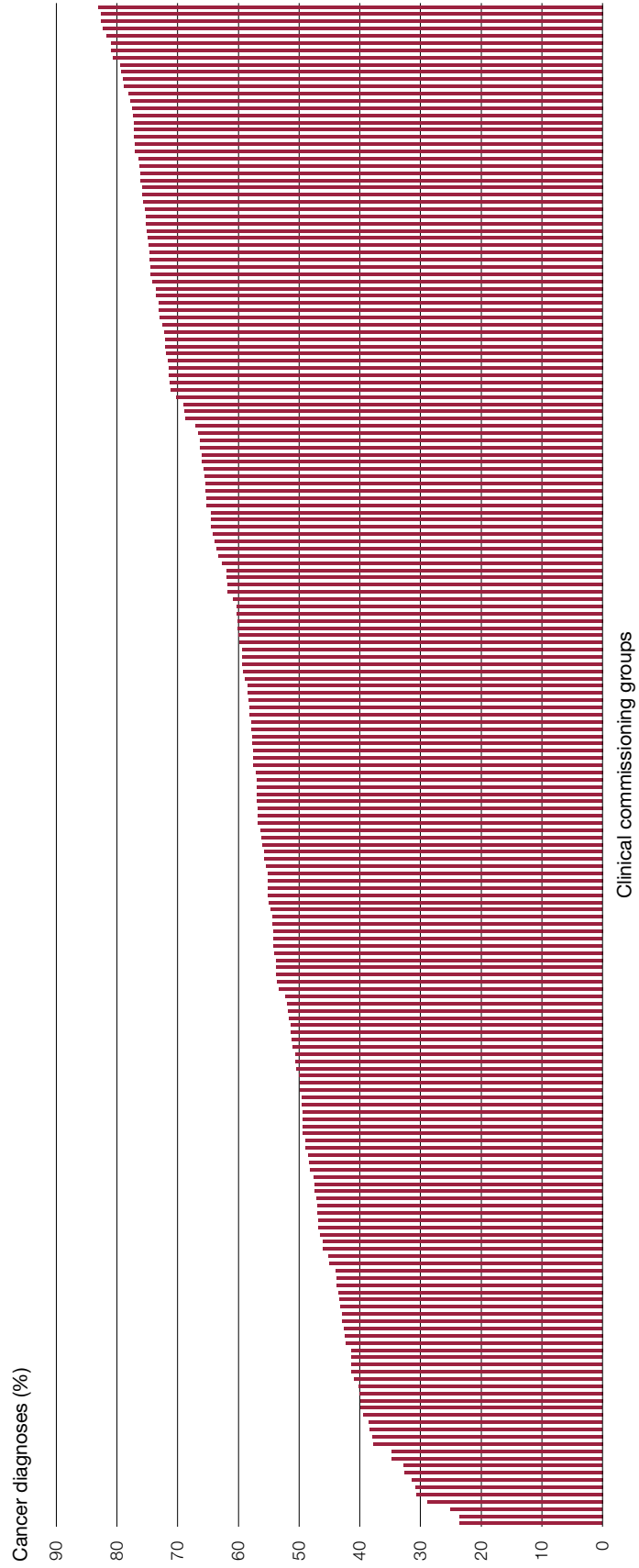
### Variation by cancer site

The percentage of cancers diagnosed with staging data varies substantially depending on the type of cancer. Cancer of the breast, prostate, lung and bowel, which account for more than half of all new cancer cases, have high rates of recorded staging data. Less common types of cancer tend to have the lowest rates (**Figure 24** on page 55). Some relatively common cancers, however, still have low rates of staging data, for example, pancreatic cancer (42%) and urinary bladder cancer (38%).

### International comparisons

No comparative data available.

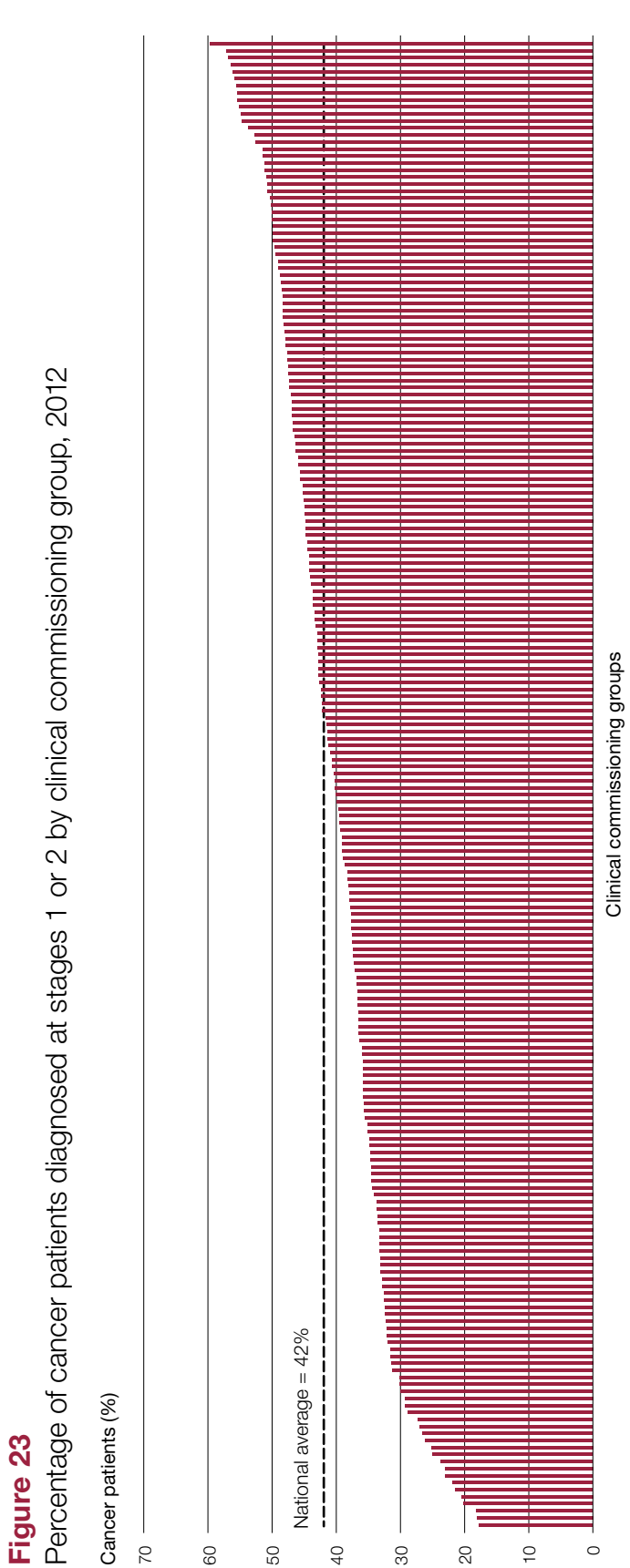
**Figure 22**  
 Percentage of cancer diagnoses with recorded staging data by clinical commissioning group, 2012



**Notes**

- 1 Staging data shows how far advanced a person's cancer is at diagnosis (stages 1 to 4).
- 2 Excludes non-melanoma skin cancer.

Source: Cancer Commissioning Toolkit, produced by Public Health England



**Notes**

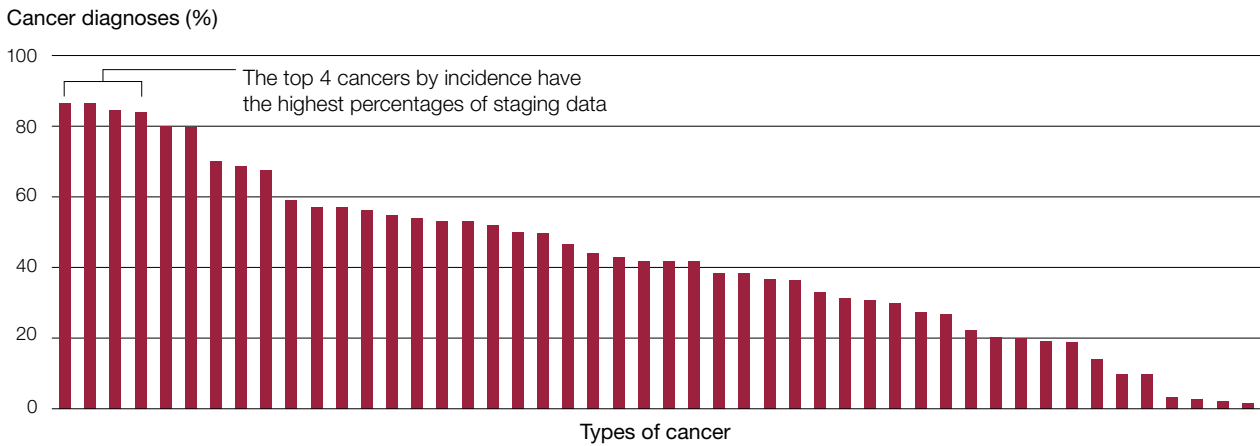
- 1 Most cancers have 4 stages. Stage 1 is usually a small cancer or tumour that has not grown deeply into nearby tissue and has not spread to the lymph nodes or other parts of the body. It is often called early-stage cancer. Stage 2 is cancers or tumours that are larger in size, have grown more deeply into nearby tissue, and may have spread to the lymph nodes, but not to other parts of the body.
- 2 Excludes non-melanoma skin cancer.

Source: Cancer Commissioning Toolkit, produced by Public Health England



**Figure 24**

Percentage of cancer diagnoses with recorded staging data by type of cancer, 2012



**Notes**

- 1 Data are presented only for stageable cancer. Brain cancers and some other cancer sites cannot be staged.
- 2 The top 4 cancers by incidence are breast, prostate, lung and bowel (colon and rectal) and have the highest percentage of staging data. The cancer types in the chart have been ordered by completeness of staging data.

Source: National Cancer Registration Service

## Referral via GP

### Why it is important

How quickly and accurately GPs refer people for further investigation is a key factor in early diagnosis. Most cancers are diagnosed after people are referred by their GP. Patients have the right to be seen by a specialist within 2 weeks of an urgent GP referral for suspected cancer.

### Trends

Urgent GP referrals (2-week referral) increased by 51% between 2009-10 and 2013-14 from 0.90 million referrals a year to 1.36 million referrals a year (**Figure 25**).

### Variation by area

The ratio of urgent GP referrals to cancer incidence across clinical commissioning groups varied from 3.9 to 6.2 in 2013-14, after excluding the highest and lowest 10% of groups (**Figure 26** on page 58), indicating that GPs make variable use of this referral route.

