

November 2010

## The NHS Atlas of Variation in Healthcare

Reducing unwarranted variation to  
increase value and improve quality



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# The NHS Atlas has been prepared in partnership with a wide range of organisations:



**The NHS Confederation – Primary Care Trust Network:** The NHS Confederation's PCT Network provides a distinct voice for Primary Care Trusts (PCTs) in England. Its aim is to improve the health care system for patients and staff by raising the profile of the issues affecting PCTs. It also aims to strengthen the influence of its members and enhance their reputation within the NHS and with wider stakeholders.

<http://www.nhsconfed.org/Networks/PrimaryCareTrust/>



**The NHS Information Centre for health and social care** (The NHS IC) is England's central authoritative source of essential data and statistical information for frontline decision makers in health and social care.

<http://www.ic.nhs.uk/>



**The Association of Public Health Observatories (APHO)** represents and co-ordinates a network of 12 public health observatories (PHOs). Our network produces information, data and intelligence on people's health and health care for practitioners, policy makers and the wider community. Our high quality public health intelligence is central to both local and central government health policy and decision-making.

<http://www.apho.org.uk>



**The South East Public Health Observatory (SEPHO)** aims to improve health and reduce inequalities in the South East region through provision of intelligence to improve decision making.

<http://www.sepho.org.uk>



**The South West Public Health Observatory (SWPHO)** aims to improve the health of the population in the South West. Through the collection, monitoring and analysis of data, we produce evidence to inform decision-making on health issues at local, regional and national levels.

<http://www.swpho.nhs.uk>



**The national Child and Maternal Health Observatory (ChiMat)** provides information and intelligence to improve decision-making for high quality, cost effective services. It supports policy makers, commissioners, managers, regulators, and other health stakeholders working on children's, young people's and maternal health.

<http://www.chimat.org.uk>



**The National Obesity Observatory (NOO)** was established to provide a single point of contact for wide-ranging authoritative information on data and evidence related to obesity, overweight, underweight and their determinants.

<http://www.noo.org.uk/>



**Solutions for Public Health (SPH)** is a not-for-profit NHS public health organisation. We work with decision makers across public and third sectors to improve health and reduce health inequalities. We help our clients provide the right services in the right place, for the right population, at the best cost and quality.

<http://www.sph.nhs.uk/>



**The National Prescribing Centre** formed in April 1996 by the Department of Health to promote and support high quality, cost-effective prescribing and medicines management across the NHS, to help improve patient care and service delivery.

<http://www.npc.co.uk/>



**Prescription Services**

**NHS Prescription Services** provide information services to 35,000 prescribers and managing organisations within the NHS in England, making available five years' worth of prescribing, financial and drug information. This helps the NHS and the Department of Health to determine the most cost effective use of drugs.

<http://www.nhsbsa.nhs.uk/PrescriptionServices.aspx>



**The NHS Alliance** plays a major part in supporting and developing Primary Care Trusts and similar primary care organisations and in providing opportunities for them (and the individuals within them) to network and exchange best practice.

<http://www.nhsalliance.org/>



**National End of Life Care Intelligence Network** is tasked with collating existing data and information on end of life care for adults in England. This is with the aim of helping the NHS and its partners commission and deliver high quality end of life care, in a way that makes the most efficient use of resources and responds to the wishes of dying people and their families.

<http://www.endoflifecare-intelligence.org.uk>



**Northgate** has been contributing to the delivery of health services through innovative solutions for over 20 years. Our national programmes include Patient Reported Outcome Measures (PROMs), Newborn Hearing Screening and Newborn Infant Physical Examination (NIPE), Abdominal Aortic Aneurysm Screening and the National Joint Registry. Our systems in use at local level include the Hospital Episodes Statistics and NHS Comparators systems.

<http://www.northgate-is.com/publicservices>



**The East Midlands Public Health Observatory (EMPHO)** is one of nine regional Public Health Observatories funded by the Department of Health in England. EMPHO is the regional health intelligence organisation providing information and analysis to support those working to improve health and reduce health inequalities in the East Midlands.

<http://www.empho.org.uk>



**The East of England Public Health Observatory** monitors the health of the population of the East of England and helps the NHS and other organisations ensure that decisions and actions taken to improve health are supported by sound data and information.

<http://www.erpho.org.uk>

The editors acknowledge the inspirational publication, *The Dartmouth Atlas of Health Care 1998*, and the vision and commitment of Professor Jack Wennberg who first charted this territory

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# Preface

In the recent White Paper (July 2010), *Equity and Excellence: Liberating the NHS*, there is a commitment to increasing value from the resources allocated to the NHS. This requires us to address variations and reduce unwarranted variations in activity and expenditure. Any such variations indicate the need to focus on appropriateness of the clinical service, and to investigate the possibilities that there is over-use of some technologies, with some lower value activities being undertaken. If lower value activities are reduced, the savings could be used to commission higher value activities not funded at present. Addressing the appropriateness of services is vital for the optimal healthcare of patients and populations irrespective of the existence of financial constraints.

In the NHS Atlas, we present a series of maps of variation selected from the topics which National Clinical Directors from the Department of Health and others have identified as being of importance to their clinical specialty. Our aim is to put variations in activity, expenditure, quality, outcome, value, and equity firmly on the health service agenda for the next decade, and to stimulate the NHS to search for unwarranted variation and, by extension, to tackle the causes and drivers of that variation.

