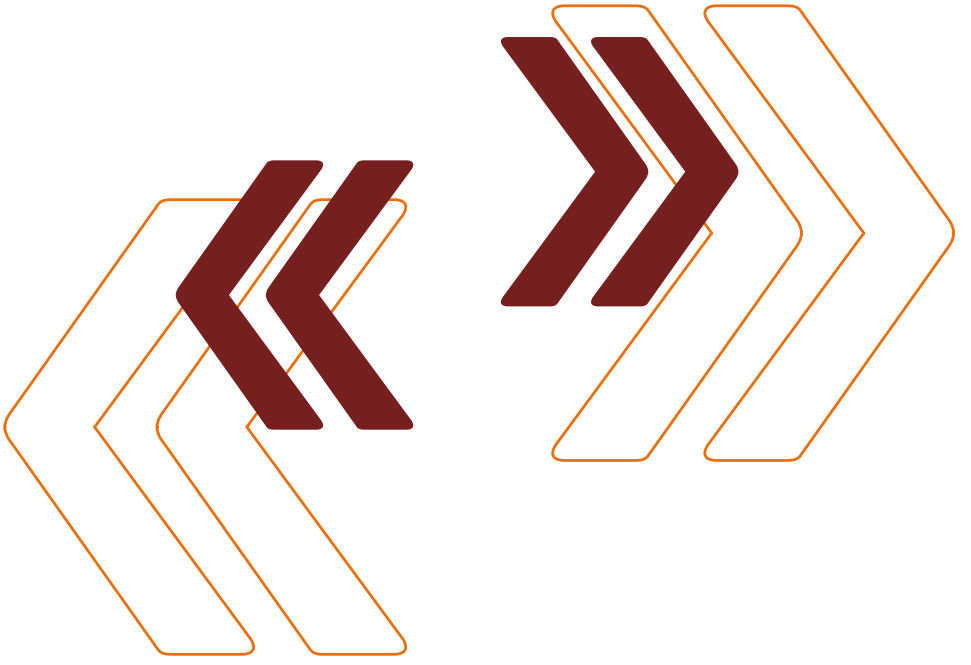
The King's Fund

Ideas that change health care

Authors

John Appleby
Tony Harrison
Catherine Foot
Alex Smith
Stuart Gilmour

Explaining variations in primary care trusts' spending on cancer services



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Acknowledgements

The King's Fund acknowledges invaluable support from the National Cancer Action Team which part-funded this study, and a steering group which provided advice about the study and comments on the final report:

Chris Carrigan, Head of the National Cancer Intelligence Network Co-ordinating Team

Jane Allberry, Deputy Director, Cancer Services, End of Life Care and Dermatology

Bob Park, Director, North East London Cancer Network

Rod Smith, Director of Finance, NHS West Kent

Peter Johnson, Chief Clinician, Cancer Research UK

James Thallon, Medical Director, NHS West Kent

Stephen Parsons, Director, National Cancer Action Team

Declan O'Neill, Director of Public Health Improvement, NHS West Kent

Andy McMeeking, Associate Director, National Cancer Action Team

We would also like to thank: the National Cancer Director, Professor Sir Mike Richards, for additional comments on the report; Yin Yau, Reg Middleton and Alison Gale at NHS West Kent for providing details of the PCT's experience with Programme Budgets; Michael Chapman from the National Cancer Intelligence Network for his advice and help; Fiona Craig from the Kent and Medway Cancer Network and Patrick McGinley from Maidstone and Tunbridge Wells NHS Trust for their input; and the Department of Health Programme Budgeting Team for their helpful comments.

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Summary

Background

From 2002 onwards, the NHS in England made a concerted effort to generate detailed, routine accounts by programme (defined generally in terms of disease areas), at the level of local NHS organisations (primary care trusts).

The stated aims of the NHS National Programme Budget Project (NPBP) are:

- to provide a way of monitoring where NHS resources are currently invested, in order, for example, to monitor expenditure against national service frameworks
- to help in evaluating the effectiveness of the current pattern of resource deployment and to act as a tool to support and improve the process for identifying the most effective way of commissioning NHS services for the future.

National spending totals produced by the NPBP conceal significant variation at a local level across England. In 2008/9 , there was a 4-fold variation in spend per head of population between the highest and lowest spending PCT on mental health, a 3.6-fold variation for circulatory diseases and a 2.5-fold variation for cancer.

Such variations are evident in all years and across all programmes, adding a further empirical dimension to a large international literature about the evidence of the pervasiveness of variations in all areas of health care – from rates of primary care prescribing and elective admission rates to hospital procedure costs and lengths of stay.

The fact that per capita spending by primary care trusts (PCTs) varies is not, in itself, an indication of a resource allocation problem. For over thirty years it has been a matter of policy, for example, to allocate the bulk of the total NHS budget to local areas in disproportionate per capita amounts to reflect variations in local need for health care. In 2009/10, for example, the weighted capitation system target per capita allocation for the highest PCT (£1,919) is nearly 70 per cent larger than that for the lowest (£1,155) (Department of Health 2009a).

Purpose of this study

Given the wide and persistent variation in spending on cancer services, this project aimed to:

- identify and quantify sources of variation in PCT cancer spending
- provide PCTs and cancer networks with a systematic way of framing decisions about the appropriate share of their total budgets to spend on cancer services
- identify possibilities for improving performance and the use of resources through reductions in unjustified spending variations and, more generally, through the adoption of better practice and service provision.

The scale of variation in cancer spend

We analysed variations in spending on cancer for the five years 2004/5 to 2008/9, between PCTs, cancer networks and sites, using several measures of variation: maximum, minimum, top and bottom deciles, top and bottom quartiles, standard deviation, and gini coefficient.

- **PCTs**: spending per capita was found to be approximately normally distributed. The ratio between the maximum and minimum spend declined from about 4 to 2.5 but other measures of variation changed very little over the five years.
- **Cancer networks**: no measure of variation showed a marked change but most measures showed an increase. As expected, given that networks are aggregates of PCTs, the scale of variation was less than for PCTs; for example, the maximum ratio of maximum to minimum spend in any year was 1.5.
- **Cancer sites**: data by cancer site was available only for the years 2006/7, 2007/8 and 2008/9. These show variations in the ratio of maximum to minimum spend of the order of 3 to 5 times. The smallest variations were found in skin and gynaecological cancer and the highest spending per head on haemotological cancers. In all three years, however, nearly 50 per cent of spend was coded as 'other', suggesting that PCTs were finding it hard to make accurate allocations.

Sources of spending variation

The key question raised by this analysis of spending variation is the extent to which such variation is explicable. We identified several possible sources of variation.

- PCT resident populations' needs for cancer care. These needs are obviously the main driver of spending and hence potentially the main source of variation.
- Differences in the costs of care which arise because of the way that services are organised on the ground and how well they perform. There is, however, insufficient data available at local level to allow such factors to be taken into account.
- Local commissioning and clinical choices justified on the grounds of maximising health benefits in cancer relative to other spending programmes and within the overall budget constraint for a PCT. There is a range of initiatives attempting to strengthen cancer commissioning. In the absence of strong evidence of the impact of these factors its impact, we have not attempted to take these into account .
- Variations arising from differences in the quality of the Programme Budget data submitted by PCTs. Earlier work by the National Audit Office had identified a number of factors that might lead to spending being imperfectly reflected in the Programme Budget data, and our own analysis has shown the extent to which PCTs have used the 'other' category to allocate spending. We have therefore attempted to estimate the extent to which the observed variation can be attributed to difference in the attribution of spending to the cancer programme.

- Difference in the finance available to PCTs because some receive less, and some more, than their target allocation. These differences will disappear in time but did exist during the period of analysis, so some variation may be due to some PCTs having more to spend on cancer than others. We have therefore taken differences from target allocations into account in our analysis of the impact of differences in cancer needs on spending variations.

Cancer spending needs

There is no currently available measure of cancer spending need. We therefore adjusted the programme spending data according to the needs measures used to allocate resources to PCTs either in total (the unified needs measure) or in respect of the hospital and community services elements. The spending data can also be adjusted to allow for the fact that actual allocations are above or below their target level.

- **PCTs:** substantial variations remain even after these adjustments are made. In some cases, the scale of variation is greater than for the adjusted figures, in others less. There is no clear evidence of the scale of variation declining over time.
- **Cancer networks:** surprisingly, the ratio of maximum to minimum spend rises after adjustment using the unified needs measure. Little difference is found on other measures between the adjusted and the unadjusted data.
- **Cancer sites:** use of the unified needs measure reduces variation but only by a small amount.

We also examined three alternatives to the population denominator: cancer deaths, cases (cancer prevalance) and new cancer cases (incidence) for each year. We tested all these using adjusted and non-adjusted spending data. Cancer prevalance explains about 40 per cent of the variation in spending (adjusted by the general needs index). Other relationships are much weaker.

Differences in spending in terms of differences in need for care can, at best, explain less than half the observed variation. However, this only holds if the spending data is adjusted to allow for differences in generalised measures of need, that is, not in cancer-specific need.

Progamme Budget data quality

While some variation in PCT spending is to be expected, it is clear from observing the spend data for cancers and tumours as a whole, and for spending by cancer site, that some PCTs' spending may seem implausibly high or low relative to that of others. However, excluding data identified as too extreme to be plausible implies that the retained data is accurate. But there are reasons to believe this is not the case.

An alternative check on data accuracy – the extent to which spending varies for each PCT from year to year – suggests that data problems may affect more than a handful of outliers. There is some indication that comparatively low-spending PCTs in one year tend to report increased spending the following year – and vice versa.

However, it is difficult to conclude whether this pattern of changes necessarily indicates problems with the quality of the data, partly because changes are made to the collection each year by the Department of Health to improve data quality. It might be the case that PCTs' relative spending in one year encourages them to make greater efforts to ensure their data is more accurate. On the other hand, it is probably the case that PCTs which spend closer to the national average should not necessarily take this to indicate that their data is more accurate than other, more outlying PCTs.

Movement in reported spending from one year to the next has left the overall variation in the data almost unchanged. There appears little to indicate any significant convergence to the average, for example. It is quite possible, however, for the 2008/9 dataset to be more accurate than previous year's as a result of the use of prior year comparisons (and subsequent adjustments or more accurate data) while leaving the bulk of the variation in the data the same.

The National Audit Office's good governance report concluded that while the processes for collecting data were well-defined in most areas, there remained scope for improvement in the robustness of the data (NAO 2008).

NHS West Kent used an alternative approach to producing cancer Programme Budget information using the local cancer registry to identify cancer patients. This approach identified similar levels of expenditure to the traditional method at an aggregate level. However, there were differences at sub-programme level between the two methods. Further work is planned to allocate costs more accurately to specific cancer sites in order to reduce the high proportion of cancer costs that are, by default, allocated to 'other cancer'.

There is *prima facie* evidence of problems with the quality of the Programme Budget data. There are a number of possible reasons for this, including a lack of incentive on the part of providers to devote necessary effort and time in producing high quality data, and technical problems with accurately allocating cancer-related resource use to the cancer programme (for example, GP prescribing).

Conclusions and recommendations

We have established that:

- demand factors can, to a limited degree, explain variations in PCT spending on cancer
- differences in reporting (ie, data quality) are probably important, but we have not been able to determine how significant they are.

The Department of Health should:

- continue its efforts to improve the accuracy of Programme Budget data
- support the development of pathway- and patient-level costing
- develop a framework that would support PCTs in determining in which parts of the cancer system to invest.

1 Introduction

Since their inception, NHS organisations have produced annual accounts of their spending based on standard, subjective accounting methods. This view produced an input-based picture of NHS spending – total spend on transport, nursing, postage, electricity and so on. While such accounts have their uses, these were limited. In particular, these methods failed to provide an account of resource use which would help inform basic planning, cost effectiveness and priority-setting questions concerning the link between inputs and outputs. As Hagen notes (Hagen 1968), in the USA before the 1921 Budget and Accounting Act, '…it was virtually impossible for any appropriating body or the public to know where its money was going'.

The limitations of input-based accounts, both in the public and private sectors, has long been recognised. Alternative accounting descriptions designed to fit better the actual production and managerial structure of organisations have been in use since the turn of the 20th century. Alternative accounts constructed on the basis of specific categories or programmes of activities or services were first tried by New York City's Bureau of Municipal Research in 1907.

Although various recommendations and reforms followed, with a number of federal US organisations adopting the principles of Programme Budgeting, it was not until the 1960s that the USA began seriously to adopt programme budgeting accounts across whole agencies, such as Defense. Similar accounts were tried in the UK by, for example, the Home Office in the 1970s. Subsequently, attempts were made to apply the principles of programme budgeting to health care. For example, for many years the Department of Health produced estimates of national spending by broad NHS service area – inpatients, outpatients, community services and so on.

The National Programme Budget Project

It has only been with the implementation of the National Programme Budget project (NPBP) in 2002, however, that the NHS has made the first, concerted effort to generate detailed, routine accounts by programme (defined generally in terms of disease areas), at the level of local NHS organisations (primary care trusts).

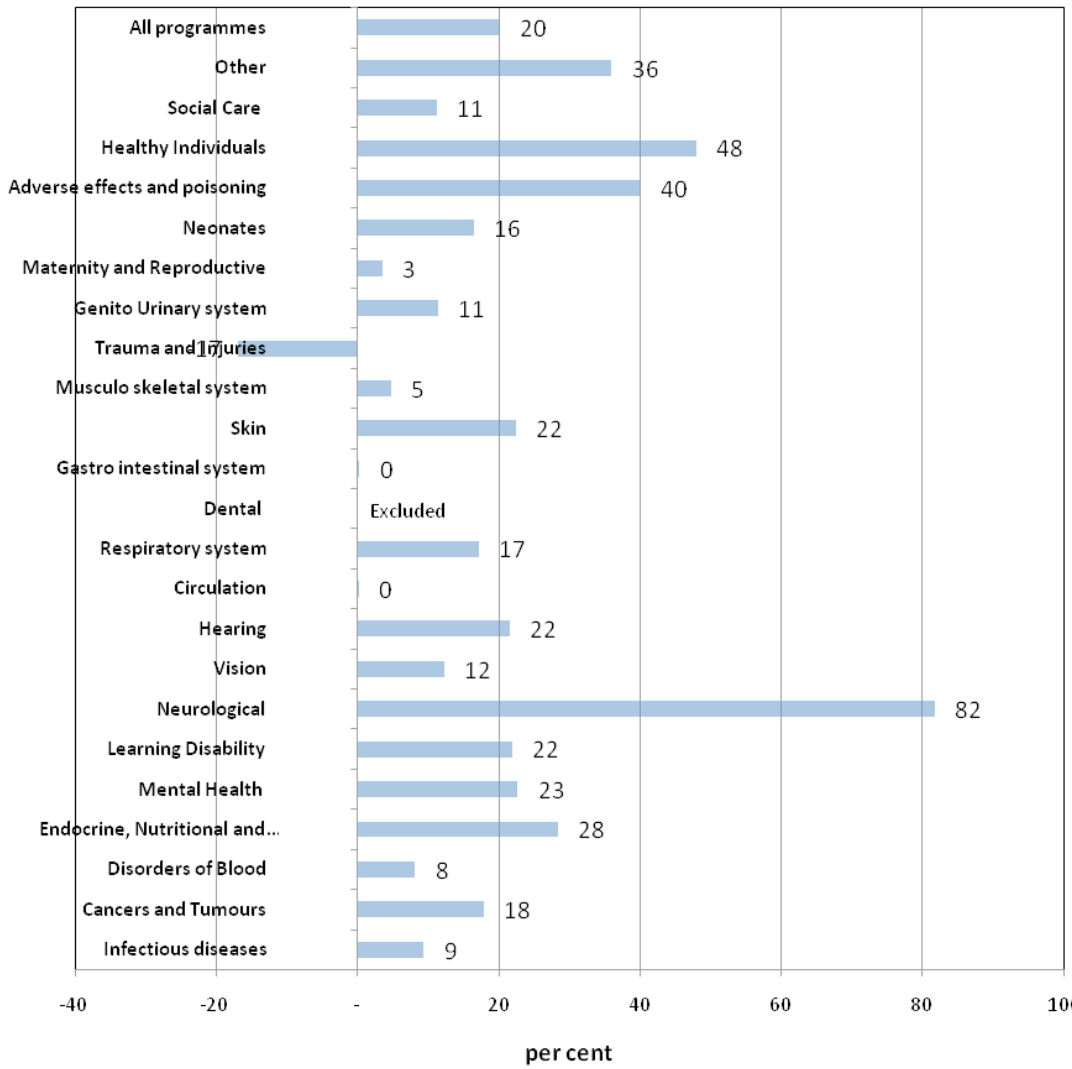
The stated aims of the NPBP are:

- to provide a way of monitoring where NHS resources are invested, in order, for example, to monitor expenditure against national service frameworks
- to assist in evaluating the effectiveness of the current pattern of resource deployment
- to act as a tool to support and improve the process for identifying the most effective way of commissioning NHS services for the future.

The NPBP has now produced PCT-level data on spending across 23 programmes of care (with a number of sub-programmes within some categories), based on medical conditions such as mental health, cardiovascular disease and cancer, for the five years from 2004/5 to 2008/9.

The latest Programme Budget data now covers around £78 billion (over 80 per cent) of total NHS spending and – in theory at least – all spending controlled by PCTs. Headline results from the NPBP reveal the split in total PCT spending across programmes. Figure 1 shows these for each of the five years covered by the dataset so far; note that figures have been adjusted to 2008/9 prices using the GDP deflator to show real as opposed to cash changes.

Figure 1: National Programme Budget spending (at 2008/9 prices)

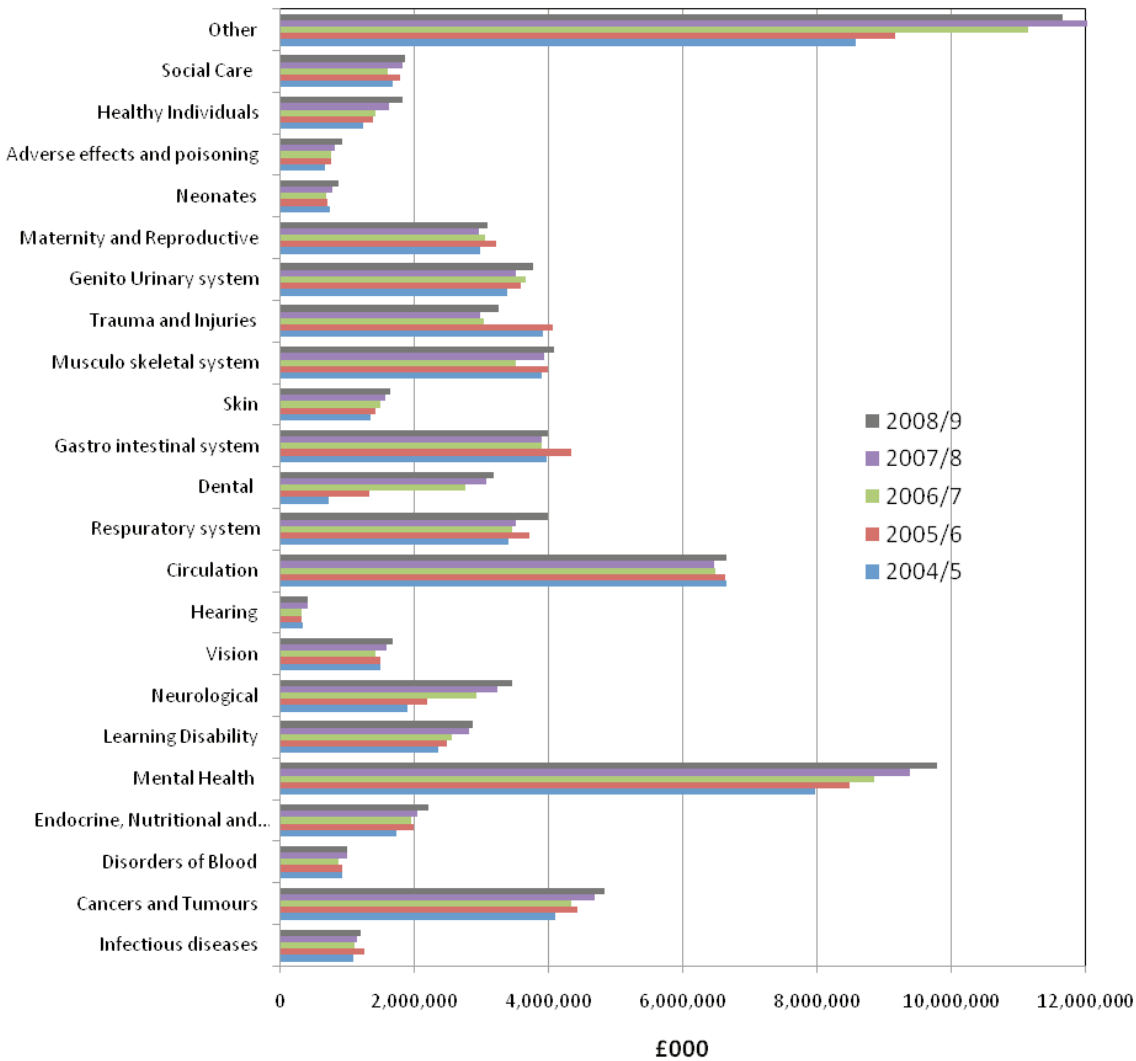


Source: Data: National Programme Budget Project (2019); calculation, authors.

Overall, the total Programme Budget spend has increased by 20 per cent in real terms between 2004/5 and 2008/9, while for cancer, real spend has increased by 18 per cent. Figure 2 shows changes in real spending for all other programmes excluding dental, where changes are very large in 2005/6

and 2006/7 and relate to data collection issues rather than actual changes in expenditure.

Figure 2: Changes in real spending 2004/5 to 2008/9 by Programme Budget category



Source: Data: National Programme Budget Project (2009; calculation, authors.

Spending variations

What these headline totals (and previous attempts at national Programme Budgeting) conceal, however, is significant variation at local level. For example, for the top three spending programmes in 2008/9, there is a 4-fold variation in spend per head of population[1] on mental health, 3.6-fold

1 Note that while the cost data used to calculate NPBP per capita spending figures are derived from the actual costs of treating and caring for patients, the per capita figures are based on PCTs' entire resident populations. They do not therefore necessarily reflect differences in the amount or type of care received by individual patients in different PCTs.

variation for circulatory diseases and a 2.5-fold variation between the highest and lowest spending PCT for cancer.

Such variations are evident in all years and across all programmes and add a further empirical dimension to a large international literature concerning the evidence of the pervasiveness of variations in all areas of health care – from rates of primary care prescribing and elective admission rates to hospital procedure costs and lengths of stay.

The fact that per capita spending by PCTs varies is not, in itself, an indication that resources are being misallocated. For over thirty years it has been a matter of policy, for example, to allocate the bulk of the total NHS budget to local areas in disproportionate per capita amounts to reflect variations in local populations' health care needs. In 2009/10, for example, the weighted capitation system target per capita allocation for the highest PCT (£1,919) is nearly 70 per cent larger than that for the lowest (£1,155) (Department of Health 2008a).

However, the actual variations in PCT spending by disease area reported by the NPBP data are much larger. While such variation may be an indication of a problem, there is no reason necessarily to suppose that spending variations on individual programmes should be of the same order as the variation in *total* spend per capita. In fact, it is to be expected that there will be more variation. The question is, how much more? And to what extent do observed variations truly reflect local health care needs? Any variation in spending over and above that which reflects population health needs suggests an allocative problem exists and indicates not only that PCT spending patterns may be inefficient, but may also be inequitable.

This project

In order to investigate these issues, this project has focused on one spending programme, cancer. It aims to:

- identify and quantify sources of PCT cancer spending variation
- provide PCTs and cancer networks with a systematic way of framing decisions about the appropriate share of their total budgets to spend on cancer services
- identify possibilities for improving performance and the use of resources through reductions in unjustified spending variations and, more generally, through the adoption of better practice and service provision.

This report first describes in more detail the patterns of PCT and cancer network spending variations reported by the NPBP, before setting out a priori reasons for justifiable and unjustifiable spending variations. It goes on to consider the factors that might give rise to variation, distringuishing between justifiable and unjustifiable reasons. Of the justifiable factors, we select cancer needs factors and of the unjustifiable, data quality for detailed investigation. The results are then reported, and the final section draws out conclusions from the study.

2 Variations in spending

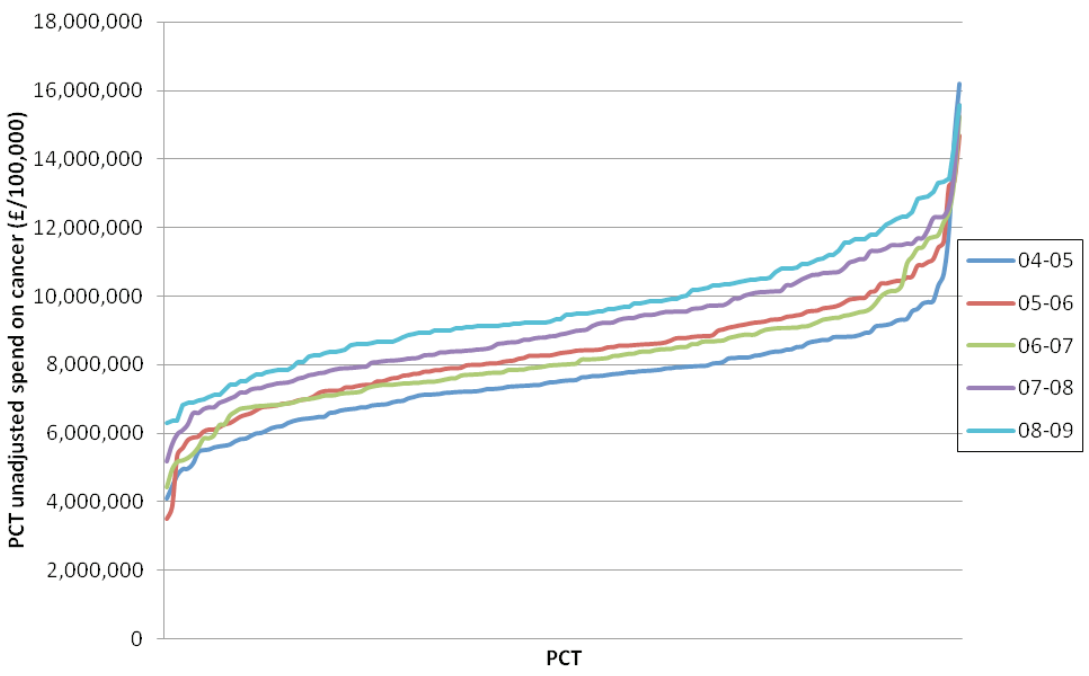
Since the publication of the first set of Programme Budget data for the financial year 2004/5, it has been evident that there are considerable variations in per capita (population) spending within all programme areas. For most programme spends, at the extreme (the highest- versus the lowest-spending PCT) there is between a 3- and 6-fold variation in per capita spending[1].

In this section we describe in more detail variations in PCT spending on cancer services, using data from the five years of Programme Budget information by PCT and cancer network as well as cancer sites. This data shows variations on the basis of reported spend per 100,000 population.

PCT spending variations

Figure 3 shows, for the five years 2004/5 to 2008/9, the variation in PCT cancer spending per 100,000 people (note: PCTs are ordered separately from low to high for each year). The shift in the curves reflects changes in levels of cash spending by PCTs over time; these have risen over time (apart from 2006/7 for most PCTs). Appendix A details each PCT's raw cancer spending per 100,000 population for all four years.

Figure 3: Variation in PCT cancer spending, 2004/5 to 2008/9



At the extremes, spending variation has reduced from around a 4-fold difference to a 2.5-fold difference. Table 1 details various measures of variation in the spending data and shows variations at the extremes of

1 For some programmes this variation is much larger: spending on HIV/AIDs, for example, varies 4,419-fold at the extremes; spending on conditions of neonates varies 62-fold.

distribution as well as for the (weighted) average for the top and bottom deciles and quartiles. Variations are, naturally, smaller at these aggregates.

Table 1: Measures of variation: PCT cancer spending

	2004/5	2005/6	2006/7	2007/8	2008/9
Max (£)	16, 187,950	14,672,244	15,241,574	15,566,530	15,568,771
Min (£)	4,094,612	3,501,184	4,436,622	5,187,796	6,289,600
Variation	*3.95*	*4.19*	*3.44*	*3.00*	*2.48*
Top decile (£)	10,403,400	11,198,273	11,199,492	12,429,997	12,909,238
Bottom decile (£)	5,290,438	5,748,466	5,702,409	6,557,583	6,906,375
Variation	*1.97*	*1.95*	*1.96*	*1.90*	*1.87*
Top quartile (£)	9,188,717	10,100,884	10,022,898	11,397,564	11,658,616
Bottom quartile (£)	6,023,795	6,567,190	6,585,906	7,224,413	7,565,834
Variation	*1.53*	*1.54*	*1.52*	*1.58*	*1.54*
Standard deviation	1,538,198	1,586,685	1,586,434	1,642,560	1,693,029
Gini coefficent	0.1022	0.1020	0.1017	0.1000	0.0972

The table also shows the standard deviation for spending patterns for each year. The spending data for all years is approximately normally distributed, with around 32 per cent of PCTs (49) more than one standard deviation above or below the (arithmetic) mean spend, and around 5 per cent (8) above or below two standard deviations above or below the mean.

The final measure of variation is the Gini coefficient, which ranges from 0 (complete equality in spending between PCTs – ie, in effect, the national average) to 1 (complete inequality – ie, where one PCT spends the total national spend on cancer). The Gini coefficient is computed using the whole distribution and not just comparisons of parts of the distribution (such as the top and bottom 10 per cent). Although this is a potentially useful measure of variation, its benchmark – equal spending per head across all PCTs – is not appropriate when applied to PCTs' raw spending. This is because some degree of inequality is to be expected due to variations in, for example, different PCT populations' need for health care. It has been retained here for completeness and for comparison with the Gini coefficient for the needs-adjusted PCT spend detailed below.

What all these measures show is that raw PCT spending per 100,000 population varies and that there has been little change over time in the scale of variation.

Spend by cancer network

There are 28 cancer networks in England that form the 'glue' for the co-ordinating services required by cancer patients. Their roles include:

- strategic planning and achieving clinical integration
- promoting cost-effectiveness
- improving clinical outcomes
- enhancing the patient experience.

Network members include representatives from acute trusts, primary care trusts and voluntary sector organisations. The success of a network is

generally seen to depend on the commitment of its members to developing a collaborative approach to improving cancer services across their area. Involving other stakeholders – including patients, carers, health care professionals, academics and voluntary organisations – is also seen as important.

Cancer networks typically have populations of 1–2 million people, although the largest, covering the East Midlands, serves a population of more than 3.5 million. Marked variations are apparent between cancer networks in the amount spent on cancer per 100,000 population. This data is derived from Programme Budget data provided by PCTs and mapped onto the cancer networks. The size of the variation between different networks will be less than for PCTs, as networks cover larger populations.

Similar analysis for cancer networks has been carried out as that for PCT-level data described above. Table 2 below shows different measures of variation for unadjusted spending data within cancer networks between 2004/05 and 2007/08. The table shows variations at either end of the distribution as well as for the weighted average for the top and bottom deciles and quartiles. Variations are, naturally, less pronounced using these aggregates. Variations between the top and bottom deciles are markedly similar for all years, as are variations between the top and bottom quartiles.

The Gini coefficient is a measure of equality; the closer to zero, the more equally the total spending (ie, the sum of spending per 100,000) is shared between the cancer networks. This measure is of less use on unadjusted data but is shown here for completeness of analysis because it is potentially useful for the adjusted data described later.

Table 2: Measures of variation: cancer network spending per 100,000 population

	2004/5	2005/6	2006/7	2007/8
Max (£)	8,795,736	9,764,582	9,519,490	10,867,260
Min (£)	6,325,971	6,829,895	6,272,434	7,613,877
Variation	*1.39*	*1.43*	*1.52*	*1.43*
Top decile (£)	8,495,548	9,180,039	9,219,252	10,720,607
Bottom decile (£)	6,531,997	9,180,039	9,219,252	10,720,607
Variation	*1.30*	*1.31*	*1.36*	*1.39*
Top quartile (£)	8,270,919	9,057,590	9,068,736	10,243,861
Bottom quartile (£)	6,729,772	7,190,129	7,112,531	7,794,233
Variation	*1.23*	*1.26*	*1.28*	*1.31*
Standard deviation	592,402	739,554	815,209	987,888
Gini coefficent	0.0433	0.1187	0.0559	0.1313

Note: 2008/9 Programme Budget data does not present spending by cancer network.