### Variation by demographic group

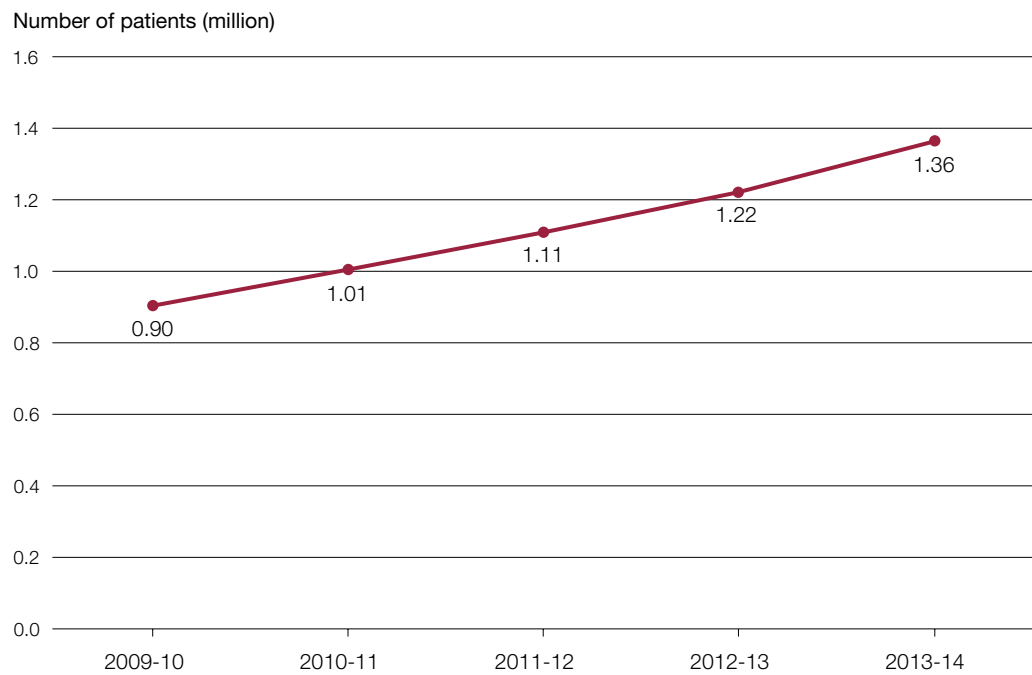
A 2009-10 audit of cancer diagnosis in primary care found that most patients (66%) consulted their GP once or twice before being referred to see a consultant. However, 4% of patients consulted with their GP 5 or more times (**Figure 27** on page 59).

### International comparisons

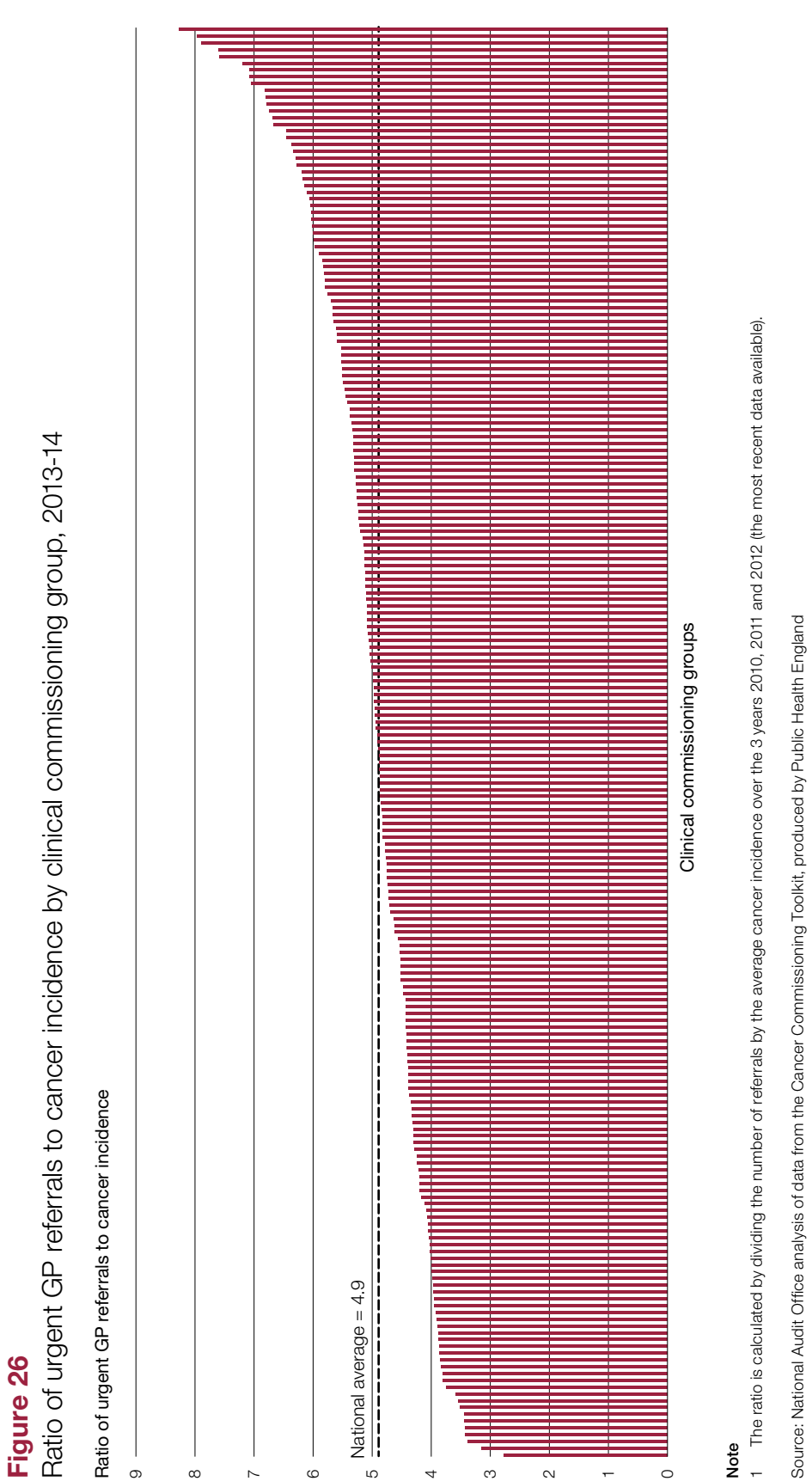
No comparative data available.

**Figure 25**

Number of cancer patients receiving an urgent GP referral (2-week wait referral route) for all cancers, 2009-10 to 2013-14

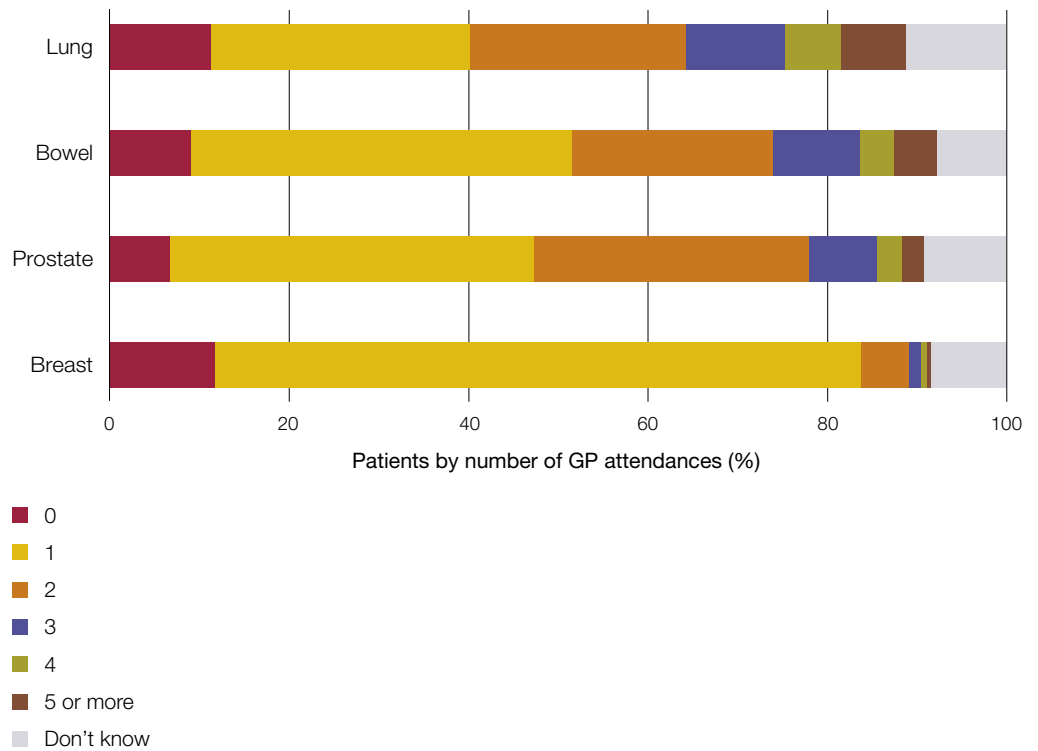


Source: NHS England cancer waiting times statistics



**Figure 27**

Number of GP attendances before referral to a consultant for the top 4 cancers by incidence, 2009-10



**Notes**

- 1 Chart ordered with the highest proportion of people receiving 1 or 2 appointments, in ascending order.
- 2 '0 attendances' includes patients that attend an Accident & Emergency department or an outpatient appointment without being referred by a GP.

Source: G Rubin et al., *National audit of cancer diagnosis in primary care*, Royal College of General Practitioners, 2011

## **Emergency presentation**

### Why it is important

Cancers may also be diagnosed via people attending hospital as an emergency, including via accident and emergency departments, emergency GP referrals and emergency admissions. People diagnosed via an emergency presentation are on average around twice as likely to die within a year of diagnosis as those diagnosed via an urgent GP referral.

### Trends

The percentage of cancers diagnosed through emergency presentations decreased from 23.7% in the first half of 2009 to 20.6% in the second half of 2012 (**Figure 28**).

### Variation by area

In 2012, the percentage of cancers diagnosed through emergency presentation varied from 13% to 30% across the 211 clinical commissioning groups. Between 2009 and 2012 the gap between the clinical commissioning groups with the highest (top 10%) and lowest (bottom 10%) percentage of cancers diagnosed through emergency presentations decreased by 1.6 percentage points (**Figure 29**).

### Variation by demographic group

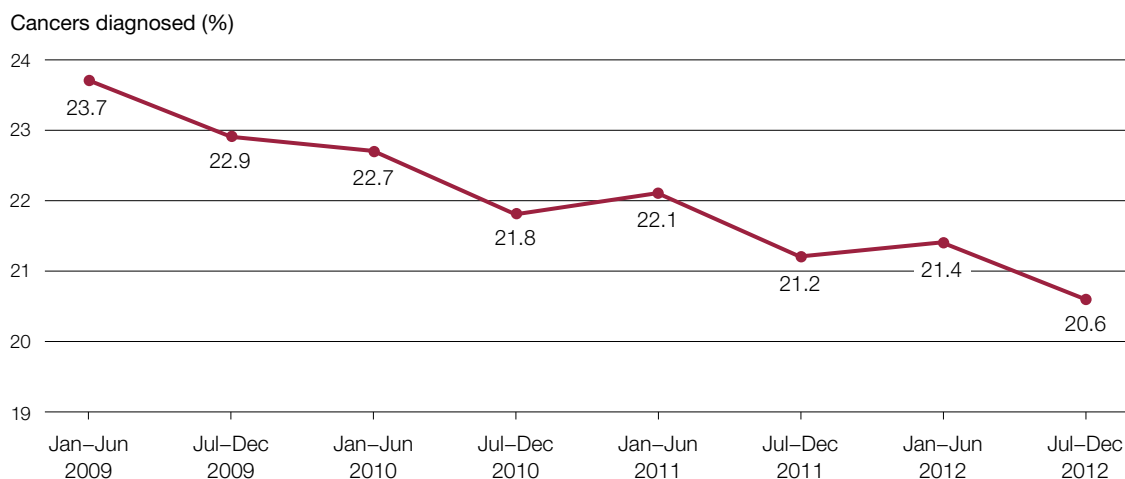
No comparative data available.