Each individual and every population is unique, and, although affected by the same modern epidemics, the priorities for each individual and for each population, and the values they hold, will be unique. For these reasons,

the occurrence of some variation is not only inevitable but also necessary in both clinical practice and healthcare commissioning.

However, unwarranted variation is cause for concern. For the last two decades, as we have faced up to the challenges disclosed by clinical audit, variation in the quality and safety of health services, and subsequent variations in outcome, have become the focus of attention both for the professions, and for those who pay for and manage healthcare. Variation in the level of quality is likely to persist as services seek to improve. This variation is understandable and explicable, especially as each service strives to reach the level achieved by the best, while the best themselves will have moved on.

More puzzling are the continuing variations in activity and expenditure, which have existed since the establishment of the NHS, and the data have been available on the worldwide web since the Internet was launched.

*The NHS Atlas of Variation in Healthcare* is intended to complement the Primary Care Trust (PCT) Health Investment Packs, which have been made available to every PCT in England. The packs are bespoke to each PCT, and explore variations for one disease group. The complementary publication of these materials signals a move towards a health service focused not only on its great institutions but also on the health and healthcare problems that persist despite reorganisation and structural change.

*Sir Muir Gray and Philip DaSilva, Editors  
Co-Leaders QIPP Right Care Programme*



## From Insight to Action

“If all variation were bad, solutions would be easy. The difficulty is in reducing the bad variation, which reflects the limits of professional knowledge and failures in its application, while preserving the good variation that makes care patient centred. When we fail, we provide services to patients who don’t need or wouldn’t choose them while we withhold the same services from people who do or would, generally making far more costly errors of overuse than of underuse.”<sup>1</sup>

### Responding to variation

“The data are wrong.” This is frequently the first response to data about variation in healthcare between one population and another. It is true that the data could be more accurate, and we must continue to improve it. It is also true that the people responsible for using the data are frequently those who have asserted that “The data are wrong.” However, even if the data are not completely accurate, the variations that can be observed in quality, outcome, activity, expenditure, and value are too great to be explained only by differences in the recording and analysis of the data.

“Our population is different.” This is sometimes the second response to data about variation in healthcare, especially when provided to people responsible for paying for or providing health services to a population. It is true that the need for healthcare varies from one population to another. Need can differ because people in one population have different types of disease, for instance, the incidence of sickle cell disease is higher in London and Birmingham than it is in Newcastle or Plymouth. However, this explanation of variation is uncommon, and can easily be taken into account during the preparation of any maps that focus solely on sickle cell disease. The principal reason for variation in need is that some populations have higher levels of the same types of common chronic disease than other populations, for example, higher rates of stroke, bronchitis, heart disease, and mental health problems. Differences in disease patterns occur because one population has more older people and more deprivation or both than another. These two factors – age and level of deprivation – are the principal determinants of rates of disease in any population, affecting both the incidence of the disease – the number of new cases that develop in a year – and the prevalence – the number of people who have a chronic disease at any point in time.

It is possible to take these two factors into account when comparing the health of two populations by “standardising” the data. This means using a formula to adjust the data from each population such that they are presented as if each population has the same age and social class distribution as the national average.

<sup>1</sup> Mulley, AJ. Improving productivity in the NHS. BMJ 2010. 341:c3965 doi: 10.1136/bmj.c3965 (Published 27 July 2010)

Standardisation, as outlined in the Methods section of the NHS Atlas, has been used to create these maps.

Another way of comparing populations is to compare like with like, for example, an inner city population with other inner city populations, a prosperous rural population with other prosperous rural populations. Irrespective of the basis for comparison, variations in quality, outcome, activity, expenditure, and value can be observed. Although some of the variation might be warranted by differences in population need, the major part is unwarranted, and should be addressed. Unwarranted variation has been defined by the originator of health atlases, Professor Jack Wennberg, as:

“Variation in the utilization of health care services that cannot be explained by variation in patient illness or patient preferences.”<sup>2</sup>

### Variations in quality and outcome

Variations in quality are inevitable due to innovation and developments. Healthcare is delivered by human beings, and even if they use the same equipment the quality