Spend by cancer site

Disaggregated spending data by cancer site is available for 2006–07, 2007–08 and 2008–09. This data shows large variations in the amounts PCTs spend on different types of cancer.

By far the greatest spend is allocated to the 'other' category – 44 per cent of cancer spend in 2006/7 and 46 per cent in both 2007/8 and 2008/9. This may reflect difficulty in allocating spending at such levels of disaggregation as well as the novelty of this data collection.

Figures 4–6 are 'box and whisker' plots showing the distribution of spend by cancer type for all PCTs, using unadjusted figures for 2006/7 to 2008/9. The lengths of the boxes show the interquartile range, the solid line in the middle of the box the median and the 'whiskers' the maximum and minimum values. Outliers have been excluded from the graphs for ease of comparison.

The high variation in the amounts PCTs spend on different types of cancer indicate the data should be treated with caution: in all three years of data collection, PCTs coded almost 50 per cent of spend by cancer site as 'other'. At the extremes, three- to five-fold variations are apparent for most cancer sites across all years. The smallest levels of variation are evident for skin, gynaecological and head and neck cancer spending across all years.

Figure 4: 2008/9 unadjusted spend by PCTs on different types of cancer per 100,000 population

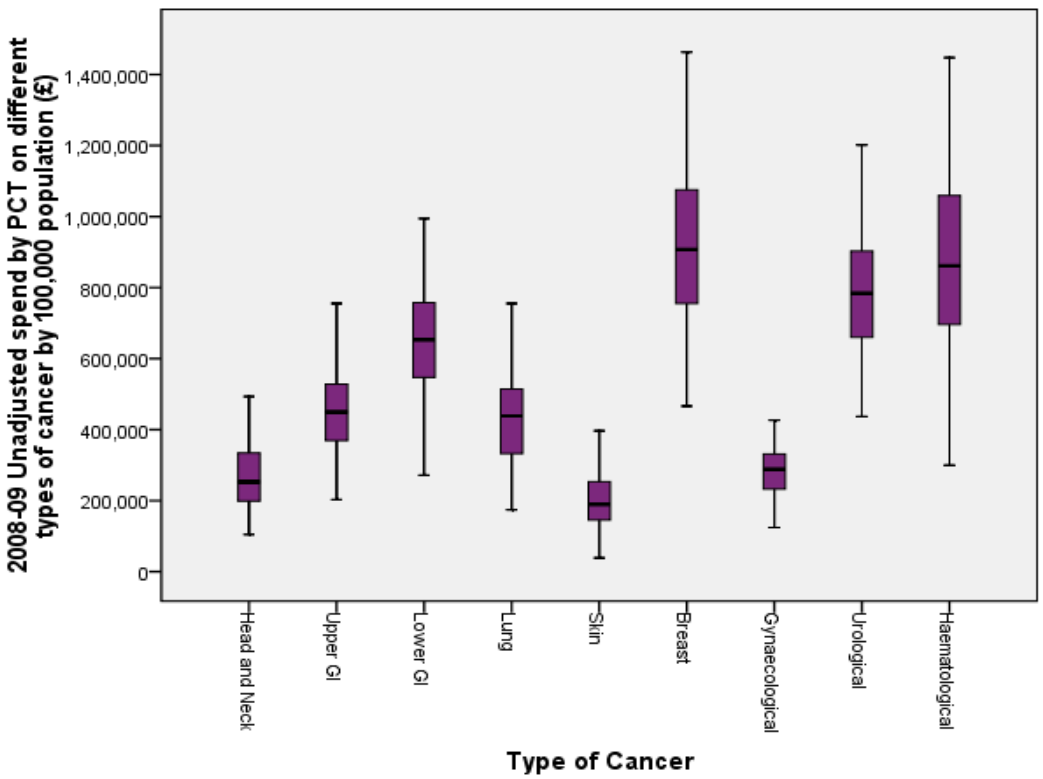


Figure 5: 2007/8 unadjusted spend by PCTs on different types of cancer per 100,000 population

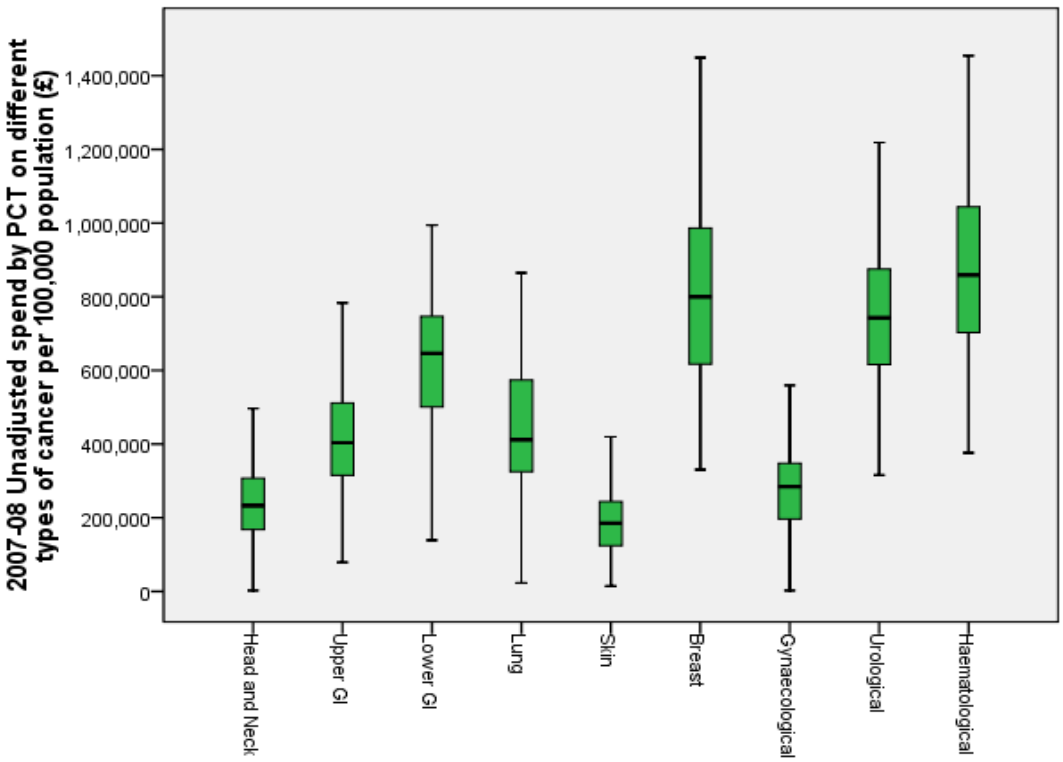
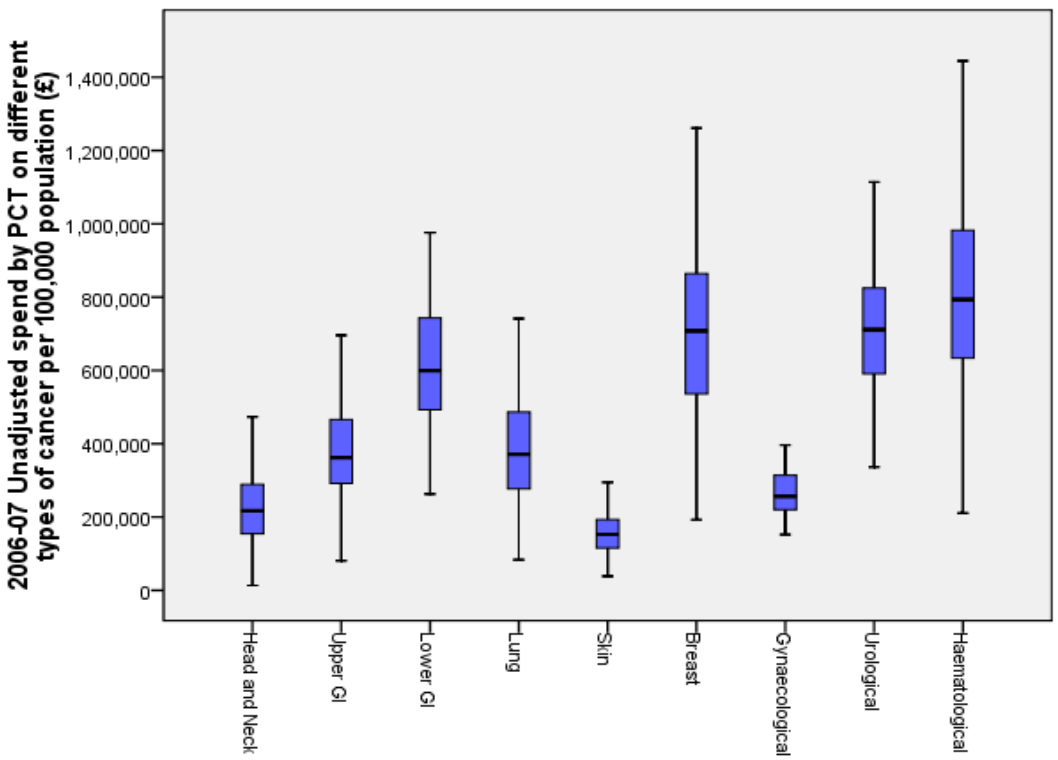


Figure 6: 2006/7 unadjusted spend by PCTs on different types of cancer per 100,000 population



Conclusions

Comparisons of the highest and lowest spending PCTs reveal spending variations of around 3- to 4-fold. But comparison of the extremes of the PCT spending distribution are not as useful as measures that use more than just two observations. However, on all the other measures, a high degree of variation in PCT spending persists and appears fairly constant over time.

Variations are also evident for spending aggregated at the level of cancer networks and, for PCTs, spending by cancer site.

The key question raised by this analysis of spending variation is the extent to which such variation is explicable. The next section considers what factors might account for differences in per capita spending on cancer services.

3 Sources of spending variations

An initial assumption about the reasons for the spending variations reported in Section 2 is that we can draw a distinction between 'justifiable' and 'non-justifiable' reasons for differences in spending. Justifiable variations are taken to be those arising from differences in the objective factors commissioners face – the needs of patients and the costs of their care – or from deliberate decisions to spend more or less in the light of local priorities and the financial resources available. Unjustifiable variations encompass differences that may be related to inefficient local health systems and which are under the control, at least to some degree, of local decision makers or the result of poor commissioning decisions.

Sources of variation can be grouped into four categories:

- demand (that is, need for cancer care)
- costs of care
- financial resources available at local level
- local choice concerning standards and scope of care.

Next, we consider the extent to which there may be justifiable and non-justifiable elements within each category.

Demand

In the short term, the number of new cases presenting for treatment will be determined by factors largely outside the control of local commissioners. The number and type of cancer cases to be treated in a given area will depend largely on the demographic composition of the local population and on other local or environmental factors that might give rise to cancer, such as local industry and the chance factors that give rise to the rarer cancers.

As well as new referrals arising in a given year, there will be a number of patients from previous years requiring continuing treatment or follow-up. The workload in any year will therefore reflect what has happened in earlier years. However, unless demand is changing rapidly, the ratio between the two is likely to change only slowly.

In principle, PCTs can affect the demand for care to the extent that they can influence effective (ie, early) diagnosis by GPs and other professionals and can promote personal behaviour that reduces the risks of their population developing cancer. They may ensure that GPs receive extra advice or training or run awareness campaigns targeted at patients and/or professionals.

But the impact of such policies remains to be established. They are among the subjects being studied through the National Awareness and Early Diagnosis Initiative. Until there is more understanding of the potential of these policies, we must assume that PCTs have little scope to influence the level of demand they face. Variations in spending from this source therefore can be regarded as justifiable.

Costs of care

The original objectives of this research project identified treatment decisions and delivery inefficiencies as sources of variation. The costs of treatment are outside the control of the commissioner, at least in the short term because of the tariff and because of the limited nature of the PCT's influence. If commissioners paid actual costs per case, and hence expenditure reflected provider efficiency levels, then high or low provider costs could enter the analysis directly (exactly how would depend on the form of the analysis).

This would be the right approach if, as we argue below, commissioning input were limited. In principle, however, commissioners do have a role in determining how services are provided. If so, then variations in inpatient treatment costs should be treated as potentially non-justifiable commissioner expenditure; this would include, for example,clinically unnecessary excess bed days, unless these were justified by improved outcomes.

Patients access care by a number of different routes: screening, fast track GP, slower track GP, accident and emergency departments (A&E), and via other consultants. Actual spend will depend on:

- the costs of identifying patients requiring care
- the routes along which patients pass on the way to and during treatment
- the length of time patients survive after treatment and hence the costs of follow-up services in the community.

In an ideal system, the screening programmes would accurately define all positive and negative cases and the fast track would be used only for patients who proved to have cancer. The other routes would be minimally used because patients would present early enough via their GPs and GPs would accurately determine which patients had cancer and hence would not misdirect them to other specialties or other inappropriate forms of care.

The current system is very far from this ideal and it is known, for example, that only a fraction of fast track cases prove to have cancer and a significant proportion of patients present as emergencies.

If an ideal system were in place – in terms of identifying patients with cancer early and accurately and routing them apropriately to secondary care – it is not clear whether it would lead to high or low costs. It is not known how costs vary by pathway (although there is work beginning through the cancer commissioning exemplar projects and recent work conducted by Macmillan Cancer Support and the Monitor Group to begin to build this picture).

One project involving the North East London Cancer Network (NELCN) along with the National Cancer Action Team (NCAT), Roche and the West London Cancer Network, is costing cancer pathways, beginning with breast and lung cancer. This is a challenging task, with pathways sometimes hard to define clearly in terms of diagnosis codes, procedure codes and Healthcare Resource Groups (HRG), and cost information coming from a range of sources such as the tariff, the indicative tariff and reference costs. However, after technical and clinical validation workshops, the pathways have been defined and work is under way to cost each element of the pathway.

This work will yield important information. For example, the 'less desirable' A&E pathway might prove to be low cost because it omits some early costs (such as GP consultations) and because it may have a poorer outcome than the others (hence saving costs later in the pathway). Equally, the A&E pathway might lead to higher costs due to the longer hospital stays that are typically associated with emergency patients. The 'more desirable' fast track pathway may be high cost but justifiable if it produces better results in terms of health outcomes.

While 'health outcomes' in this context would primarily mean 'survival outcomes', there are of course other outcomes or benefits that an effective cancer service should deliver: For example:

- good process and patient experience – support before treatment, information
- post- treatment monitoring and support
- good end-of-life care.

Overall spending figures would shed no light on the scale of these outcomes or their justification as no benefit measures are available and the last survey of cancer patients' experiences was conducted in 2004 (although a further survey is soon to be completed). As a first step, any analysis of spending would need these elements to be identified separately.

Until the results of the pathway studies are available and there is a more detailed analysis of spending, we do not think it is practicable to take cost variations arising from different service configurations into account.

Local choice

PCTs face decisions about spending across all 23 programmes of care and, in theory at least, will allocate their total budget until the marginal benefits of spending the last pound in each programme are the same. Given variations in population need – not just for cancer services, but all other areas of spending – and variations in the efficiency with which providers are able to convert inputs (ie, PCT spending) into desired outputs (ie, health benefits), there will be variations in spending on cancer and other programmes.

To assess whether these commissioning factors can explain any part of the variations in cancer spending would, in effect, require a detailed review of the competency and practice of cancer commissioning, which is beyond the scope of this project.

Anecdotally, however, discussions about cancer commissioning with NHS West Kent the Kent, Medway Cancer Network and the North East London Cancer Network (NELCN) suggest that, to date at least, commissioning factors are likely to have had limited impact.

Commissioning in cancer has, arguably, been particularly weak because of the complexity of cancer pathways and because of the relative dominance in the system of a small number of major cancer provider organisations. From NHS West Kent's perspective, commissioning priorities have been driven by several factors including national priorities, capacity, technology, access, national targets and guidance. While these drivers remain, NHS West Kent has adopted a programme-based approach to planning and prioritisation,

which helps to ensure that the relative needs of different patients are clearly reflected in the commissioning intentions.

A considerable amount of work is underway to strengthen cancer commissioning, suggesting commissioning factors could play a greater role in spending in the future. A range of important new initiatives is underway to support stronger cancer commissioning. Three of these initiatives are described in the box below.

The Cancer Reform Strategy identified commissioning as a major potential lever for quality improvement in cancer and there remains a considerable way to go to strengthen cancer commissioning at both network and particularly PCT level. In the first annual report of the Cancer Reform Strategy, for example, it was recognised that:

> *…although all Cancer Networks had plans to implement the Cancer Reform Strategy, those plans did not necessarily feed through into PCT commissioning plans.*
>
> (Department of Health 2008b, para 9.7)

Initiatives such as the *Cancer Commissioning Guidance* (Department of Health 2009c) and *Cancer CommissioningToolkit* (NCAT 2010) and the commissioning exemplar projects, combined with wider work to develop world class commissioning, all have potential to strengthen cancer commissioning in the future. While it is outside the scope of this study to fully ascertain the degree to which commissioning decisions could be driving spending decisions and thus explaining variation in spend, on balance the limited evidence suggests commissioning factors are to date playing only a small role and hence can be omitted from the present analysis.

Three major initiatives to strengthen cancer commissioning: the *Cancer Commissioning Guidance* and *Toolkit*

Cancer Commissioning Guidance

Cancer Commissioning Guidance (Department of Health 2009c) has been developed by the National Cancer ActionTeam (NCAT) in order to support world-class commissioning of cancer services across the NHS. The guidance sets out key issues and questions that commissioners and cancer network teams should take into consideration when performing their key commissioning functions – assessing health needs, reviewing services, developing their contract service specifications and monitoring performance.

Cancer Commissioning Toolkit

The guidance is supported by the *Cancer Commissioning Toolkit*, developed by NCAT (2010) and National Cancer Intelligence Network (NCIN). The toolkit is a web-based, 'one-stop' source of cancer information, bringing together national published information on cancer that is held in different places such as the cancer registries, screening services, Hospital Episode Statistics (HES) and Programme Budgeting data. These and other relevant cancer metrics have been selected and benchmarked to answer key commissioning questions and act as a catalyst for intelligent discussion between commissioners, local providers and the local population.

Cancer Commissioning Exemplar Projects

NCAT is running 20 cancer commissioning exemplar projects to further develop cancer commissioning, all of which are due to report by July 2010 (Department of Health 2009c). For example, the North East London Cancer Network (NELCN) is engaged in one project which is seeking to develop commissioning against agreed pathways of care. To do this, the first step is to develop agreed, clinically effective pathways, at least for the common cancers. These pathways are well into development, and are being put on to the Map of Medicine (NHS Institute for Innovation and Improvement 2010) for use by other networks. The second step is then to benchmark each local provider against these pathways for cancer care, so as to identify differences between current and best practice. This too is under way in NE London. Each provider should then have a clear understanding of the extent to which its practice meets best practice and what it needs to improve to move towards providing clinically effective pathways. Services can then be commissioned with these considerations in mind. While it might not be possible immediately to commission for the best practice pathway, the commissioner and provider can agree service specifications which will prioritise the most important improvements and incrementally move the provider towards best practice.

Financial resources

The method used to determine how the share of national resources should be allocated to PCTs does not have a specific cancer component: a general needs index is used, based on factors such as age and deprivation.

The allocation method was changed for the 2009/10 and 2010/11 PCT allocations. Actual allocations are not in line with the amounts that PCTs should receive according to the new formula, because the rate at which changes in allocations are made was explcitly limited.

There is no way of estimating the extent to which a 'resource rich' PCT would spend extra funding on cancer: we assume for the purposes of this analysis that it would raise spend in proportion to the extra funding it enjoys across cancer and all other services. However, we recognise that in some areas a few specific programmes may have disproportionate effects – for example, high spending on mental health and learning disability services is still associated with historical institutional service provision in some areas.

Data accuracy

Any data series is liable to recording and other errors. In the case of the National Programme Budget data there is evidence, from work carried out by the National Audit Office, that PCTs and NHS trusts have been finding it hard to allocate spending accurately to each programme. In addition, as the National Audit Office notes, providers have little incentive to supply the data required (see box below).

On the face of it, there is reason to believe that some of the variation described in the previous section may be due to differences in recording expenditure and hence should, if possible, be taken into account in our analysis.

Conclusion

This review of factors that might give rise to variations suggests:

- for the purposes of this analysis, cancer needs can be taken as a justifable source of variation, on the ground that in practice PCTs have little scope for influencing them directly
- it is reasonable to assume that differences in resource availability relative to target would result in variation in spending.

These factors are considered together in Section 4.

- There are reasons for thinking that some variation may reflect data quality.

Whether it does so is considered in Section 5.

- The other two factors, variations in costs and local choice, may account for some variation but we can see no way of including them in our analysis. We consider in Section 6 how these gaps should be remedied.

National Audit Office Good Governance Report

In a good governance report completed in 2008, the National Audti Office (NAO) produced an investigation into Programme Budget data quality issues. The NAO review aimed to '...examine the quality, timeliness and suitability of Programme Budgeting data to support [their] audit of the Department of Health Resource Account and determine whether the systems and processes in place to provide data are accurate'. (NAO 2009)

The NAO findings were based largely on a sample survey of trusts (69), PCTs (41) and SHAs (5) and provided some mixed results relating to the quality and accuracy of programme budgeting data. Here are some examples.

Trusts

- 90 per cent of trusts stated that less than 10 per cent of admitted patient care records did not have accurate clinical coding. Coding of episodes to PCTs was also good.
- However, non-admitted patient care data was less good, and over half of trusts used generic apportion reports to allocate non-admitted care episodes to specific PCTs.
- Use of the 'other' programme budget category was low, with 93 per cent of trusts allocating less than 5 per cent of their expenditure to this category.

PCTs

- 42 per cent of PCTs had difficulty collecting data from private sector providers.
- Prescribing data from the NHS Business Authority was high quality and accurate.
- GP activity was gathered under just one programme budget category.
- PCT-provided services were apportioned or allocated on the basis of local knowledge.
- 43 per cent of PCTs used the '99 per cent rule' to apportion between 1 per cent and 5 per cent of spending not identified with particular programmes across all programmes (and nearly a fifth to apportion more than 10 per cent).

Validation

- Most trusts validated their data submission to PCTs using a 'reasonableness' check or 'prior year comparison'.
- 82 per cent of trusts audited checked figures by reconciling totals to reference costs.
- But 65 per cent of trusts stated that only 0–20 per cent of their PCTs validated the data they received.
- All PCTs stated that they performed a 'reasonableness' check on their data return to the Department of Health and most reviewed collection etc methodologies and carried out a 'prior year comparison'.
- 90 per cent carried out 'reasonableness' checks on trust data they received; 83 per cent a prior year comparison, and around two thirds queried trusts' apportionment methods.

The NAO also noted that a number of PCTs expressed concern about the accuracy of data supplied to them by their trusts, in part because trusts did not attach a high level of importance to the data (indeed, the NAO found that most trusts did not use or find the data they supply of any use to them). The NAO's main conclusion was that while the processes for collecting data were well defined in most areas, there remained scope for improvement in the robustness of the data.

Overall, it is hard to draw firm or detailed conclusions about the accuracy of the Programme Budget data sets in general, or the cancer data in particular, from these results.

4 Spending variations and cancer needs

We have argued in Section 3 that differences in PCT populations' need for cancer services is the main justifiable reason for variation in spending. In this section we examine the effect on the variation in raw spending of adjusting raw spending for a variety of needs measures: two generalised needs measures and three cancer-specific needs measures.

Generalised needs measures:

- an index based on PCTs' unified weighted capitation (with and without adjustment for PCTs' distance from target)
- an index based on the hospital and community health services (HCHS) element of PCTs' weighted capitation (with and without adjustment for PCTs' distance from target).

Cancer-specific measures:

- cancer deaths (rates per 100,000 population)
- cancer prevalence (rates per 100,000 population)
- cancer incidence (rates per 100,000 population).

We also examine the variation in PCT spending on the basis of spending per cancer death, per case (prevalence) and per new case (incidence) and the extent to which the variation in these alternative spending measures is explained by the two capitation formula-based measures of need.

First we look at the impact of adjusting raw spending by needs measures, based on PCTs' weighted capitation formula.

Generalised needs measures

The NPBP data is currently supplied with a number of ways of adjusting the raw data to take account of need using, for example, the overall population adjustment employed by the PCT weighted capitation formula (unified weighted population) or the need index used by the hospital and community health services (HCHS) element of the PCT allocation formula. In addition, spend can also be adjusted to take account of the fact that many PCTs' actual allocations are not at the 'target' allocation as determined by the weighted capitation formula (see box).

Raw and adjusted programme budget data

Programme Budget spending data by PCT is available in its 'raw' state – that is, actual spending per capita – as well as with various adjustments to take account of need and/or PCTs' distance from their target allocations.

Raw population-based spending

'Raw population' is the population for which the PCT is responsible: ie, patients registered with GP practices and unregistered patients resident in the PCT's geographic area.

Needs adjustment

The 'unified weighted population' is the population for which the PCT is responsible adjusted using the national weighted capitation formula for the age structure of the population, its additional need over and above that accounted for by age, and the unavoidable geographical variations in the costs of providing services. The formula has separate components for hospital and community health services (HCHS), prescribing and primary medical services. This weighting is used to calculate PCT allocations. PCTs with higher needs have their raw population figures increased according to the weighted capitation formula – this means that their spend per capita reduces on an adjusted need basis.

Distance from target adjustment

This is an adjustment to expenditure to take into account the fact that a PCT is likely to have received either more or less than its target allocation. The difference between target and actual allocations is pro-rated across the Programme Budgeting categories. The adjusted total spend in each programme, for each PCT, can then be applied to the raw or needs-adjusted populations to obtain per capita spending figures.

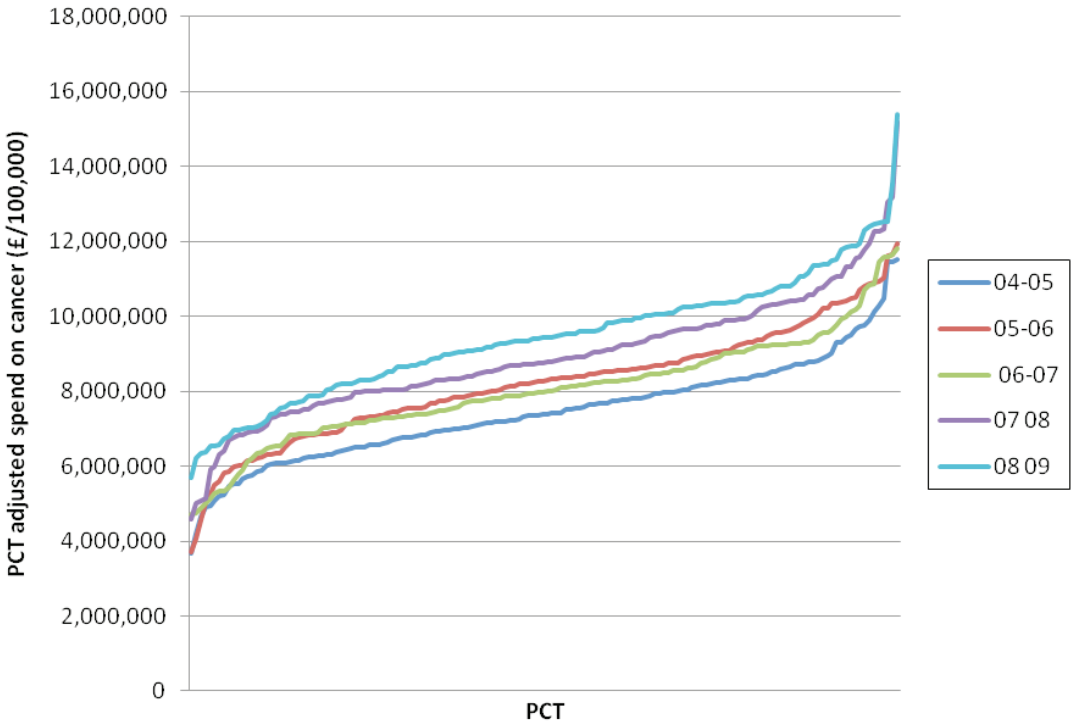
Using an index of need based on PCTs' unified weighted populations[1] and distance from target adjustments available on the Programme Budget Toolkit, we detail here the impact such adjustments have on spending by PCT, cancer network and cancer site.

Adjusted spending by PCT

Although adjusting spending using PCTs' unified weighted populations does reduce the scale of variation, it does so only marginally and significant variations persist, as Figure 7 and Table 3 show.

1 The index is PCTs' unified weighted population divided by their raw population.

Figure 7: Variation in PCT spending adjusted for need[1], 2004/5 to 2008/9



1 The needs adjustment uses the unified weighted population for each PCT from the formula used to allocate PCTs' overall budgets (Department of Health 2008a).

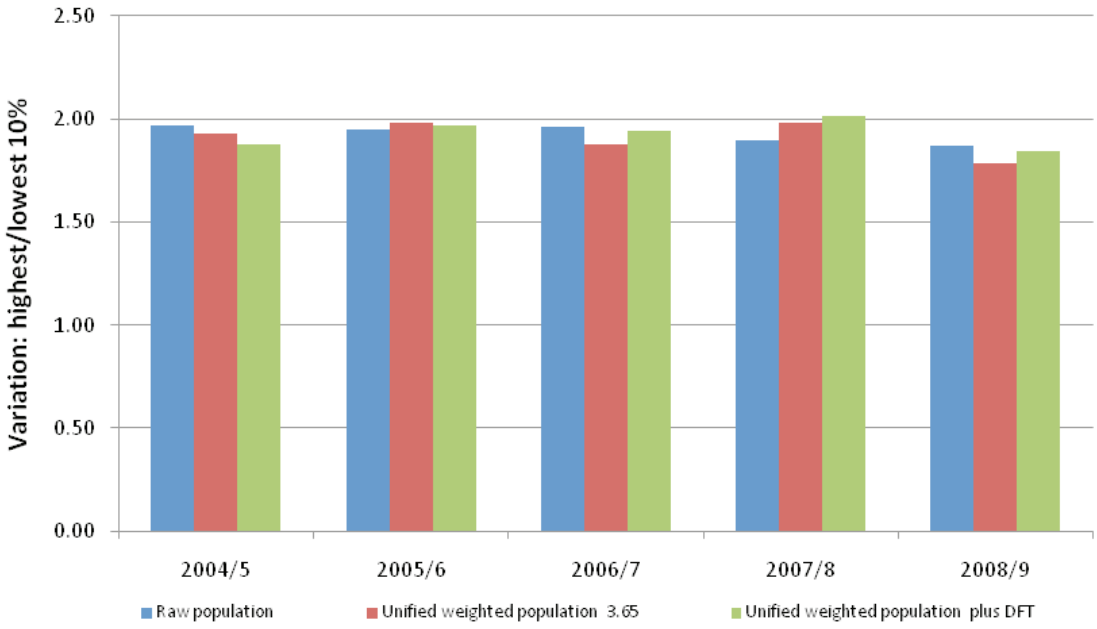
Table 3: Measures of variation: PCT cancer spending adjusted for unified weighted population

	2004/5	2005/6	2006/7	2007/8	2008/9
Max (£)	12,294,850	11,545,269	11,802,094	15,671,447	15,399,362
Min (£)	3,368,755	3,556,864	4,716,231	4,815,397	5,517,005
Variation	*3.65*	*3.25*	*2.50*	*3.25*	*2.79*
Top decile (£)	9,755,680	10,634,800	10,567,615	12,242,723	12,113,651
Bottom decile (£)	5,060,990	5,369,602	5,624,190	6,188,141	6,796,117
Variation	*1.93*	*1.98*	*1.88*	*1.98*	*1.78*
Top quartile (£)	9,020,757	9,994,325	9,664,114	10,957,516	11,183,343
Bottom quartile (£)	5,825,872	6,368,669	6369066	7,168,403	7,500,258
Variation	*1.55*	*1.57*	*1.52*	*1.53*	*1.49*
Standard deviation	1,353,292	1,472,721	1,345,373	1,593,893	1,530,380
Gini coefficent	0.1003	0.0997	0.0923	0.0962	0.0900

Further adjusting spending for PCTs' distance from target has a mixed impact on spending variations across measures of variation and years (see Appendix C).

Figure 8 compares the impact of the needs adjustment (including an adjustment for PCTs' distance from target) with the variation in raw, unadjusted, spending for one variation measure: the top and bottom spending deciles.

Figure 8: PCT spending variation: top and bottom decile



As can be seen, while the needs adjustment reduces variation for some years (eg, 2004/5, 2005/6 and 2008/9) it increases variation in others. A similarly mixed impact is evident on the other measures of variation (see Appendix C).