### International comparisons

No comparative data available.

**Figure 28**

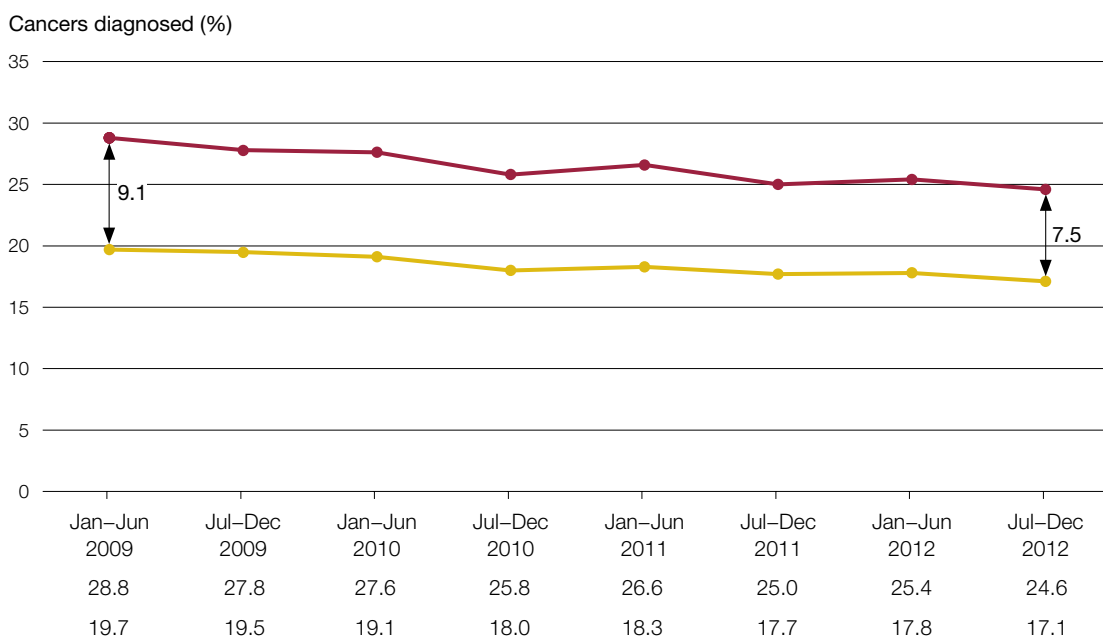
Percentage of cancers diagnosed through emergency presentation, 2009 to 2012



Source: Cancer Commissioning Toolkit, produced by Public Health England

**Figure 29**

Variation in the percentage of cancers diagnosed through emergency presentation between clinical commissioning groups, 2009 to 2012



**Note**

1 The 10th percentile is the percentage below which 10% of clinical commissioning groups fall, and the 90th percentile is the percentage above which 10% of clinical commissioning groups fall. These values have been selected so as not to overstate the extent of the observed variation.

Source: National Audit Office analysis of data from the Cancer Commissioning Toolkit, produced by Public Health England

## Diagnostic imaging testing

### Why it is important

Advanced diagnostic imaging services, such as magnetic resonance imaging (MRI) and computed tomography (CT), are commonly used to diagnose cancer.

We were unable to separate diagnostic imaging activity for cancer from that for other conditions in a meaningful way. The data presented on diagnostic services are, therefore, for all registered patients regardless of health condition. It is likely that a substantial proportion of this activity will be for the diagnosis of cancer patients.

### Trends

The number of CT and MRI tests increased by 39% between 2009-10 and 2013-14 from 5.7 million to 7.9 million (**Figure 30**).

The number of patients waiting more than 6 weeks for diagnostic imaging tests has increased over the past year (**Figure 31** on page 64). At the end of September 2014, just under 16,200 patients had been waiting for this long, up from just over 11,900 at the end of September 2013.

### Variation by area

In 2013, the number of scans per 100,000 registered patients (age-standardised against an average population in England) varied across clinical commissioning groups from less than 2,000 to more than 9,000 for CT scans, and from less than 2,000 to more than 6,000 for MRI scans (**Figure 32** on page 65).

### Variation by demographic group

Diagnostic activity generally increases with age. In 2013, 44% of all diagnostic imaging activity was carried out for people aged 60 or over. Despite this, older people are less likely to have access to MRI scans than to other common diagnostic imaging services, such as CT scans (**Figure 33** on page 66).

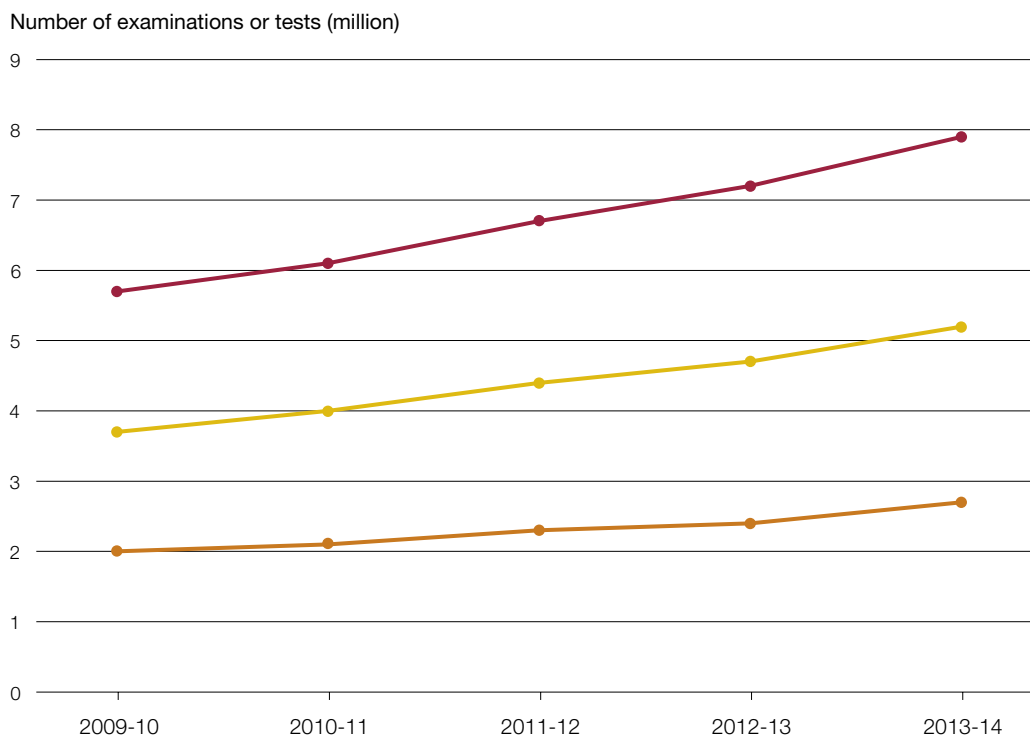
### International comparisons

No comparative data available.



**Figure 30**

Total number of CT and MRI diagnostic examinations or tests, 2009-10 to 2013-14



● CT and MRI	5.7	6.1	6.7	7.2	7.9
● CT	3.7	4.0	4.4	4.7	5.2
● MRI	2.0	2.1	2.3	2.4	2.7

**Note**

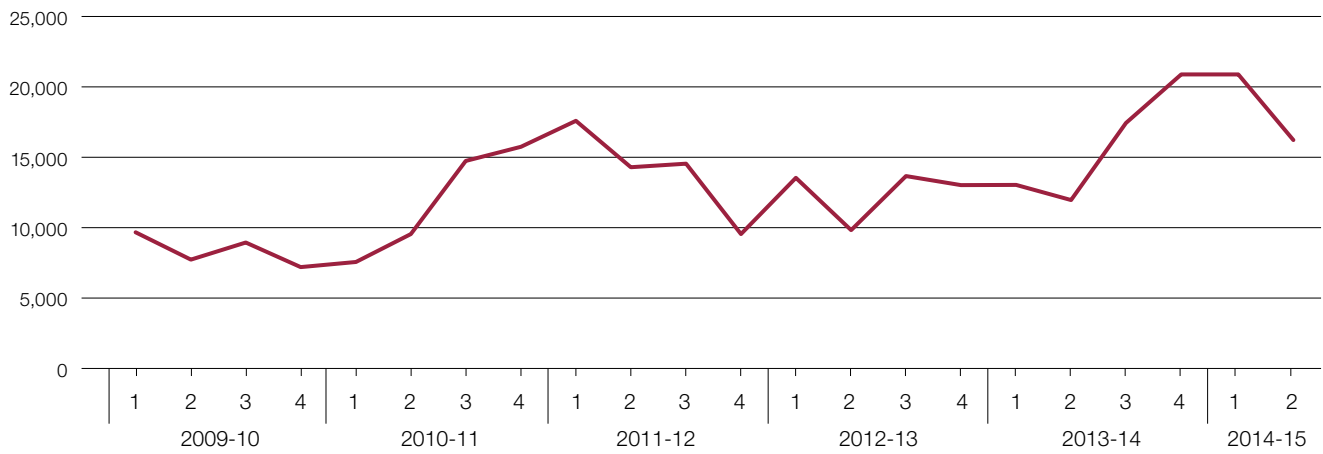
1 Totals for 'CT and MRI' may not sum due to rounding.

Source: NHS England annual imaging and radiodiagnostics data

**Figure 31**

Number of patients waiting 6 weeks or longer for diagnostic imaging tests, 2009-10 to 2014-15

Number of patients

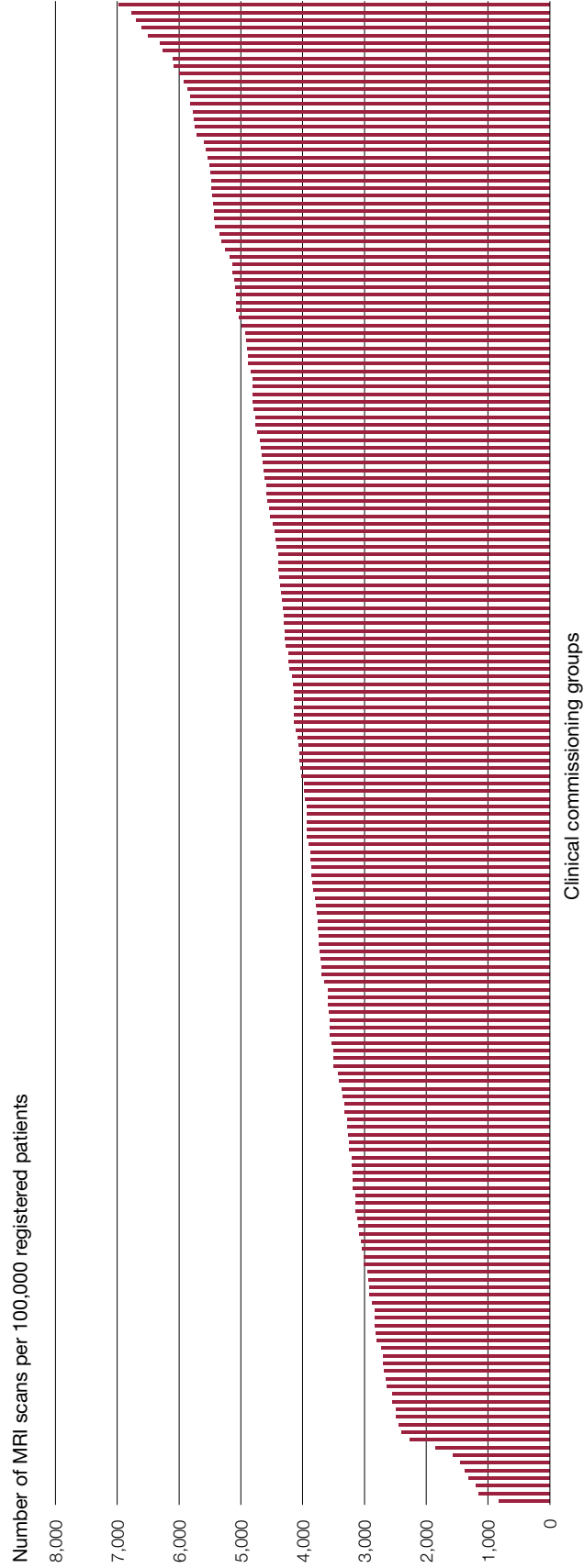


**Note**

1 Number of patients waiting at the end of each quarter.

Source: National Audit Office analysis of NHS England diagnostic waiting times and activity data