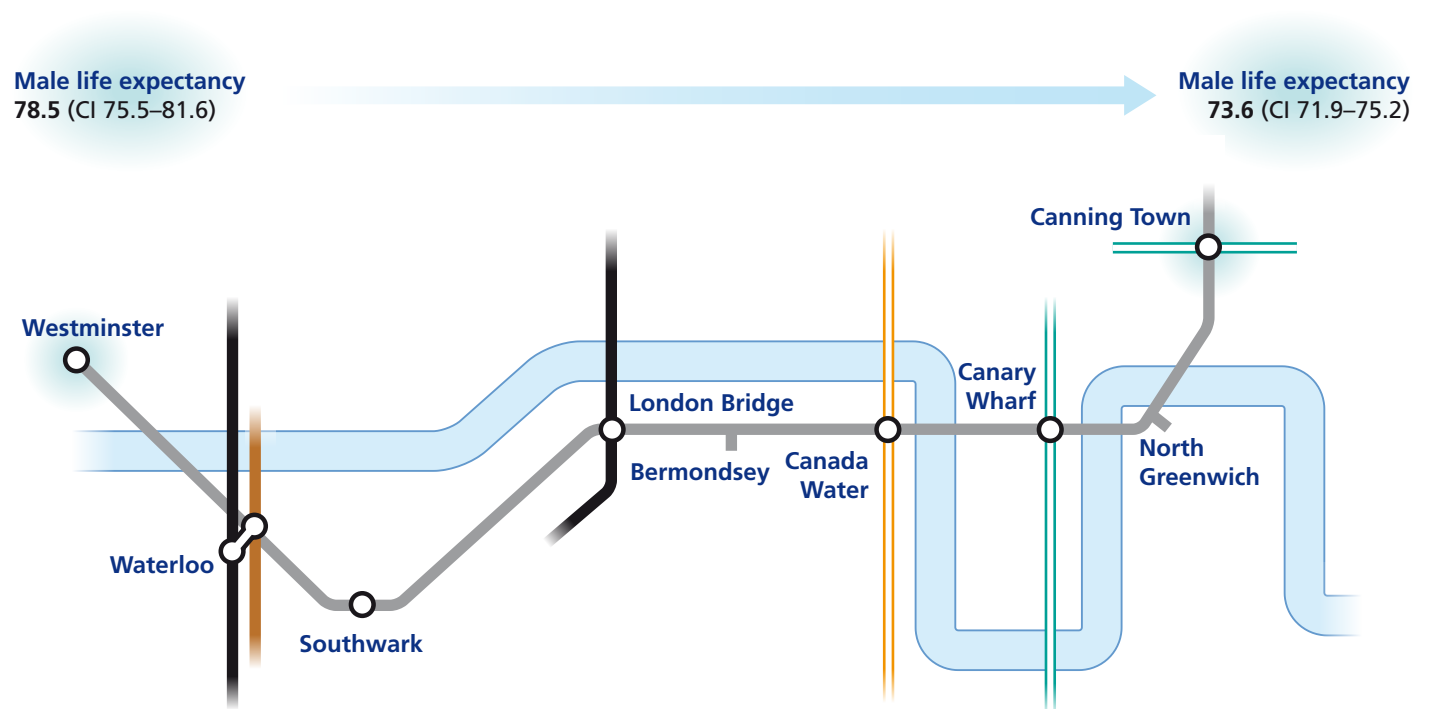
of care, that is, the degree to which it meets pre-set standards of goodness, will vary.

The focus on quality improvement in the last decade, together with the publication of explicit Quality Standards by the National Institute of Health and Clinical Excellence (NICE), will help to reduce variation in quality and outcome, but more needs to be done.

Although variations in quality and outcome are usually presented in relation to providers of health services, such as hospitals, rather than in relation to populations, the NHS Atlas contains population-based maps of variations in quality and outcome. This is because the primary audience for the NHS Atlas is clinicians, and commissioners or people who plan and allocate finite resources for healthcare. It will also be of interest to all those who provide and receive healthcare across England.

When commissioning healthcare, those who are responsible for health services need to be concerned about the quality of the services they commission. As before, they also need to bear in mind that not all outcomes arise as a result of the quality of health

**FIGURE 1: DIFFERENCES IN MALE LIFE-EXPECTANCY WITHIN A SMALL AREA OF LONDON: TRAVELLING EAST FROM WESTMINSTER, EVERY TWO TUBE STOPS REPRESENT OVER ONE YEAR OF LIFE-EXPECTANCY LOST (DATA REVISED TO 2004–2008)<sup>3</sup>**



<sup>2</sup> <http://www.dartmouthatlas.org/>

<sup>3</sup> Source: Analysis by London Health Observatory of ONS and GLA data for 2004–2008. Adapted from a diagram produced by Department of Health.

services alone. This point has been well made by the London Health Observatory's re-working of the map of the Jubilee Line (see Figure 1), which shows how male life-expectancy varies to a degree that cannot be explained by variations in the amount or quality of health service delivered. Electoral wards just a few miles apart geographically have life-expectancy spans varying by years. For instance, there are eight stops between Westminster and Canning Town on the Jubilee Line: as one travels east, every two stops, on average, mark over one year of shortened lifespan.

We need to acknowledge that agencies outside the NHS also play a role in influencing health outcomes, and therefore we must work in partnership to address the principal determinants of disease, and to tackle variation.

Nonetheless, the NHS has a significant role to play.

Those who commission healthcare have a responsibility to mitigate the effects of factors that influence poor access to, and provision of, healthcare. A recent study of equity in access to total joint replacement of the hip and knee in England found "equity in access to hip and knee replacement varies by age, sex, deprivation, rurality, and ethnicity."<sup>4</sup>

Those who provide health services, clinicians, and managers have primary responsibility for assuring the quality of the care they provide. Those who commission healthcare have primary responsibility for the planning and allocation of resources, and, therefore, the amount of care provided to one group of patients or another.