Adjusted spending by cancer network

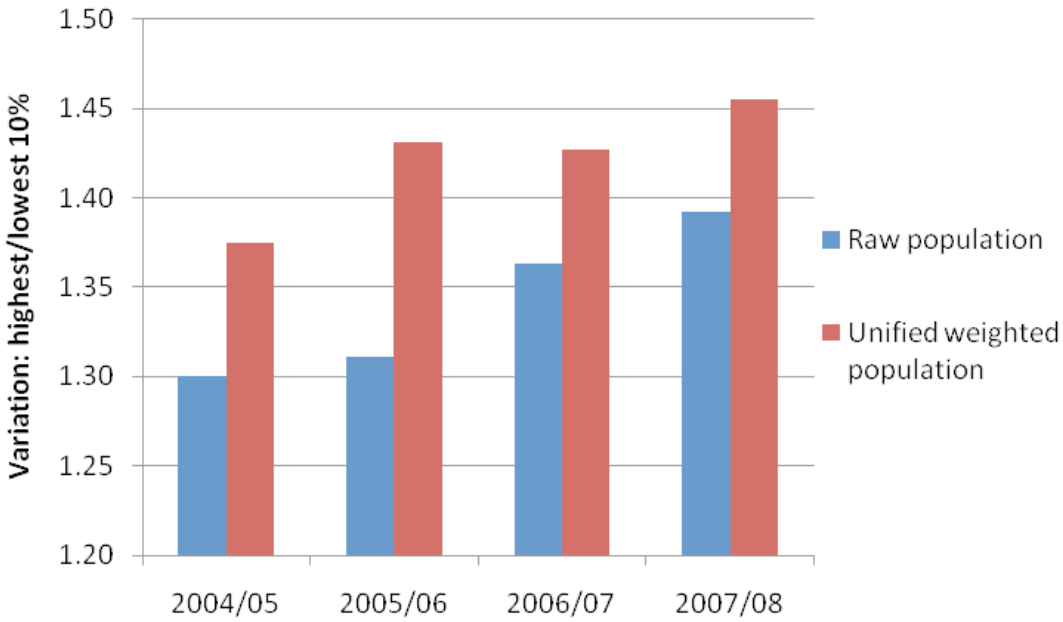
Spending across cancer networks can also be adjusted for need in a similar way as for PCTs. As Table 4 shows, however, variations persist after adjustment. In fact, as Figure 9 illustrates, the needs adjustment increases the degree of variation on one measure – the ratio of the top to bottom spending deciles. (Appendix D details broadly similar impacts of the needs adjustment on other measures of variation).

Table 4: Measures of variation: cancer network spending adjusted for unified weighted population

	2004/5	2005/6	2006/7	2007/8
Max (£)	8,727,175	10,072,957	9,849,135	10,911,586
Min (£)	6,056,793	6,803,347	6,142,160	6,741,981
Variation	*1.44*	*1.48*	*1.60*	*1.62*
Top decile (£)	8,650,327	9,844,123	9,474,719	10,703,273
Bottom decile (£)	6,290,501	6,879,585	6,639,738	7,354,588
Variation	*1.38*	*1.43*	*1.43*	*1.46*
Top quartile (£)	8,382,651	9,403,601	9,144,244	10,422,524
Bottom quartile (£)	6,622,781	7,298,180	7,078,399	7,982,825
Variation	*1.27*	*1.29*	*1.29*	*1.31*
Standard deviation	706,042	826,120	814,425	976,724
Gini Coefficent	0.0508	0.0544	0.0532	0.0582

Note: 2008/9 Programme Budget data does not present spending by cancer network.

Figure 9: Cancer network spending variation: top, bottom decile



Adjusted spending by cancer site

Finally, adjusting aggregate PCT spending by cancer site similarly has only marginal impact on spending variations. For illustration, raw and adjusted spending distributions for 2008/9 are shown in figures 10 and 11. These show the median (square point) and the maximum and minimum values. Similar results (not shown here) are evident for other years.

Figure 10: 2008/9 unadjusted spend by PCTs on different types of cancer per 100,000 population

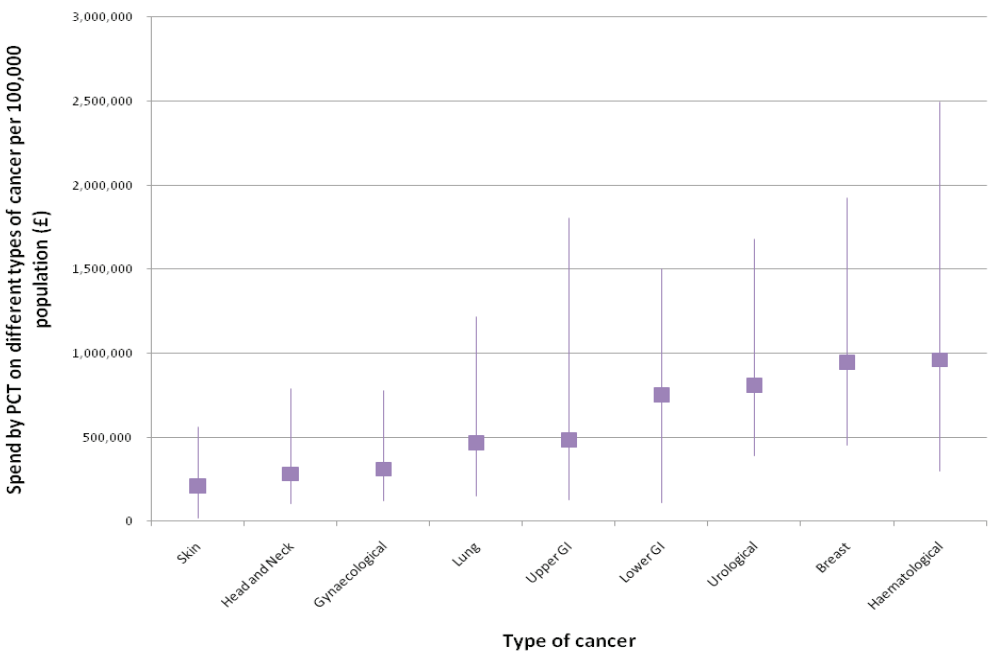
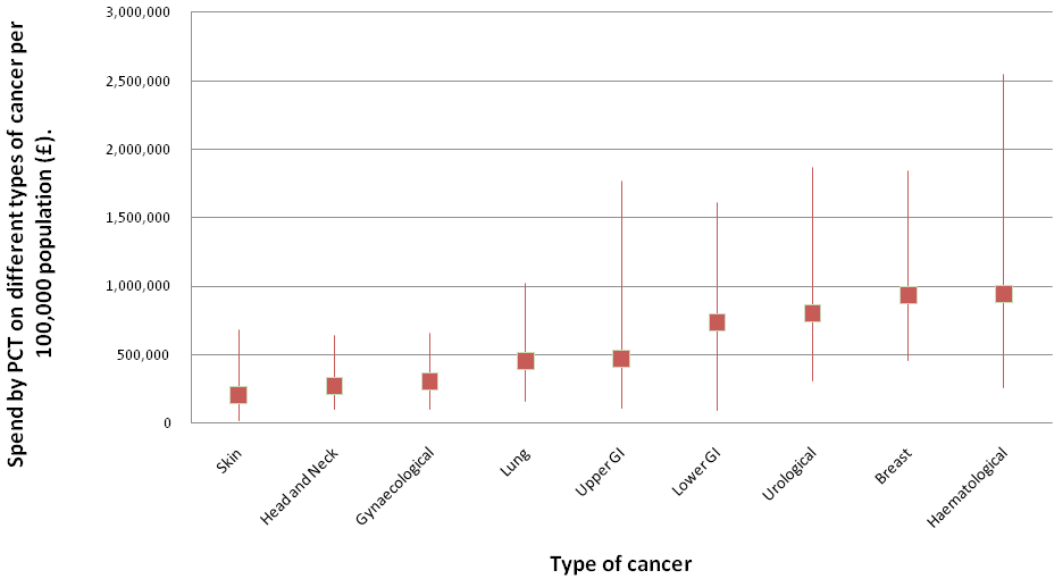


Figure 11: 2008/9 adjusted spend by PCTs on different types of cancer per 100,000 population



The reason for the relative lack of impact on spending distributions for PCTs, cancer networks and cancer sites is evident from the relatively weak correlations between the various needs indices used to adjust spending and variations in raw spending per 100,000 (as illustrated by Table 5 for spending by PCTs). The figures provide at least an indication of the variation explained by need (for example, the unified weighted capitation adjustment 'explains' between 6 per cent (2007/8) and around 21 per cent (2006/7) of the variation in raw spending variation). However, neither of these adjustments were specifically designed to reflect need for cancer services per se and, as noted, the proportion of the variation they explain is relatively low, and indeed variable from year to year.

Table 5: Pearson correlation coefficients and (R-squares): Raw PCT cancer spend per 100,000 vs PCT weighted capitation needs indices and adjustments for distance from allocation target (DFT)

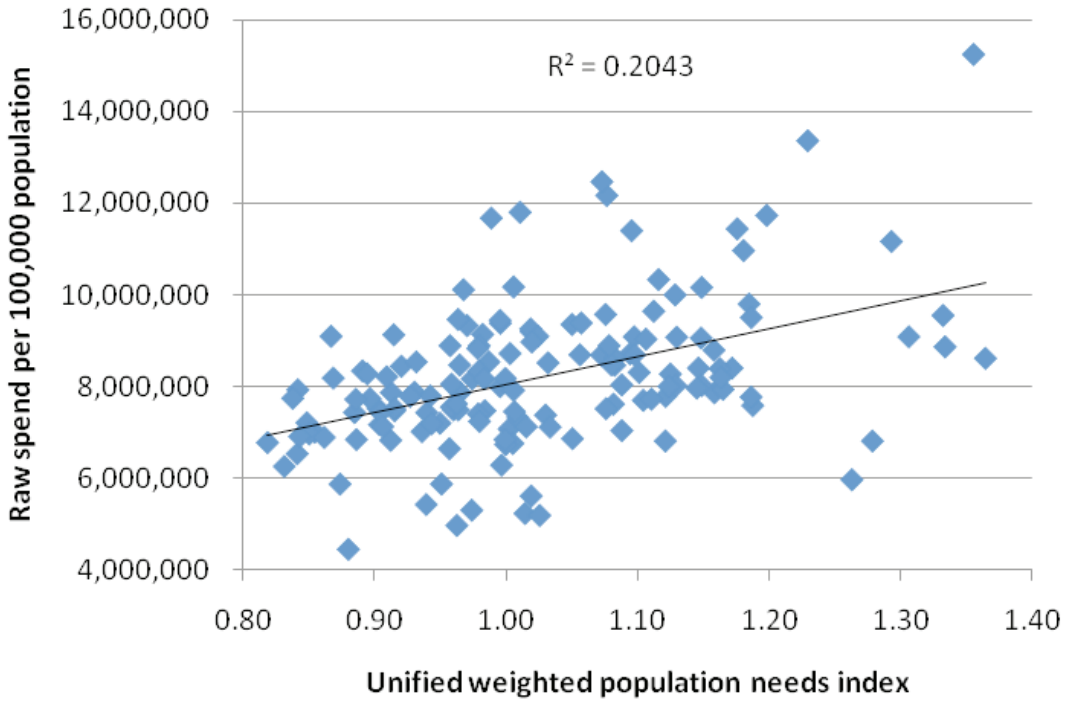
	2004/5	2005/6	2006/7	2007/8	2008/9
HCHS needs index	0.36	0.35	0.42	0.25	0.35
	(0.13)	(0.12)	(0.18)	(0.06)	(0.12)
HCHS needs index with DFT	0.43	0.39	0.43	0.26	0.35
adjustment	(0.18)	(0.16)	(0.18)	(0.08)	(0.12)
Unified weighted population	0.38	0.36	0.45	0.28	0.39
index	(0.15)	(0.13)	(0.21)	(0.08)	(0.15)
Unified weighted population	0.44	0.40	0.45	0.29	0.39
index with DFT adjustment	(0.19)	(0.16)	(0.21)	(0.09)	(0.15)

Note: Pearson's r: 0 = no correlation; (+/-)1 = perfect (+ve/-ve) correlation; R-squares = (Pearson's r)^2

The table shows that PCTs with higher needs tend to spend more per 100,000 on cancer services – but the correlation is not very strong, particularly for the 2007/8 Programme Budget data. As the R-squares (in brackets) in Table 5 show and Figure 12 illustrates, the generalised needs indices used to

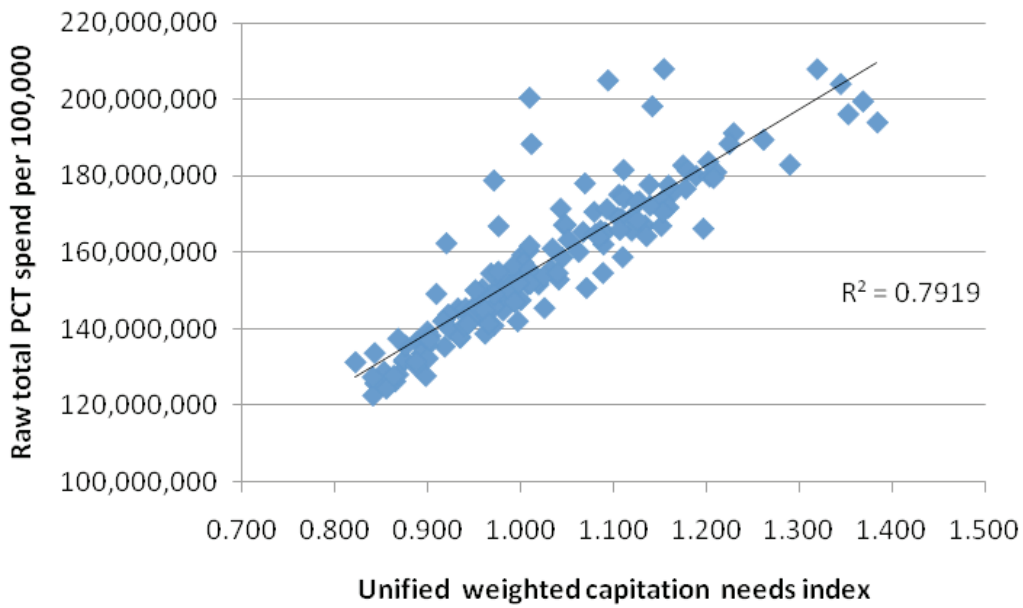
calculate PCTs' target allocations at best explain around 20 per cent of the variation in PCTs' raw cancer spending per 100,000 population.

Figure 12: Raw cancer spend per 100,000 vs unified weighted population needs index, 2006/7



A confounding problem, however, is that *total* PCT allocations are in part determined by the unified needs measure. As Figure 13 shows, total PCT spending per 100,000 is highly correlated with the unified weighted capitation index – as expected, given that this measure is used to determine allocations.

Figure 13: Raw total PCT spend per 100,000 vs unified weighted population needs index, 2006/7



Because a significant proportion of the variation in total spending per 100,000 is explained by policy on PCT allocations, with areas of higher need receiving higher allocations, it is also to be expected that part of the variation observed in cancer spending per 100,000 is simply a reflection of deliberate policy action.[2]

Given the correlation between raw total PCT spending per 100,000 and the unified needs measure, to disentangle the effects on variation in cancer spending attributable to deliberate policy on PCT allocations, one option is to adjust raw spending on cancer using the unified needs (or HCHS, also highly correlated with total PCT spend per 100,000) index and then to examine whether alternative measures of cancer-specific measures of need are better able to explain variations in this adjusted spending.

Cancer-specific needs measures

Table 6 sets out, for available years, the correlation between three cancer-specific measures of need – mortality, prevalence and incidence (both absolute numbers and population rates) – and HCHS weighted population adjusted spending per 100,000 population. Correlations for the unified weighted population needs measure are very similar to HCHS and are not presented here.

For comparison, raw spend per 100,000 is also included in the table. Correlations with and without adjusting for PCTs' distance from target are similar; the table presents correlation coefficients only for the former.

Table 6: Pearson correlation coefficients: raw, HCHS and unified weighted population adjusted PCT cancer spend per 100,000 vs cancer deaths, prevalence and incidence

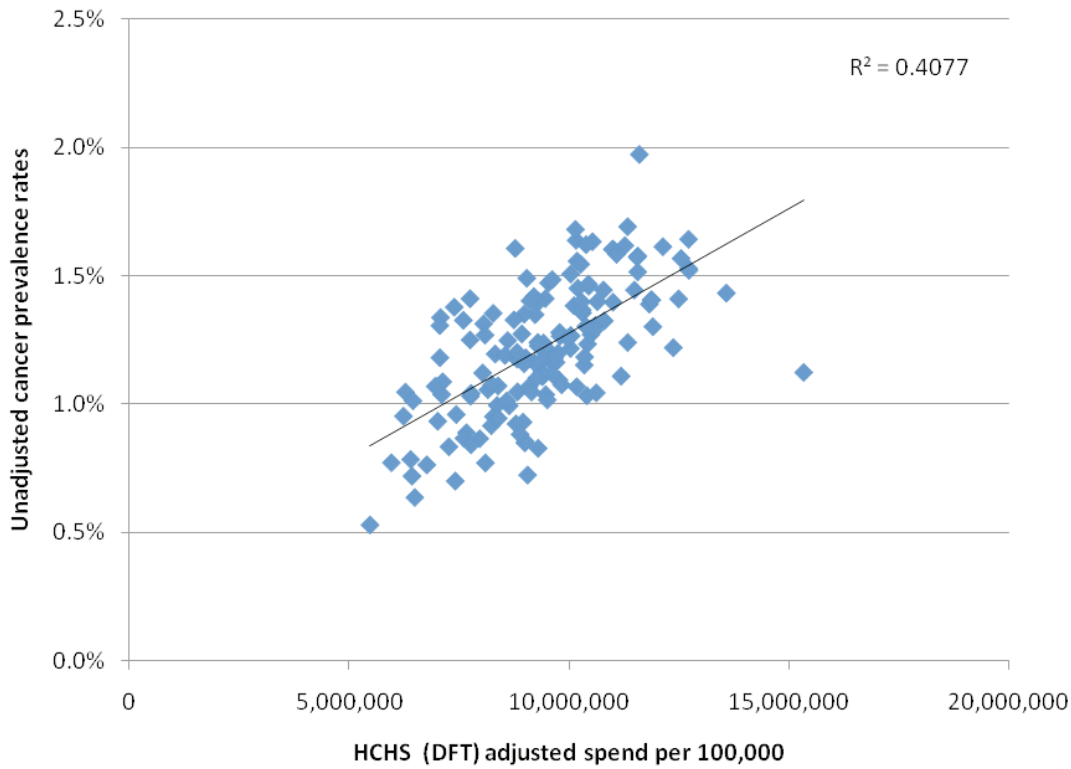
	2004/5	2005/6	2006/7	2007/8	2008/9
Raw spend/100,000 population					
Mortality: No.		-0.01	0.04	0.04	-0.03
Rates		0.23	0.39	0.42	0.56
Prevalence: No.			-0.01	-0.02	-0.10
Rates			0.20	0.27	0.33
Incidence: No.	-0.04	0.01	0.02		
Rates (age adjusted)	0.03	0.21	0.39		
HCHS and DFT adjusted spend/100,000 population					
Mortality: No.		0.31	0.35	0.31	0.27
Rates		0.43	0.50	0.47	0.61
Prevalence: No.			0.33	0.29	0.25
Rates			0.52	0.54	0.64
Incidence: No.	0.30	0.34	0.35		
Rates (age adjusted)	0.33	0.48	0.59		

In summary, Table 6 reveals:

2 Raw spending per 100,000 on cancer is correlated with total spending per 100,000: 2006/7 (0.41); 2007/8 (0.30); 2008/9 (0.46) – figures in brackets, Perason correlation coefficients.

- no correlation between raw spending and absolute numbers of deaths, prevalence and incidence
- the two needs-adjusted spending measures are correlated – somewhat weakly in most cases and across most years – with **absolute** numbers of deaths, prevalence and incidence
- some correlation between raw spending and **rates** of mortality, prevalence and incidence
- stronger correlation between **rates** of mortality, prevalence and incidence and the two needs adjusted measures of spend
- at best, for 2008/9, prevalence rates explain around 41 per cent of the variation in HCHS adjusted spend per 100,000 population (see Figure 14).

Figure 14: Relationship between HCHS and DFT adjusted PCT spend per 100,000 and (unadjusted) cancer prevalence rates (2008/9)



It should be noted that adjusting cancer spending for needs through the HCHS or unified weighted population measures does not resolve the direction of causation between spending and the various needs/outcomes measures. Figure 14, for example, should not be interpreted as meaning that higher rates of cancer prevalence are caused by higher spending on cancer. Disentagling such causation requires more sophisticated econometric techniques (cf. Martin *et al* 2009).

Spend related to cancer

The forgoing analysis of adjusted spending variations is based on a whole population denominator. However, other, cancer-specific, denominators can be computed. Here we review three alternatives, spend per:

- **death** (observed cancer deaths, National Centre for Health Outcome Development Compendium)
- **case** (prevalence, using Quality and Outcomes Framework (QOF) unadjusted cancer prevalence figures)
- **new case** (incidence, using PCT-based incidence data supplied by the National Cancer Intelligence Network).

Note that the QOF-based prevalence figures used here need to be treated with caution, given that their accuracy depends on how well individual GPs record this information. However, it is worth noting that in its absolute form, this measure is highly (positively) correlated with mortality and incidence, as well as with the size of PCT populations (see Table 7. Note: data on all four measures is only currently available for 2006/7). PCTs with larger populations have more deaths from cancer and higher prevalence and incidence than PCTs with smaller populations.

Table 7: Absolute denominator measures: correlation coefficients

2006/7	Raw population	Mortality	Prevalence	Incidence
Raw population	1.00			
Mortality	0.96	1.00		
Prevalence	0.97	0.98	1.00	
Incidence	0.97	0.99	0.99	1.00

Given these relationships, it might be expected that the variations in spending per 100,000 population, per death, per case and per new case will also be similar. Table 8 suggests this is the case, with a 3- to 3.4-fold variation at the extremes of spending, around 2-fold variations between the top and bottom spending deciles and between 1.5- and 1.8-fold variation between the top and bottom quartiles of spending. Appendix E details raw spending by PCT on these three measures.

Table 8: Measures of variation: PCT cancer spending unadjusted, 2006/7

	Spend per 100,000 pop.	Spend per cancer death	Spend per cancer case	Spend per new cancer case
Max (£)	15,241,574	60,074	17,028	29,823
Min (£)	4,436,622	20,368	5,259	9,779
Variation	*3.44*	*2.95*	*3.24*	*3.05*
Top decile (£)	11,199,492	51,759	13,685	26,315
Bottom decile (£)	5,702,409	23,382	6,020	12,033
Variation	*1.96*	*2.21*	*2.27*	*2.19*
Top quartile (£)	10,022,898	44,878	11,775	22,876
Bottom quartile (£)	6,585,906	25,493	6,555	13,215
Variation	*1.52*	*1.76*	*1.80*	*1.73*

In terms of spending per 100,000 population, per death, per cancer case and per new cancer case, for 2006/7 (the only year for which data is available on all four measures) there are relatively high correlations between the three alternative spending measures (eg, PCTs that are high (low) spending per cancer death are also high (low) spending per cancer case). However, there is less correlation between these measures and spending per 100,000 (see Table 9).

Table 9: Correlation in PCT spending across alternative spend measures

Spend...	Pearson correlation coefficients			
	per 100,000	per cancer death	per cancer case	per new cancer case
per 100,000	1.00			
per death	0.40	1.00		
per cancer case	0.62	0.80	1.00	
per new cancer case	0.52	0.93	0.88	1.00

Note: Pearson's r: 0 = no correlation; (+/-)1 = perfect (+ve/-ve) correlation.

It is worth noting, however, that the correlations between these alternative measures and spending per 100,000 can vary from year to year. Table 10 shows correlations between spending per 100,000 and each alternative spending measure for the years when data is available.

Table 10: Correlation between spending per 100,000 population and alternative spending measures

Spend per 100,000 vs...	2004/5	2005/6	2006/7	2007/8	2008/9
Spend per death	na	0.56	0.40	0.30	0.18
Spend per cancer case	na	na	0.62	0.54	0.49
Spend per new cancer case	0.73	0.64	0.52	na	na

Note: na = not available

In terms of the rank order of PCTs there is a degree of similarity across spending measures, particularly between the three alternative spend measures, less so between these and spending per 100,000 population (see Table 11). In general, high (low) spending PCTs per 100,000 population tend to be high (low) spending per death, per case and per new case as well.

Table 11: Correlation in PCT ranking across alternative spend measures

Spend...	Spearman rank correlation coefficients			
	per 100,000	per cancer death	per cancer case	per new cancer case
per 100,000	1.00			
per death	0.42	1.00		
per cancer case	0.60	0.78	1.00	
per new cancer case	0.53	0.91	0.86	1.00

Note: Spearman rank: 0 = no correlation in rank order; 1 = perfect correlation in rank order.

Explaining variations in raw spending per death, per case and per new case

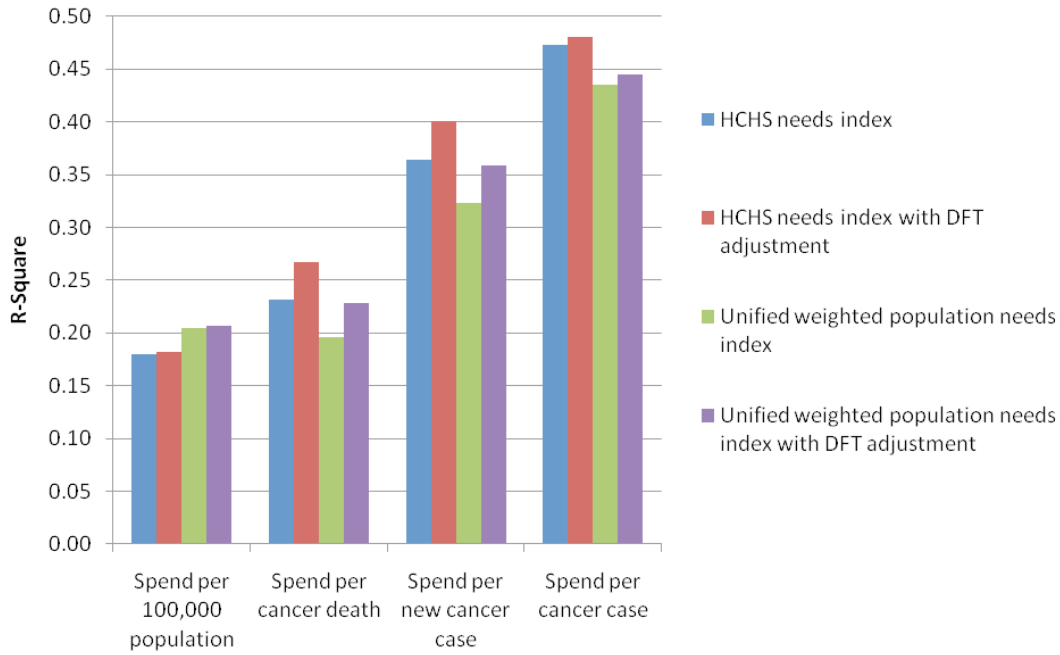
For the three alternative spending measures – per death, case and new case – Table 12 (together with R-squares for an illustrative year – 2006/7, Figure 15) reports correlation coefficients for the HCHS and unified weighted population needs measures (together with an additional adjustment for PCTs' distance from allocation target). Correlations for spend per 100,000 population (from Table 5) are also shown for comparison.

The analysis suggests that depending on the spending measure, year and needs measure, between 8 per cent and 48 per cent of the variation in the three alternative measures of spending can be explained by variations in the PCT allocation needs indices.

Table 12: Pearson correlation: various cancer spending measures vs various measures of need

	2004/5	2005/6	2006/7	2007/8	2008/9
Spend per 100,000 population					
HCHS needs index	0.36	0.35	0.42	0.25	0.35
HCHS needs index with DFT adjustment	0.43	0.39	0.43	0.26	0.35
Unified weighted population needs index	0.38	0.36	0.45	0.28	0.39
Unified weighted population needs index with DFT adjustment	0.44	0.40	0.45	0.29	0.39
Spend per cancer death					
HCHS needs index		0.48	0.48	0.32	0.41
HCHS needs index with DFT adjustment		0.54	0.52	0.37	0.45
Unified weighted population needs index		0.48	0.44	0.29	0.38
Unified weighted population needs index with DFT adjustment		0.53	0.48	0.33	0.42
Spend per cancer case					
HCHS needs index			0.69	0.56	0.67
HCHS needs index with DFT adjustment			0.69	0.58	0.67
Unified weighted population needs index			0.66	0.53	0.64
Unified weighted population needs index with DFT adjustment			0.67	0.55	0.65
Spend per new cancer case					
HCHS needs index	0.52	0.57	0.60		
HCHS needs index with DFT adjustment	0.57	0.62	0.63		
Unified weighted population needs index	0.52	0.56	0.57		
Unified weighted population needs index with DFT adjustment	0.57	0.60	0.60		

Figure 15: Comparison of correlations (R-sq) between various per capita cancer spending and various needs measures



However, as with raw spending per 100,000 population, there is a correlation between these alternative spending measures and *total* PCT budgets (expressed as total spend per 100,000): PCTs with larger overall spends per 100,000 tend to spend more per 100,000 cancer deaths, cases and new cases (see Table 13).

Table 13: Relationship (Pearson's r) between total PCT spend per 100,000 and spend per 100,000 population, cancer deaths, cases and new cases

	Raw cancer spend per 100,000...			
	Population	**Cancer deaths**	**Cancer cases**	**New cancer cases**
2006/7	0.41	0.40	0.53	0.49
2007/8	0.30	0.28	0.45	
2008/9	0.46	0.35	0.60	

However, unlike the correlation between total PCT spend per 100,000 and cancer spending per 100,000 *population*, it is not entirely clear to what extent variations in PCT spending per cancer death, case, or new case can be attributed to deliberate policy on PCTs' overall allocations. In other words, while it might be expected that PCTs with higher (lower) total allocations per head of population would spend more (less) per head of population across Programme Budgets in total (not just cancer), the explanation for the association between total per capita spending and spend per death, case, or new case is less obvious.

Conclusion

At best, the generalised needs indices used to calculate PCTs' target allocations explain around 20 per cent of the variation in PCTs' unadjusted cancer spend per 100,000 population. Use of these generalised indices in relation to cancer network and cancer site has only a slight inpact on observed variation.

Measures of cancer need (cancer mortality, incidence or prevalence) do not appear to have any more power to explain variations in PCT raw spending per 100,000 than the more generalised needs measures used as part of the formula for determining PCTs' overall target allocations.

However, a greater proportion – about 40 per cent – of the variation in raw spend *adjusted using either the HCHS or unified weighted population measures of need* is explained by more cancer-specific measures of need, such as cancer mortality, prevalence and incidence.

For three alternative spending measures based on cancer deaths, cases and new cases, the HCHS and unified weighted population need measures explain a much higher proportion of the variation in spending. The fact that these measures are also correlated with PCTs' total spend per 100,000 population is difficult to explain in terms of deliberate policy concerning the allocation basis for PCTs' overall allocations, however.

Part of the reason for what appears, prima facia, to be a comparatively poor relationship between need (measured in a variety of ways) and spend could be problems with the quality of the spending data. This is explored in Section 5.

5 Progamme Budget data quality

Although in its fifth year, the NPBP data set is still fairly novel, and each year the Department of Health continues to introduce measures to help improve data quality. As noted in Section 3, the National Audit Office recently reported on the way PCTs and trusts assembled Programme Budget data, suggesting that they were still finding it difficult to do so accurately. The NAO report revealed a number of ways in which spending data might not be correctly allocated to, and within, each programme. Its conclusion was that the data was not yet of 'unauditable' quality (NAO 2008).

Here we present evidence from three sources to explore data quality issues. First, evidence based on the published spending patterns of PCTs for the five years' worth of NPBP data published so far; second, more results from the report on the NPBP data produced by the National Audit Commission; third, a case study based on NHS West Kent's actual data collection which describes how activity and costing data is brought together to produce a submission to the Department of Health, together with a summary of the results of an alternative method for compiling one element of the cancer spend (NHS trusts admitted and non-admitted care) for one PCT (West Kent).

What does the data reveal?

Obvious outliers?

While some variation in PCT spending is to be expected, it is clear from observing the spend data for cancers and tumours as a whole, and for spending by cancer site, that some PCTs' data may seem implausibly high or low relative to that of others. However, identifying what may be considered implausible is difficult. Table 14 gives an indication (though no more) of what might be considered outliers in the data. This shows PCT raw[1] spend per 100,000 population for all cancers and tumours for five years for high and low spending PCTs. The table highlights PCTs with spends +/- 3 and 2 standard deviations from the mean national spend.