**Figure 32**  
MRI scans per 100,000 registered patients (age-standardised) by clinical commissioning group, 2013

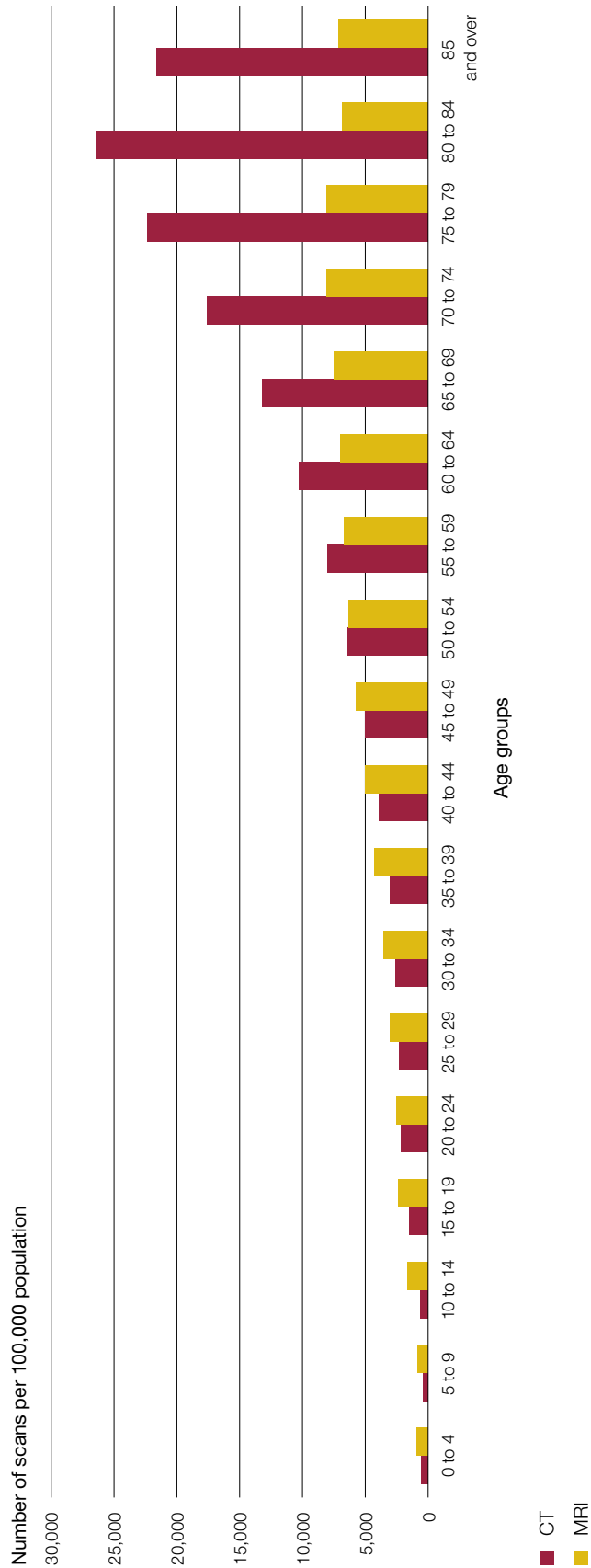


**Notes**

- 1 Rates are age-standardised against all patients registered with GP practices in all 211 clinical commissioning groups in 2013.
- 2 This figure presents data for 197 clinical commissioning groups. Fourteen clinical commissioning groups were excluded from this analysis because they either had missing MRI activity data or more than 0.1% of their records did not include data on age.

Source: National Audit Office analysis of Diagnostic Imaging Dataset data and clinical commissioning group profile data from Public Health England. The Diagnostic Imaging Dataset has been re-used with permission from the Health and Social Care Information Centre

**Figure 33**  
 Number of CT and MRI scans per 100,000 people for all conditions by age group, 2013



Source: National Audit Office analysis of Diagnostic Imaging Dataset. The Diagnostic Imaging Dataset has been re-used with permission from the Health and Social Care Information Centre

## C Access to treatment

### Waiting times

#### Why they are important

Timely access to diagnostic testing and treatment is essential to improving outcomes for cancer patients. In 2000, as part of its 10-year plan to improve cancer services, the Department introduced waiting time standards for diagnosis and treatment with the aim of reducing waiting at all stages of the care pathway.

#### Trends

The NHS met all 9 cancer waiting time standards between April 2010 and the end of 2013, despite a 51% increase in referral activity between 2009-10 and 2013-14. However, there are signs that hospital trusts are now finding it difficult to cope with this rising demand:

- For the first three quarters of 2014, the NHS did not achieve the standard that 85% of patients who are urgently referred by their GP with a suspicion of cancer and subsequently diagnosed with cancer should wait no longer than 62 days from the date the referral is received by the hospital to the date of their first treatment. January to March 2014 was the first time the standard was not achieved since it was introduced, and it was missed again between April and June and between July and September 2014 (**Figure 34** overleaf).
- Also between April and June 2014, the NHS did not achieve the 2-week waiting time standard that 93% of patients should be seen by a specialist when referred urgently with breast symptoms, where cancer was not initially suspected. This was the first time the standard was not achieved since early 2010.

The NHS Operating Framework 2012-13 introduced an expectation that less than 1% of patients should wait 6 weeks or longer for a diagnostic test, including those for cancer. Between April 2009 and September 2014, the NHS did not meet this expectation in 36 of the 66 months and has not met the standard since December 2013 (**Figure 35** on page 69).

### Variation by area

Between July and September 2014, performance across clinical commissioning groups against the 62-day waiting time standard from GP referral to treatment varied from 75% to 90% after excluding the highest and lowest 10% of groups. During this period, 120 of the 211 clinical commissioning groups failed to meet the standard (**Figure 36** on page 70).

### Variation by demographic group

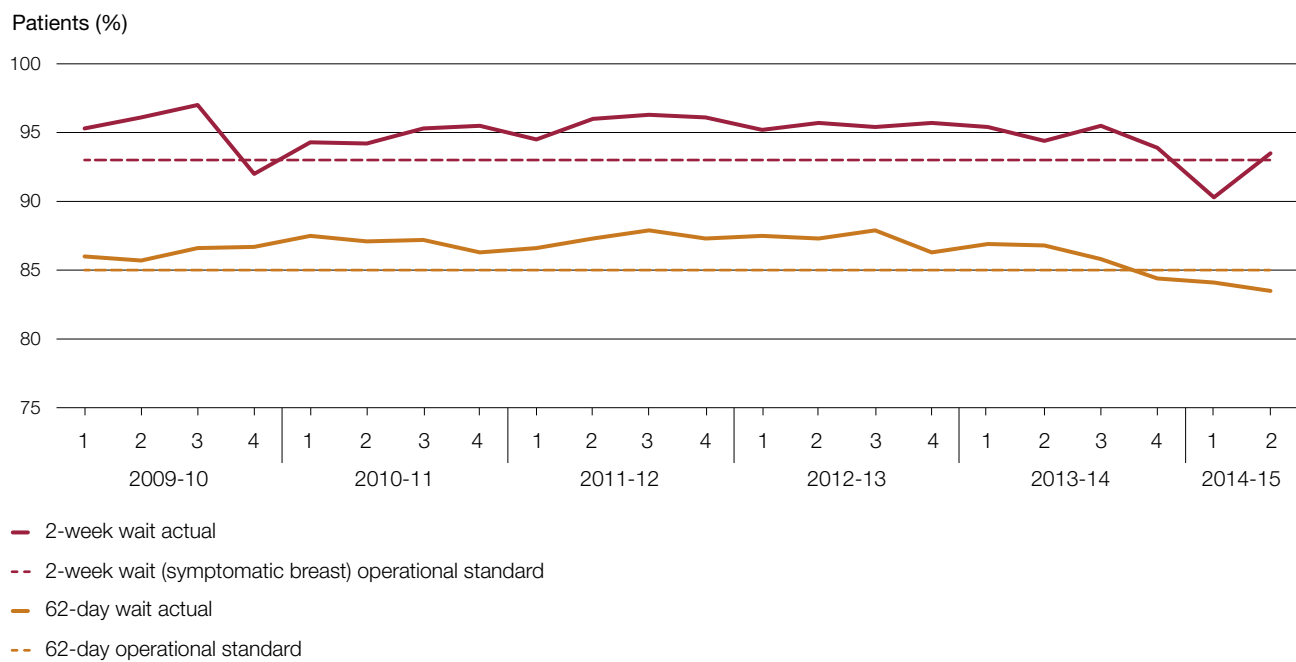
No comparative data available.

### International comparisons

Not comparative data available.