**TABLE 1: ESTIMATED GROSS EXPENDITURE BY PROGRAMME BUDGET FOR ENGLAND (UPDATED 15 APRIL 2010); PROGRAMME BUDGET CATEGORIES ARE LISTED IN ORDER OF HIGHEST SPEND<sup>5</sup>**

Rank	Programme Budgeting Category		Estimated gross expenditure	
			2008/09 £000s	% change over 2007/08
1	5	Mental Health Disorders	10,477,252	+2%
2	10	Problems of Circulation	7,405,732	+2%
3	2	Cancers and Tumours	5,130,993	+3%
4	11	Problems of the Respiratory System	4,247,083	+12%
5	15	Problems of the Musculo-Skeletal System	4,214,927	+3%
6	13	Problems of the Gastro-Intestinal System	4,096,245	0
7	17	Problems of the Genito-Urinary System	4,003,690	+10%
8	7	Neurological	3,694,954	+7%
9	16	Problems due to Trauma and Injuries	3,297,859	+7%
10	22	Social Care Needs	3,155,621	+52%
11	12	Dental Problems	3,098,939	+3%
12	18	Maternity and Reproductive Health	3,095,945	+5%
13	6	Problems of Learning Disability	2,929,036	+3%
14	4	Endocrine, Nutritional and Metabolic	2,529,181	+4%
15	21	Healthy Individuals	1,915,158	+11%
16	14	Problems of the Skin	1,806,816	+6%
17	8	Problems of Vision	1,668,115	+4%
18	1	Infectious Diseases	1,417,985	+6%
19	3	Disorders of the Blood	1,258,915	+2%
20	19	Conditions of Neonates	1,110,223	+16%
21	20	Adverse Effects and Poisoning	951,716	+14%
22	9	Problems of Hearing	424,192	+1%

4 Judge A, Welton NJ, Sandhu J, Ben-Shlomo Y. Equity in access to total joint replacement of the hip and knee in England. *British Medical Journal* 2010; 341:c4092 doi: 10.1136/bmj.c4092 (Published 11 August 2010)

5 Table 1 does not include programme budget 23 known as "Other". "Other" covers General Medical Services, Personal Medical Services, SHAs, and Miscellaneous. The expenditure for General Medical Services ought to be allocated across all the programme budget categories dealing with conditions and/or diseases, but this is not possible at present.

## Variations in expenditure and activity

Variations in activity and expenditure rates are more difficult to understand than variations in quality.

Differences in expenditure on a disease, or a group of diseases such as lung disease, is a function of two variables:

1. The amount of resource allocated to spend on that particular group of diseases, or programme;
2. The cost of each unit of treatment.

The latter, the cost per unit of care (as distinct from the tariff charged for interventions) or productivity, varies widely. Reductions in the cost of care, and in the variations in costs, are primarily the responsibility of the provider of care, whereas the commissioner is responsible for ensuring that the cost of care is as low as it can be without impairing quality or safety. However, most of the difference in expenditure on different types of health problems is determined not by the cost of care but by differences in the decisions made in the allocation of resources. The allocation of resources by programme budget for the NHS in England is shown in Table 1.

It is important to emphasise that this pattern of resource allocation was not determined in 1948, nor has it been formally addressed since then. It represents the patterns of resource allocation inherited, and subsequently modified, usually without explicit analysis and decision-making during the last six decades.

Neither has much attention been paid to the variation in investment decisions made by commissioners that can be observed within any one of the 22 programme budgets dealing with groups of conditions or diseases. Variation in expenditure may be justified by variation in need, but much of the variation may simply be the end result of years, indeed decades, of investment decisions made with or without due regard to the needs of the different patient groups competing for finite resources. To help commissioners reflect on their position, PCT Health Investment Packs were made available to every PCT in October 2010, showing how their expenditure by programme budget differed from the allocations made by PCTs serving similar populations.

When more resources are invested in a service, it is likely that there will be more activity, but not always improved outcomes. If there has been a high rate of activity in a service for a particular population over a period of years, then increased investment may have

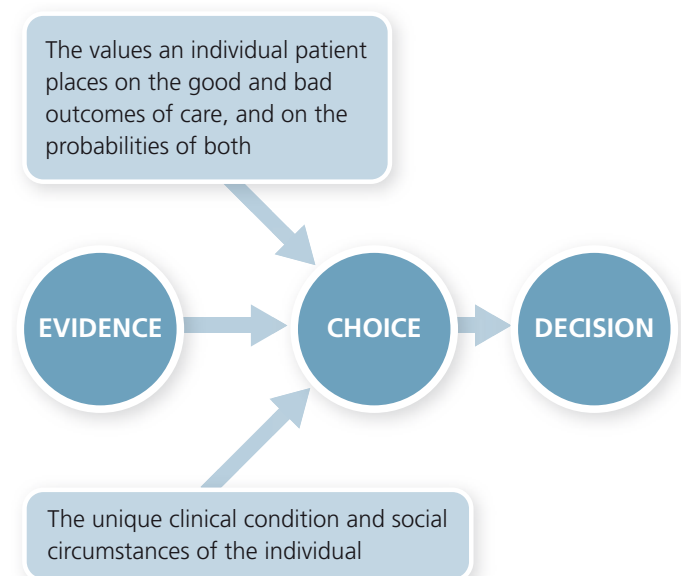
followed, thereby compounding variation. Whatever the reasons, considerable variation can be seen in the rate of interventions in which both clinicians' and patients' judgements can be significant factors. Some clinical decisions are unequivocal, such as the decision to admit someone with a hip fracture to hospital and to repair that fracture by means of an operation. However, the decision to replace a hip in someone with chronic arthritis is one in which three factors have a part to play (see Figure 2).

Following the pioneering research of Jack Wennberg at the Dartmouth Medical School, research in many countries has demonstrated wide variations in the rates of clinical activity. To some people, the level of variation was surprising because the medical profession now has a strong evidence base, and an explicit commitment to evidence-based decision-making. However, these striking differences have been observed between countries, within countries, and even within the same health economy.