Table 15 shows the proportion of total cancer spending per 100,000 by PCTs for cancer sites for the year 2008/9. There is some connection between PCTs which apparently devote a high proportion of their cancer spending to 'other' cancers and comparatively low spending on other cancer sites.

1 Similar results are obtained on data adjusted by PCTs' unified allocation populations.

Table 14: High and low spending PCTs: cancers and tumours

2004/5		2005/6		2006/7		2007/8		2008/9	
£ per 100,000		£ per 100,000		£ per 100,000		£ per 100,000		£ per 100,000	
Comparatively high spenders									
Camden	16,187,950	Camden	14,672,244	Knowsley	15,241,574	Leeds	15,566,530	North East Lincolnshire	15,568,771
Tower Hamlets	14,529,218	Tower Hamlets	13,331,795	Salford Teaching	13,357,367	Great Yarmouth and Waveney	13,593,302	Isle of Wight Healthcare	14,322,291
Torbay Care Trust	11,910,051	South Tyneside	13,193,576	Nottingham City	12,460,999	North East Lincolnshire	12,624,357	Redcar and Cleveland	13,438,325
Newcastle	10,641,188	Gateshead	11,576,579	Wakefield District	12,162,272	Torbay Care Trust	12,329,642	Torbay Care Trust	13,345,323
Hammersmith and Fulham	10,319,497	Torbay Care Trust	11,417,466	Bournemouth and Poole	11,795,563	Sefton	12,306,365	Barnsley	13,296,838
Great Yarmouth and Waveney	9,852,999	Trafford	11,068,116	South Tyneside	11,726,809	Salford Teaching	12,273,968	Hastings and Rother	13,027,034
North East Essex	9,822,415	Newcastle	10,987,520	Trafford	11,668,301	Knowsley	11,947,175	Knowsley	12,920,881
Knowsley	9,779,844	Nottingham City	10,894,387	Gateshead	11,432,848	Bath and North East Somerset	11,696,037	Great Yarmouth and Waveney	12,870,640
Blackpool	9,624,473	Manchester	10,877,413	Torbay Care Trust	11,392,246	Middlesbrough	11,683,057	Sunderland	12,847,535
Kingston	9,558,669	Great Yarmouth and Waveney	10,567,515	Manchester	11,156,944	Lincolnshire Teaching	11,534,106	Middlesbrough	12,444,844
Comparatively low spenders									
Warrington	4,437,492	Buckinghamshire	4,986,710	Ealing	5,176,664	Harrow	5,978,258	Oxfordshire	6,379,662
Buckinghamshire	4,223,082	Luton Teaching	3,846,072	South West Essex	4,956,710	Camden	5,682,244	Hillingdon	6,376,728
Heart of Birmingham	4,094,612	Dudley	3,501,184	Bedfordshire	4,436,622	Leicester City Teaching	5,187,796	Berkshire East	6,289,600

Notes: Light grey cells indicate PCT percentage spend is between 2 standard deviations and 3 standard deviations above or below the mean (unweighted) proportion for all PCTs.

Dark grey cells indicate PCT percentage spend is more than 3 standard deviations above/below the mean.

Table 15: High spending PCTs: proportion of cancer spend devoted to particular cancer sites, 2008/9

Head and Neck		Upper GI		Lower GI		Lung		Skin	
Comparatively high spenders									
PCT	%	PCT	%	PCT	%	PCT	%	PCT	%
Salford Teaching	6.7	Havering	18.9	Somerset	13.7	Hull	10.5	Mid Essex	6.2
Halton and St Helens	6.4	Sutton and Merton	8.6	Buckinghamshire	13.6	South Tyneside	9.9	Dorset	4.6
Westminster	6.3	Nottingham City	8.6	Gloucestershire	12.9	Manchester	9.2	Dudley	4.5
Luton	5.9	Greenwich	8.2	Lincolnshire	12.8	Salford Teaching	8.9	East Sussex Downs and Weald	3.9
Bradford and Airedale	5.5	Warrington	7.8	Herefordshire	12.4	North Lincolnshire	8.8	Buckinghamshire	3.8
Tower Hamlets	5.4	Stockport	7.5	Derby	12.3	Hammersmith and Fulham	8.6	Solihull Care Trust	3.7
Hounslow	5.3	Halton and St. Helens	7.3	South Tyneside	12.2	Stoke on Trent	8.4	Middlesborough	3.7
Waltham Forest	5.3	Salford Teaching	7.1	Greenwich	11.9	Greenwich	7.2	Tower Hamlets	3.6
Comparatively low spenders									
North Tyneside	1.1	City and Hackney	2.7	City and Hackney	3.3	East and North Hertfordshire	2.1	City and Hackney	0.5
Isle of Wight	1	Heart of Birmingham	1.6	Hammersmith and Fulham	1.2	North Somerset	2	Newham	0.3
Breast		Gynaecological		Urological		Haematological		Other	
Comparatively high spenders									
PCT	%	PCT	%	PCT	%	PCT	%	PCT	%
Bassetlaw	17.6	Heart of Birmingham	8.8	West Kent	17.7	South West Essex	24.7	East Lancashire	64.5
North Somerset	17.1	Gateshead	7.1	Solihull	13.3	City and Hackney	21.5	Knowsley	63.1
Bournemouth and Poole	16.5	Tower Hamlets	6.5	Dorset	12.6	Stockport	20.5	Middlesborough	62.9
Hounslow	15.4	Nottingham City	5.9	Buckinghamshire	12.5	Medway	20	Newham	62
Kirklees	15.3	Harrow	5.7	Darlington	12.2	Ealing	19.7	Redcar and Cleveland	61.1
South Tyneside	14.8	Southampton	5.6	County Durham	12.2	Bexley	19.6	Leeds	59.7
Sheffield	14.7	Solihull	5.5	Warrington	12.1	Solihull Care Trust	17.9	Halton and St Helens	59.3
North Lincolnshire	14.2	East Lancashire	5.2	Lincolnshire	11.9	Dudley	17.3	Bolton	58.1
Comparatively low spenders									
Trafford	4.7	Waltham Forest	1.4	Tower Hamlets	4.5	Bolton	3.3	Solihull Care Trust	25.2
Redcar and Cleveland	4.2	Bexley	1.4	East Lancashire	4.3	Halton and St Helens	2.7	Buckinghamshire	22.3

Notes: Light grey cells indicate PCT percentage spend is between 2 standard deviations and 3 standard deviations above or below the mean (unweighted) proportion for all PCTs. Dark grey cells indicate PCT percentage spend is more than 3 standard deviations above/below the mean

Although using multiples of the standard deviations of the data as a way to identify potentially 'suspect' or inaccurate/implausible figures has been traditionally used (in the form of control charts as a way to monitor systems and processes to identify when and by how much they go out of control), their use in this context is perhaps limited. Excluding data identified as too extreme to be plausible implies that the retained data is accurate, but as we have noted, there are reasons to believe this is not the case.

Unstable data?

An alternative check on data accuracy – the extent to which spending varies for each PCT from year to year – suggests that data problems may affect more than a handful of outliers.

Figure 16 shows the percentage change in spending per 100,000 from 2004/5 to 2005/6, through each year to the change from 2007/8 to 2008/9. PCTs are ordered in all years so the plots do not correspond. However, in each year there are some large increases/decreases for a large number of PCTs.

Figure 16: Change in PCTs' cancer spending from year to year

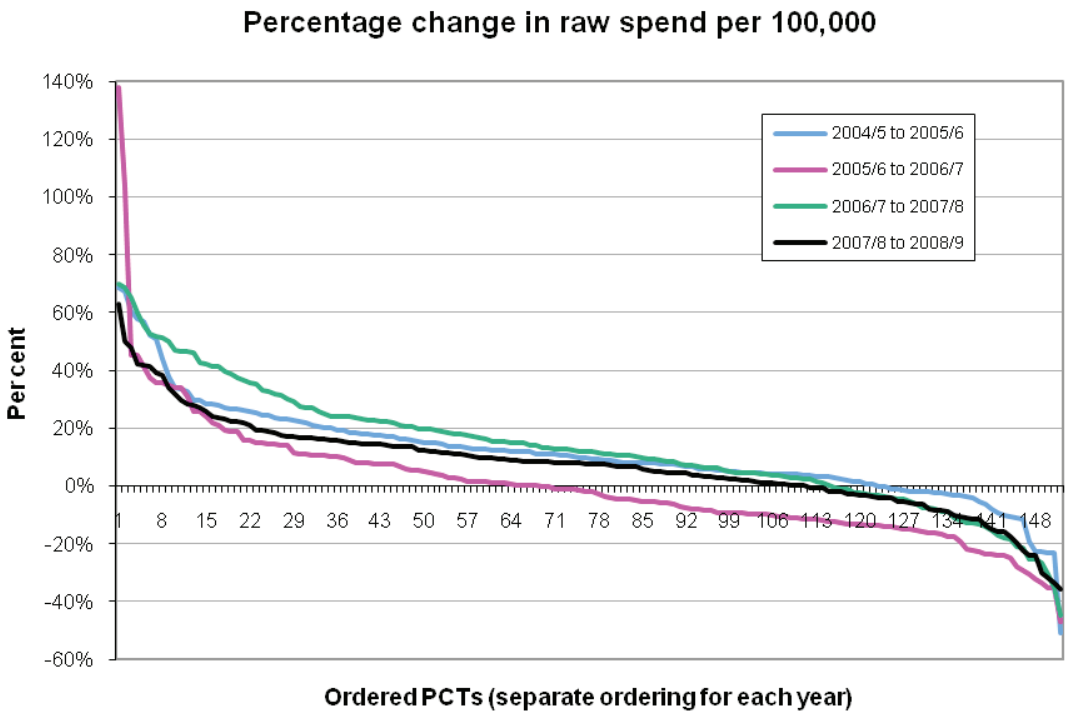


Figure 17 shows that in 2004/5 to 2005/6, 13 PCTs appeared to reduce their spending on cancer overall by between 10 per cent and over 40 per cent and 74 increased their spending by between 10 per cent and more than 40 per cent. Between 2005/6 and 2006/7, the equivalent numbers were 68 and 36 (out of 152 PCTs), between 2006/7 to 2007/8 the equivalent numbers were 24 and 84, and between 2007/8 and 2008/9 the numbers were 27 and 58.

Figure 17: Distribution of (percentage) changes in PCT cancer spend from year to year

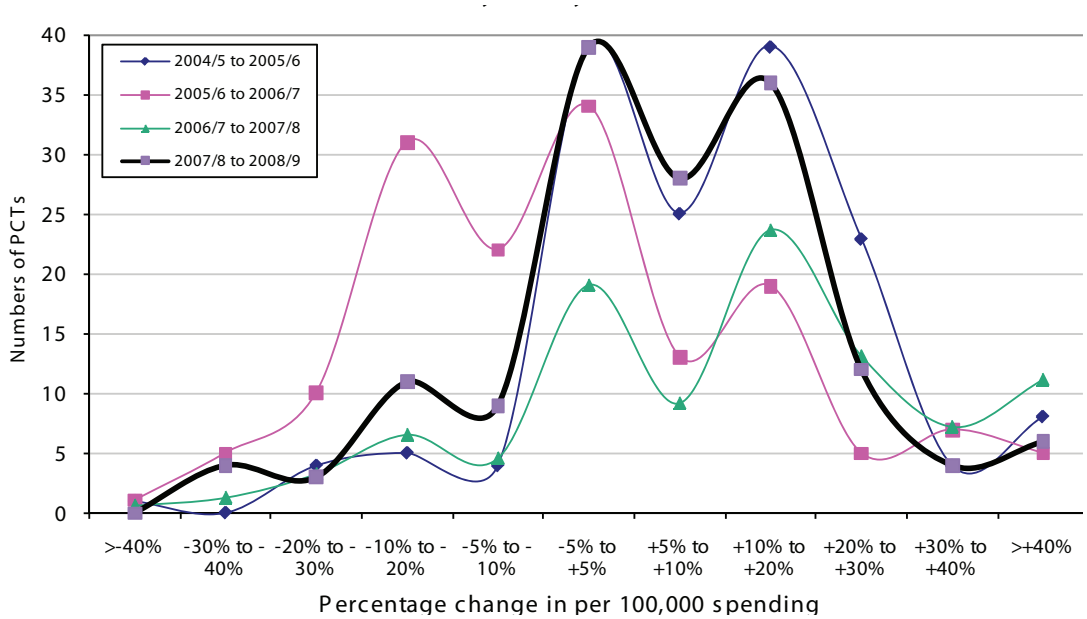
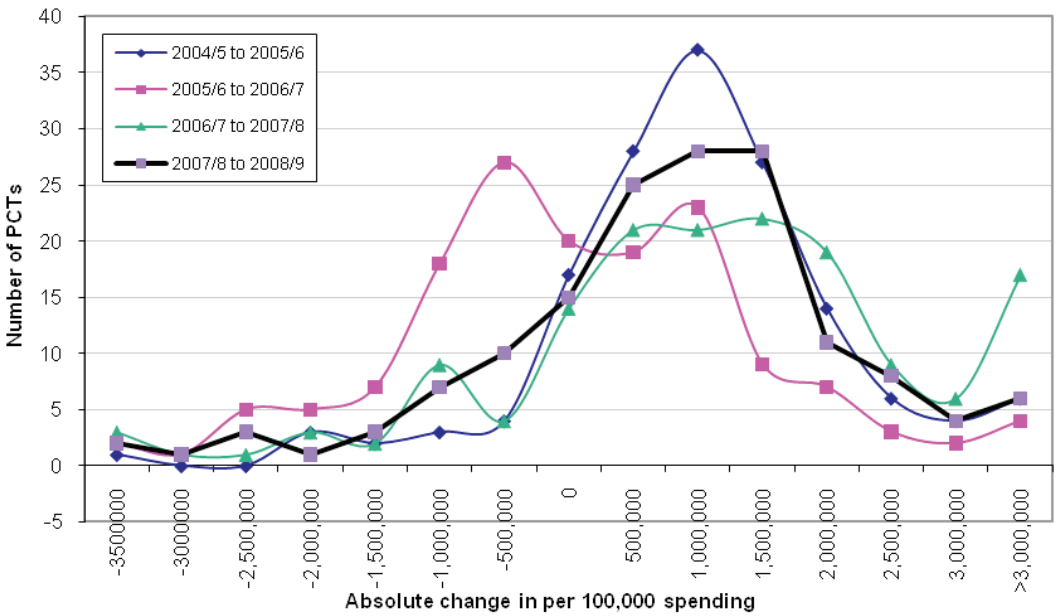


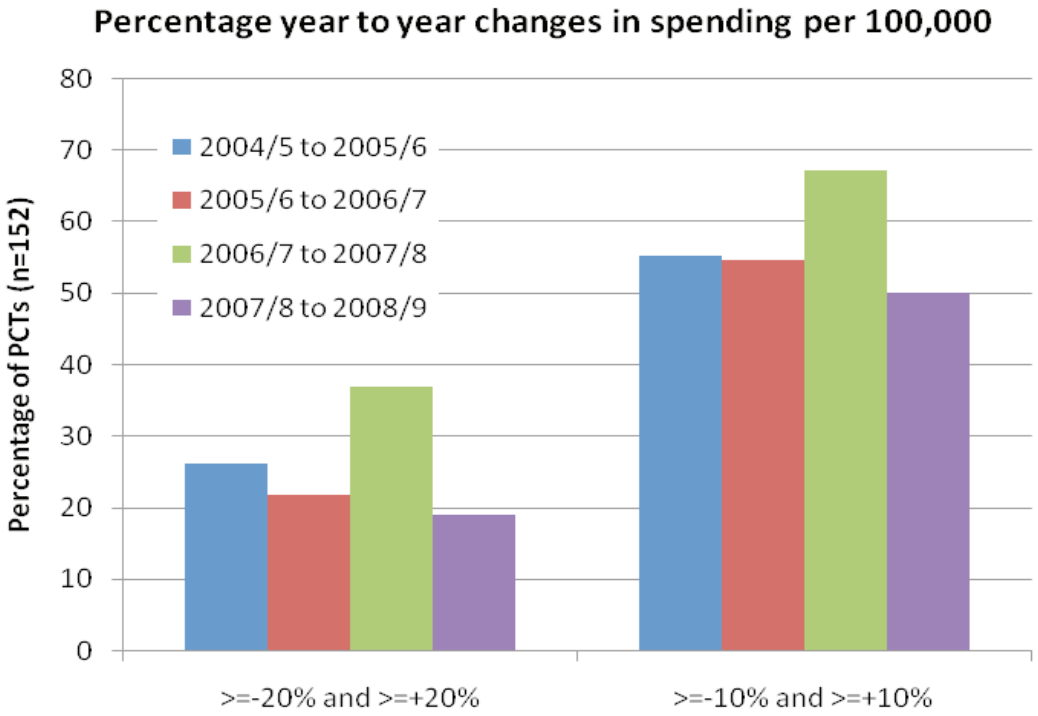
Figure 18 shows the same data, but in terms of actual spending per 100,000.

Figure 18: Distribution of (absolute) changes in PCT cancer spend from year to year



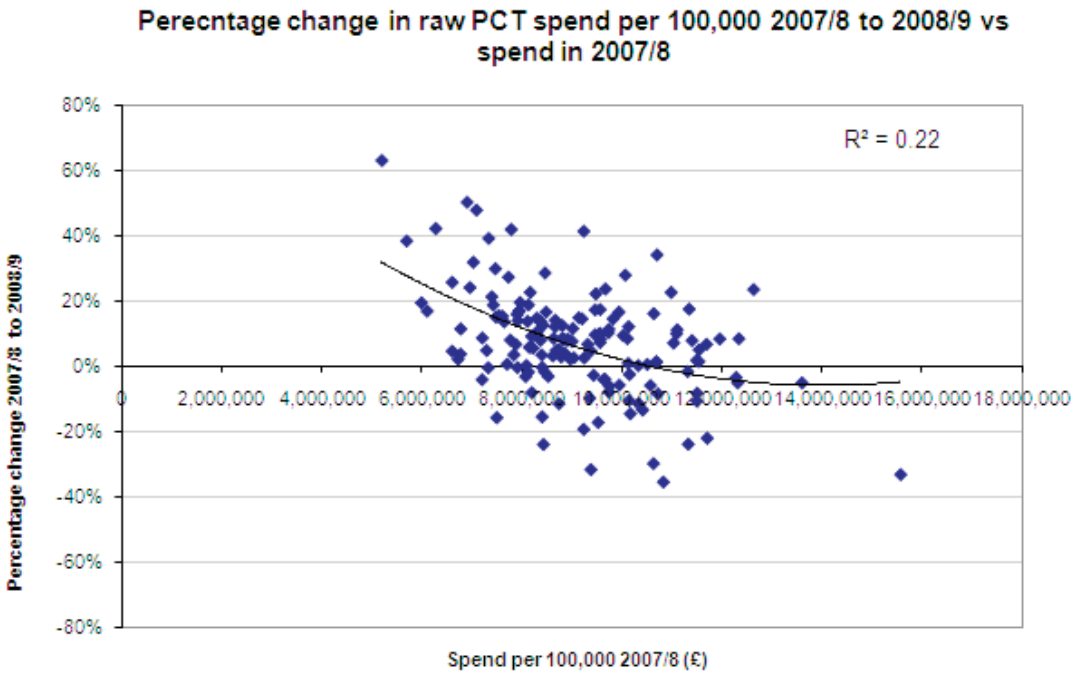
Again, what might be considered implausible – in this case, changes in spending from year to year – is difficult to decide. However, not only are around 55 per cent of PCTs reporting swings of +/-10 per cent (and around 75 per cent swings of +/-5 per cent), but there appears to be an indication of a pattern in the way spending changes.

Figure 19: Percentage year-to-year changes in PCT cancer spending: summary



One reason for the swings in spending is that PCTs may adjust their data on the basis of their comparative spending in in the previous year. As Figure 20 show, for changes in spending from 2007/8 to 2008/9 vs spending per 100,000 in 2007/8, there does appear to be a suggestion of such a link. Similar patterns are evident in other years, but are not presented here.

Figure 20: Relationship between change in spending 2007/8 to 2008/9 and level of spend in 2007/8



There is some indication that comparatively low-spending PCTs in one year tend to report increased spending the following year and vice-versa. Overall, however, it is difficult to conclude whether this pattern of changes

necessarily indicates problems with the quality of the data, partly because changes are made to the collection each year by the Department of Health to improve data quality. It might be the case that PCTs' relative spending in one year encourages them to make greater efforts to ensure their data is more accurate. On the other hand, it is probably the case that PCTs with closer to the national average spend should not necessarily take this to indicate that their data is more accurate than other more statistically outlying PCTs.

It is of course possible that changes in spending at PCT level from one year to the next reflect changes in PCT populations' cancer epidemiology (and hence demand for care). However, for those years available, no association was found between changes in age-standardised incidence rates and changes in total cancer spending from 2004/5 to 2005/6 and 2005/6 to 2006/7, and no association was found for changes in prevalence (as reported by QOF) and changes in spending for the years 2006/7 to 2007/8 and 2007/8 to 2008/9 (see Table 16).

Table 16: Correlation between PCT spending and cancer incidence and prevalence changes from year to year

	2004/5 to 2005/6	2005/6 to 2006/7	2006/7 to 2007/8	2007/8 to 2008/9
Prevalance	na	na	0.03	-0.13
Incidence	-0.03	0.06	na	na

Pearson correlation coefficients

How is Programme Budget data collected and compiled?

West Kent: a case study

NHS West Kent PCT recognised the relevance of Programme Budgeting as a means to drive and measure the changes that will achieve improvements in the way health services are commissioned and provided. However, the PCT also recognised that to achieve better health and fair access to efficient health services, a more rigorous approach to calculating and understanding programme costs and health outcomes was required.

Responding to benchmark comparisons that suggested comparatively high spending in cancer, but not exceptionally good outcomes, West Kent established a multi-disciplinary project to study the cancer programme area. The objectives were:

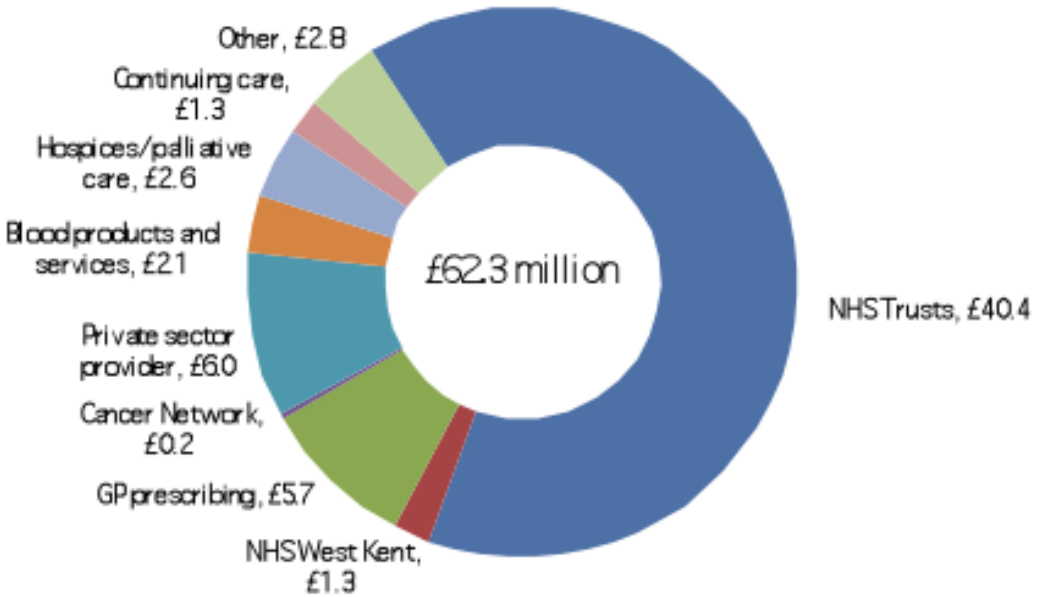
- to better understand the costs attributed to cancer
- to consider whether or not available information could be used to refine the programme analysis, not only at the main programme level, but at more detailed sub-programme level which should be far more relevant for clinical engagement.

Collecting and compiling Programme Budget data

In 2008/9 West Kent reported a total spend for its cancer programme of £62.3 million. Arriving at this figure required collection and collation of activity and costs from many different sources, using a variety of methods to identify cancer-related activities and their associated costs.

As Figure 21 shows, while the bulk of West Kent's total cancer spending was on care provided by NHS hospitals, around a third of the spend arose from other service areas, ranging from GP prescribing to continuing and hospice care. No cancer spending was identified relating to core primary services – not because GPs do not see and treat patients with suspected cancer or confirmed disease, but because the convention/requirement is to map these costs into a programme labelled 'Other'. Improvements in routinely available and shared information about how much resource GPs commit to patients with different conditions would allow a more accurate allocation of such costs to programme areas.

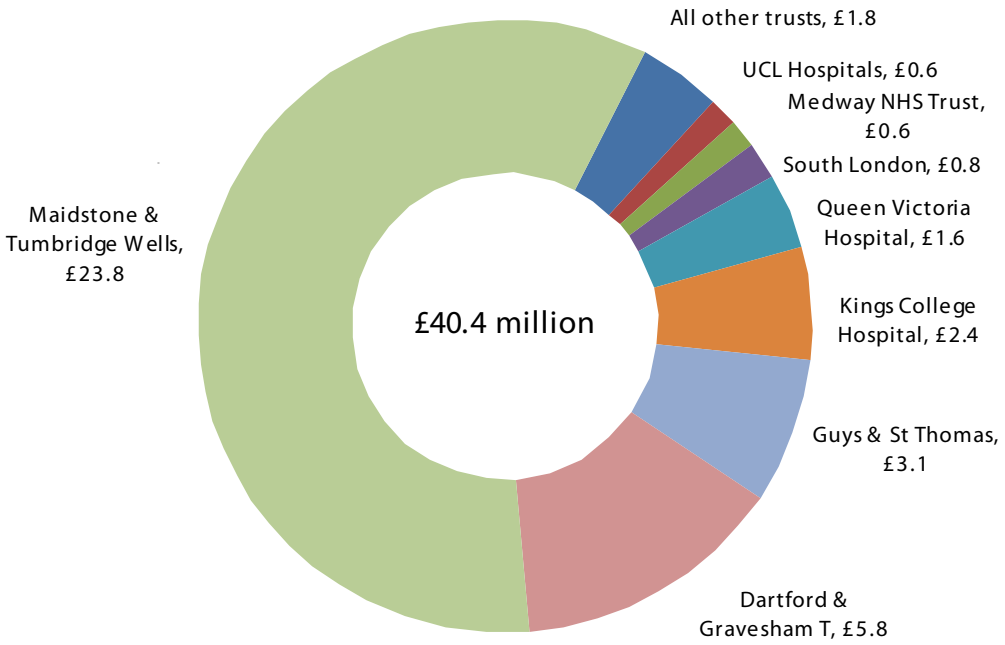
Figure 21: West Kent 2008/9 total cancer Programme Budget spend, by service/sector



Source: NHS West Kent PCT

Figure 22 shows most of the NHS hospital spend was attributable to one trust, Maidstone and Tunbridge Wells. In total, 30 trusts are routinely providing cancer care and treatment to the residents of West Kent and contribute to the PCT's spend on secondary cancer care. Thames Cancer Registry data suggests that as many as 75 Trusts may serve West Kent residents over a period of years.

Figure 22: West Kent 2008/9 cancer Programme Budget spend for admitted and non-admitted patient care



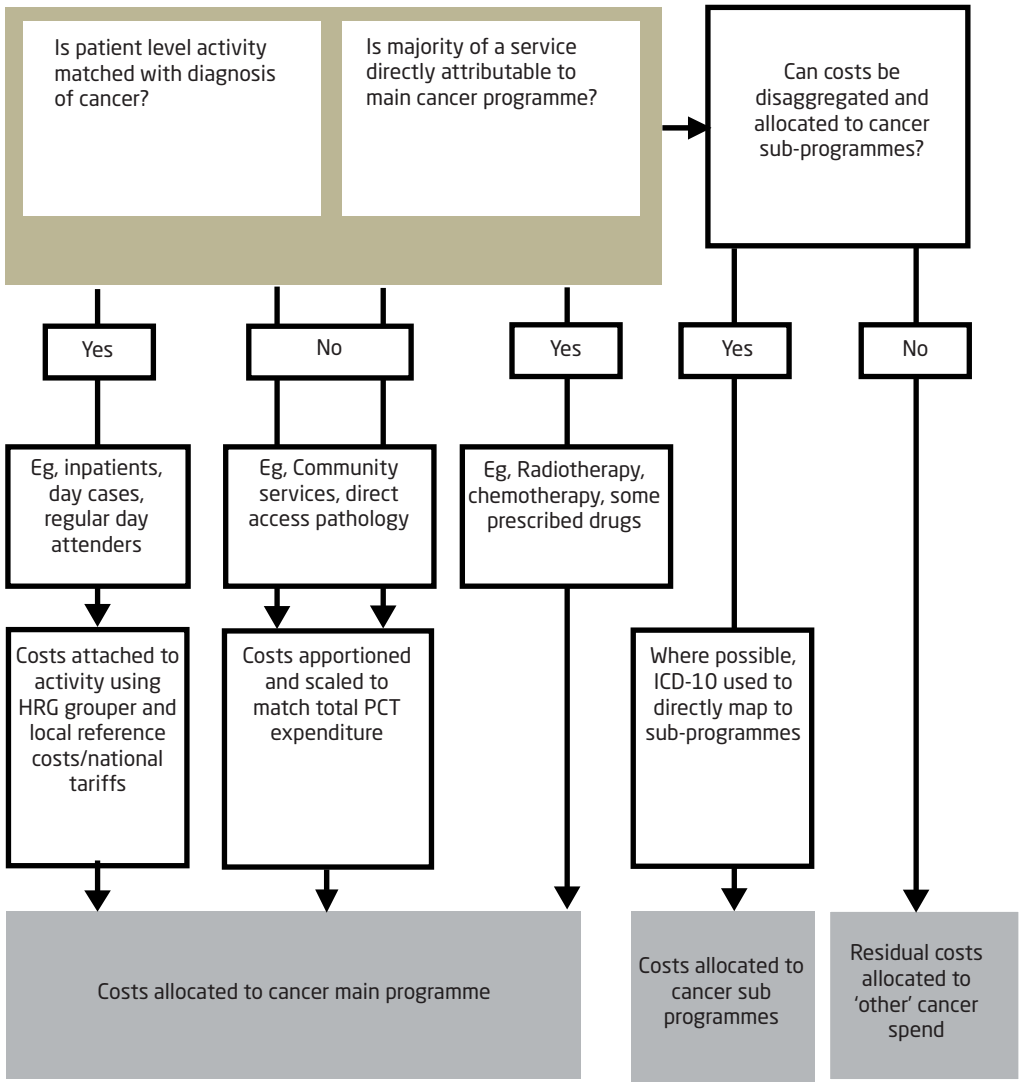
Source: NHS West Kent

The flow diagram below (Figure 23) shows in broad terms the steps needed to bring activity and cost data together to form the overall cancer programme spend for a PCT and its disaggregation into cancer sub-programmes.

Ideally, all activities and costs would be perfectly described in sufficient detail to match individual patient level information, including an unambiguous diagnosis that matched with a single cancer sub-programme. In reality, the closest to this is admitted patient care activity in acute hospitals, where activity can be recategorised into HRGs to allow linkage with costs. Patient-based ICD-10 data held on hospital record systems can then be used to generate costs for cancer sub-programmes too. Nationally, around 45 per cent of the total cancer programme spend is allocated to 'other cancers and tumours'; for NHS West Kent this is around 41 per cent.

For complex patients with multiple conditions and multiple episode hospital spells, however, judgements have to be made as to which Programme Budget their costs are allocated.

Figure 23: Compiling the cancer Programme Budget



Services that are not directly associated with specialist treatment for given condition, but clearly form part of the service provided for patients with the condition, pose a challenge in terms of accurately allocating costs. Examples include ambulance journeys, pathology tests, therapies and most community-based nursing services. Programme budgeting requires that all the costs of treating patients and the overheads are accounted for, not just the direct costs which specialists deem to be important.

There are a number of observations to be made about the collection and collation of Programme Budget activity and cost data from Figure 23.

First, for costed patient-level activity with diagnosis, which includes inpatients, day cases and regular day attenders (for the administration of chemotherapy, for example), it is possible to attach unit costs to activity which can then be linked directly to the sub-programme category using the (ICD-10) diagnostic code for patients.

Second, there are services where the costs are attributable to the treatment of cancer patients, but the link to a specific patient and precise diagnosis

is not available. These areas include radiotherapy, high-cost drugs, and outpatient activity for specialties such as medical and clinical oncology. It is seldom possible to allocate the bulk of the costs of these services and activities directly to a specific sub-programme; such costs are usually attributed to 'other cancers and tumours'.