**Figure 34**

Performance against 2 cancer waiting time standards, 2009-10 to July–September 2014



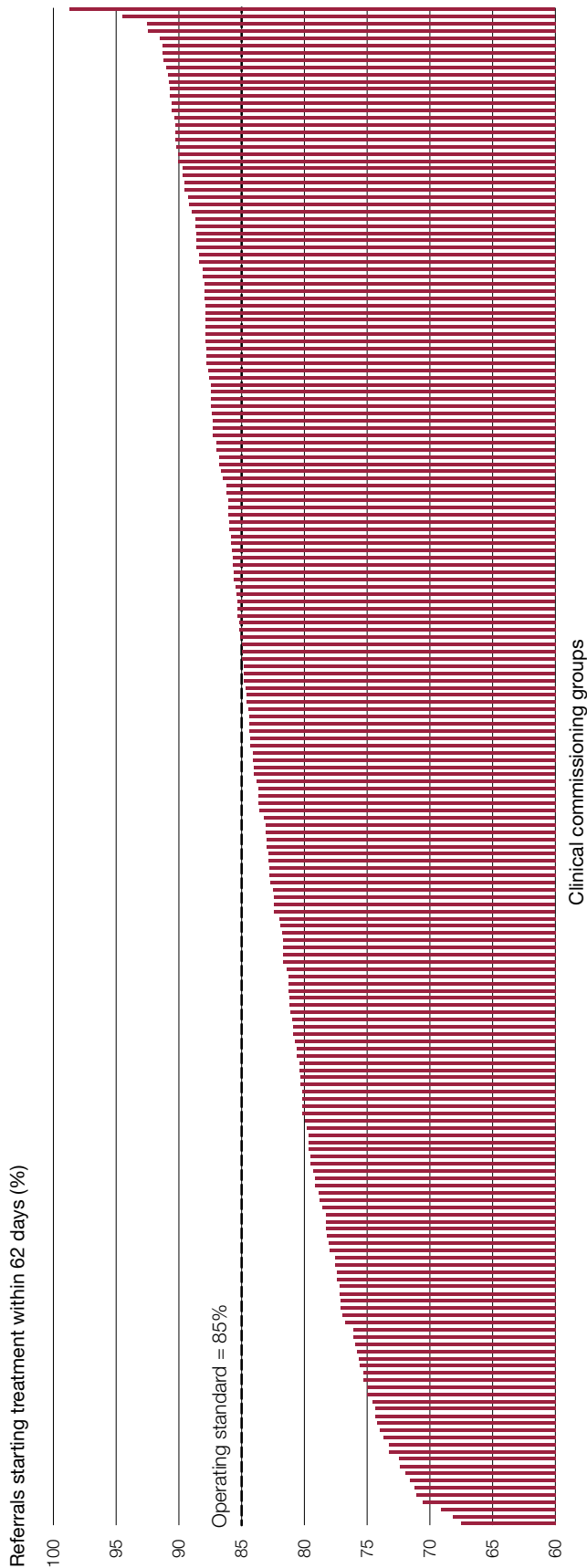
**Notes**

- 85% of patients who are urgently referred by their GP with a suspicion of cancer and subsequently diagnosed with cancer should wait no longer than 62 days from the date the referral is received by the hospital to the date of their first treatment.
- 93% of patients should wait no longer than 2 weeks to see a specialist when referred urgently by their GP with breast symptoms, where cancer was not initially suspected.

Source: NHS England cancer waiting times statistics



**Figure 36** Percentage of urgent GP referrals for suspected cancer which started treatment within 62 days, by clinical commissioning group, July to September 2014



Source: NHS England cancer waiting times statistics



## Surgery

### Why it is important

Surgery is the most effective treatment for cancer when appropriate. For example, for people with early-stage non-small cell lung cancer, surgery offers the best chance of a cure. A higher proportion of patients receiving lung surgery is associated with a lower mortality rate from lung cancer. Surgery rates for 4 cancers are monitored by national clinical audits.<sup>34</sup> As an example, we present here results from the national lung cancer audit, published in 2013, and based on lung cancer patients in England and Wales first seen by the NHS in 2012.

### Trends

The proportion of patients receiving surgery has increased. For example, the proportion of lung cancer patients having a section of their lung removed increased from 13.9% in 2008 to 21.9% in 2012 (**Figure 37** overleaf).

### Variation by area

Between 2008 and 2012, the number of patients receiving surgery for lung cancer varied across the 30 regional cancer networks by more than 100%, from 15.1% to 30.8% (**Figure 38** overleaf).

### Variation by demographic group

The proportion of non-small cell lung cancer patients receiving surgery to remove a section of their lung varies by age – from 21% of patients aged under 75 compared with 14% for those aged 75 and over during the period 2008 to 2012. However, older patients are more likely to have co-morbidities and poorer general health and, therefore, surgery is likely to be appropriate in fewer cases.

### International comparisons

In 2012, the rate of surgical resection in England and Wales was 22%, up from 14% in 2008.<sup>35</sup> The 2013 national lung cancer audit reported that, compared with some European countries, England has low lung cancer survival rates and low use of surgical resection.<sup>36</sup> The only comparative data that we could identify, from 2003, suggests that England's surgical resection rate (11%) was lower than the level for Europe (17%) and North America (21%).<sup>37</sup>

34 Bowel, head and neck, lung and oesophago-gastric.

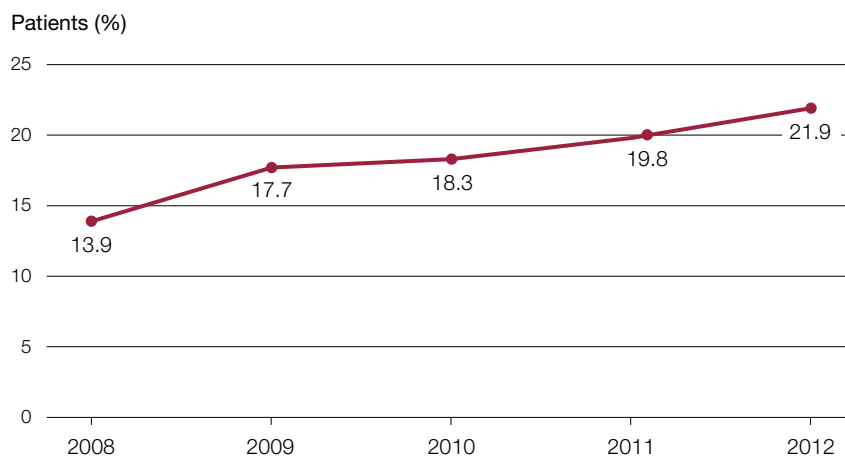
35 Surgical resection uses surgery to remove abnormal tissue or organs, and sometimes the surrounding tissue. Surgery may provide a cure in some cancer cases, when the tumour is discovered early.

36 Health and Social Care Information Centre, *National Lung Cancer Audit Report 2013: Report for the audit period 2012*, December 2013.

37 D Sleeman et al., 'A comparison between clinical decisions made about lung cancer patients and those inherent in the corresponding Scottish Intercollegiate Guidelines Network (SIGN) guideline', *Health Informatics Journal*, Vol. 16, Issue 4, December 2010, pp. 260–73.

**Figure 37**

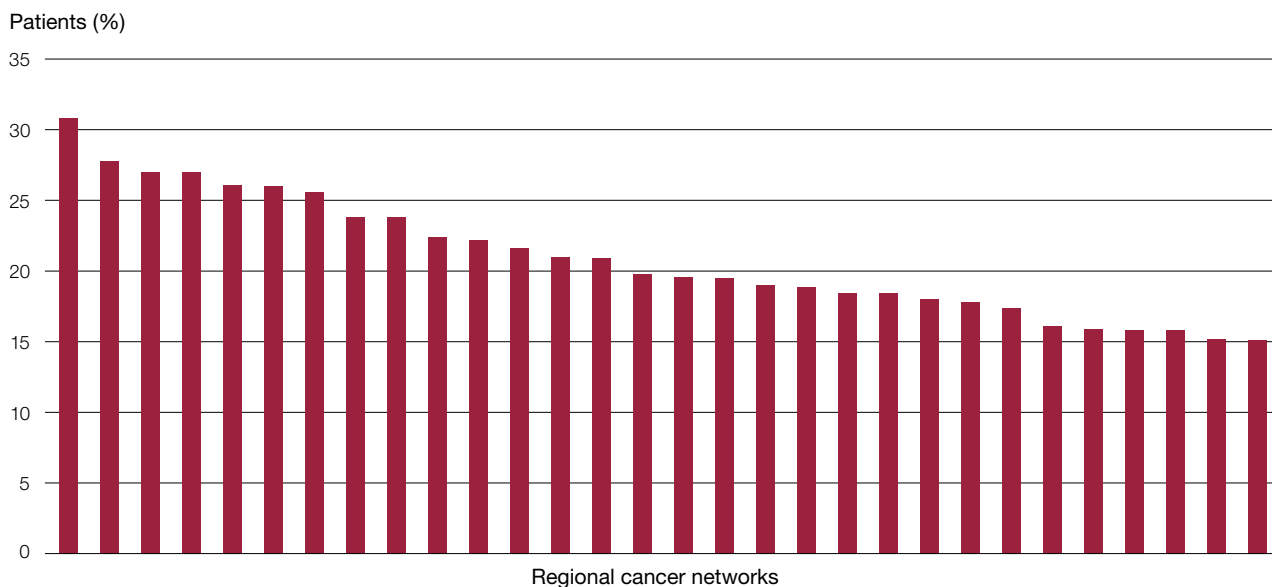
Percentage of non-small cell lung cancer patients who underwent surgical resection in England and Wales, 2008 to 2012



Source: Lung cancer clinical audit, 2013

**Figure 38**

Percentage of non-small cell lung cancer patients who underwent surgical resection in England and Wales by regional cancer network, 2008 to 2012



Source: Lung cancer clinical audit, 2013

## Radiotherapy

### Why it is important

Radiotherapy is a treatment that involves the use of radiation. Radiotherapy can be used, alone or in combination with chemotherapy or surgery, to try to cure cancers or to control cancer symptoms. Research indicates that between 40% and 50% of cancer patients could benefit from radiotherapy at some time during their illness.<sup>38</sup> Improving access to radiotherapy treatment has been a key objective for the Department and the NHS since the publication of the NHS Cancer Plan in 2000.

### Trends

Recorded radiotherapy activity increased rapidly until 2007. However, the way data are collected changed in 2009 and the number of reported treatment episodes decreased by 10% between 2007 and 2009. Since then, radiotherapy activity has increased broadly in line with the increase in the number of new cancer cases (**Figure 39** on page 75).

Between 2009-10 and 2013-14, the percentage of cancer patients in England estimated to be receiving radiotherapy treatment remained at around 35% to 36%.<sup>39</sup>

Patients receiving intensity modulated radiotherapy (IMRT), an advanced form of radiotherapy treatment which causes less damage to the tissue surrounding a tumour, increased from 10% in April 2012 to more than 36% in August 2014.<sup>40</sup>

### Variation by area

Radiotherapy is provided in 51 hospital trusts across England. In 2013-14, the percentage of cancer patients receiving radiotherapy varied from 33% to 43% across these trusts (**Figure 40** on page 76).

Trusts which had the lowest rates of radiotherapy in 2010-11 continued to have the lowest rates in 2013-14; however, the gap between these trusts and those with higher rates has narrowed (Figure 40).

In 2010, we reported that there was wide variation in the average use of radiotherapy machines between trusts. Average use of these machines improved by 9% between 2009-10 and 2013-14. However, the number of treatments delivered per machine by individual trusts continued to vary. In 2013-14, the average number of attendances per linear accelerator varied from just below 6,000 at the 5 trusts with the lowest usage to more than 9,000 at the 5 trusts with the highest usage.<sup>41</sup>

38 C E Round et al., 'Radiotherapy demand and activity in England 2006-2020', *Clinical Oncology*, Vol. 25, Issue 9, September 2013, pp. 522-30; National Radiotherapy Advisory Group, *Radiotherapy: developing a world class service for England*, February 2007; and G P Delaney et al., 'The role of radiotherapy in cancer treatment: estimating optimal utilization from a review of evidence-based clinical guidelines', *Cancer*, Vol. 105, Issue 6, September 2005, pp. 1129-37.

39 Data provided by the National Clinical Analysis and Specialised Applications Team.

40 See footnote 38.

41 Some of this variation could be due to the complexity of the treatment being provided, the type of cancers being treated and patient characteristics.

### Variation by demographic group

People aged 65 and over are less likely to receive radiotherapy treatment. For example, recent research found that less than 30% of patients over the age of 75 received some form of radiotherapy treatment in 2009-10 and 2010-11, compared with 40% of patients under the age of 65.<sup>42</sup>

Cancer patients from more deprived groups are less likely to receive radiotherapy treatment (**Figure 41** on page 77) than those from less deprived groups.