The significance for the individual patient is that in populations in which there are high rates of activity some individuals might be receiving treatments that other clinicians and patients would regard as unnecessary and of no additional value. The significance for the population receiving a high rate of a particular intervention is that it is not always beneficial and the value derived from the additional resources allocated to fund activity that is above the average may be lower than if the same amount of resource were to be invested in:

- another type of treatment, or preventive intervention, for people with the same conditions;
- to meet unmet needs in another group of patients.

FIGURE 2





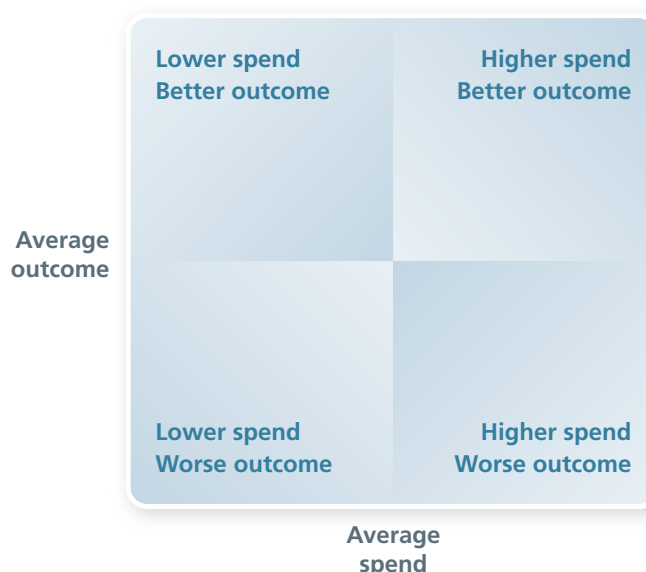
## Variations in value

The definition of value is subjective and complex. Different groups, such as commissioners, providers, clinicians, managers and indeed the public may place a different value on the same service, or on a decision to invest or disinvest. Commissioners will need to embrace and lead this debate, engaging not only clinicians but also the populations served. Perhaps more importantly, within each group of patients, different individuals may place a different level of value on an intervention. To one patient, an operation is of high value; to another, its value is low. What is clear from the research is that during decision-making in which the patient's values matter, a decision about knee replacement or end-of-life care for example, the individual needs to be given complete information about the potential benefits and harms, and the probabilities of both. Early analysis of the use of shared decision tools, which provide patients with structured information on the options for treatment and the possible benefits and harms, has shown that "decision aids improve people's knowledge of the options, create accurate risk perceptions of their benefits and harms, reduce difficulty with decision making, and increase participation in the process" and that "they may have a role in preventing use of options that informed patients don't value without adversely affecting health outcomes".<sup>6</sup> These tools have a major contribution to make to the quality agenda and to putting patients at the centre of their own care.

For the population, value is measured by the relationship between outcome and cost, and this relationship can be depicted using the Spend and Outcome Tool (SPOT), described in the section entitled "Tools for analysing health investment". The framework for a SPOT diagram is shown in Figure 3. SPOT Diagrams have also been included in the PCT Health Investment Packs (<http://www.rightcare.nhs.uk>) to indicate where every PCT's programme lies in relation to expenditure and, where available, the outcome.

However, to regard the values of an individual and the values of a population as separate issues is misguided. As the rate of healthcare interventions changes, so the relationship between the benefit and the harm for a population changes, and the balance between the probability of benefit and the probability of harm for an individual patient also changes.

FIGURE 3



## Taking up the challenge

Awareness is the first important step in identifying and addressing unwarranted variation; if the existence of variation is unknown, the debate about whether it is unwarranted cannot take place. In the NHS Atlas, which we recognise is a snapshot in time, we have published maps of variation at a national level, and in the bespoke PCT Health Investment Packs variation at a local level. Our aim is to stimulate a debate on the causes and drivers of variation, and action to reduce unwarranted variation.

The editors recognise that the NHS is working hard to understand variation and in many places to mitigate unwarranted variation through local initiatives. However, to generate widespread change, the need to identify and reduce unwarranted variation must be placed at the centre of commissioning decision-making, and also needs to be a priority for clinicians and patients. It is also vital for clinicians and managers to engage effectively with patients and the public to share knowledge of the causes of variation, and to build consensus for rational commissioning decisions.

Although clear national policy, expressed as guidelines, has an essential part to play in reducing unwarranted variation, as many of the commentaries to the maps in the NHS Atlas highlight, guidance alone will not guarantee a consistent response.

6 O'Connor AM., Bennett CL, Stacey D, Barry M, Col NF, Eden KB, Entwistle VA, Fiset V, Holmes-Rovner M, Khangura S, Llewellyn-Thomas H, Rovner D. Decision aids for people facing health treatment or screening decisions. Cochrane Database of Systematic Reviews 2009, Issue 3. Art. No.: CD001431. DOI: 10.1002/14651858.CD001431.pub2

Commissioners, working in partnership with all general practitioners and other clinicians, should ask themselves which variations exist in their local populations. They should see the NHS Atlas as a challenge to understand variations in healthcare in their own localities, and should seek to understand the implications any variation may have for their health spend and health outcomes. The section entitled “Tools for analysing health investment” signposts the user to the available datasets and analysis tools. These tools have been designed to help local commissioners understand their health spend across disease groups, and identify priority programmes that warrant action. Commissioners should also seek advice and support from their Directors of Public Health, and the relevant Public Health Observatory, and Quality Observatory.