In West Kent, prescribing by GPs for cancer amounts to £5.7 million (9 per cent of total cancer spend in the area). This information is derived from a mapping of British National Formulary (BNF) categories to main programmes and in some cases sub-programmes. However, this is known to produce imperfect information because many drugs are used for many conditions, spanning more than one programme. Prescribing data is linked to GP practices but not to individual patients, which makes improvement in allocation accuracy very difficult. Use of drugs across a range of cancer and non-cancer conditions means that it is only possible to confidently use the following cancer sub-categories for prescribing costs: lower gastrointestinal, breast, gynaecological and urological. The drugs associated with these four sub-categories account for 60 per cent of total cancer prescribing spend.

Third, costs that cannot be mapped directly to one of the 23 main programmes (cancer being the second of 23) will be apportioned between all 23 programmes using the best available information and workload statistics. Ambulance and community services are examples of these. Less familiar but important areas include the costs of free nursing care and fully funded continuing care. Where are costs are apportioned this way, they will be mapped to the 'other/ non-specific' sub-programme within each main programme area such as cancer.

Developing Programme Budgeting

In order to investigate the quality of its cancer programme spend data and to develop a deeper and shared understanding of its local information, NHS West Kent initiated an exercise to find ways of more accurately matching costs with cancer sub-programmes using alternative sources of routinely available information. The project aimed to compile cancer programme and sub-programme spending for admitted and non-admitted patient activity, constituting the majority of cancer spending. In part, this reflects a recommendation in the *Cancer Commissioning Guidance* (Department of Health 2009c) for PCTs to compile their own cancer spend breakdown using National Programme Budget methods supplemented by local knowledge and data. Appendix F details our attempt to do this for the largest element of PCTs' spending, inpatient care.

Patient identifiers (NHS numbers of all those on the registry who were alive on April 1st 2008) were extracted from the Thames Cancer Registry and all admitted and non-admitted patient activity attributable to these patients that could be reliably allocated to the cancer programme via patients' primary diagnosis was extracted from NHS trusts' patient-level datasets. Importantly, the cancer registry data also allowed patient identifiers to be mapped to the cancer programme sub categories.

The collated activity was then converted into spend using HRG codes and national tariffs. The results showed that total spend on admitted and non-admitted patient cancer care delivered by NHS trusts was £30.3 million, of which more than £24.3 million mapped to specific cancer sites and around

£6 million was attributable to other cancers not covered by the specific sub-programmes.

The specific cancer sub-programme costs identified via the cancer registry data were, in aggregate, very similar to the amount identified by the Programme Budget process (£24.9 million), confirming the reliability, at a total level, of the Programme Budgeting data.

While the cancer registry method identified £6 million 'other cancer' spend, the Programme Budget process reported around £15 million. The reason for this difference was due to a group of cancer-related service costs such as radiotherapy, high cost drugs diagnostics, A&E and other overhead costs, which were not part of West Kent's alternative Programme Budget analysis.

The exercise undertaken by West Kent points not only to the potential for improved information with existing data but also identifies areas, such as primary care prescribing, where national level support would result in improvements in the quality of programme information. A next step being considered is the use of cancer registry and other related data to create a profile to reasonably map the costs of radiotherapy, pathology and other services currently allocated to 'other cancers and tumours' to specific cancer sub-programmes.

Conclusion

Quantifying the accuracy of the Programme Budget data is not easy. However, from our analysis of some obvious outliers and changes in spending from year to year for individual PCTs, there appear to be indications of problems with data quality.

For example, while there appears to have been some improvement over time, in 2008/9 half of all PCTs' spending had changed by more than +/-10 per cent compared with 2007/8 and nearly 20 per cent of PCTs reported changes greater than +/-20 per cent. In addition, the alternative analysis of NHS trust spending on admitted and non-admitted care for cancer patients resident in NHS West Kent revealed a large difference compared with the Programme Budget methodology for this element of West Kent's spending. While further analysis of the West Kent data is required, an initial probe suggests that the bulk of the difference in spending under the two methods appears to be accounted for by one provider and in the 'other' cancer subcategory.

While there seems therefore to be prima facie evidence of problems with the quality of the Programme Budget data, it has not been possible to identify a cause or set of causes for this which would allow us to amend the data to adjust for quality.

However, we can make some observations based on our analysis.

- As the NAO's investigation noted, there is very little incentive on the part of providers to spend all but minimum time and effort ensuring the data they supply to PCTs maximises accuracy.
- Other PCTs could replicate West Kent's alternative analysis. This would help identify whether West Kent's results are typical.
- The proportion of cancer spend classified as 'other' remains high nationally (around 45 per cent of all cancer spend) and, if West Kent's

experience is typical, may be a key source of data imprecision and a barrier to further clinical engagement with this data.

- Large swings (+/- 10 per cent?) in PCTs' reported cancer spend from year to year could trigger a need to investigate reasons for the change and an exception report by PCTs.

6 Conclusions and recommendations

The primary aim of this study was to identify reasons for observed and persistent variation across PCTs in per capita spending on cancer services as reported by the National Programme Budget data sets from 2004/5 to 2008/9.

We have established that:

- demand factors can, to a limited degree, explain such variations
- differences in reporting – that is, data quality – are probably important, though the impact on spending variations is difficult to quantify
- it is not possible to take into account other sources of justifiable variation without further data.

On the basis of these headline results and the work underlying this report, there are three areas where work could be extended to support the NHS National Programme Budget Programme process and its underlying objectives:

- continuing improvements in the recording of programme expenditure
- further development of cost analysis at patient and pathway levels
- development of a 'system view' of cancer care.

Recommendation 1: Efforts to improve recording of programme expenditure should continue

We recognise that efforts continue at national, regional and local level to support and improve the Programme Budgeting process. As a result, the quality of data will improve, particularly the sub-category information which has not been collected for the whole of the period analysed in this report.

Further efforts in two other areas would also be beneficial: clinical coding and the correct allocation of costs to programmes. As far as the first is concerned, it may be that the requirements placed on NHS providers to report on their data quality in annual quality accounts will provide a useful spur to improvements in this area. It is well known that clinical coding too often remains a low priority, low status area of the NHS's work, and this report adds to existing voices calling for this to change, such as those of the Royal College of Physicians and the Audit Commission (RCP and AC 2009).

The second area, the correct allocation of costs to programmes, is problematic. The Department of Health already offers and updates its guidance on how allocations should be made and tries to ensure that providers have sufficient time to complete their returns, but our analysis suggests that there is some way to go.

A key difficulty appears to be that providers tend to see little direct benefit from the Programme Budgeting data coding process, since PCTs rarely commission on the basis of programme data. However, developments in other policy areas may provide them with an incentive to devote more attention to this. Financial pressures will increase their interest in identifying

areas where their revenues fall short of their costs. In addition, if, as seems possible, contracting and tariffs move towards a pathway basis, their incentive will become even stronger. Our next recommendation bears on this.

Recommendation 2: Support is needed for the further development of cost analysis at the level of patient and pathway

We would expect that as the quality of recording is improved, the degree of variation would reduce and that the proportion of that variation explained by demand and financial factors would increase. However, even if recording were perfect and if (over time) financial factors were eliminated, we would not expect that all variation could be explained using the aggregate data alone.

Some of the possible reasons for differences in spending to emerge could not be identified, even in principle, from the aggregate data alone. For example, much additional information would be needed to identify differences in total spend due to differences in case-mix in terms of either cancer type or pathway. Much of this data – for example, concerning pathways along which patients move to access care – is not systematically collected.

This approach leads in the direction of costed norms or standards of provision that could be built up from the unit costs of individual processes or pathways for each of a large range of client groups and for an expected distribution of costs between each pathway; for example, that x per cent of cases were found via the two-week rule and that two-week rule cases represented y per cent of all cases.

This could be very complicated, however, and require a lot of detailed information derived from patient-level costing. On the other hand, some degree of averaging over types of case may be acceptable, that is, good enough to identify prima facie cases of wasteful spending.

We do not have any information on the scale of variation between areas in respect of number of cases or of variation in costs of treatment for different cancers and social groups and for different pathways. Hence, it is not yet clear how far off the mark a simple average cost per case would be.

As we noted in Section 3, work is already underway in a number of cancer networks on the costs of different patient pathways, and in West Kent a similar form of analysis has been conducted at the level of the individual patient. A recent Chartered Institute of Management Accountants report (CIMA 2009) suggests that a majority of NHS trusts are using, to some degree, service line or patient level costing methods. In addition, as the *Cancer Commissioning Guidance* (Department of Health 2009c) suggests, PCTs should be encouraged to build up their own local Programme Budgets, in part using data used to construct Programme Budget returns, and in part, as West Kent have attempted, using local knowledge and data to cross check their National Programme Budget methodology and to establish some common cause with providers around the importance of this sort of financial information.

We consider that work of this kind is essential, both as a complement to the Programme Budget data and in its own right. As a complement, it is required to support understanding of the significance of the Programme Budget

figures, for the reasons set out above; in its own right, such work will be valuable to both purchasers and providers.

For providers, it gives insight into where their costs are 'too high' and hence where to target their efforts to raise their levels of efficiency. According to the CIMA report (2009), many trusts recognise that they provide a better means of identfying where costs can be reduced than the across-the-board approach typical of previous efficiency drives.

For purchasers, this work provides insight into where their resources are being used, whether the services involved are being delivered efficiently and whether these services are appropriately designed. In particular, taking cancer care as whole, it may provide the key to determining whether it is worthwhile investing in one part of the system (for example, early identification and referral) with the aim of reducing costs in another. Such data is also essential to assessing the potential benefits of changes in treatment regimes (Karnon *et al* 2007).

Recommendation 3: A programme of work is needed to enable a 'system view' of cancer care to be developed

Both these approaches require additional information and research results. For example, output and quality measures are needed, and some key relationships need to be specified – for instance, the potential of local action to modify referral behaviour or reduce the number of cancer cases. If the ultimate aim is to design an efficient cancer care system, then the relationship between spending in different parts of the system is critical.

In the case of cancer the main system relationship is probably between prevention/diagnosis and later treatment costs. This is reflected in the current Cancer Reform Strategy, where there is significant emphasis on patient presentation and rapid diagnosis. If the current research programme is successful in showing that early presentation and diagnosis are important to outcomes and that patient and GP behaviour can be improved, then an efficient cancer care system would be devoting resources to that form of improvement. In terms of our analysis it would mean that some degree of what we have treated as justifiable variation should be treated as non-justifiable (that is, if PCTs were spending in the 'wrong' way). Similarly, if it proves feasible to alter personal behaviour or other causes of cancer, then some element of demand/need could be regarded as 'non-justifiable'.

Clearly this line of argument goes far beyond the ambitions of the National Programme Budget Project. The Department of Health has (always) recognised the need for local and more detailed analysis then the Programme Budget data itself can provide the basis for.

We consider that if analysis of spending variations is to fulfil its potential, the Department of Health should promote the development of a framework within which the various elements of cancer care and the relationships between them can be considered as a whole. The work of the National Cancer Intelligence Network, the cancer registries, the National Cancer Action Team and the cancer networks all put cancer in a potentially strong position to be a service capable of undertaking this level of analysis. The work already carried out for the Department by the York Health Economics Consortium and the University of Sheffield (2007) into the costs and benefits of bowel cancer services shows what can be done from existing sources to

build up a picture of how a specific cancer is treated. However, that project also identified serious gaps in the evidence; gaps that need to be filled if a systems perspective is to be fully realised. We consider that this work should be updated and developed further in the light of more recent evidence, including the introduction of screening for bowel cancer, and that it should also be carried out for other cancers.

As our own project has shown, it will not be easy to make progress. But it is our belief that if the Programme Budget initiative is to achieve its full potential, more detailed work of the type already being carried out within the NHS, combined with an overall system approach, offers the best way forward.

References

Chartered Institute of Management Accountants (2009). *A Picture of Health: Service cost data in performance management in the NHS*. CIMA Global website. Available at: www.cimaglobal.com/Documents/ImportedDocuments/cid_execrep_service_cost_data_performance_management_oct_2009.pdf (accessed on 21 October 2010).

Department of Health (2008a). *Exposition Book 2009/10 and 2010/11*. National Archives website. Available at: http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Managingyourorganisation/Financeandplanning/Allocations/DH_091850 (accessed on 21 October 2010).

Department of Health (2008b). *Cancer Reform Strategy: Maintaining the momentum, building for the future. First annual report*. London: Department of Health. Available at: www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_091261 (accessed on 4 February 2011).

Department of Health (2009a). *Patient level information and costing systems*. National Archives website. Available at: http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Managingyourorganisation/Financeandplanning/NHScostingmanual/DH_080056 (accessed on 21 October 2010).

Department of Health (2009b). *Cancer Reform Strategy, achieving local implementation. Second annual report* [online]. Available at: www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_109338 (accesssed on 4 February 2011).

Department of Health (2009c). *Cancer Commissioning Guidance* [online]. Department of Health website. Available at: www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_110115 (accessed 21 October 2010).

Hagen J (1968). *Program Budgeting: CSE Report No. 7*. Los Angeles, California: Center for the Study of Evaluation, UCLA Graduate School of Education. Available at: www.cse.ucla.edu/products/reports/R007.pdf (accessed on 21 October 2010).

Karnon J, Kerr GR, Jack W, Papo NL, Cameron DA (2007) 'Healthcare costs for the treatment of cancer recurrent events: estimates from a UK-based patient-level analysis'. *British Journal of Cancer*, 97(4); 479–85.

Martin S, Rice N, Smith P (2009). *The Link Between Health Care Spending and Health Outcomes for the New English Primary Care.* CHE Research Paper 42. York: Centre for Health Economics, University of York. Available at: www.york.ac.uk/inst/che/pdf/rp42.pdf (accessed on 21 October 2010).

National Audit Office (2008). *Good Governance Report: Review of programme budgeting*. London: NAO.

National Cancer Action Team (2010). Cancer Commissioning Toolkit. Available at: www.cancertoolkit.co.uk/PublicPages/Login.aspx?ReturnUrl=%2fdefault.aspx&AspxAutoDetectCookieSupport=1 (accessed on 4 February 2011).

National Programme Budget Project (2009). *Programme budgeting tools and data*. Department of Health website. Available at: www.dh.gov.uk/en/Managingyourorganisation/Financeandplanning/Programmebudgeting/DH_075743

NHS Institute for Innovation and Improvement (2010). 'Map of Medicine website'. Available at: www.mapofmedicine.com/ (accessed on 4 February 2011).

Royal College of Physicians and the Audit Commission (2009). *Improving clinical records and clinical coding together.* London: RCP.

York Health Economics Consortium and School of Health and Related Research, University of Sheffield (2007). *Bowel Cancer Services: Costs and benefits. Final report to the Department of Health.* York: YHEC/University of Sheffield. Available at: http://php.york.ac.uk/inst/yhec/files/resources/FinalBowelCancerReport%20-%20Apr07.pdf (accessed 21 October 2010).

Appendix A: Adjusted and unadjusted spend per 100,000 population: PCT ordered: 2004/5 to 2008/9

Adjusted and unadjusted spend per 100,000 population, 2004/5

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Camden	16,187,950	Camden	11,534,171
Tower Hamlets	14,529,218	Torbay Care Trust	11,455,834
Torbay Care Trust	11,910,051	Oxfordshire	11,447,537
Newcastle	10,641,188	Tower Hamlets	10,465,820
Hammersmith and Fulham	10,319,497	North East Essex	10,286,990
Great Yarmouth and Waveney	9,852,999	Kingston	10,120,219
North East Essex	9,822,415	Bath and North East Somerset	9,886,612
Knowsley	9,779,844	West Kent	9,756,584
Blackpool	9,624,473	Great Yarmouth and Waveney	9,722,418
Kingston	9,558,669	Gloucestershire	9,651,160
Middlesbrough	9,333,087	West Hertfordshire	9,488,996
Gateshead	9,312,084	Norfolk	9,438,329
Islington	9,281,633	Lincolnshire	9,305,486
Northumberland Care Trust	9,191,726	Northumberland Care Trust	9,297,649
Sheffield	9,156,646	Leeds	9,015,718
Leeds	9,133,143	Newcastle	8,958,909
Wakefield District	9,112,459	Wakefield District	8,889,562
Lambeth	8,948,500	Cornwall and Isles Of Scilly	8,807,375
Kensington and Chelsea	8,923,869	Somerset	8,793,860
Nottingham City	8,863,164	Medway	8,786,839
Westminster	8,823,909	Derbyshire County	8,713,790
Lewisham	8,813,099	Cambridgeshire	8,710,938
Gloucestershire	8,809,572	North Somerset	8,710,033
West Hertfordshire	8,804,913	South East Essex	8,641,204
Salford Teaching	8,801,382	Berkshire West	8,623,333
Lincolnshire	8,721,516	Worcestershire	8,592,431
Norfolk	8,721,367	Sheffield	8,519,962
Bath and North East Somerset	8,692,437	Mid Essex	8,511,321
West Kent	8,668,177	Surrey	8,457,949
Cornwall and Isles Of Scilly	8,620,048	Havering	8,436,065
Redcar and Cleveland	8,522,719	Sutton and Merton	8,418,066
Redbridge	8,513,407	Devon	8,395,704
Hull	8,446,219	Bromley	8,339,300

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Bristol	8,434,916	West Essex	8,337,434
Havering	8,387,207	Knowsley	8,316,571
Sutton and Merton	8,382,388	Nottingham City	8,311,796
South Tyneside	8,358,618	Northamptonshire	8,297,572
Wolverhampton City	8,313,568	Suffolk	8,260,926
Barking and Dagenham	8,275,524	Gateshead	8,246,520
Derbyshire County	8,263,631	Middlesbrough	8,242,950
Greenwich	8,213,431	Bristol	8,199,132
Oldham	8,208,804	Blackpool	8,168,270
Manchester	8,208,601	Redbridge	8,163,050
Walsall	8,189,333	Dorset	8,138,331
South East Essex	8,181,085	Bexley	8,104,629
Hounslow	8,080,260	Warwickshire	8,048,876
Devon	8,043,959	North Yorkshire and York	8,046,879
Somerset	8,033,136	Hammersmith and Fulham	7,997,985
Bradford and Airedale	7,975,829	Shropshire County	7,979,740
Cumbria	7,959,516	Portsmouth City	7,968,248
Portsmouth City	7,956,479	Cumbria	7,962,650
Hastings and Rother	7,945,811	Nottinghamshire County	7,936,501
Bournemouth and Poole	7,937,594	Bassetlaw	7,931,550
North Lancashire	7,922,947	Bournemouth and Poole	7,864,247
Ashton, Leigh and Wigan	7,920,955	Hull	7,857,519
Bromley	7,896,059	Redcar and Cleveland	7,823,303
Dorset	7,890,024	Central Lancashire	7,816,020
Buckinghamshire	7,852,763	Wolverhampton City	7,805,262
Barnsley	7,838,393	Walsall	7,763,642
North Somerset	7,821,302	Oldham	7,762,841
North Tyneside	7,814,367	East Riding Of Yorkshire	7,742,885
Coventry Teaching	7,806,229	Barking and Dagenham	7,732,196
Bexley	7,782,527	Stockport	7,690,039
County Durham	7,782,096	Leicestershire County and Rutland	7,681,883
West Essex	7,753,627	Coventry Teaching	7,665,369
Central Lancashire	7,734,731	North Lancashire	7,654,206
Isle of Wight	7,723,388	Central and Eastern Cheshire	7,638,848
Surrey	7,699,311	Hounslow	7,589,242
Blackburn with Darwen Teaching	7,674,813	North East Lincolnshire	7,560,813
Haringey	7,665,034	Bradford and Airedale	7,546,086
Wirral	7,663,297	Wiltshire	7,521,866
Enfield	7,635,608	Dudley	7,502,439
East Lancashire	7,628,546	Hampshire	7,424,689
Worcestershire	7,552,374	Ashton, Leigh and Wigan	7,417,557
Nottinghamshire County	7,543,823	Kirklees	7,405,209
Calderdale	7,534,544	South Tyneside	7,388,688
Medway	7,517,040	Derby City	7,374,067
Wandsworth	7,490,439	Calderdale	7,365,311
Ealing	7,484,280	North Tyneside	7,356,983

PCT	Unadjusted (£)	PCT	Unified weighted (£)
East Sussex Downs and Weald	7,451,698	Plymouth	7,346,012
Bassetlaw	7,407,203	Enfield	7,309,424
North East Lincolnshire	7,404,502	East Sussex Downs and Weald	7,264,088
Plymouth	7,387,430	Salford	7,229,398
Northamptonshire	7,381,223	Solihull Care Trust	7,225,151
Stockport	7,374,077	Lewisham	7,207,550
Cambridgeshire	7,364,280	Isle of Wight	7,199,601
Rotherham	7,354,146	County Durham	7,185,790
Warwickshire	7,317,342	Kensington and Chelsea	7,174,636
Birmingham East and North	7,299,471	East Lancashire	7,172,074
Suffolk	7,288,343	Barnsley	7,111,661
Derby City	7,287,059	Richmond and Twickenham	7,079,907
North Yorkshire and York	7,248,534	Blackburn with Darwen	7,046,902
Doncaster	7,223,630	Lambeth	7,044,424
Sandwell	7,215,617	Rotherham	7,019,241
East Riding Of Yorkshire	7,215,499	Southampton City	7,011,186
South Birmingham	7,206,718	Greenwich	7,002,328
Kirklees	7,199,271	South West Essex	6,973,065
Sefton	7,183,674	Hastings and Rother	6,972,089
Shropshire County	7,176,025	Bedfordshire	6,933,826
Sunderland	7,146,412	Bury	6,925,649
Berkshire West	7,132,525	North Lincolnshire	6,908,974
Mid Essex	7,121,386	West Sussex	6,841,074
Dudley	7,121,181	Doncaster	6,833,050
Tameside and Glossop	7,100,869	Swindon	6,789,588
Richmond and Twickenham	7,052,689	Wirral	6,760,354
Waltham Forest	7,016,872	Birmingham East and North	6,753,849
Central and Eastern Cheshire	6,945,338	Ealing	6,753,485
Liverpool	6,933,847	Trafford	6,749,013
Trafford	6,903,979	Tameside and Glossop	6,695,012
Bury	6,850,852	South Birmingham	6,651,505
Heywood, Middleton and Rochdale	6,836,021	East and North Hertfordshire	6,621,568
Southampton City	6,825,380	Eastern and Coastal Kent	6,572,907
Darlington	6,806,026	Sandwell	6,571,875
Southwark	6,756,674	Sefton	6,565,853
Halton and St. Helens	6,755,467	Haringey	6,508,891
Eastern and Coastal Kent	6,718,924	Wandsworth	6,500,109
Solihull Care Trust	6,703,081	Waltham Forest	6,493,919
North Lincolnshire	6,685,620	Milton Keynes	6,479,378
Brighton and Hove City	6,659,693	Stockton-on-Tees	6,433,820
Hartlepool	6,605,051	Telford and Wrekin	6,411,781

PCT	Unadjusted (£)	PCT	Unified weighted (£)
West Sussex	6,589,145	Manchester	6,380,722
Wiltshire	6,479,654	Hillingdon	6,310,075
Hampshire	6,476,103	South Staffordshire	6,297,620
Newham	6,448,681	Darlington	6,283,991
Leicestershire County and Rutland	6,430,483	Brighton and Hove City	6,281,172
Barnet	6,416,154	Heywood, Middleton and Rochdale	6,261,546
South West Essex	6,389,825	Sunderland	6,258,759
Hillingdon	6,350,888	West Cheshire	6,204,095
Bolton	6,294,512	Barnet	6,155,935
Stockton-on-Tees	6,208,876	Halton and St. Helens	6,136,235
Leicester City	6,189,560	Leicester City	6,117,041
Swindon	6,150,931	Islington	6,101,040
Stoke On Trent	6,077,644	Croydon	6,074,823
Croydon	6,009,688	Herefordshire	6,074,471
West Cheshire	5,993,607	Bolton	6,049,252
Bedfordshire	5,920,619	Westminster	6,034,065
Peterborough	5,840,911	South Gloucestershire	5,877,509
East and North Hertfordshire	5,826,105	North Staffordshire	5,841,857
Brent	5,763,652	Peterborough	5,747,308
North Staffordshire	5,669,339	Hartlepool	5,736,056
Milton Keynes	5,637,338	Stoke On Trent	5,656,034
City and Hackney	5,616,468	Liverpool	5,533,765
Telford and Wrekin	5,586,209	Berkshire East	5,529,706
Harrow	5,523,581	Harrow	5,472,901
South Staffordshire	5,506,335	Luton	5,248,626
Herefordshire	5,446,959	Newham	5,219,228
Oxfordshire	5,121,335	Southwark	5,065,810
Luton	4,966,115	Brent	4,934,718
Berkshire East	4,950,528	Buckinghamshire	4,917,061
South Gloucestershire	4,780,316	Warrington	4,663,676
Warrington	4,437,492	City and Hackney	4,192,039
Heart of Birmingham	4,094,612	Heart of Birmingham	3,665,029

Adjusted and unadjusted spend per 100,000 population, 2005/6

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Camden	14,672,244	Oxfordshire	11,946,239
Tower Hamlets	13,331,795	South Tyneside	11,658,498
South Tyneside	13,193,576	North Somerset	11,606,687
Gateshead	11,576,579	Cambridgeshire	11,043,444
Torbay Care Trust	11,417,466	Torbay Care Trust	10,923,833
Trafford	11,068,116	Trafford	10,886,368
Newcastle	10,987,520	Gloucestershire	10,854,457
Nottingham City	10,894,387	North East Essex	10,816,357
Manchester	10,877,413	Suffolk	10,705,264
Great Yarmouth and Waveney	10,567,515	Camden	10,513,575
Liverpool	10,537,413	Norfolk	10,481,927
North Somerset	10,444,702	Devon	10,420,007
Islington	10,435,990	East and North Hertfordshire	10,387,505
North East Essex	10,402,936	West Kent	10,342,580
South Birmingham	10,360,694	Great Yarmouth and Waveney	10,340,334
Blackpool	10,357,510	Gateshead	10,234,039
Hull	10,149,380	Nottingham City	10,206,461
Hammersmith and Fulham	10,107,294	Lincolnshire	10,042,558
Devon	9,948,169	East Riding Of Yorkshire	9,947,235
Sheffield	9,939,122	Cornwall and Isles Of Scilly	9,878,616
Wolverhampton City	9,915,787	South Gloucestershire	9,828,188
Gloucestershire	9,893,833	Stockport	9,746,811
Lambeth	9,804,737	Bath and North East Somerset	9,683,708
Isle of Wight	9,723,267	Northamptonshire	9,638,184
Norfolk	9,680,962	South Birmingham	9,607,231
Cornwall and Isles Of Scilly	9,656,682	Sutton and Merton	9,560,365
Leeds	9,637,412	Leeds	9,552,286
Walsall	9,575,610	Derbyshire County	9,545,591
Blackburn with Darwen Teaching	9,562,275	Hull	9,456,672
Hastings and Rother	9,543,076	Tower Hamlets	9,383,061
Sutton and Merton	9,463,778	Shropshire County	9,371,812
Suffolk	9,434,611	Solihull Care Trust	9,320,748
Lincolnshire	9,406,552	Newcastle	9,296,335
Redcar and Cleveland	9,387,738	Sheffield	9,262,083
Greenwich	9,327,648	Wolverhampton City	9,245,250
Cambridgeshire	9,315,202	Somerset	9,191,462
Stockport	9,302,291	Dorset	9,074,591
Birmingham East and North	9,255,980	Calderdale	9,066,658
Calderdale	9,234,370	Isle of Wight	9,057,443

PCT	Unadjusted (£)	PCT	Unified weighted (£)
East Riding Of Yorkshire	9,222,168	Walsall	9,052,830
Salford	9,195,081	Wiltshire	9,004,530
West Kent	9,162,503	South East Essex	8,990,903
East and North Hertfordshire	9,137,766	Berkshire West	8,961,591
Ashton, Leigh and Wigan	9,101,626	North East Lincolnshire	8,942,999
Derbyshire County	9,073,675	Bromley	8,932,022
Wakefield District	9,022,401	Nottinghamshire County	8,879,008
Oldham	8,985,374	Mid Essex	8,849,563
Hartlepool	8,854,515	Blackpool	8,767,770
County Durham	8,827,497	Wakefield District	8,759,201
Bristol	8,824,792	Bournemouth and Poole	8,756,554
Bournemouth and Poole	8,817,789	Portsmouth City	8,702,317
Peterborough	8,801,654	Central and Eastern Cheshire	8,700,229
Dorset	8,775,290	Blackburn with Darwen Teaching	8,679,920
Sefton	8,769,756	Peterborough	8,665,891
North East Lincolnshire	8,766,136	Kirklees	8,620,421
Portsmouth City	8,699,816	Redcar and Cleveland	8,617,958
North Tyneside	8,644,681	Bristol	8,606,296
Barking and Dagenham	8,617,656	West Cheshire	8,576,124
Rotherham	8,607,102	Medway	8,566,967
Solihull Care Trust	8,594,841	Plymouth	8,564,911
Northamptonshire	8,587,671	Cumbria	8,556,747
Redbridge	8,578,709	Central Lancashire	8,518,703
Plymouth	8,566,722	Derby City	8,513,400
North Lancashire	8,553,404	Ashton, Leigh and Wigan	8,510,345
Cumbria	8,545,635	Birmingham East and North	8,509,017
East Lancashire	8,545,469	Warwickshire	8,471,653
South East Essex	8,506,634	Manchester	8,458,144
Bath and North East Somerset	8,503,322	Worcestershire	8,397,738
Nottinghamshire County	8,449,921	Surrey	8,394,116
Shropshire County	8,429,095	Hastings and Rother	8,387,214
Derby City	8,418,651	Oldham	8,375,767
Central Lancashire	8,417,743	North Yorkshire and York	8,367,896
Bromley	8,411,918	Northumberland Care Trust	8,357,687
Somerset	8,403,800	West Essex	8,345,235
Kirklees	8,371,080	Leicestershire County and Rutland	8,338,699
Lewisham	8,352,028	North Lancashire	8,282,183
Tameside and Glossop	8,333,270	Liverpool	8,279,782
Middlesbrough	8,296,579	Redbridge	8,262,700
Heywood, Middleton and Rochdale	8,265,461	Bexley	8,247,092
Wirral	8,263,699	Bassetlaw	8,214,556
West Cheshire	8,258,976	Havering	8,214,056
Westminster	8,254,539	Rotherham	8,203,814

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Northumberland Care Trust	8,253,582	North Tyneside	8,132,164
Buckinghamshire	8,189,930	Telford and Wrekin	8,122,737
Havering	8,167,524	County Durham	8,115,168
Barnsley	8,112,698	Sefton	8,030,005
Eastern and Coastal Kent	8,101,079	East Lancashire	8,013,542
Bolton	8,076,374	South Staffordshire	8,010,781
Waltham Forest	8,037,572	Greenwich	7,988,454
Coventry Teaching	8,031,762	Bury	7,955,780
Bradford and Airedale	8,026,735	Eastern and Coastal Kent	7,930,644
Southwark	7,996,643	Barking and Dagenham	7,911,600
South Gloucestershire	7,994,137	Coventry Teaching	7,859,819
Ealing	7,988,494	Hammersmith and Fulham	7,850,799
Kensington and Chelsea	7,974,810	Tameside and Glossop	7,848,126
Bexley	7,902,349	Kingston	7,839,736
Central and Eastern Cheshire	7,895,747	Hampshire	7,784,601
Enfield	7,891,318	Lambeth	7,757,876
Bury	7,874,517	Bolton	7,733,904
Haringey	7,835,658	Hartlepool	7,680,750
East Sussex Downs and Weald	7,831,536	East Sussex Downs and Weald	7,666,286
Bassetlaw	7,795,045	Stockton-on-Tees	7,595,809
Doncaster	7,789,355	Bradford and Airedale	7,566,071
West Essex	7,735,746	Heywood, Middleton and Rochdale	7,561,191
Wiltshire	7,727,457	Enfield	7,551,909
Darlington	7,688,327	Salford	7,551,278
Warwickshire	7,676,413	Swindon	7,512,853
Surrey	7,614,561	Milton Keynes	7,445,786
Halton and St. Helens	7,601,217	Waltham Forest	7,438,696
Leicester City	7,554,032	Leicester City	7,430,225
North Yorkshire and York	7,506,675	Barnsley	7,348,600
Knowsley	7,504,936	Middlesbrough	7,341,359
Mid Essex	7,412,835	North Lincolnshire	7,325,610
Berkshire West	7,409,179	Doncaster	7,316,345
Worcestershire	7,394,437	Wirral	7,294,347
Kingston	7,363,833	West Hertfordshire	7,287,699
Medway	7,330,088	Ealing	7,242,771
Stockton-on-Tees	7,330,048	West Sussex	7,138,994
Sunderland	7,244,209	Darlington	7,137,921
Telford and Wrekin	7,239,909	Barnet	6,957,515
Wandsworth	7,236,387	South West Essex	6,890,198
Barnet	7,222,685	Islington	6,889,734
Brighton and Hove City	7,176,461	Hillingdon	6,870,226
North Lincolnshire	7,068,201	Lewisham	6,866,690
South Staffordshire	6,999,912	Croydon	6,861,196
Sandwell	6,976,451	Halton and St. Helens	6,847,153