### International comparisons

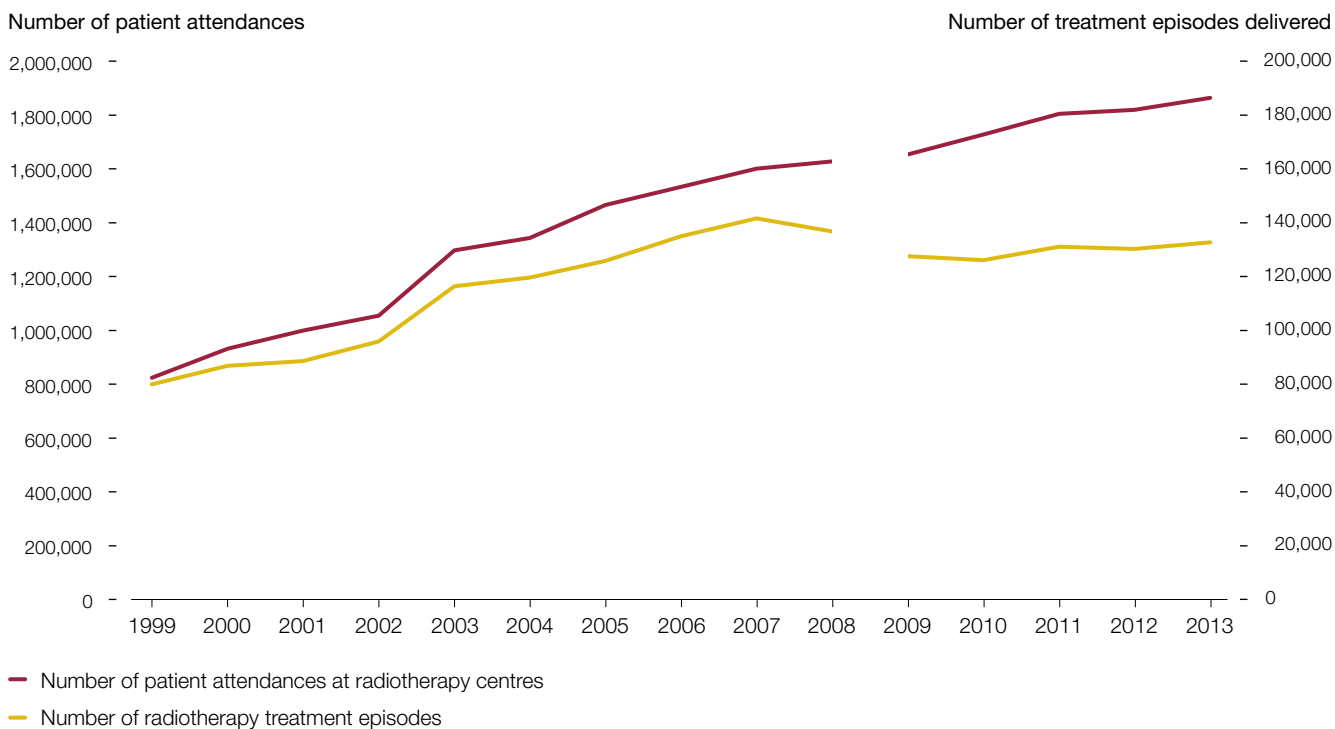
The United Kingdom has 5 radiotherapy treatment machines for every 1 million people, fewer than most other selected high-income countries (**Figure 42** on page 78). This analysis does not consider the efficiency with which machines are used in different countries.

Research commissioned by the Department found that, compared with international practice, the number of patients receiving radiotherapy treatment in England is low and the level of radiation (dosage) that patients receive during treatment also tends to be low. The research noted that a 50% increase in overall radiotherapy treatment activity would be required to match estimated demand under international norms.<sup>43</sup>

42 National Clinical Analysis and Specialised Applications Team, *Improved access: quick on the uptake*, 2013.

43 C E Round et al., 'Radiotherapy demand and activity in England 2006-2020', *Clinical Oncology*, Vol. 25, Issue 9, September 2013, pp. 522–30.

**Figure 39**  
Radiotherapy activity, 1999 to 2013

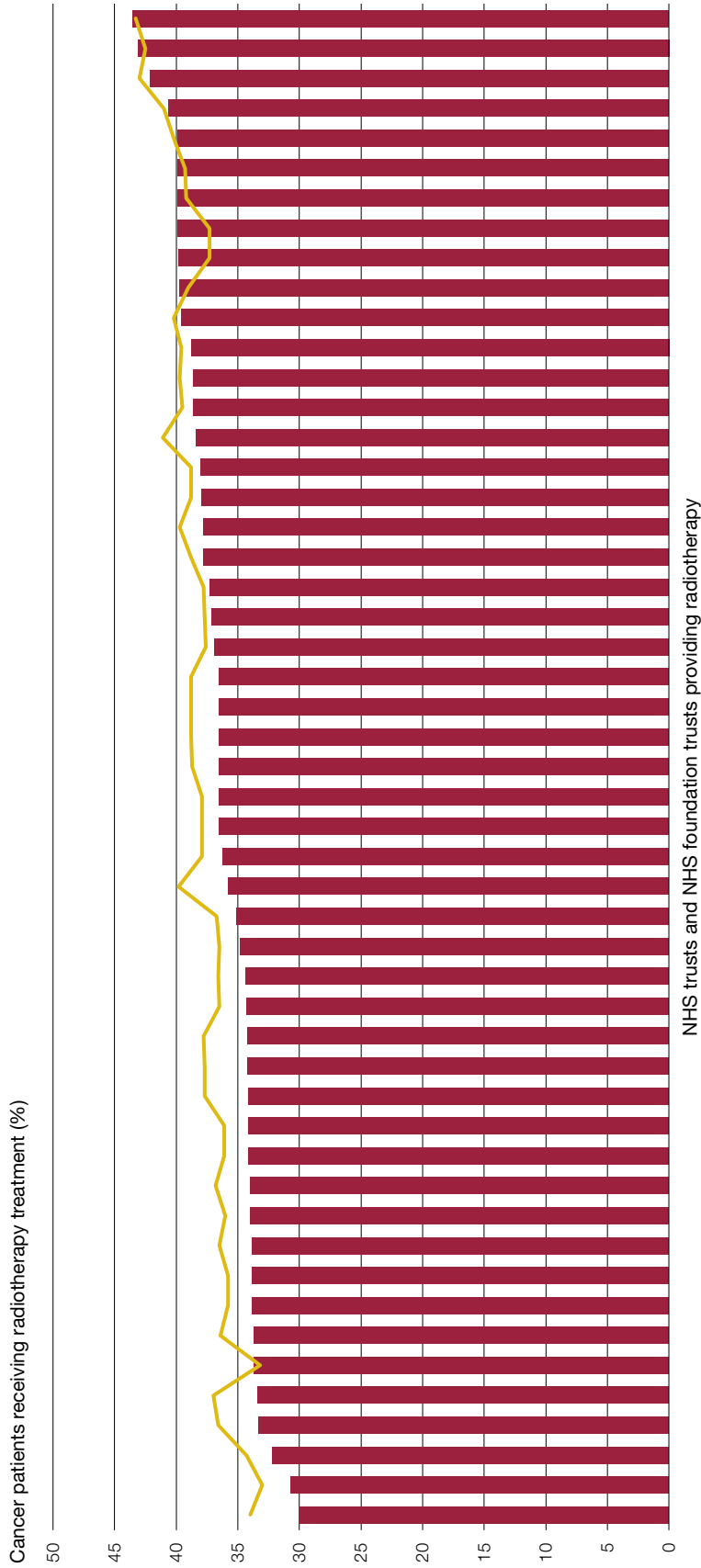


**Notes**

- 1 'Radiotherapy treatment episodes' refers to the number of treatment requests. One treatment episode usually consists of several attendances by a cancer patient. Episodes of treatment better reflect the number of people receiving radiotherapy treatment. This is because attendance numbers are influenced by different practices in the delivery of treatments. However, the number of episodes remains only an estimate of the number of people receiving treatment because the number may include re-treatments following a previous intervention, as well as treatments for new cancer patients.
- 2 Between 1999 and 2008, data were collected by calendar year; from 2009, data were collected by financial year.
- 3 From 2009, there was a change in how episodes and patient attendances are measured, meaning that these data cannot be compared with previous data.

Source: Analysis of the National Radiotherapy Dataset 2009–2013 and UK Radiotherapy Equipment Survey 1999–2008 by the National Clinical Analysis and Specialised Applications Team

**Figure 40** Percentage of cancer patients receiving radiotherapy treatment by NHS trusts and NHS foundation trusts, 2010 and 2013



■ 2010  
— 2013

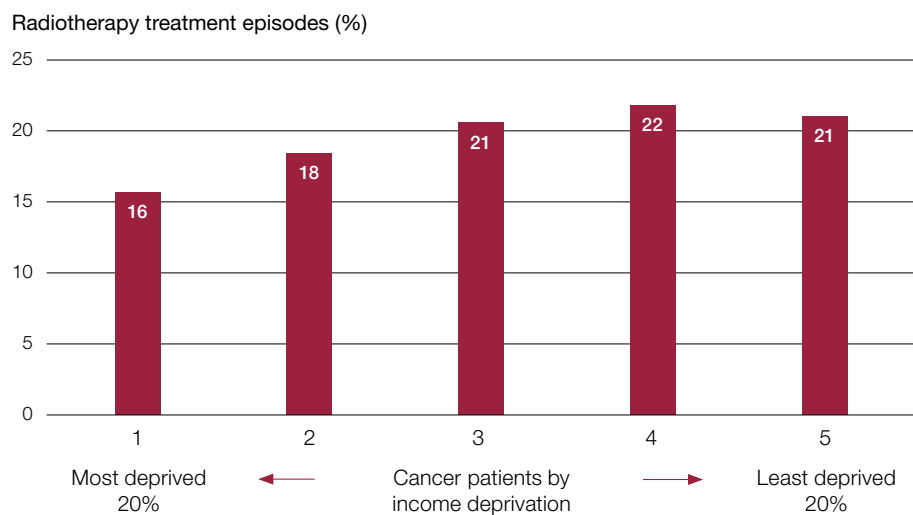
**Notes**

- 1 This figure shows the number of requests for radiotherapy treatment for each trust divided by the number of newly diagnosed cancer patients for its catchment area.
- 2 Data on newly diagnosed cancer patients were for 2010; however, the number of newly diagnosed cancer patients has increased between 2010 and 2013. Some variation observed in 2013 may be due to the difference between these data and the actual number of newly diagnosed cancer patients for each trust.