Furthermore, education alone is insufficient to change clinical practice, as demonstrated by the work of the National Clinical Directors, which has underlined the need for strong clinical leadership. Effective commissioning and good service management are also necessary but not sufficient. Ultimately, it will be vital to address whole systems of care, built on networks not institutions, and planned on the size of population appropriate for a particular condition. For example, the Map of Medicine has demonstrated the power of

bringing all parties together, around the whole care pathway: it has been used in Newham to improve services and reduce variation in diabetes care,<sup>7</sup> and in Leicestershire to reduce inequality in musculo-skeletal services.<sup>8</sup> This is a theme that the Right Care Programme will be developing in future publications.

Doing nothing is not an option at a time when the NHS and taxpayers will need to obtain more value from the budget allocated to healthcare. In the first instance, PCT boards should use their data to ask themselves whether a reduction in variation could add value to their commissioning decisions or whether variations are being driven by factors such as choice, case-mix, planned improvements, or unplanned services.

Commissioners could maintain a focus on reducing unwarranted variations through annual reports on local variation. The Annual Report of the Director of Public Health for Herefordshire PCT is an excellent example of just such an approach.

Finally, as the new commissioning structures are formed, SHAs and PCTs should ensure that addressing variation remains a high priority and that unwarranted variation is tackled before the GP consortia take up the challenge.

7 <http://www.mapofmedicine.com/mapinnhs/casestudies/reducingvariationsincare/>

8 <http://www.mapofmedicine.com/mapinnhs/casestudies/reducinghealthinequalities/>

# Tools for analysing health investment

There are several web-based analysis tools and resources available to help commissioners and clinicians to analyse variations in health spend and outcome, to identify opportunities for increasing productivity, and to support decision-making about health investment for populations. In this section, a short introduction to these resources is provided.

Links to all of these tools and supporting guides can be found on the Health Investment Network website, available at: <http://www.networks.nhs.uk/nhs-networks/health-investment-network>

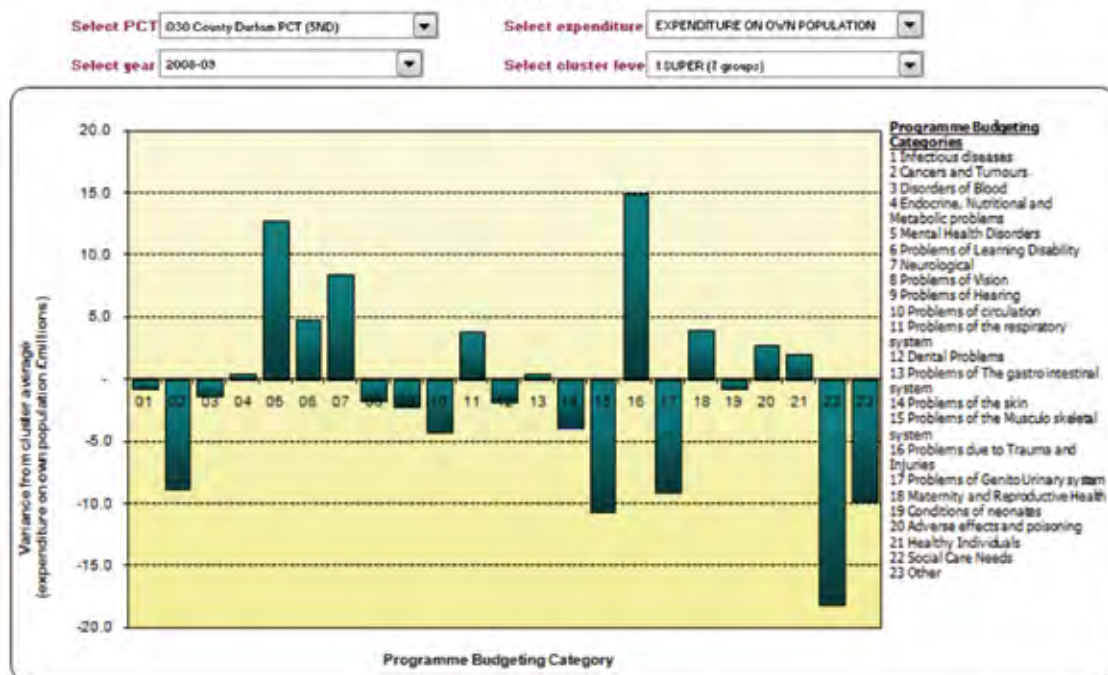
Additional support for health investment analysis and interpretation of variance is available to every PCT from the Directors of Public Health, and the Health Observatory network.

## Identifying relative expenditure across programmes

Since 2002, PCTs in England have collected financial information that identifies all PCT expenditure, including primary care services, in relation to programmes of care based on the World Health Organization (WHO) International Classification of Diseases, version 10 (ICD-10).<sup>1</sup> Programme budgeting data for PCTs have been available since 2003/04 (see Table 1, page 13, for overall spend in England by programme budget category for the financial year 2008/09).

The **Programme Budgeting Benchmarking Tool** can be used to identify how much is spent by a PCT on each programme of care when compared with other similar PCTs.

Column chart showing the variance of the selected PCT expenditure on own population from cluster average for main programmes.