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Leicestershire County and Rutland	6,955,772	Berkshire East	6,826,009
Heart of Birmingham	6,897,761	Bedfordshire	6,787,112
Hillingdon	6,864,826	Brighton and Hove City	6,768,155
West Sussex	6,855,651	Southampton City	6,751,650
Swindon	6,808,037	Haringey	6,653,425
Croydon	6,785,249	North Staffordshire	6,503,924
Hampshire	6,770,904	Sunderland	6,342,290
West Hertfordshire	6,750,477	Kensington and Chelsea	6,340,759
Newham	6,666,692	Wandsworth	6,317,895
Southampton City	6,578,090	Sandwell	6,305,713
Hounslow	6,533,093	Richmond and Twickenham	6,238,420
Milton Keynes	6,480,604	Knowsley	6,226,947
South West Essex	6,382,251	Hounslow	6,154,407
North Staffordshire	6,293,748	Harrow	6,142,140
Richmond and Twickenham	6,255,710	Heart of Birmingham	6,033,118
Harrow	6,170,998	Southwark	6,015,770
City and Hackney	6,103,257	Herefordshire	5,978,368
Berkshire East	6,101,383	Warrington	5,843,289
Oxfordshire	6,047,386	Buckinghamshire	5,811,574
Stoke On Trent	5,901,751	Westminster	5,595,277
Brent	5,871,126	Stoke On Trent	5,491,179
Bedfordshire	5,795,523	Newham	5,286,984
Warrington	5,561,515	Brent	5,029,078
Herefordshire	5,362,982	City and Hackney	4,550,021
Luton	3,846,072	Luton	4,067,297
Dudley	3,501,184	Dudley	3,695,627

Adjusted and unadjusted spend per 100,000 population, 2006/7

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Knowsley	15,241,574	Knowsley	11,797,941
Salford	13,357,367	Nottingham City	11,636,925
Nottingham City	12,460,999	Bournemouth and Poole	11,578,360
Wakefield District	12,162,272	Wakefield District	11,573,101
Bournemouth and Poole	11,795,563	Trafford	11,463,776
South Tyneside	11,726,809	Lincolnshire	10,857,900
Trafford	11,668,301	Torbay Care Trust	10,828,339
Gateshead	11,432,848	Salford	10,718,112
Torbay Care Trust	11,392,246	North Somerset	10,296,979
Manchester	11,156,944	Warwickshire	10,197,071
Blackpool	10,959,383	Cumbria	10,120,609
Birmingham East and North	10,326,054	South Tyneside	9,985,833
Cumbria	10,167,594	Surrey	9,938,565
County Durham	10,155,856	Gateshead	9,776,237
Lincolnshire	10,105,755	Leicestershire County and Rutland	9,635,414
Wolverhampton City	9,990,870	Norfolk	9,578,741
Hartlepool	9,791,257	Birmingham East and North	9,557,166
Hastings and Rother	9,636,917	Stockport	9,509,289
Great Yarmouth and Waveney	9,564,192	Great Yarmouth and Waveney	9,364,838
Liverpool	9,541,817	Hampshire	9,323,390
Middlesbrough	9,497,675	West Cheshire	9,294,456
North Somerset	9,455,523	North Yorkshire and York	9,281,986
Leeds	9,435,391	Wolverhampton City	9,275,751
Leicester City	9,378,231	Berkshire West	9,266,814
Calderdale	9,372,544	West Kent	9,250,190
Sheffield	9,345,782	Shropshire County	9,247,368
Stockport	9,321,745	Blackpool	9,243,378
North East Lincolnshire	9,248,666	North East Essex	9,241,088
North Lancashire	9,186,136	North Lincolnshire	9,223,018
West Cheshire	9,129,011	Leicester City	9,216,802
Warwickshire	9,121,431	Worcestershire	9,202,554
Surrey	9,088,909	Leeds	9,154,575
North East Essex	9,087,593	Calderdale	9,110,576
Islington	9,076,661	North East Lincolnshire	9,054,606
Sefton	9,076,341	Manchester	9,038,241
Blackburn with Darwen	9,067,907	Northamptonshire	9,033,284
Newcastle	9,050,095	County Durham	9,028,936
Walsall	9,024,601	North Lancashire	9,009,185
Hounslow	8,964,974	Derby City	8,907,996
Norfolk	8,884,634	Redbridge	8,885,212
South Birmingham	8,881,735	Nottinghamshire County	8,838,278
North Lincolnshire	8,880,698	East and North Hertfordshire	8,789,579
City and Hackney	8,856,783	Mid Essex	8,744,948

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Redbridge	8,820,823	Sutton and Merton	8,658,816
Sandwell	8,785,240	Bath and North East Somerset	8,638,485
Bristol	8,712,184	Medway	8,627,134
Ashton, Leigh and Wigan	8,703,823	Bristol	8,567,291
Coventry Teaching	8,683,455	Dudley	8,551,669
Bradford and Airedale	8,683,189	Sheffield	8,549,328
Bolton	8,678,638	Hartlepool	8,499,052
Hull	8,609,155	Somerset	8,496,207
Tower Hamlets	8,607,016	Derbyshire County	8,476,779
Sutton and Merton	8,528,213	South Staffordshire	8,455,663
Derby City	8,525,974	Hastings and Rother	8,448,374
Darlington	8,507,587	South East Essex	8,424,128
Rotherham	8,465,694	Hounslow	8,358,979
Nottinghamshire County	8,460,016	Cambridgeshire	8,342,831
East Lancashire	8,454,132	Swindon	8,318,170
Shropshire County	8,433,409	Blackburn with Darwen	8,307,304
Wirral	8,392,812	East Riding Of Yorkshire	8,287,966
Sunderland	8,391,697	Bradford and Airedale	8,267,697
Halton and St. Helens	8,380,502	Bolton	8,264,661
North Yorkshire and York	8,331,863	Berkshire East	8,259,816
Dudley	8,325,273	South Birmingham	8,257,836
Doncaster	8,299,591	Coventry Teaching	8,240,858
West Kent	8,269,904	Walsall	8,227,553
Heywood, Middleton and Rochdale	8,263,350	Portsmouth City	8,188,653
Worcestershire	8,205,345	Oxfordshire	8,165,742
Lambeth	8,186,744	Middlesbrough	8,157,962
Hampshire	8,175,896	Warrington	8,135,790
Portsmouth City	8,167,945	Ashton, Leigh and Wigan	8,135,581
Derbyshire County	8,159,227	Suffolk	8,117,779
East Sussex Downs and Weald	8,157,174	Sefton	8,105,402
South East Essex	8,042,706	East Sussex Downs and Weald	8,031,948
Waltham Forest	8,027,099	Havering	8,008,384
Barnsley	8,014,357	Wiltshire	7,995,816
Stoke On Trent	8,009,750	Dorset	7,986,044
Lewisham	7,993,746	Solihull Care Trust	7,956,849
Havering	7,989,765	Rotherham	7,928,341
Haringey	7,957,974	Herefordshire	7,925,030
Barking and Dagenham	7,930,246	Devon	7,922,750
Leicestershire County and Rutland	7,919,685	East Lancashire	7,881,213
Plymouth	7,908,746	Hull	7,881,116
Barnet	7,867,789	Bromley	7,859,154
Warrington	7,860,396	Sandwell	7,859,000
Northamptonshire	7,856,470	Barnet	7,805,794
Redcar and Cleveland	7,855,077	Plymouth	7,800,192
Somerset	7,784,853	Gloucestershire	7,796,943
Oldham	7,774,751	Buckinghamshire	7,783,891

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Swindon	7,773,201	Darlington	7,758,935
Camden	7,761,820	Bassetlaw	7,749,511
Berkshire West	7,734,424	Bexley	7,744,784
East and North Hertfordshire	7,727,372	Newcastle	7,719,998
Hammersmith and Fulham	7,716,700	Doncaster	7,682,669
Bath and North East Somerset	7,712,178	South Gloucestershire	7,576,374
Greenwich	7,689,383	Croydon	7,540,858
Dorset	7,613,158	Central Lancashire	7,522,654
North Tyneside	7,606,087	Kirklees	7,478,158
Heart of Birmingham	7,576,316	Heywood, Middleton and Rochdale	7,476,158
Devon	7,541,810	West Hertfordshire	7,458,340
South Staffordshire	7,515,506	Liverpool	7,425,916
Bromley	7,508,050	Kingston	7,396,369
Isle of Wight	7,507,163	West Sussex	7,389,831
Croydon	7,481,962	Stockton-on-Tees	7,387,244
Bexley	7,480,377	West Essex	7,367,675
Central Lancashire	7,463,054	Central and Eastern Cheshire	7,364,577
East Riding Of Yorkshire	7,461,633	Halton and St. Helens	7,338,003
Bassetlaw	7,443,515	North Staffordshire	7,326,904
Berkshire East	7,422,779	Wirral	7,288,865
Medway	7,421,536	Telford and Wrekin	7,285,783
Solihull Care Trust	7,420,737	Waltham Forest	7,280,536
Kirklees	7,395,060	Barnsley	7,242,104
Peterborough	7,367,114	Isle of Wight	7,228,170
Northumberland Care Trust	7,316,225	Northumberland Care Trust	7,225,135
North Staffordshire	7,229,301	Barking and Dagenham	7,166,720
Mid Essex	7,200,690	Oldham	7,150,006
Herefordshire	7,190,288	Richmond and Twickenham	7,145,110
West Sussex	7,180,784	Stoke On Trent	7,142,717
Suffolk	7,160,869	Sunderland	7,117,479
Gloucestershire	7,117,588	Eastern and Coastal Kent	7,097,777
Eastern and Coastal Kent	7,111,207	Cornwall and Isles Of Scilly	7,072,313
Enfield	7,106,348	Peterborough	7,064,767
Stockton-on-Tees	7,064,097	Milton Keynes	7,040,530
Tameside and Glossop	7,029,965	North Tyneside	7,031,235
West Essex	7,006,470	Southampton City	6,883,591
Cambridgeshire	6,996,069	Haringey	6,878,020
Kingston	6,953,387	City and Hackney	6,872,533
Oxfordshire	6,901,828	Enfield	6,867,542
Wiltshire	6,881,175	Bury	6,864,232
Brighton and Hove City	6,853,178	Redcar and Cleveland	6,834,063
West Hertfordshire	6,833,404	Greenwich	6,823,983

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Cornwall and Isles Of Scilly	6,832,285	Heart of Birmingham	6,675,142
Central and Eastern Cheshire	6,818,488	Tower Hamlets	6,544,771
Brent	6,802,122	Brighton and Hove City	6,526,236
Southwark	6,800,120	Hammersmith and Fulham	6,511,560
Richmond and Twickenham	6,767,562	Tameside and Glossop	6,490,587
Bury	6,749,126	Lewisham	6,375,883
Southampton City	6,724,470	Islington	6,354,586
Telford and Wrekin	6,634,651	Lambeth	6,229,998
Buckinghamshire	6,524,949	Camden	6,107,914
Wandsworth	6,275,084	Hillingdon	5,900,121
South Gloucestershire	6,246,939	Brent	5,787,504
Newham	5,955,963	Wandsworth	5,613,888
Hillingdon	5,862,118	Luton	5,423,909
Milton Keynes	5,860,309	South West Essex	5,334,442
Westminster	5,599,818	Harrow	5,323,307
Harrow	5,415,532	Bedfordshire	5,267,711
Kensington and Chelsea	5,291,468	Southwark	5,128,336
Luton	5,220,594	Kensington and Chelsea	5,002,480
Ealing	5,176,664	Newham	4,871,532
South West Essex	4,956,710	Westminster	4,755,679
Bedfordshire	4,436,622	Ealing	4,702,803

Adjusted and unadjusted spend per 100,000 population, 2007/8

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Leeds	15,566,530	Leeds	15,212,062
Great Yarmouth and Waveney	13,593,302	Bath and North East Somerset	13,180,353
North East Lincolnshire	12,624,357	Great Yarmouth and Waveney	13,056,058
Torbay Care Trust	12,329,642	North East Lincolnshire	12,348,430
Sefton	12,306,365	Norfolk	12,276,344
Salford	12,273,968	Lincolnshire	12,263,145
Knowsley	11,947,175	Warrington	11,932,961
Bath and North East Somerset	11,696,037	Bexley	11,765,140
Middlesbrough	11,683,057	Torbay Care Trust	11,578,943
Lincolnshire	11,534,106	Devon	11,564,828
Warrington	11,532,909	Stockport	11,333,046
Norfolk	11,492,872	Bournemouth and Poole	11,308,987
Bournemouth and Poole	11,487,069	North Lincolnshire	11,076,951
Walsall	11,486,708	North Somerset	11,076,493
South Tyneside	11,391,715	Kirklees	10,991,928
Barnsley	11,333,997	Sefton	10,910,573
Bexley	11,316,326	Central Lancashire	10,758,078
Manchester	11,305,575	Suffolk	10,750,722
South Birmingham	11,096,930	Dorset	10,590,707
Stockport	11,082,206	Gloucestershire	10,567,594
Devon	11,024,215	Somerset	10,458,962
Redcar and Cleveland	10,975,203	Trafford	10,451,089
Kirklees	10,818,723	Walsall	10,429,008
North Lincolnshire	10,710,296	Calderdale	10,411,823
Isle of Wight	10,693,573	East Riding Of Yorkshire	10,394,322
Oldham	10,678,862	South Birmingham	10,334,858
Hartlepool	10,675,337	Shropshire County	10,327,326
Trafford	10,626,779	West Kent	10,326,020
Calderdale	10,621,883	West Cheshire	10,279,374
Central Lancashire	10,560,438	Isle of Wight	10,252,701
Heywood, Middleton and Rochdale	10,495,328	Barnsley	10,154,969
Bolton	10,404,149	Oxfordshire	10,012,267
North Somerset	10,323,372	Mid Essex	9,970,409
Tameside and Glossop	10,315,696	Derby City	9,927,210
Lambeth	10,158,390	Salford	9,909,836
Nottingham City	10,141,240	Cumbria	9,904,810
Doncaster	10,134,958	Bolton	9,891,903
East Lancashire	10,122,402	Wiltshire	9,880,530
West Cheshire	10,116,745	Nottinghamshire County	9,808,059
Dorset	10,097,669	Oldham	9,782,911
Sunderland	10,057,190	Cornwall and Isles Of Scilly	9,768,031
Liverpool	10,015,045	Middlesbrough	9,763,248
Cumbria	9,937,101	West Sussex	9,703,585

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Newcastle	9,929,556	Redcar and Cleveland	9,674,333
Ashton, Leigh and Wigan	9,812,142	Worcestershire	9,658,542
Islington	9,738,264	Herefordshire	9,657,867
Bristol	9,729,430	Bristol	9,654,355
Rotherham	9,727,492	South Tyneside	9,626,154
Barking and Dagenham	9,719,124	South Gloucestershire	9,613,338
Wirral	9,659,695	Hillingdon	9,556,808
Somerset	9,645,016	Tameside and Glossop	9,503,989
Gloucestershire	9,627,436	Nottingham City	9,474,902
Halton and St. Helens	9,555,265	Heywood, Middleton and Rochdale	9,465,500
Tower Hamlets	9,551,456	Cambridgeshire	9,445,310
Derby City	9,551,310	Doncaster	9,350,227
Birmingham East and North	9,547,664	East Lancashire	9,313,014
Suffolk	9,543,200	Northamptonshire	9,263,571
Westminster	9,513,717	Portsmouth City	9,249,319
Cornwall and Isles Of Scilly	9,468,740	Bassetlaw	9,248,749
Shropshire County	9,456,134	Hartlepool	9,232,814
Gateshead	9,454,496	Ashton, Leigh and Wigan	9,162,745
Nottinghamshire County	9,422,718	Knowsley	9,099,705
Hillingdon	9,369,158	Rotherham	9,099,610
East Riding Of Yorkshire	9,365,789	Manchester	9,066,376
West Sussex	9,346,397	Sutton and Merton	9,051,611
Coventry Teaching	9,305,812	Bury	9,032,998
West Kent	9,235,296	Croydon	8,966,141
Hastings and Rother	9,226,871	West Hertfordshire	8,931,989
Portsmouth City	9,224,993	Solihull Care Trust	8,926,046
Haringey	9,191,546	North Yorkshire and York	8,908,542
Sandwell	9,127,800	Havering	8,879,752
Hammersmith and Fulham	9,030,371	Stockton-on-Tees	8,875,370
Bassetlaw	9,006,002	South West Essex	8,859,427
Sheffield	8,993,091	Bromley	8,811,337
Hull	8,954,485	Coventry Teaching	8,793,641
Herefordshire	8,911,979	North East Essex	8,787,703
Bury	8,887,883	Berkshire West	8,764,616
County Durham	8,840,293	Birmingham East and North	8,739,132
Havering	8,833,305	Barking and Dagenham	8,723,438
Sutton and Merton	8,795,768	Surrey	8,718,255
Croydon	8,793,917	Kingston	8,718,106
Blackburn with Darwen	8,773,426	Medway	8,698,264
Lewisham	8,732,084	Derbyshire County	8,692,897
Darlington	8,731,181	East and North Hertfordshire	8,687,845
Hounslow	8,673,671	Swindon	8,670,985
North East Essex	8,657,690	Warwickshire	8,597,258
Worcestershire	8,651,573	Buckinghamshire	8,562,442
Stockton-on-Tees	8,624,984	Sunderland	8,537,927

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Bradford and Airedale	8,608,864	Newcastle	8,527,358
Wiltshire	8,515,729	Central and Eastern Cheshire	8,489,639
Wakefield District	8,470,873	Telford and Wrekin	8,447,985
East Sussex Downs and Weald	8,451,097	Westminster	8,409,191
Southwark	8,445,370	East Sussex Downs and Weald	8,386,820
Oxfordshire	8,420,982	Eastern and Coastal Kent	8,360,723
Brighton and Hove City	8,414,099	Wirral	8,339,984
Eastern and Coastal Kent	8,394,913	Halton and St. Helens	8,338,654
Derbyshire County	8,393,891	Berkshire East	8,320,552
Stoke On Trent	8,384,087	South Staffordshire	8,304,520
Solihull Care Trust	8,361,657	Luton	8,303,001
South West Essex	8,360,430	Redbridge	8,295,386
Bromley	8,299,040	Sheffield	8,249,080
Enfield	8,285,934	Hull	8,209,056
Mid Essex	8,278,266	Bradford and Airedale	8,181,667
Northamptonshire	8,211,774	Hounslow	8,141,701
Brent	8,187,656	Sandwell	8,131,574
Greenwich	8,182,922	Hastings and Rother	8,060,072
North Lancashire	8,155,476	Brighton and Hove City	8,045,649
Redbridge	8,136,661	Gateshead	8,041,945
North Tyneside	8,121,161	Darlington	8,041,813
Luton	8,119,515	Enfield	8,023,685
West Hertfordshire	8,101,723	North Lancashire	8,022,531
Kingston	8,078,140	Blackburn with Darwen	8,020,193
Swindon	8,061,362	Wakefield District	8,012,464
North Yorkshire and York	7,952,742	Haringey	7,995,060
South Gloucestershire	7,939,496	Milton Keynes	7,993,340
Plymouth	7,923,809	West Essex	7,982,057
Cambridgeshire	7,909,256	Bedfordshire	7,957,766
Heart of Birmingham	7,902,511	Plymouth	7,835,383
Surrey	7,894,173	Lambeth	7,819,255
Central and Eastern Cheshire	7,865,778	Richmond and Twickenham	7,783,532
Telford and Wrekin	7,828,627	County Durham	7,782,421
Northumberland Care Trust	7,773,704	Liverpool	7,739,789
Ealing	7,758,097	Hammersmith and Fulham	7,710,993
Warwickshire	7,720,741	Northumberland Care Trust	7,675,312
Peterborough	7,694,267	Hampshire	7,664,355
East and North Hertfordshire	7,632,509	Leicestershire County and Rutland	7,599,118
Medway	7,600,268	North Tyneside	7,517,145
West Essex	7,527,469	Dudley	7,516,789
Berkshire East	7,486,236	Barnet	7,457,810

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Wandsworth	7,471,494	Stoke On Trent	7,449,923
Wolverhampton City	7,458,152	Southampton City	7,445,066
South Staffordshire	7,417,305	Greenwich	7,391,133
Barnet	7,386,038	South East Essex	7,381,457
Dudley	7,326,253	Peterborough	7,310,973
Berkshire West	7,314,628	Tower Hamlets	7,274,756
Southampton City	7,282,782	Ealing	7,110,351
Richmond and Twickenham	7,195,661	Lewisham	7,000,833
Buckinghamshire	7,191,950	Brent	6,945,780
Blackpool	7,082,280	Islington	6,925,742
South East Essex	7,015,915	Heart of Birmingham	6,902,781
Kensington and Chelsea	6,948,011	Wolverhampton City	6,831,596
Waltham Forest	6,892,575	Kensington and Chelsea	6,825,136
Bedfordshire	6,764,790	Wandsworth	6,775,332
Milton Keynes	6,760,302	North Staffordshire	6,691,876
Hampshire	6,711,135	Southwark	6,426,400
City and Hackney	6,594,727	Waltham Forest	6,303,460
North Staffordshire	6,593,455	Blackpool	5,998,675
Leicestershire County and Rutland	6,265,022	Harrow	5,930,063
Newham	6,094,838	City and Hackney	5,140,796
Harrow	5,978,258	Leicester City	5,066,756
Camden	5,682,244	Newham	4,995,406
Leicester City	5,187,796	Camden	4,578,566

Adjusted and unadjusted spend per 100,000 population, 2008/9

PCT	Unadjusted (£)	PCT	Unified weighted (£)
North East Lincolnshire	15,568,771	North East Lincolnshire	15,399,362
Isle of Wight Healthcare	14,322,291	Isle of Wight Healthcare	13,113,030
Redcar and Cleveland	13,438,325	Stockport	12,490,693
Torbay Care Trust	13,345,323	Devon	12,396,436
Barnsley	13,296,838	Warrington	12,308,870
Hastings and Rother	13,027,034	Trafford	12,213,307
Knowsley	12,920,881	Torbay Care Trust	12,204,461
Great Yarmouth and Waveney	12,870,640	Lincolnshire	12,146,586
Sunderland	12,847,535	Great Yarmouth and Waveney	12,027,460
Middlesbrough	12,444,844	Redcar and Cleveland	11,802,966
Trafford	12,320,393	Hastings and Rother	11,726,669
South Birmingham	12,314,756	Cornwall and Isles Of Scilly	11,582,142
South Tyneside	12,267,487	Suffolk	11,563,394
Stockport	12,166,533	Barnsley	11,527,495
Warrington	12,094,092	South Birmingham	11,525,391
Wirral	11,927,207	South Gloucestershire	11,291,280
Salford	11,802,755	Shropshire County	11,278,048
Devon	11,783,301	Dorset	11,259,233
Lincolnshire	11,673,481	Bournemouth and Poole Teaching	11,231,631
Bournemouth and Poole	11,671,334	Norfolk	11,135,514
Sefton	11,654,261	East Sussex Downs and Weald	11,088,381
Newcastle	11,555,627	Northumberland Care Trust	10,921,542
Cornwall and Isles Of Scilly	11,550,379	East Riding Of Yorkshire	10,879,151
East Lancashire	11,326,616	North Yorkshire and York	10,843,003
Ashton, Leigh and Wigan	11,215,590	Mid Essex	10,823,874
Halton and St. Helens	11,194,718	Leeds	10,712,228
Manchester	11,097,542	Sutton and Merton	10,711,364
Gateshead	11,068,401	Sunderland	10,682,866
Northumberland Care Trust	11,019,170	Leicestershire County and Rutland	10,560,427
Liverpool	10,937,456	Surrey	10,531,161
Dorset	10,931,070	West Kent	10,530,206
East Sussex Downs and Weald	10,849,827	Warwickshire	10,507,835
Rotherham	10,812,217	Sefton	10,495,511
Oldham	10,795,613	Worcestershire	10,478,121
Hartlepool	10,792,467	East Lancashire	10,455,980
Barking and Dagenham	10,696,334	Bath and North East Somerset	10,396,403
Heywood, Middleton and Rochdale	10,531,668	Cambridgeshire	10,375,159

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Norfolk	10,518,964	Middlesbrough	10,359,201
Haringey	10,506,445	Solihull Care Trust	10,327,201
Birmingham East and North	10,492,955	West Hertfordshire	10,304,330
Sandwell	10,466,698	Wirral	10,295,385
Blackpool	10,459,998	Derby City	10,287,240
Suffolk	10,400,654	Dudley	10,275,054
Leeds	10,362,668	Gloucestershire	10,223,484
Shropshire County	10,348,557	North Lincolnshire	10,152,094
Waltham Forest	10,344,800	South Tyneside	10,139,392
Tameside and Glossop	10,314,709	Ashton, Leigh and Wigan	10,124,291
Derby City	10,311,952	West Cheshire	10,090,987
Walsall	10,235,626	Herefordshire	10,049,621
Tower Hamlets	10,223,398	Bassetlaw	10,032,565
Dudley	10,182,740	Central Lancashire	10,006,568
West Cheshire	10,181,863	North Lancashire	10,005,470
Bassetlaw	10,027,377	Rotherham	9,963,131
North Lancashire	9,984,855	North East Essex	9,932,638
Central Lancashire	9,914,298	Newcastle	9,842,097
Coventry Teaching	9,912,121	Somerset	9,799,545
Sutton and Merton	9,870,675	South Staffordshire	9,746,298
Nottingham City	9,865,549	Bromley	9,739,779
North East Essex	9,861,625	Croydon	9,709,607
Wakefield District	9,860,717	North Somerset	9,701,960
Warwickshire	9,813,397	Halton and St. Helens	9,662,353
East Riding Of Yorkshire	9,783,304	Oldham	9,649,659
North Lincolnshire	9,778,260	East and North Hertfordshire	9,648,997
Worcestershire	9,679,282	Northamptonshire Teaching	9,621,225
Wolverhampton City	9,672,733	Salford	9,606,732
Sheffield	9,657,030	Barnet	9,599,068
North Tyneside	9,631,317	Nottinghamshire County	9,582,501
Herefordshire	9,629,390	Knowsley	9,557,367
Bury	9,572,352	Wiltshire	9,540,333
Havering	9,545,857	Medway	9,535,393
Croydon	9,518,895	South East Essex	9,520,638
Solihull Care Trust	9,494,332	Kingston	9,481,262
North Yorkshire and York	9,492,977	Tameside and Glossop	9,461,035
Enfield	9,490,640	Nottingham City	9,448,468
Brighton and Hove City	9,457,455	Bury	9,410,726
West Kent	9,449,196	South West Essex	9,378,260
Stockton-on-Tees	9,341,409	Havering	9,371,005
Cumbria	9,338,915	Heywood, Middleton and Rochdale	9,359,530
South Gloucestershire	9,275,798	Waltham Forest	9,351,979
Hammersmith and Fulham	9,243,994	Cumbria	9,344,415
South East Essex	9,238,079	Gateshead	9,316,540
Somerset	9,237,325	Stockton-on-Tees	9,274,121
Plymouth	9,233,683	Walsall	9,271,222

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Gloucestershire	9,213,599	West Essex	9,249,828
West Hertfordshire	9,198,844	Birmingham East and North	9,246,798
County Durham	9,178,944	Sheffield	9,234,046
Bromley	9,169,938	Plymouth	9,223,769
Lewisham	9,156,738	Hartlepool	9,170,201
Nottinghamshire County	9,141,919	Bristol	9,164,567
Surrey	9,134,507	Central and Eastern Cheshire	9,145,514
Hull	9,134,272	Redbridge	9,140,310
Islington	9,121,587	Wakefield District	9,131,840
North Somerset	9,119,710	Enfield	9,121,086
Mid Essex	9,097,385	Sandwell	9,080,926
Bath and North East Somerset	9,087,972	Haringey	9,051,749
Hounslow	9,077,092	North Tyneside	9,030,815
Doncaster	9,049,382	Barking and Dagenham	8,943,638
South West Essex	9,009,485	Coventry	8,936,906
Blackburn with Darwen	9,006,026	Bexley	8,898,042
Cambridgeshire	9,000,443	West Sussex	8,887,096
Bolton	8,984,745	Blackpool	8,872,949
Barnet	8,944,342	Manchester	8,802,149
Bristol	8,938,635	Wandsworth	8,796,010
Greenwich Teaching	8,917,681	Hounslow	8,795,176
Leicestershire County and Rutland	8,898,353	Richmond and Twickenham	8,793,386
Bradford and Airedale	8,864,855	Brighton and Hove City	8,769,432
South Staffordshire	8,793,814	Hull	8,715,317
Medway	8,749,543	Bedfordshire	8,706,714
West Essex	8,683,611	Kensington and Chelsea	8,642,608
East and North Hertfordshire	8,658,116	Derbyshire County	8,550,836
Stoke On Trent	8,656,827	Berkshire West	8,498,910
Lambeth	8,654,810	Telford and Wrekin	8,466,211
Northamptonshire	8,648,711	Bradford and Airedale	8,435,621
Kensington and Chelsea	8,609,528	Wolverhampton	8,405,775
Redbridge	8,592,361	Swindon	8,338,192
Bexley	8,586,908	Bolton	8,254,333
Wandsworth	8,580,341	Lewisham	8,248,294
Leicester City	8,450,200	Buckinghamshire	8,188,998
West Sussex	8,409,702	Doncaster	8,187,530
Central and Eastern Cheshire	8,375,848	Portsmouth City	8,167,977
Ealing	8,364,286	Hammersmith and Fulham	8,156,189
Derbyshire County	8,346,370	Ealing	8,092,790
City and Hackney	8,278,471	Blackburn with Darwen	8,048,395
Southwark	8,273,535	Milton Keynes	8,009,776
Wiltshire	8,230,906	Liverpool	7,996,353
Telford and Wrekin	8,086,724	County Durham	7,964,958
Kingston	8,080,803	Leicester City	7,958,353

PCT	Unadjusted (£)	PCT	Unified weighted (£)
Luton	7,956,128	Greenwich	7,913,784
Heart of Birmingham	7,853,655	Westminster	7,789,951
Camden	7,852,966	Luton	7,762,649
Westminster	7,852,292	Southampton City	7,715,221
Richmond and Twickenham	7,803,129	Hampshire	7,714,899
Swindon	7,790,087	Stoke On Trent	7,698,530
Peterborough	7,726,896	Tower Hamlets	7,607,387
Darlington	7,708,299	Lambeth	7,584,981
Southampton City	7,617,575	Calderdale	7,578,802
Bedfordshire	7,525,568	Oxfordshire	7,575,029
Brent	7,505,840	Harrow	7,560,635
Calderdale	7,427,843	Peterborough	7,541,978
Portsmouth City	7,421,003	Darlington	7,394,850
Berkshire West	7,264,589	Kirklees	7,162,009
Harrow	7,128,221	Berkshire East	7,093,069
Newham	7,112,084	Eastern and Coastal Kent	7,005,256
Eastern and Coastal Kent	7,071,969	North Staffordshire	6,984,341
Milton Keynes	6,996,213	Islington	6,917,639
Kirklees	6,951,280	Camden	6,901,920
North Staffordshire	6,884,520	Brent	6,898,850
Buckinghamshire	6,879,922	Southwark	6,759,598
Hampshire	6,837,967	Hillingdon	6,572,410
Oxfordshire	6,379,662	Heart of Birmingham	6,507,089
Hillingdon	6,376,728	City and Hackney	5,984,560
Berkshire East	6,289,600	Newham	5,517,005

Appendix B: Unadjusted cancer spend (£) per 100,000 population: Cancer network ordered, 2004/5 to 2007/8