Source: Analysis of the National Radiotherapy Dataset by the National Clinical Analysis and Specialised Applications Team

**Figure 41**

Percentage of radiotherapy treatment episodes delivered to cancer patients by income deprivation group, 2009 to 2011



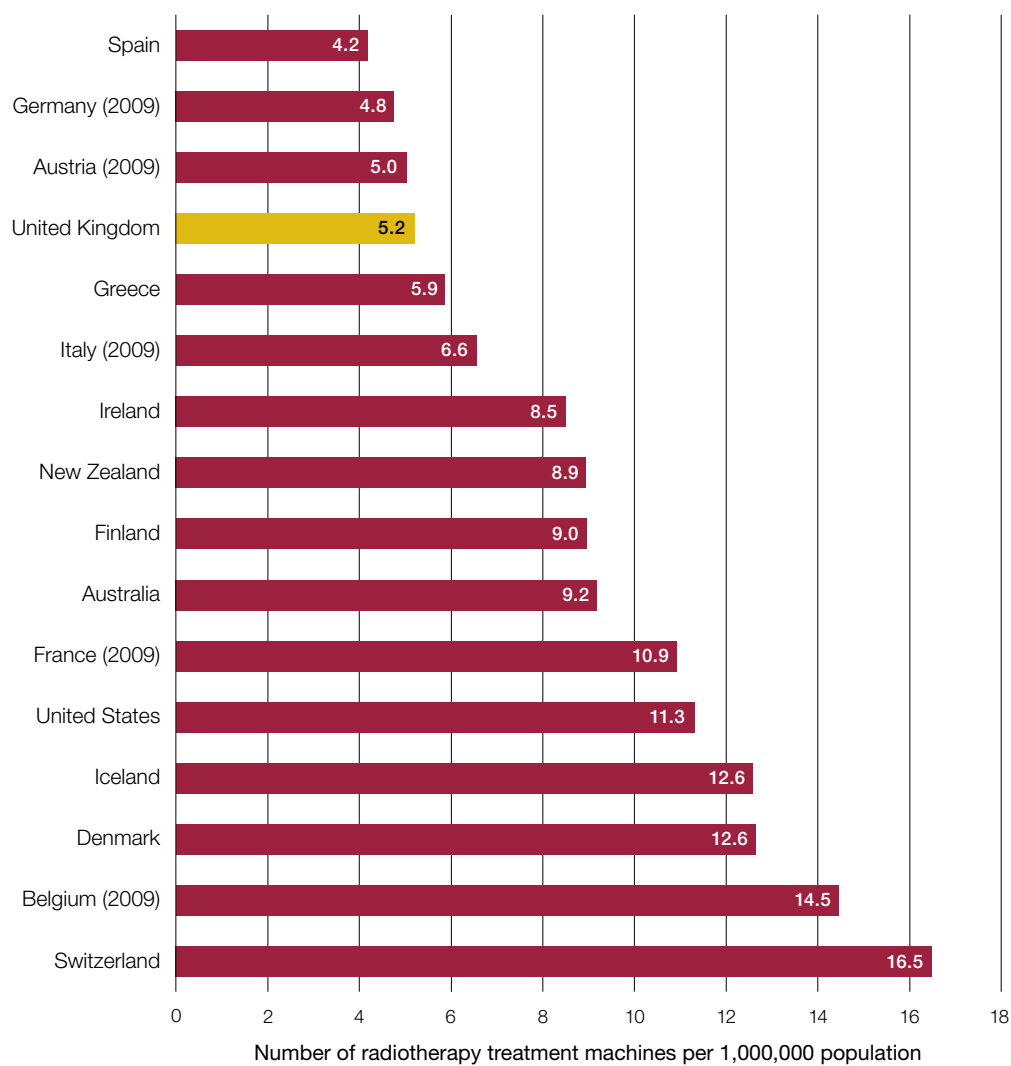
**Note**

1 Totals do not sum to 100 due to missing data in the original analysis.

Source: P J Hoskin et al., 'Variations in radiotherapy delivery in England – evidence from the national radiotherapy dataset', *Clinical Oncology*, Vol. 25, Issue 9, September 2013, pp. 531–537

**Figure 42**

Number of radiotherapy treatment machines per 1,000,000 people in selected high-income countries, 2010 (unless stated)

**Note**

1 Data for Belgium, France, Germany and Spain are under-stated because they do not include radiotherapy equipment outside of hospitals.

Source: Organisation for Economic Cooperation and Development, *Cancer care: assuring quality to improve survival*, October 2013



## Chemotherapy

### Why it is important

Chemotherapy is the use of anti-cancer drugs to kill cancer cells. It is used if a cancer has spread or if there is a risk that it will. Chemotherapy is commonly used both to cure cancer and prolong life and to alleviate symptoms for cancer patients. The NHS spends around £1.5 billion a year on chemotherapy treatment for cancer patients.

### Trends

Despite the progress made in introducing the chemotherapy dataset, there are no reliable national data on the total number of patients receiving chemotherapy. We estimate that, in 2009-10, at least 87,000 cancer patients were admitted to hospital for chemotherapy treatment, rising to more than 100,000 in 2012-13.<sup>44</sup> The chemotherapy dataset suggests that more than 130,000 cancer patients received chemotherapy in 2013-14 in all settings (hospital admissions, outpatient attendances and community care).

The number of patients receiving chemotherapy through the Cancer Drugs Fund increased from 11,800 in 2011-12 to 19,560 in 2013-14.

### Variation by area

In 2012-13, the number of patients receiving chemotherapy treatment in a hospital setting per 100 new cancer cases varied across clinical commissioning groups from fewer than 15 to more than 60. We excluded the quarter of clinical commissioning groups (52) with the lowest rates of chemotherapy treatment from our analysis as their data are more likely to be incomplete (**Figure 43** overleaf).

### Variation by demographic group

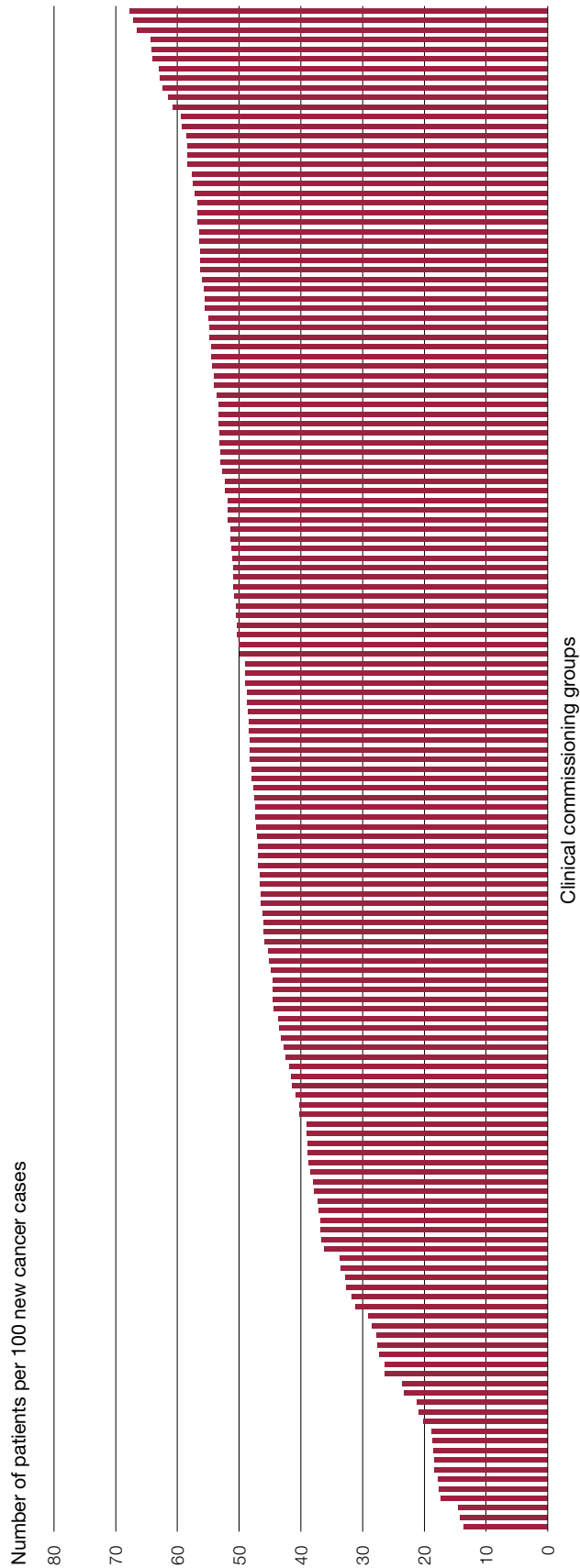
Patients aged 60 and over are much less likely to receive chemotherapy than those aged under 55 (**Figure 44** on page 81).

### International comparisons

A 2010 report on cancer drugs usage found that, for drugs launched at least 5 years before the review, the United Kingdom's usage was slightly below the average for other similar countries, but for cancer drugs launched within the previous 5 years, the United Kingdom's usage was about 48% of the average (**Figure 45** on page 82).

<sup>44</sup> Either as day cases or with overnight stays.

**Figure 43**  
 Number of cancer patients receiving chemotherapy per 100 new cancer cases by clinical commissioning group, 2012-13

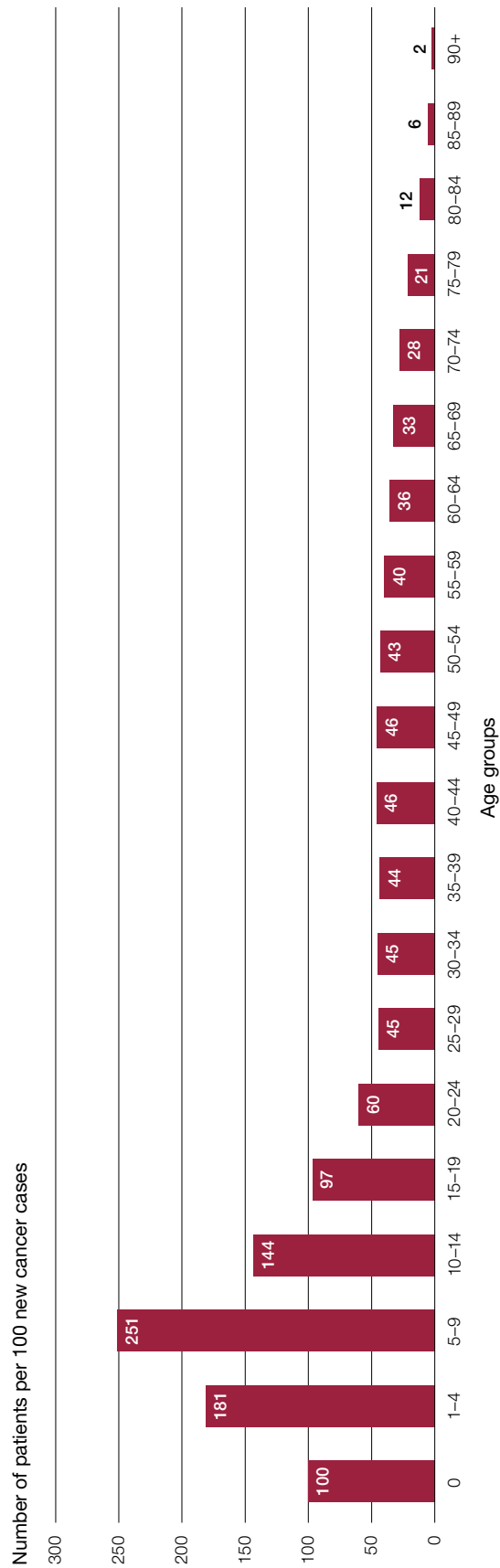


**Notes**

- 1 Only cancer patients receiving NHS-funded chemotherapy treatment in a hospital setting were included in this analysis. Those patients receiving chemotherapy in an outpatient department or a community setting and those that are privately funded were not included.
- 2 This figure presents data on 159 clinical commissioning groups. Research suggests that about 90% of cancer patients receiving chemotherapy can be identified in hospital episode statistics. We excluded the quarter of clinical commissioning groups (52) with the lowest rates of chemotherapy treatment from our analysis as their data are more likely to be incomplete.