Screen shot 1

1 <http://www.who.int/classification/icd/en/>

The programme budgeting benchmarking tool contains expenditure data across programmes for all PCTs in England. There are 23 main programmes, broadly corresponding to the chapters in the WHO ICD-10, e.g. Cancers and Tumours, and Mental Health Disorders. Many of the programmes also have subcategories, e.g. Cancers and Tumours, which is subcategorised by the site of the cancer in the body.

The tool provides a variety of graphical representations of the data. This enables a PCT user to compare expenditure against national and SHA averages, as well as against other PCTs that have similar characteristics. The tool is flexible enabling the user to select different types of standardisation, different groupings of PCTs, and different time periods.

Using the tool, PCTs can identify the following:

- How they spend their allocation over the 23 programmes, and respective subcategories;
- How, and by how much, their expenditure distribution pattern compares with PCTs nationally, PCTs locally, or PCTs that have similar characteristics (see Screen shot 1);
- How their expenditure distribution has changed over time.

## Identifying the relationship between spend and health outcomes

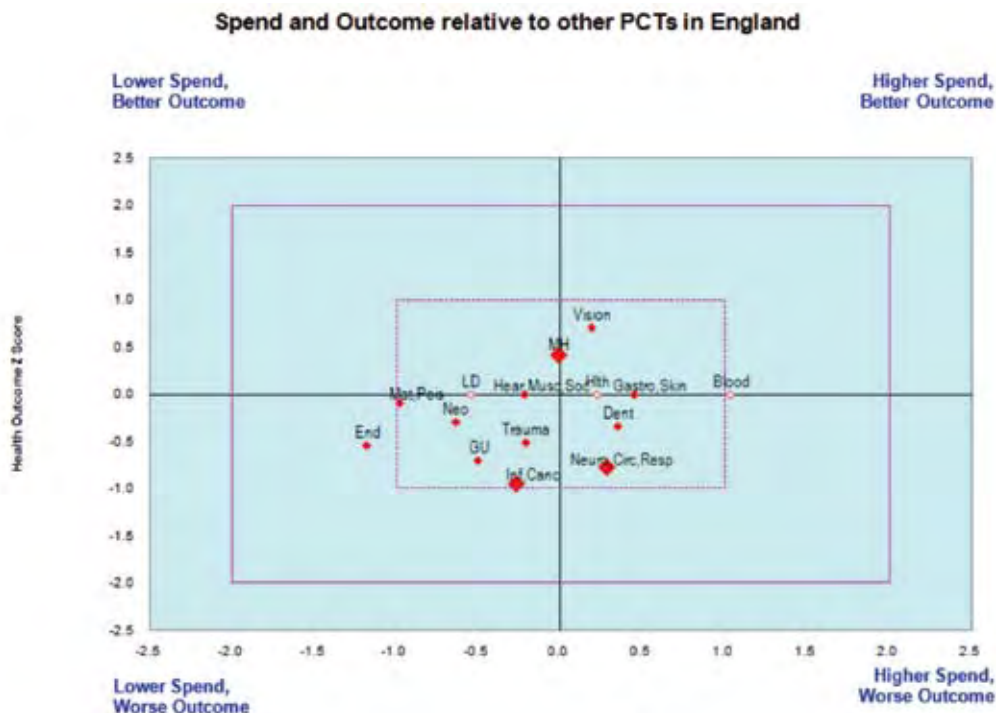
**The Spend and Outcome Tool (SPOT)** combines programme budgeting data and health outcome data. The tool enables the user to identify those programmes which are potential outliers when compared with other PCTs.

The tool has a simple interface and is flexible; users can select the outcome measures they want to examine, and the PCTs with which they want to compare themselves.

The tool allows commissioners to understand:

- How expenditure and outcomes compare with other PCTs nationally (see Screen shot 2), with similar demographic areas, and against any other individual PCT of the user's choice;
- The relative expenditure and outcomes for the biggest spending programmes;
- Which programmes warrant further investigation to see what could be driving the expenditure.

The tool can be downloaded from the Yorkshire and Humber Public Health Observatory (YHPHO)



Screen shot 2

website: <http://www.yhpho.org.uk/resource/view.aspx?RID=49488>. The YHPHO has led on the development of this tool for the Department of Health. YHPHO has also produced a set of fact sheets summarising the results from the tool for each PCT in England. The fact sheet for any PCT can be downloaded, or the tool can be used to explore a PCT's data. A user guide is available which can be used to help to interpret the charts.

The principal limitation of the SPOT is that there are several programmes for which there are no outcome data. This weakness will be addressed during the consultation about the White Paper entitled "Transparency in outcomes – a framework for the NHS" (available at: [http://www.dh.gov.uk/en/Consultations/Liveconsultations/DH\\_117583](http://www.dh.gov.uk/en/Consultations/Liveconsultations/DH_117583)).

### Identifying the drivers of spend

Having identified the programmes that warrant further investigation, the next stage is to use the **Programme Budgeting Atlases** to look at the possible factors driving spend, e.g. are emergency admissions or prescribing rates higher than those in comparable areas?