Network	2004/05	2005/06	2006/07	2007/08
North East London	6,775,849	6,873,358	6,824,097	6,741,981
North London	7,913,964	8,071,387	7,239,546	7,396,958
Greater Midlands	6,728,137	6,965,465	8,177,594	7,923,104
West London	6,913,761	6,803,347	6,142,160	8,065,117
Central South Coast	7,423,634	7,910,548	8,463,482	8,343,722
South East London	7,329,549	7,838,521	7,012,894	8,420,277
North of England	7,544,389	8,279,300	8,293,329	8,533,134
Essex	8,200,522	8,494,258	7,592,103	8,541,117
Arden	7,912,083	8,154,582	9,088,404	8,612,380
Pan Birmingham	6,168,231	7,849,912	8,011,808	8,692,201
Mount Vernon	7,722,665	8,141,334	7,685,241	8,706,776
Sussex	6,949,943	7,494,735	7,715,360	8,841,856
Thames Valley	7,469,937	8,240,705	8,198,242	8,874,562
Lancashire and South Cumbria	7,475,886	8,268,655	8,456,254	8,879,090
South West London	8,105,204	8,144,727	8,296,032	8,924,934
North Trent	7,702,019	8,390,798	8,051,602	8,948,458
Surrey, West Sussex & Hampshire	8,471,435	8,512,453	9,849,135	9,036,918
Kent & Medway	8,064,317	8,869,147	8,034,291	9,067,185
East Midlands	7,943,212	8,997,961	9,332,914	9,102,987
Merseyside & Cheshire	6,056,793	7,331,697	8,002,775	9,103,499
Greater Manchester & Cheshire	6,890,628	8,391,498	8,355,187	9,441,953
Humber & Yorkshire Coast	7,773,959	9,150,748	8,541,775	9,942,665
3 Counties	8,727,175	9,332,695	8,118,642	10,089,489
Peninsula	8,722,304	10,072,957	7,775,190	10,253,937
Anglia	8,389,981	9,894,787	7,982,279	10,286,914
Avon, Somerset & Wiltshire	8,158,785	9,331,559	8,440,345	10,311,307
Dorset	8,095,934	8,999,355	9,672,039	10,895,695
Yorkshire	8,248,922	8,742,837	9,175,272	10,911,586

Appendix C: Measures of variation of PCT cancer spending adjusted for need based on PCTs' unified weighted populations and DFT

Table C1: Measures of variation: PCT cancer spending adjusted for unified weighted population and distance from target (DFT)

	2004/5	2005/6	2006/7	2007/8	2008/9
Max (£)	11,540,728	11,658,498	11,797,941	15,212,062	15,381,282
Min (£)	3,657,902	3,695,627	4,702,803	4,578,566	5,700,989
Variation	*3.16*	*3.15*	*2.51*	*3.32*	*2.70*
Top decile (£)	9,680,958	10,657,917	10,554,720	12,316,945	12,283,818
Bottom decile (£)	5,158,452	5,422,268	5,441,759	6,118,441	6,667,101
Variation	*1.88*	*1.97*	*1.94*	*2.01*	*1.84*
Top quartile (£)	8,977,347	9,983,266	9,704,776	11,047,227	11,310,581
Bottom quartile (£)	5,830,254	6,382,122	6,315,941	7,102,804	7,397,863
Variation	*1.54*	*1.56*	*1.54*	*1.56*	*1.53*
Standard deviation	1,309,058	1,470,606	1,411,312	1,631,176	1,615,908
Gini Coefficent	0.0956	0.0955	0.0967	0.0997	0.0955

Figure C1: PCT spending variation: maximum, minimum

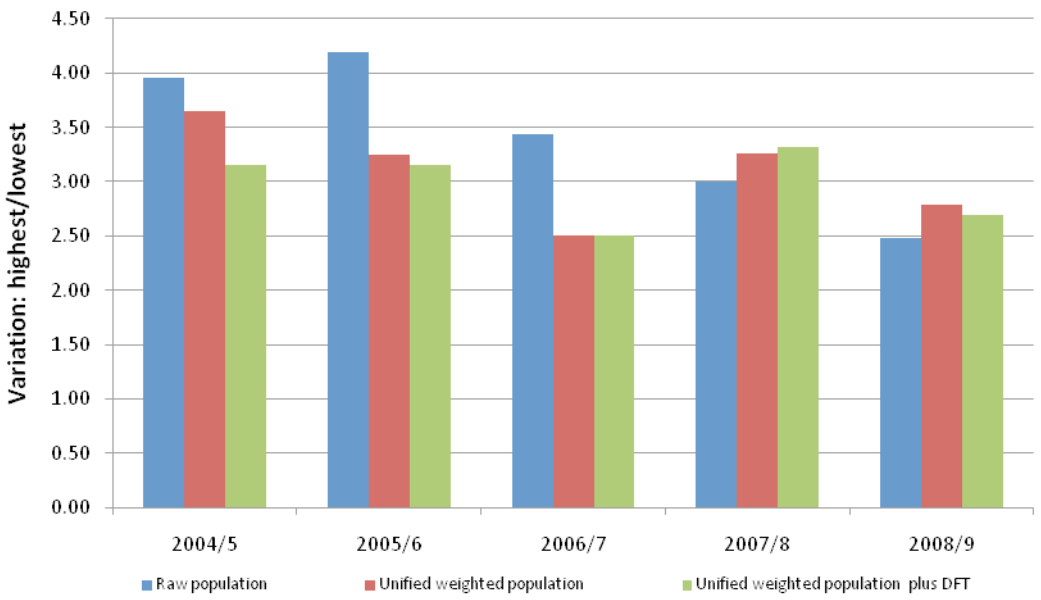


Figure C2: PCT spending variation: top, bottom decile

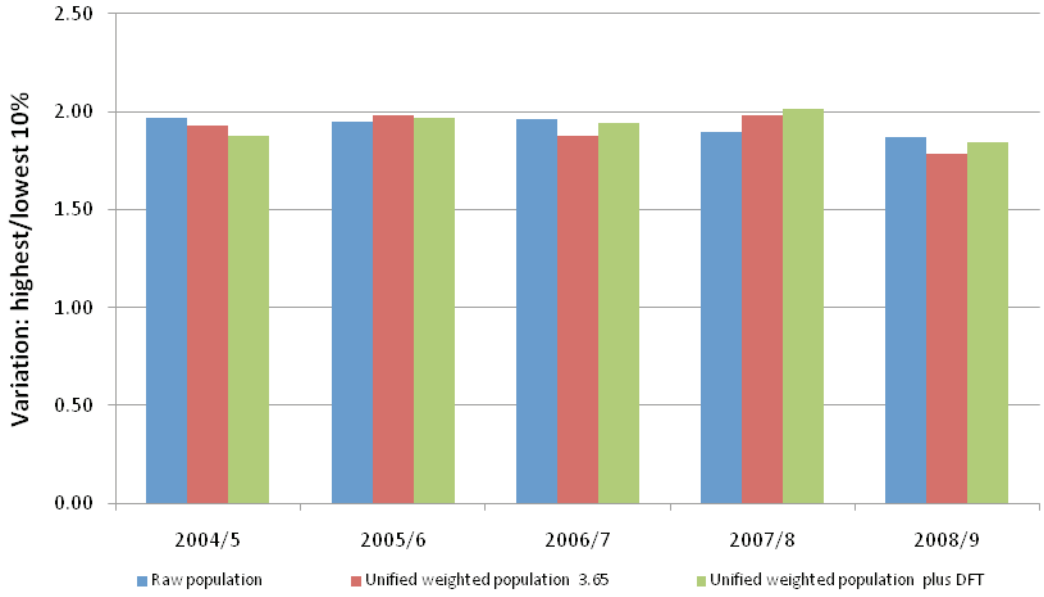


Figure C3: PCT spending variation: top, bottom quartile

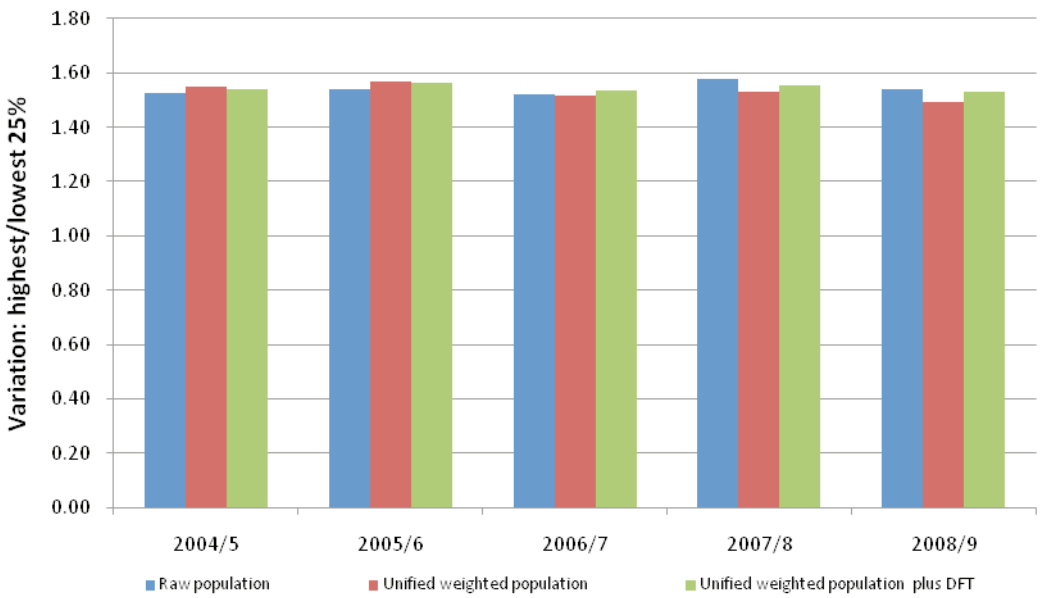


Figure C4: PCT spending variation: standard deviation

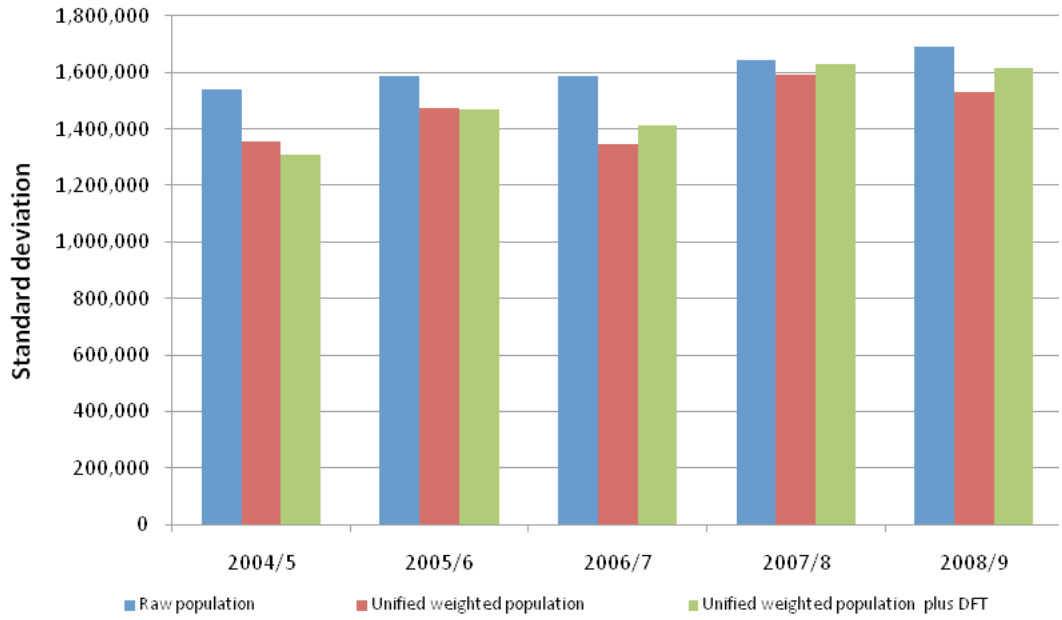


Figure C5: PCT spending variation: Gini coefficient

Appendix D: Measures of variation of cancer spending across cancer networks adjusted for need based on PCTs' unified weighted populations

Figure D1: Cancer network spending variation: maximum, minimum

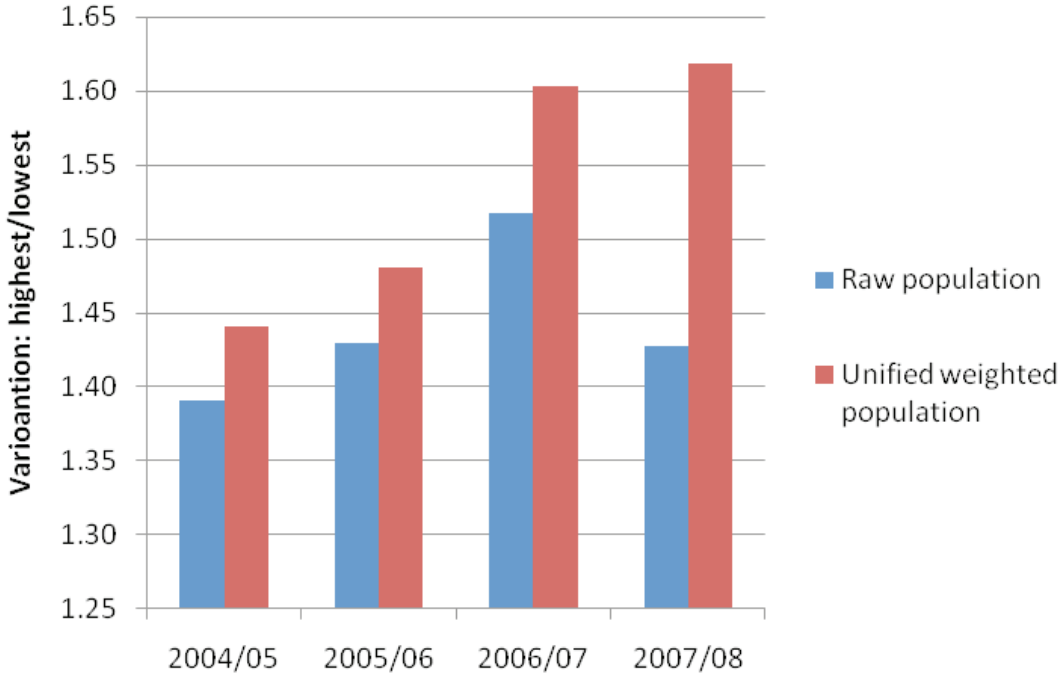


Figure D2: Cancer network spending variation: top, bottom quartile

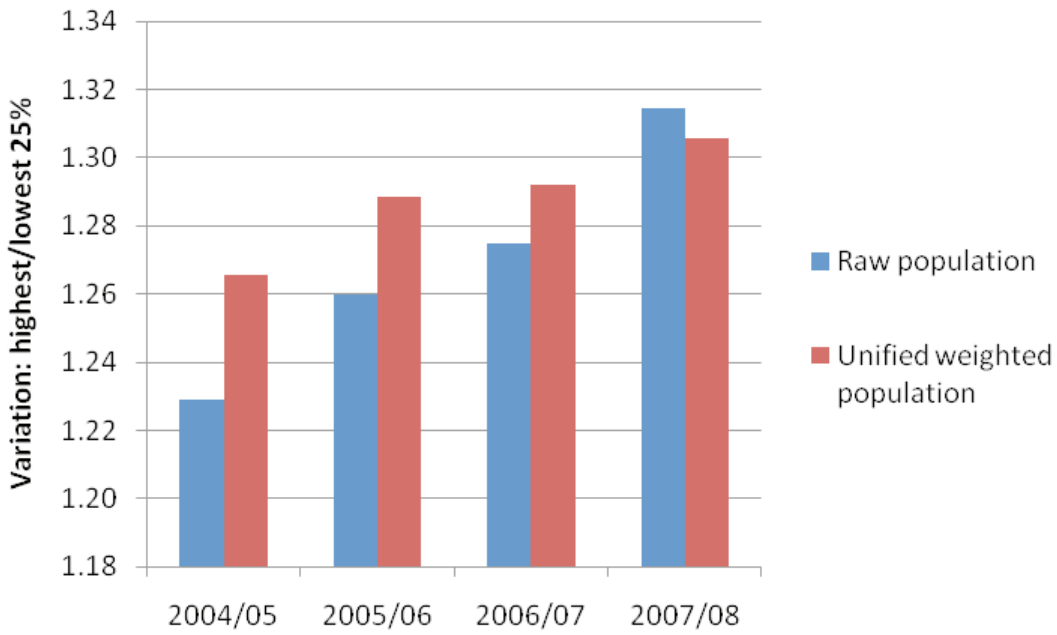


Figure D3: Cancer network spending variation: standard deviation

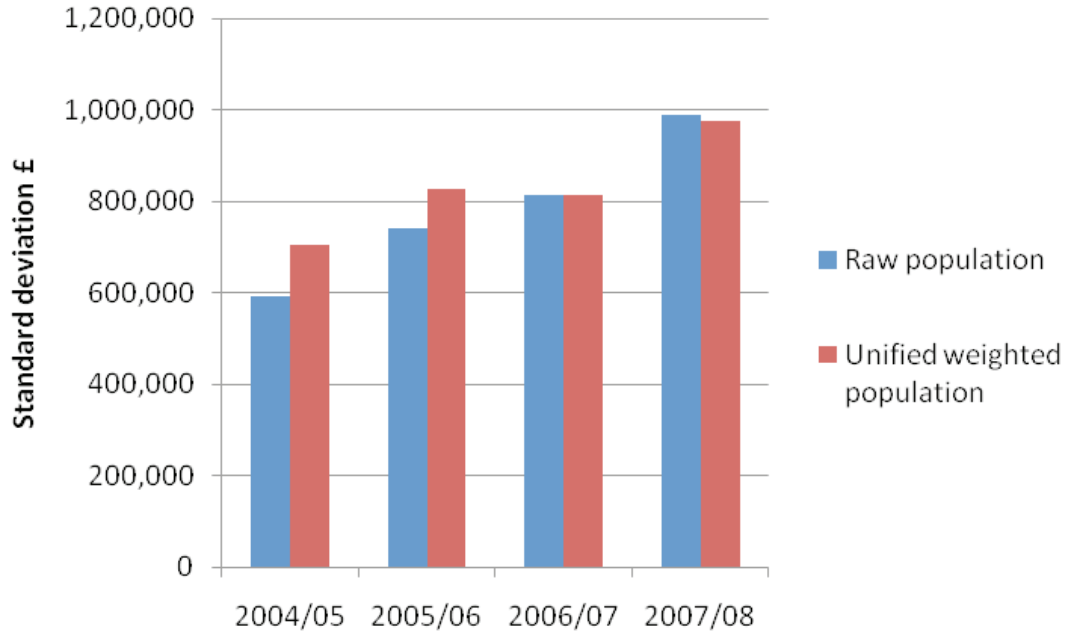
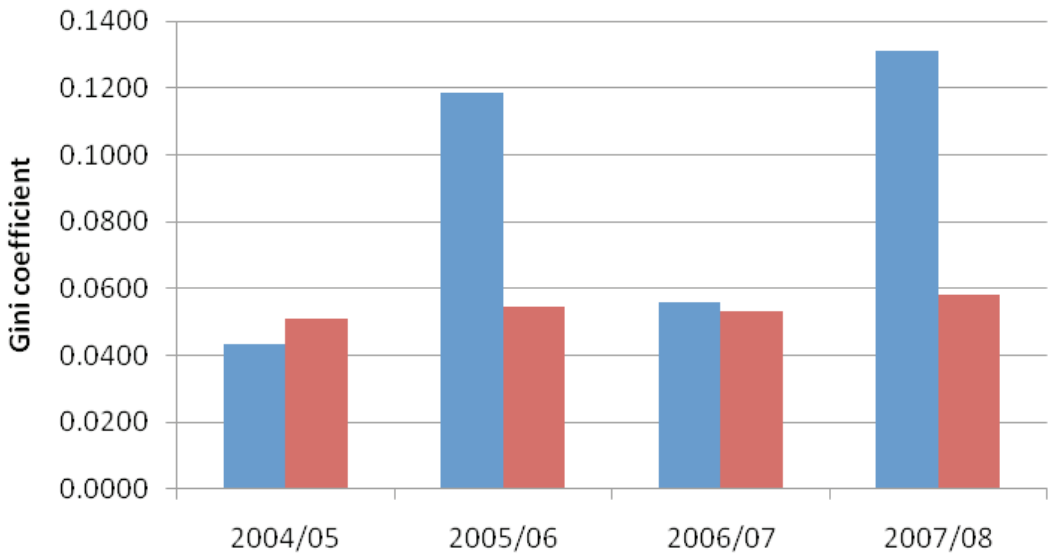


Figure D4: Cancer network spending variation: Gini coefficient



Appendix E: Spending per 100,000 population, per cancer death, per cancer case, per new cancer case: PCT ordered, 2006/7

Spending...

per 100,000 population		per cancer death		per cancer case		per new cancer case	
Knowsley	15,241,574	City and Hackney	60,074	Nottingham City	17,028	Nottingham City	29,823
Salford	13,357,367	Nottingham City	57,425	Knowsley	16,819	Knowsley	29,665
Nottingham City	12,460,999	Tower Hamlets	57,128	Manchester	14,999	Tower Hamlets	29,110
Wakefield District	12,162,272	Haringey	56,377	Tower Hamlet	14,767	City and Hackney	28,470
Bournemouth and Poole	11,795,563	Hammersmith and Fulham	54,729	Heart of Birmingham	14,511	Islington	26,953
South Tyneside	11,726,809	Lambeth	51,567	Salford	14,118	Manchester	26,716
Trafford	11,668,301	Camden	50,610	City and Hackney	13,722	Haringey	26,624
Gateshead	11,432,848	Knowsley	50,345	Leicester City	13,217	Camden	26,481
Torbay Care Trust	11,392,246	Leicester City	50,157	Newham	12,753	Lambeth	25,214
Manchester	11,156,944	Manchester	49,339	Wakefield District	12,454	Wakefield District	25,132
Blackpool	10,959,383	Islington	49,309	Greenwich	12,265	Heart of Birmingham	25,079
Birmingham East and North	10,326,054	Heart of Birmingham	49,187	Barking and Dagenham	12,068	Hounslow	24,649
Cumbria	10,167,594	Brent	48,839	Islington	11,966	Waltham Forest	24,237
County Durham	10,155,856	Hounslow	48,684	Lambeth	11,763	Leicester City	23,626
Lincolnshire	10,105,755	Westminster	46,810	Hounslow	11,726	Hammersmith and Fulham	23,592
Wolverhampton City	9,990,870	Wakefield District	46,407	Redbridge	11,719	Coventry	23,338
Hartlepool	9,791,257	Salford	45,762	Trafford	11,715	Salford	23,043
Hastings and Rother	9,636,917	Blackburn with Darwen	45,601	Birmingham East and North	11,517	Lewisham	22,686
Great Yarmouth and Waveney	9,564,192	Kensington and Chelsea	45,544	Bradford and Airedale	11,193	Greenwich Teaching	22,532
Liverpool	9,541,817	Lewisham	45,268	Lewisham	11,163	Newham	22,463
Middlesbrough	9,497,675	Trafford	42,855	Hammersmith and Fulham	11,035	Redbridge	22,308
North Somerset	9,455,523	Bournemouth and Poole	42,806	Waltham Fores	10,926	Blackburn with Darwen	21,989
Leeds	9,435,391	Birmingham East and North	42,065	Middlesbrough	10,917	Sutton and Merton	21,872
Leicester City	9,378,231	Redbridge	41,660	Wolverhampton City	10,797	Birmingham East and North	21,705
Calderdale	9,372,544	Waltham Forest	41,368	Blackburn with Darwen	10,785	Brent	21,342
Sheffield	9,345,782	Barnet	41,151	Gateshead	10,639	Barnet	21,262
Stockport	9,321,745	Derby City	40,857	Hartlepool	10,619	Kensington and Chelsea	20,577
North East Lincolnshire	9,248,666	Newham	40,630	Camden	10,539	Bournemouth and Poole	20,561
North Lancashire	9,186,136	Sutton and Merton	40,567	Coventry	10,497	Trafford	20,507
Western Cheshire	9,129,011	Greenwich Teaching	40,200	Blackpool	10,474	Calderdale	20,471
Warwickshire	9,121,431	Berkshire West	40,182	Southwark	10,455	Gateshead	19,914

Spending...

per 100,000 population		per cancer death		per cancer case		per new cancer case	
Surrey	9,088,909	Southwark	40,010	Sandwell	10,366	Sandwell	19,896
North East Essex	9,087,593	Wandsworth	39,846	Haringey Teaching	10,318	Kingston	19,765
Islington	9,076,661	Calderdale	39,693	North East Lincolnshire	10,154	Derby City	19,714
Sefton	9,076,341	Bradford and Airedale	39,400	Bolton	10,132	Barking and Dagenham	19,471
Blackburn with Darwent	9,067,907	Coventry	39,371	Medway	10,116	Wolverhampton City	19,465
Newcastle	9,050,095	Kingston	38,878	County Durham	10,110	Bradford and Airedale	19,448
Walsall	9,024,601	South Birmingham	38,589	Ashton, Leigh and Wigan	10,054	North East Lincolnshire	19,400
Hounslow	8,964,974	Croydon	38,253	Walsall Teaching	10,036	Surrey	19,124
Norfolk	8,884,634	Torbay Care Trust	37,990	South Tyneside	9,894	Warwickshire	19,035
South Birmingham	8,881,735	Surrey	37,947	Hull	9,884	Leeds	18,972
North Lincolnshire	8,880,698	Bristol	37,812	Sutton and Merton	9,842	Westminster	18,865
City and Hackney	8,856,783	Leeds	37,445	Liverpool	9,762	South Tyneside	18,862
Redbridge	8,820,823	Sheffield	37,187	Heywood, Middleton and Rochdale	9,717	Hartlepool	18,814
Sandwell	8,785,240	Berkshire East	36,571	Sheffield	9,714	Torbay Care Trust	18,794
Bristol	8,712,184	South Tyneside	36,130	Darlington	9,661	Middlesbrough	18,785
Ashton, Leigh and Wigan	8,703,823	East and North Hertfordshire	35,870	Newcastle	9,629	East and North Hertfordshire	18,768
Coventry	8,683,455	Ealing	35,323	Cumbria	9,620	County Durham .	18,726
Bradford and Airedale	8,683,189	Gateshead	35,216	Doncaster	9,521	Sheffield	18,687
Bolton	8,678,638	Enfield	35,180	Torbay Care Trust	9,486	Berkshire West	18,589
Hull	8,609,155	Stockport	35,086	Richmond and Twickenham	9,480	Liverpool	18,557
Tower Hamlets	8,607,016	Milton Keynes	35,008	Kirklees	9,420	South Birmingham	18,517
Sutton and Merton	8,528,213	Bolton	34,933	Derby City	9,397	West Hertfordshire	18,482
Derby City	8,525,974	Warwickshire	34,902	Leeds	9,391	Cumbria	18,386
Darlington	8,507,587	Swindon	34,762	Calderdale	9,353	Southwark	18,368
Rotherham	8,465,694	North Somerset	34,665	Bristol	9,334	Bristol	18,368
Nottinghamshire County	8,460,016	Wolverhampton City	34,613	Oldham	9,246	Hull	18,225
East Lancashire	8,454,132	Lincolnshire	34,492	Nottinghamshire County	9,171	Warrington	18,208
Shropshire County	8,433,409	Ashton, Leigh and Wigan	34,459	Brent Teaching	9,166	Croydon	18,120
Wirral	8,392,812	Cumbria	34,457	Croydon	9,166	Berkshire East	18,119
Sunderland Teaching	8,391,697	Heywood, Middleton and Rochdale	34,295	Lincolnshire	9,163	Medway	17,933
Halton and St Helens	8,380,502	West Kent	34,108	East Lancashire	9,152	Western Cheshire	17,865
North Yorkshire and York	8,331,863	East Lancashire	34,001	Warwickshire	9,084	Enfield	17,755
Dudley	8,325,273	Bath and North East Somerset	33,678	North Lincolnshire	8,986	North Somerset	17,753

Spending...

per 100,000 population		per cancer death		per cancer case		per new cancer case	
Doncaster	8,299,591	North East Lincolnshire	33,282	Berkshire East	8,961	Blackpool	17,741
West Kent	8,269,904	Blackpool	33,098	Bournemouth and Poole	8,959	Bolton	17,613
Heywood, Middleton and Rochdale	8,263,350	Hampshire	33,094	Sunderland Teaching	8,878	Lincolnshire	17,602
Worcestershire	8,205,345	Barking and Dagenham	33,082	Halton and St Helens	8,877	East Lancashire	17,572
Lambeth	8,186,744	Northamptonshire	32,887	Kingston	8,864	Newcastle	17,340
Hampshire	8,175,896	Middlesbrough	32,805	Stockport	8,831	West Kent	17,240
Portsmouth City Teaching	8,167,945	Medway	32,760	Rotherham	8,828	Havering	17,177
Derbyshire County	8,159,227	County Durham	32,715	Dudley	8,818	Wandsworth Teaching	17,157
East Sussex Downs and Weald	8,157,174	Sandwell	32,491	Havering	8,763	Heywood, Middleton and Rochdale	17,061
South East Essex	8,042,706	Southampton City	32,307	North East Essex	8,754	Bath and North East Somerset	17,023
Waltham Forest	8,027,099	Liverpool	32,272	South Birmingham	8,693	North Lincolnshire	16,947
Barnsley	8,014,357	Peterborough	32,209	Swindon	8,665	Brighton and Hove City Teaching	16,929
Stoke On Trent	8,009,750	Western Cheshire	32,043	Warrington	8,603	Stoke On Trent	16,892
Lewisham	7,993,746	Worcestershire	32,022	Berkshire West	8,601	Walsall Teaching	16,811
Havering	7,989,765	North Lincolnshire	31,718	Peterborough	8,576	Portsmouth City Teaching	16,748
Haringey Teaching	7,957,974	Warrington	31,664	Portsmouth City Teaching	8,546	Rotherham	16,711
Barking and Dagenham	7,930,246	Leicestershire County and Rutland	31,661	West Kent	8,527	Peterborough	16,488
Leicestershire County and Rutland	7,919,685	North East Essex	31,647	Surrey	8,520	Halton and St Helens	16,472
Plymouth Teaching	7,908,746	Havering	31,639	North Tees	8,499	Kirklees	16,457
Barnet	7,867,789	Richmond and Twickenham	31,615	Mid Essex	8,470	North East Essex	16,451
Warrington	7,860,396	Halton and St Helens	31,538	Barnet	8,446	Wirral	16,447
Northamptonshire Teaching	7,856,470	Hull	31,464	Westminster	8,425	Ashton, Leigh and Wigan	16,433
Redcar and Cleveland	7,855,077	Great Yarmouth and Waveney	31,448	Western Cheshire	8,380	Northamptonshire Teaching	16,395
Somerset	7,784,853	Newcastle	31,403	Bury	8,319	Ealing	16,360
Oldham	7,774,751	Bromley	31,363	Kensington and Chelsea	8,309	Darlington	16,305
Swindon	7,773,201	Oldham	31,344	Derbyshire County	8,262	Stockport	16,125
Camden	7,761,820	Hartlepool	30,961	Great Yarmouth and Waveney	8,189	Southampton City	16,089
Berkshire West	7,734,424	Dudley	30,815	Stoke On Trent	8,164	Great Yarmouth and Waveney	16,072
East and North Hertfordshire	7,727,372	Mid Essex	30,713	Wandsworth Teaching	8,160	Richmond and Twickenham	16,047

Spending...