Source: National Audit Office analysis of hospital episode statistics, and incidence data from the Cancer Commissioning Toolkit, produced by Public Health England

**Figure 44**  
 Number of cancer patients receiving chemotherapy per 100 new cancer cases by age group, 2012-13



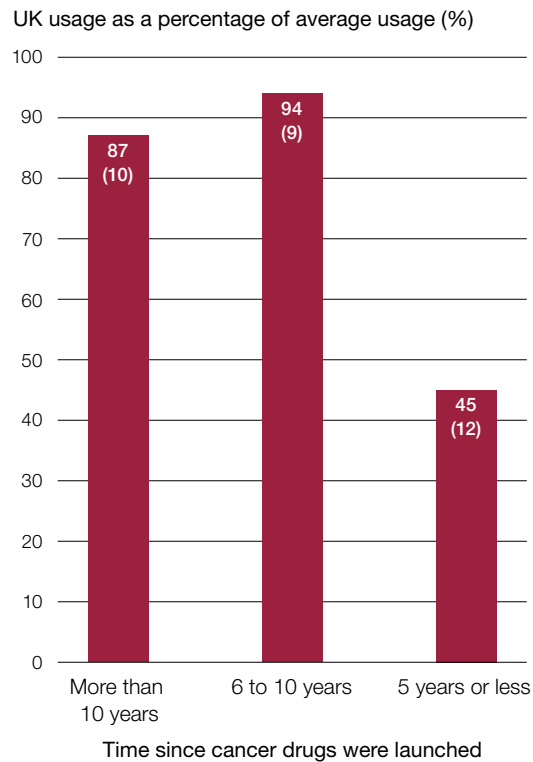
**Note**

1 Only cancer patients receiving NHS-funded chemotherapy treatment in a hospital setting were included in this analysis. Those patients receiving chemotherapy in an outpatient department or a community setting and those that are privately funded were not included.

Source: National Audit Office analysis of hospital episode statistics, and incidence data from the Cancer Commissioning Toolkit, produced by Public Health England

**Figure 45**

Comparison of the United Kingdom's cancer drugs usage before 2010 with 13 other countries



■ UK usage against average of 13 other similar countries.  
Text in brackets, UK ranking out of 14 countries

**Note**

1 Ranking out of 14 countries: Australia, Austria, Canada, Denmark, France, Germany, Italy, New Zealand, Norway, Spain, Sweden, Switzerland, the United Kingdom and the USA. The higher the ranking, the lower the usage level.

Source: National Audit Office analysis of data presented in Professor Sir Mike Richards CBE, *Extent and causes of international variations in drug usage: A report for the Secretary of State for Health*, July 2010

## D Service management by hospitals

### **Admissions to hospitals**

#### Why they are important

Most of the treatments for cancer patients, including surgery and chemotherapy, are carried out when patients are admitted to hospitals. Managing admissions more effectively and efficiently, including providing care in the most appropriate setting, should help to improve the quality of care and patient outcomes.

#### Trends

Cancer patients are increasingly being treated in a day-care setting, with an 11% increase between 2009-10 and 2012-13. While elective inpatient admissions to hospitals have remained constant, emergency admissions by cancer patients fell by 9% over the period. This compares with a 5% increase for the NHS as a whole (**Figure 46** overleaf).

Between 2009-10 and 2012-13, the total number of hospital bed days occupied by cancer patients reduced from around 3.4 million to around 3.0 million.

#### Variation by area

There is wide variation in the level of elective and emergency admissions to hospitals by cancer patients across the 211 clinical commissioning groups (**Figure 47** on page 85). A high level of elective admissions is not always associated with lower levels of emergency admissions, but more work is needed to understand the relationship between elective and emergency care for cancer.

#### Variation by demographic group

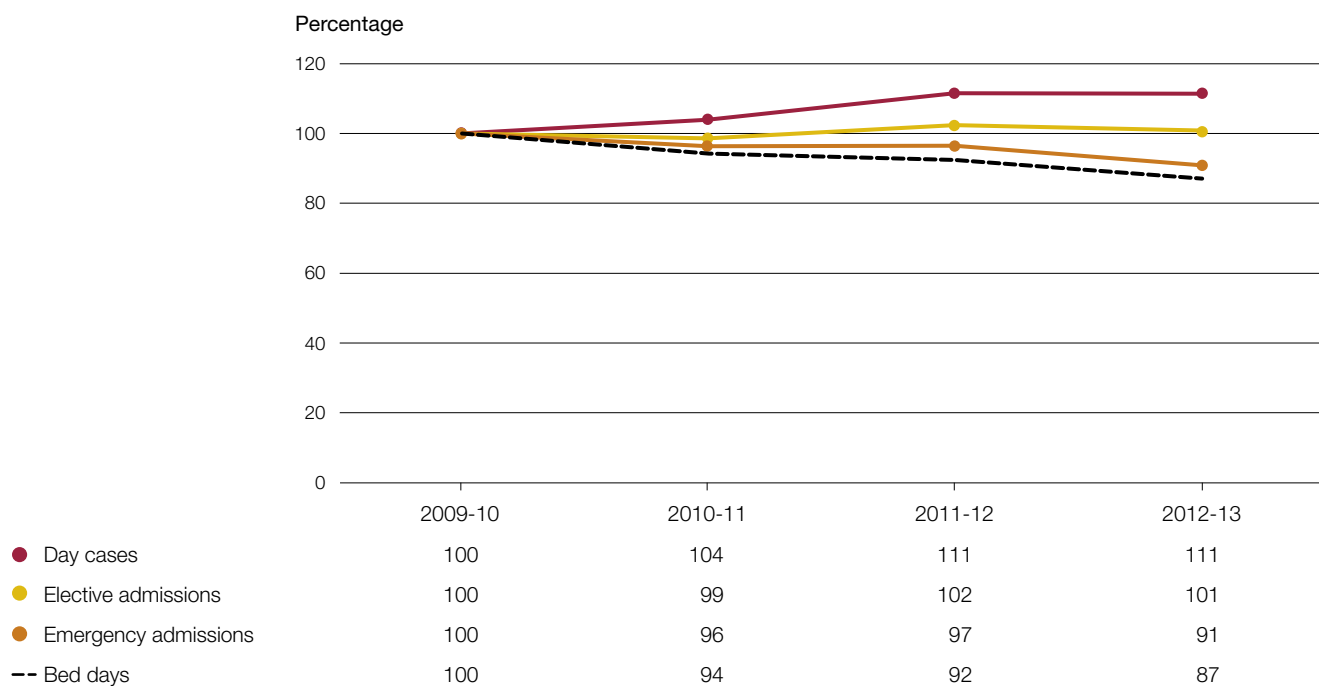
No comparative data available.

#### International comparisons

No comparative data available.

**Figure 46**

Trends in inpatient activity by cancer patients, 2009-10 to 2012-13



**Notes**

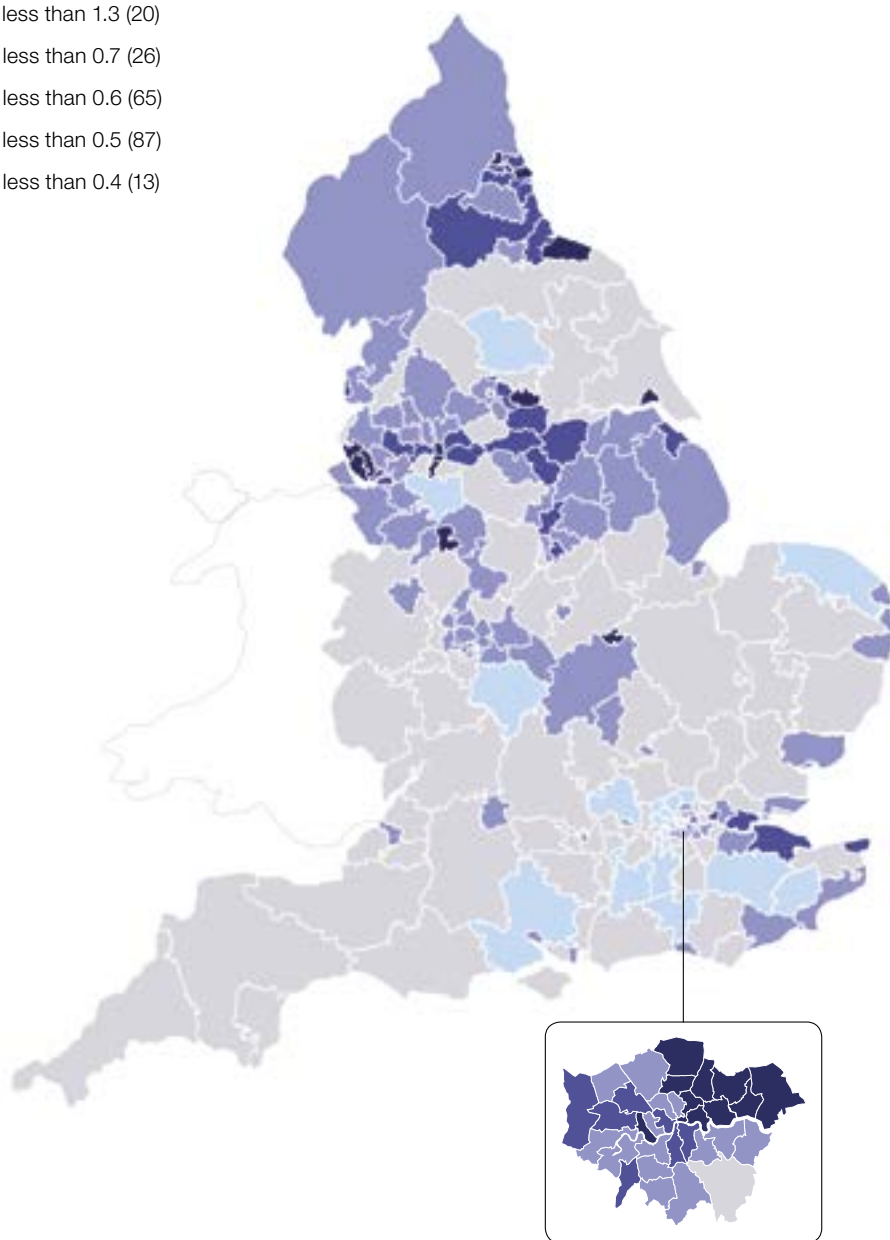
- 1 2009-10 was used as a baseline to index the trend in different types of inpatient activity by cancer patients.
- 2 All patients with a primary cancer and tumour diagnosis (ICD C00-97, ICD D00-48 plus a few other cancer-related ICD codes) were included in the analysis.

Source: National Audit Office analysis of hospital episode statistics, admitted patient care annual publications, 2009-10 to 2012-13

**Figure 47**

Number of emergency cancer admissions per new cases of cancer patients by clinical commissioning group, 2012-13

- 0.7 to less than 1.3 (20)
- 0.6 to less than 0.7 (26)
- 0.5 to less than 0.6 (65)
- 0.4 to less than 0.5 (87)
- 0.3 to less than 0.4 (13)



**Note**

1 All patients with a primary cancer diagnosis (ICD C00-97) were included in the analysis.

Source: National Audit Office analysis of hospital episode statistics, and clinical commissioning group profile data from Public Health England

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