per 100,000 population		per cancer death		per cancer case		per new cancer case	
Hammersmith and Fulham	7,716,700	Cambridgeshire	30,528	Milton Keynes	8,131	Sefton	16,027
Bath and North East Somerset	7,712,178	Nottinghamshire County	30,427	Northamptonshire Teaching	8,096	Leicestershire County and Rutland	15,930
Greenwich Teaching	7,689,383	Walsall	30,412	Central Lancashire	8,091	West Essex	15,926
Dorset	7,613,158	Telford and Wrekin	30,349	North Lancashire	8,078	Swindon	15,908
North Tyneside	7,606,087	Portsmouth City	30,275	Southampton City	8,036	Hastings and Rother	15,857
Heart of Birmingham Teaching	7,576,316	North Yorkshire and York	30,162	Hastings and Rother	8,025	Oldham	15,846
Devon	7,541,810	Oxfordshire	30,147	Enfield	7,937	Sunderland Teaching	15,743
South Staffordshire	7,515,506	Kirklees	30,068	East and North Hertfordshire	7,923	Hampshire	15,711
Bromley	7,508,050	Rotherham	30,036	Norfolk	7,836	Doncaster	15,696
Isle Of Wight NHS	7,507,163	Sefton	29,729	Bexley Care Trust	7,790	Dudley	15,667
Croydon	7,481,962	Bexley Care Trust	29,716	Hampshire	7,713	Worcestershire	15,555
Bexley Care Trust	7,480,377	Plymouth Teaching	29,711	Wirral	7,686	Shropshire County	15,426
Central Lancashire	7,463,054	West Hertfordshire	29,495	Worcestershire	7,671	Nottinghamshire County	15,421
East Riding Of Yorkshire	7,461,633	North Lancashire	29,456	Bassetlaw	7,643	North Lancashire	15,369
Bassetlaw	7,443,515	South Staffordshire	29,177	Leicestershire County and Rutland	7,635	Plymouth Teaching	15,307
Berkshire East	7,422,779	Barnsley	29,127	South East Essex	7,633	Milton Keynes	15,167
Medway	7,421,536	Shropshire County	29,030	Brighton and Hove City	7,607	Bromley	15,166
Solihull Care Trust	7,420,737	Doncaster	28,823	Sefton	7,592	Norfolk	15,018
Kirklees	7,395,060	Darlington	28,716	Plymouth Teaching	7,553	North Yorkshire and York	15,010
Peterborough	7,367,114	Norfolk	28,634	North Somerset	7,535	North Tees	14,917
Northumberland Care Trust	7,316,225	Buckinghamshire	28,606	Barnsley	7,514	Cambridgeshire	14,892
North Staffordshire	7,229,301	Derbyshire County	28,582	Tameside and Glossop	7,484	Mid Essex	14,859
Mid Essex	7,200,690	South East Essex	28,529	Eastern and Coastal Kent	7,416	Oxfordshire	14,847
Herefordshire	7,190,288	Brighton and Hove City Teaching	28,484	Isle Of Wight	7,404	Telford and Wrekin	14,779
West Sussex	7,180,784	Central Lancashire	28,206	West Hertfordshire	7,381	Central Lancashire	14,728
Suffolk	7,160,869	Suffolk	28,001	Telford and Wrekin	7,369	Barnsley	14,691
Gloucestershire	7,117,588	Wiltshire	27,903	Redcar and Cleveland	7,335	Bexley Care Trust	14,623
Eastern and Coastal Kent	7,111,207	Solihull Care Trust	27,844	North Staffordshire	7,320	East Sussex Downs and Weald	14,604
Enfield	7,106,348	Somerset	27,711	Luton	7,290	North Staffordshire	14,574

Spending...

per 100,000 population		per cancer death		per cancer case		per new cancer case	
North Tees	7,064,097	Luton	27,634	Bromley	7,135	Hillingdon	14,546
Tameside and Glossop	7,029,965	Gloucestershire	27,619	Shropshire County	7,002	Bassetlaw	14,465
West Essex	7,006,470	Stoke On Trent	27,482	Hillingdon	6,985	Harrow	14,415
Cambridgeshire	6,996,069	Sunderland Teaching	27,433	Oxfordshire	6,892	South East Essex	14,380
Kingston	6,953,387	Central and Eastern Cheshire	26,348	North Yorkshire and York	6,881	South Staffordshire	14,273
Oxfordshire	6,901,828	North Tees	26,341	Gloucestershire	6,833	Derbyshire County	14,262
Wiltshire	6,881,175	Hillingdon	26,066	Bath and North East Somerset	6,814	Suffolk	14,005
Brighton and Hove City	6,853,178	West Essex	25,994	Suffolk	6,794	Redcar and Cleveland	13,993
West Hertfordshire	6,833,404	East Sussex Downs and Weald	25,841	Cambridgeshire	6,766	North Tyneside	13,856
Cornwall and Isles Of Scilly	6,832,285	Wirral	25,540	South Staffordshire	6,730	Buckinghamshire	13,773
Central and Eastern Cheshire	6,818,488	North Staffordshire	25,353	Ealing	6,650	Luton	13,503
Brent	6,802,122	Bury	25,302	Devon	6,598	West Sussex	13,492
Southwark	6,800,120	Northumberland Care Trust	25,180	East Sussex Downs and Weald	6,517	Central and Eastern Cheshire	13,336
Richmond and Twickenham	6,767,562	Hastings and Rother	25,153	West Essex	6,494	Gloucestershire	13,291
Bury	6,749,126	North Tyneside	24,922	Wiltshire	6,462	Solihull Care Trust	13,180
Southampton City	6,724,470	Herefordshire	24,786	North Tyneside	6,432	Eastern and Coastal Kent	13,178
Telford and Wrekin	6,634,651	South Gloucestershire	24,582	Solihull Care Trust	6,405	Wiltshire	13,149
Buckinghamshire	6,524,949	Isle Of Wight NHS	24,531	Central and Eastern Cheshire	6,387	Northumberland Care Trust	13,062
Wandsworth Teaching	6,275,084	West Sussex	24,507	South West Essex	6,379	Somerset	12,938
South Gloucestershire	6,246,939	Eastern and Coastal Kent	24,048	Buckinghamshire	6,358	Bury	12,891
Newham	5,955,963	Devon	23,974	Somerset	6,308	Isle Of Wight NHS	12,863
Hillingdon	5,862,118	Bassetlaw	23,964	East Riding Of Yorkshire	6,198	Tameside and Glossop	12,487
Milton Keynes	5,860,309	Redcar and Cleveland	23,824	Northumberland Care Trust	6,108	Herefordshire	12,453
Westminster	5,599,818	Harrow	23,559	West Sussex	6,038	South West Essex	11,989
Harrow	5,415,532	Tameside and Glossop	23,537	Herefordshire	5,967	Devon	11,843
Kensington and Chelsea	5,291,468	East Riding Of Yorkshire	23,311	South Gloucestershire	5,902	East Riding Of Yorkshire	11,821
Luton	5,220,594	Cornwall and Isles Of Scilly	22,243	Harrow	5,800	South Gloucestershire	11,576
Ealing	5,176,664	Dorset	22,232	Cornwall and Isles Of Scill	5,749	Cornwall and Isles Of Scilly	11,006
South West Essex	4,956,710	Bedfordshire	21,579	Bedfordshire	5,262	Dorset	10,371
Bedfordshire	4,436,622	South West Essex	20,368	Dorset	5,259	Bedfordshire	9,779

Appendix F: Bottom-up costing of PCT cancer spending

Given the indications that there appear to be problems with the quality of the National Programme Budget data on PCT cancer spending, here we attempt to construct an alternative programme spend, by PCT, using the bottom up costing approach recommended by the *Cancer Commissioning Guidance* (Department of Health 2009c). This should provide a more accurate estimate of PCT spending with which to investigate spending variations. It should also give some indication of the relative contribution of the elements of PCT spending to any variation identified.

Table F1 and Figure F1 show the total spend on cancer for England calculated by the *Cancer Commissioning Guidance* by service area of spend. The last two rows show that the total spend corresponds reasonably well with total PCT cancer spend as reported by the National Programme Budget data set for 2005/6.

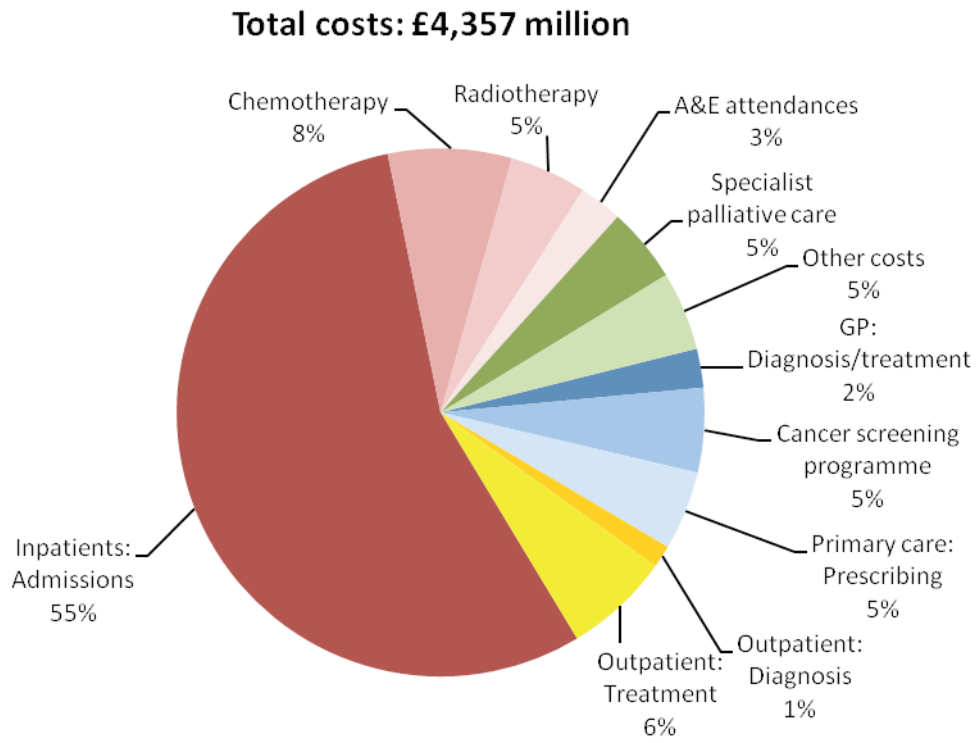
Table F1: Estimates of total English NHS cancer care costs, 2005/6

Cost elements		Estimated cost (£m)
1	Primary care	
1a	GP visits for cancer diagnosis/treatment	104
1b	Cancer screening programme	225
1c	Spend on cancer drugs prescribed in primary care setting	211
2	Outpatient	
2a	First and follow up appointments related to diagnosis of cancer	60
2b	First and follow up appointments related to treatment of cancer	282
3	Hospital	
3a	Admissions with primary diagnosis of cancer	2,414
3b	Chemotherapy	330
3c	Radiotherapy	205
3d	A&E attendances for cancer patients	115
4	Other	
4a	Specialist palliative care	200
4b	Other costs	210
	National Programme Budget total	4,094
	Bottom up costing total	4,357

Source: *Cancer Commissioning Guidance* (Department of Health 2009c)

It should be noted that not all the cost elements identified in Table F1 are included specifically in the National Programme Budget total spend of £4,094 million. GP visits, national cancer screening, specialist palliative care and a variety of 'other' costs (totalling about £749 million) are either included in other programmes or excluded from the National Programme Budget data.

Figure F1 Estimate of NHS cancer care costs for England, 2005/6



Methodology

Table F2 describes the data sources and methodology adopted by the *Cancer Commissioning Guidance* to estimate each element of the national spend on cancer. The methodology has been amended in the table where appropriate to explain the estimates of costs at PCT level.

Table F2: Bottom up costing data sources and methods

Cost elements		Data source/method
1	Primary care	
1a	GP visits for cancer diagnosis/treatment	Data from the **General Practitioner Weekly Returns database** (Birmingham Research Unit, Weekly Returns Service, Annual Report (Department of Health 2009c) 2009c suggests an estimated average of 619 visits related to neoplasms per 10,000 population per year. This equates to a cost of approximately £104 million per annum.
1b	Cancer screening programme	National figures suggest that £225 million is spent on breast and cervical cancer screening programmes annually (Department of Health). It is further estimated that, when fully rolled out, the bowel screening programme will cost £60 million per annum, so this can also be factored into future years' estimates.
1c	Spend on cancer drugs prescribed in primary care setting	**Prescriptions and pharmacy statistics** (PPS) provide a break down NHS spend on cancer drugs in the community by PCT (Department of Health 2009c).
2	Outpatient	

Cost elements		Data source/method
2a	First and follow up appointments related to diagnosis of cancer	**NHS reference costs (**Department of Health 2009c) provide activity and cost estimates for the following procedures performed in an outpatient setting: • fine-needle biopsy of breast • needle biopsy of prostate • biopsy of cervix uteri • rigid sigmoidoscopy • colposcopy • bronchoscopy • diagnostic endoscopic examination of larynx • diagnostic endoscopic examination of pharynx. It is assumed that all these tests are attributable to cancer, as it is not possible from the data to distinguish the reason for diagnosis. Although this is likely to be an overestimate, there will also be many other types of assessments for cancer (including, for example, MRI and CT scans) which have not been included here because the data is not available to distinguish the reason for diagnosis. In theory, it should be possible to link national Reference Cost data with HES data in order to allocate these diagnostic outpatient costs to PCTs in a similar way as for inpatient costs.
2b	First and follow up appointments related to treatment of cancer	**NHS reference costs** provide activity and cost estimates for the following: • clinical oncology • medical oncology • gynaecological oncology • radiotherapy (consultation only) • chemotherapy (consultation only). In addition, it is assumed that there are two outpatient appointments (ie, one 'new' and one 'follow-up') for each cancer patient undergoing surgery. In theory, it should be possible to link national Reference Cost data with HES data in order to allocate outpatient treatment costs to PCTs in a similar way as for inpatient costs.
3	**Hospital**	
3a	Admissions with primary diagnosis of cancer	**HES data (**Department of Health 2009c) identified cancer admissions (as defined below), and were linked to **NHS reference costs** to calculate the cost of this activity. *Definition of a cancer admission* Admission with an appropriate cancer diagnosis in any of the first three diagnosis fields. An appropriate cancer diagnosis was any malignant, in-situ or uncertain neoplasm, or a benign tumour in a neurological site. *Linkage with NHS reference costs* **The NHS National Reference Costs** provide average HRG cost figures by provider. Individual episodes recorded on **HES** have three key data fields, which are used to identify the correct cost of that episode: HRG, admission type and length of stay. In addition, it is also possible to identify which provider treated a PCT's residents for cancer. From these data it is possible to calculate the total admissions costs for each PCT, including any additional costs for excess bed days. In effect, the inpatient admission costs for $PCT_k = \Sigma HRG_{ijk}.C_{ij}$ (where HRG_{ijk} = admissions for cancer HRG, i = hospital, j = residents of PCT k , C_{ij} = the national reference cost for cancer HRG.
3b	Chemotherapy	**NHS reference costs** have a separate category for chemotherapy costs, which reflects just the drug component of costs, regardless of the setting in which it is administered (inpatient, day case or outpatient). This is separate from the costs within the inpatient or outpatient costs. As with inpatient costs, in theory it should be possible to link National Reference Costs data at hospital level to PCTs via chemotherapy HRGs information from HES for each PCT.
3c	Radiotherapy	**NHS reference costs** have a separate category for radiotherapy costs, which reflects just the costs of the radiotherapy department, regardless of the setting in which treatment is administered (inpatient, day case or outpatient). This is separate from the costs within the inpatient or outpatient. As with inpatient costs, in theory it should be possible to link National Reference Costs data at hospital level to PCTs via radiology HRGs information from HES for each PCT.
3d	A&E attendances for cancer patients	**NHS reference costs** have A&E activity and costs, including for minor injury units, but these data are not broken down by diagnosis. It may therefore be assumed that cancer accounts for 9 per cent of this activity, which is the proportion of overall emergency hospital admissions that is related to cancer (using the definition of a cancer diagnosis specified in 3a above). There is no ready way of linking A&E activity (and cost) from hospitals to PCTs. The total national cost could be allocated to PCTs on the basis of PCTs' share of total inpatient costs (from 3a)

Cost elements		Data source/method
4	**Other**	
4a	Specialist palliative care	**The National Council for Palliative Care** estimates that the cost of specialist palliative care is in the region of £200 million for England (Department of Health 2009c). Some other estimates suggest a slightly higher figure, but as palliative care is not exclusively for cancer patients, the cost of specialist palliative care can be taken to be a reasonable estimate for the cancer element of the costs.
4b	Other costs	**NHS reference costs** have a number of other categories of costs that will be incurred in relation to cancer. As a further breakdown of these costs by patient diagnosis is not available, it is not possible to identify the cancer element of the costs, so the proportions need to be estimated..

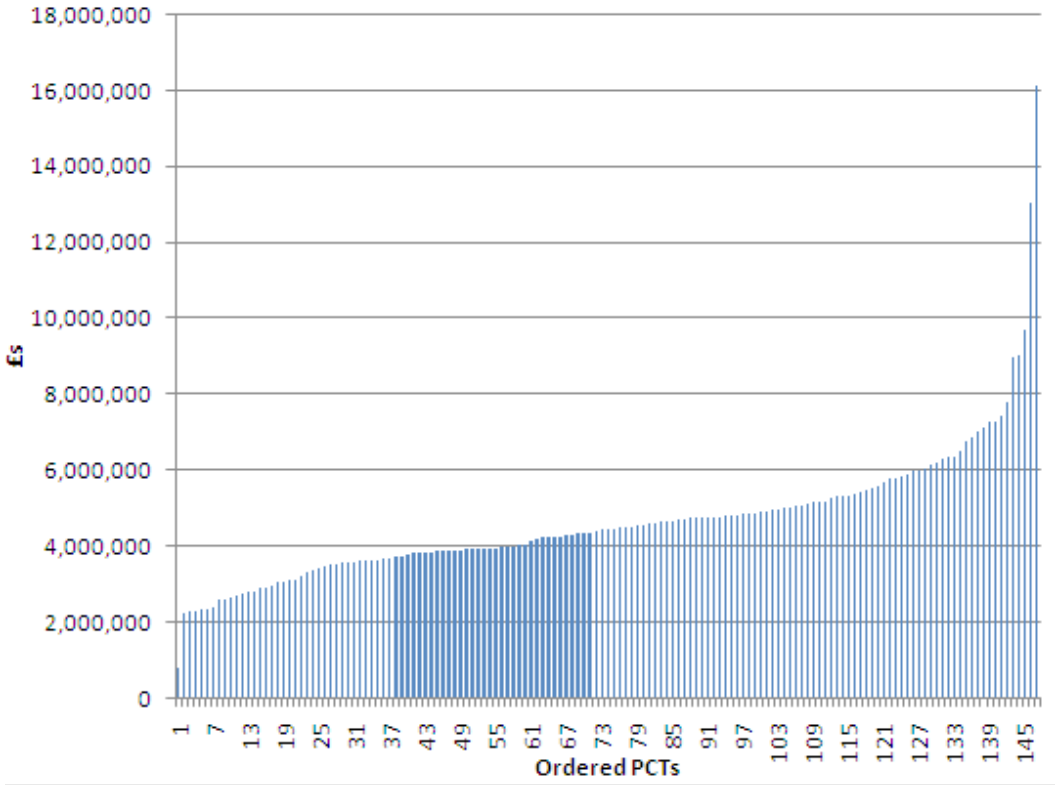
Allocation of inpatient costs to PCTs

As cancer inpatient costs represent an estimated £2.4 billion (55 per cent) of total PCT spend for Englandand with, in theory at least, a reasonably straightforward method of linking costs from the National Reference Cost (NRC) data set to PCTs, we tackled this allocation first.

The allocation method involved first identifying hospitals' unit costs for 69 cancer related HRGs from the NRC data set (see Appendix G). Second, the volume of activity (FCEs) for each PCT, for each provider hospital, was identified from HES and multiplied by the unit costs using the hospital as the link between HES and the NRC data sets. Inpatient spend by Programme Budget category (HES derived activity by PCT multiplied by tariff) is available from the NHS Comparators website (https://www.nhscomparators.nhs.uk/). However, The King's Fund did not have access to this site at the time of this study. The Comparator Toolkit does not give access to underlying data, but rather enables individual PCTs and trusts to compare themselves with other organisations.

The total PCT spend across the NHS in England amounts to £2.29 billion compared to the £2.414 billion estimate derived for the *Cancer Commissioning Guidance*. The resulting 'spend' on inpatient cancer care (actually, hospitals' costs) by PCT per 100,000 population for 2006/7 is shown in Figure F2.

Figure F2: PCT spend on cancer inpatient care, 2006/7



Some problems are revealed, however, by comparing this allocated inpatient spend with the total Programme Budget cancer spend by PCTs per 100,000 population. Figure F3, for example, plots inpatient spend by PCT per 100,000 population against total PCT cancer spend per 100,000 raw population and shows that the former exceeds the latter for around 12 PCTs, while for a small number (seven PCTs under 40 per cent) inpatient spending appears to be an unfeasibly small proportion of the total spend (see also Figure F4).

Figure F3: PCT inpatient spend per 100,000 vs total Programme Budget spend per 100,000, 2006/7

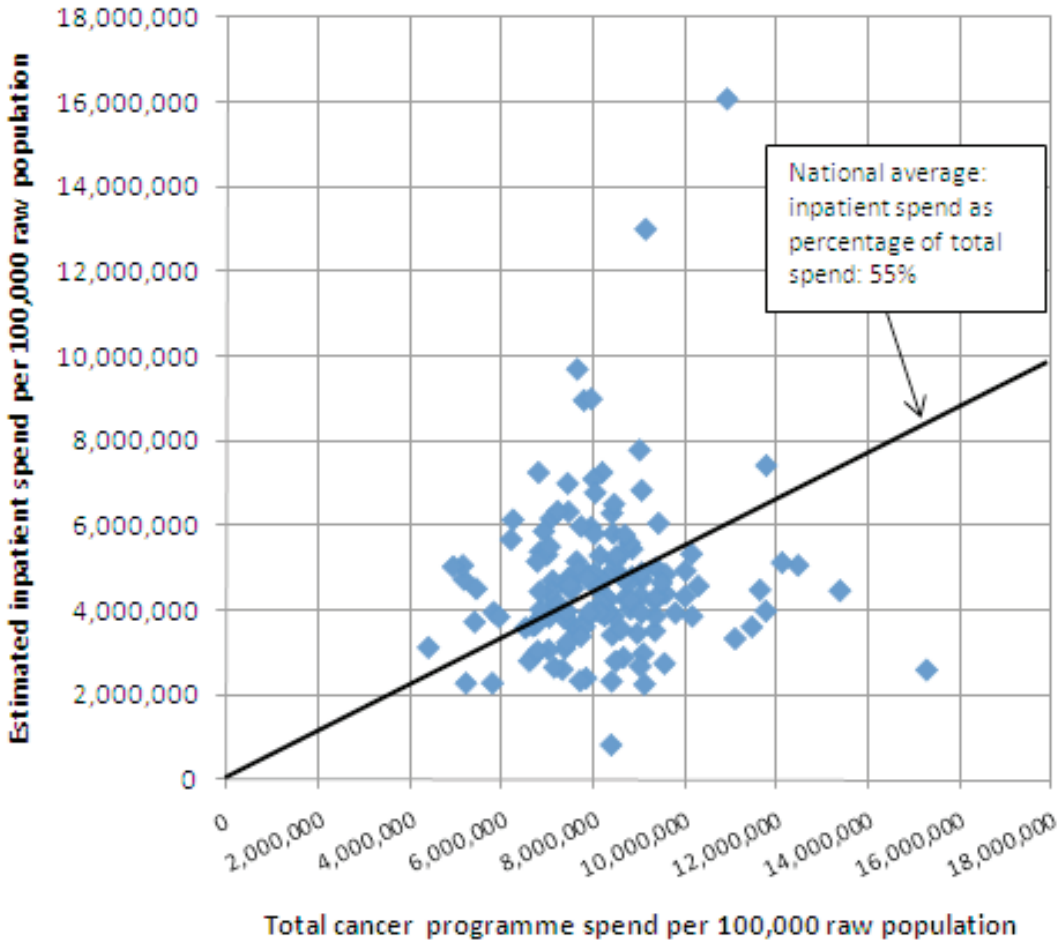
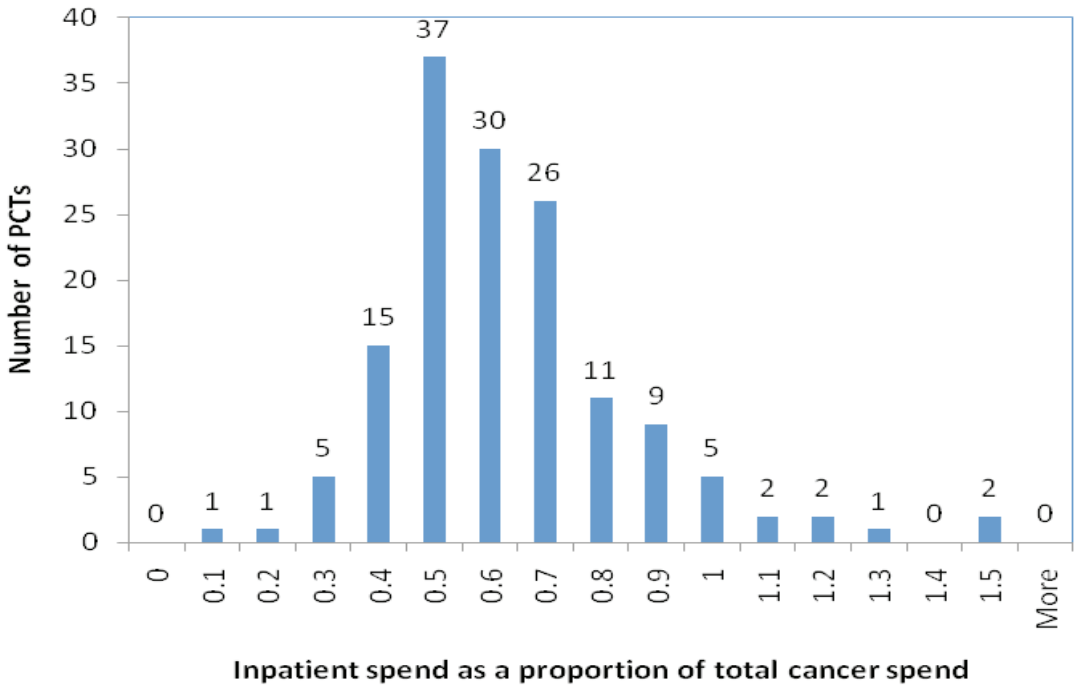


Figure F4: Frequency distribution of PCT total inpatient spend as a proportion of total Programme Budget spend



Further analysis needed

Further analysis is needed to explore the reasons for NRC/HES data problems. Initial work suggests the problem may partly lie in differences in the activity reported by HES compared with that reported by the NRC dataset following the linkage to PCTs. Some of the apparently large variations between PCTs in terms of inpatient spend as a proportion of total cancer spend, as reported by the National Programme Budget data, may be due to the use of cost data in the former and a combination of cost data and reconciliation to actual PCT spend in the latter.

Further work is needed to resolve these data issues – issues which are also likely to affect outpatient figures (which in addition will be affected by the quality of diagnostic coding). In addition, apportioning A&E costs on the basis of inpatient costs will simply reflect the apparent problems of accurately identifying PCTs' inpatient spending.

Allocation of prescribing, chemotherapy and radiotherapy costs to PCTs

Time and resource constraints on this study have precluded further work on allocating the remaining 18 per cent of cancer costs to PCTs (community prescribing, chemotherapy and radiotherapy costs), which make up around 18 per cent of the total cancer spend.

Conclusions

While it should be feasible in theory to compile an alternative cancer programme budget in a bottom up way using a variety of data set linking and apportionment methods, in practice there are potential problems. The method used in this study to allocate cancer inpatient costs to PCTs, for example, produces a national average inpatient spend on cancer of around 50 per cent – close to the *Cancer Commissioning Toolkit*'s estimate of 55 per cent. However, there is considerable variation between PCTs, with around half apparently spending 20 percentage points more or less than the national average of 55 per cent of total spend on cancer (based on Programme Budget total spends). A difficulty with drawing any firm conclusion as to the accuracy of the estimated inpatient spend figures is that the quality of the comparator data – the Programme Budget data set – is potentially problematic.

However, NHS Comparators' report on Programme Budget inpatient costs by PCT, using activity derived from HES multiplied by HRG tariff prices, with further work could investigate the extent of correlation between this data and total cancer PCT spend as reported by the National Programme Budget data set (along with our own cost estimates based on provider reference costs, not tariff prices).

Appendix G: Cancer-related healthcare resource groupss (HRGs)

Table supplied by National Programme Budget Project team.

Root HRG	Final HRG	HRG Label – Including Split
AA06	AA06Z	Intracranial procedures except trauma with brain tumours or cerebral cysts – category 4
AA12	AA12Z	Intracranial procedures except trauma with brain tumours or cerebral cysts – category 3
AA18	AA18Z	Intracranial procedures except trauma with brain tumours or cerebral cysts – category 1 or 2
AA24	AA24Z	Brain tumours or cerebral cysts
DZ17	DZ17A	Respiratory neoplasms with major CC
DZ17	DZ17B	Respiratory neoplasms with CC
DZ17	DZ17C	Respiratory neoplasms without CC
HC23	HC23A	Spinal tumours with major CC
HC23	HC23B	Spinal tumours with CC
HC23	HC23C	Spinal tumours without CC
HD36	HD36A	Pathological fractures or malignancy of bone and connective tissue with major CC
HD36	HD36B	Pathological fractures or malignancy of bone and connective tissue with CC
HD36	HD36C	Pathological fractures or malignancy of bone and connective tissue without CC
JA12	JA12A	Malignant breast disorders with major CC
JA12	JA12B	Malignant breast disorders with intermediate CC
JA12	JA12C	Malignant breast disorders without CC
MA06	MA06Z	Open major upper and lower genital tract procedures with malignancy
MB05	MB05Z	Gynaecological malignancy
PA40	PA40A	Acute lymphoblastic leukaemia with length of stay 1 day or more with CC
PA40	PA40B	Acute lymphoblastic leukaemia with length of stay 1 day or more without CC
PA41	PA41Z	Other haematological malignancies with length of stay 1 day or more
PA42	PA42Z	Brain tumours with length of stay 1 day or more
PA43	PA43A	Other neoplasms with length of stay 1 day or more with CC
PA43	PA43B	Other neoplasms with length of stay 1 day or more without CC
PA44	PA44Z	Neoplasm diagnoses with length of stay 0 days
PA45	PA45Z	Febrile neutropenia with malignancy
SA17	SA17C	Malignant disorders of lymphatic/haematological systems with major CC
SA17	SA17E	Malignant disorders of lymphatic/haematological systems with intermediate CC
SA17	SA17F	Malignant disorders of lymphatic/haematological systems without CC
SA24	SA24C	Acute lymphoblastic leukaemia with major CC
SA24	SA24E	Acute lymphoblastic leukaemia with intermediate CC
SA24	SA24F	Acute lymphoblastic leukaemia without CC
SA25	SA25C	Acute myeloid leukaemia with major CC
SA25	SA25E	Acute myeloid leukaemia with intermediate CC
SA25	SA25F	Acute myeloid leukaemia without CC
SB01	SB01Z	Procure chemotherapy drugs for regimens in band 1
SB02	SB02Z	Procure chemotherapy drugs for regimens in band 2
SB03	SB03Z	Procure chemotherapy drugs for regimens in band 3

Root HRG	Final HRG	HRG Label – Including Split
SB04	SB04Z	Procure chemotherapy drugs for regimens in band 4
SB05	SB05Z	Procure chemotherapy drugs for regimens in band 5
SB06	SB06Z	Procure chemotherapy drugs for regimens in band 6
SB07	SB07Z	Procure chemotherapy drugs for regimens in band 7
SB08	SB08Z	Procure chemotherapy drugs for regimens in band 8
SB09	SB09Z	Procure chemotherapy drugs for regimens in band 9
SB10	SB10Z	Procure chemotherapy drugs for regimens in band 10
SB11	SB11Z	Deliver exclusively oral chemotherapy
SB12	SB12Z	Deliver simple parenteral chemotherapy at first attendance
SB13	SB13Z	Deliver more complex parenteral chemotherapy at first attendance
SB14	SB14Z	Deliver complex chemotherapy, including prolonged infusional treatment at first attendance
SB15	SB15Z	Deliver subsequent elements of a chemotherapy cycle
SC01	SC01Z	Define volume for SXR, DXR, electron or megavoltage radiotherapy without imaging and with simple calculation
SC02	SC02Z	Define volume for simple radiation therapy with imaging (simulator, CT scanner etc) but with simple calculation and without dosimetry
SC03	SC03Z	Define volume for simple radiation therapy with imaging and dosimetry
SC04	SC04Z	Define volume for multiple phases of complex radiation therapy with imaging and dosimetry
SC05	SC05Z	Define volume for radiation therapy with imaging, dosimetry and technical support e.g. mould room
SC06	SC06Z	Define volume for radiation therapy with imaging and intensity-modulated radiation therapy dosimetry or equivalent
SC07	SC07Z	Prepare for total body irradiation
SC08	SC08Z	Prepare for intracavitary radiotherapy
SC09	SC09Z	Prepare for interstitial radiotherapy
SC10	SC10Z	Other radiotherapy planning
SC21	SC21Z	Deliver a fraction of treatment on a superficial or orthovoltage machine
SC22	SC22Z	Deliver a fraction of treatment on a megavoltage machine
SC23	SC23Z	Deliver a fraction of complex treatment on a megavoltage machine
SC24	SC24Z	Deliver a fraction of radiotherapy on a megavoltage machine using general anaesthetic
SC25	SC25Z	Deliver a fraction of total body irradiation
SC26	SC26Z	Deliver a fraction of intracavitary radiotherapy without general anaesthetic
SC27	SC27Z	Deliver a fraction of intracavitary radiotherapy with general anaesthetic
SC28	SC28Z	Deliver a fraction of interstitial radiotherapy
SC29	SC29Z	Other radiotherapy treatment