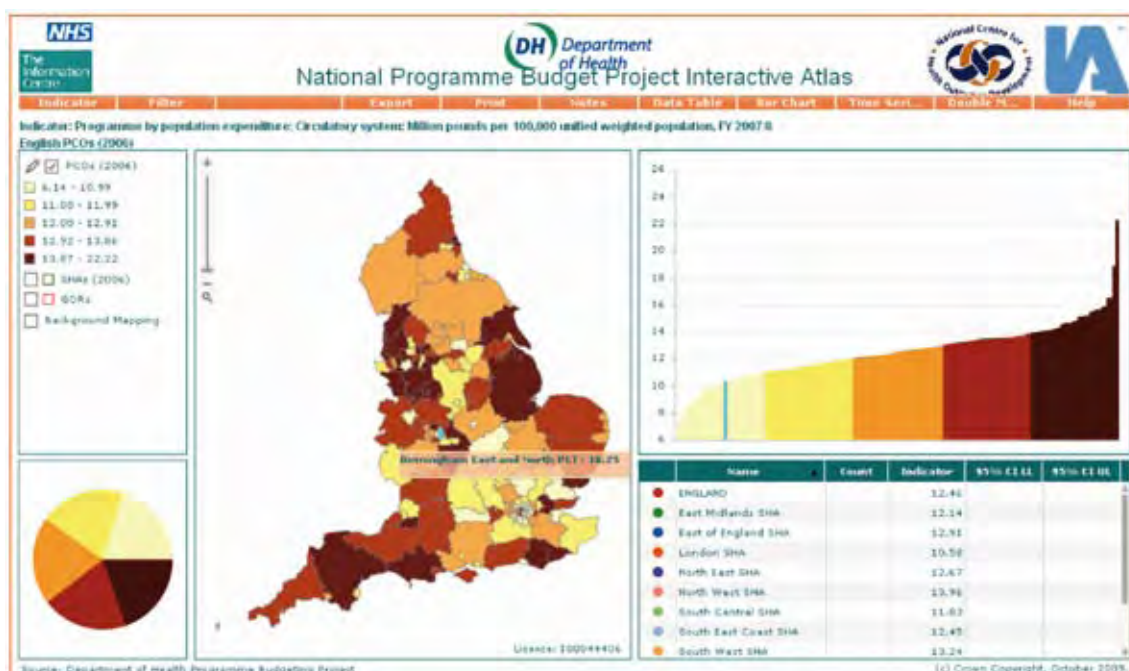
The programme budgeting atlases enable PCTs to link programme budgeting expenditure data, as presented

in the programme budgeting spreadsheet, with a range of outcome and activity data. Data are presented for each programme in the form of interactive maps and correlation plots (see Screen shot 3). However, this tool is available only to those connected to the NHS network (N3).

Greater insight can be gained about the drivers using **NHS comparators** data. NHS Comparators is a benchmarking tool that has been developed by the NHS Information Centre for Health and Social Care. Data are available by GP practice, by provider, and over time. It enables PCTs, PBCs, GP practices and providers:

- To investigate detailed variation in activity (see Screen shot 4), costs, and outcome;
- To look at variation over time, by specialty and disease group;
- To examine a variety of datasets in the same format, including secondary care activity, Quality and Outcomes Framework (QOF) data, and prescribing (costs and volume) data.

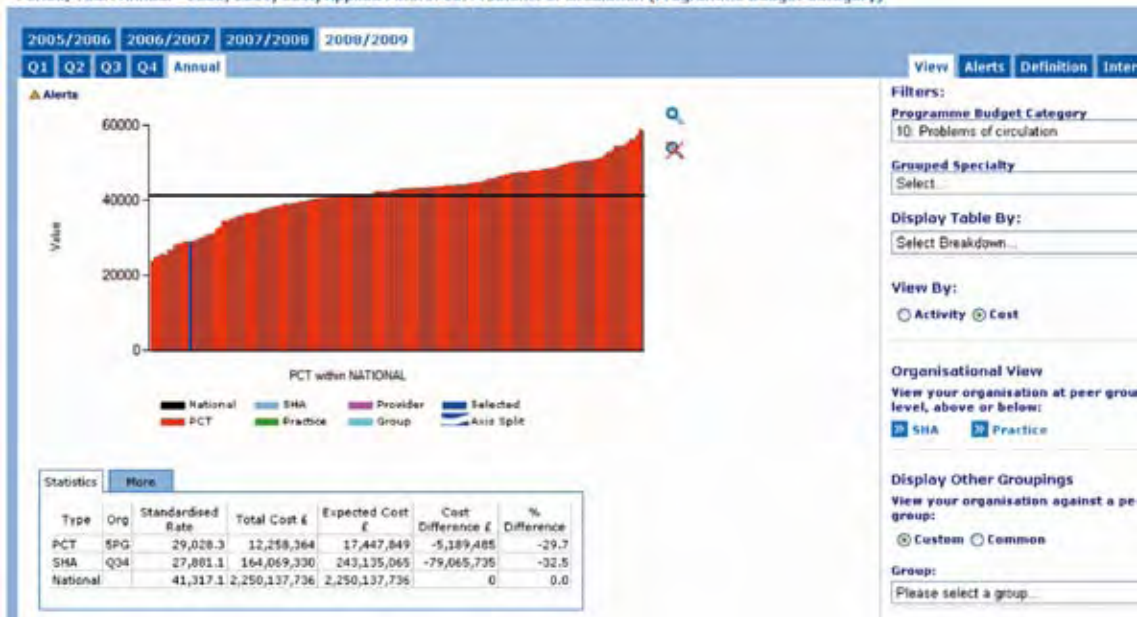
NHS Comparators is available on the NHS network (N3). Non-NHS users can now access the tool, but need to contact the Information Centre directly for registration details.



Screen shot 3

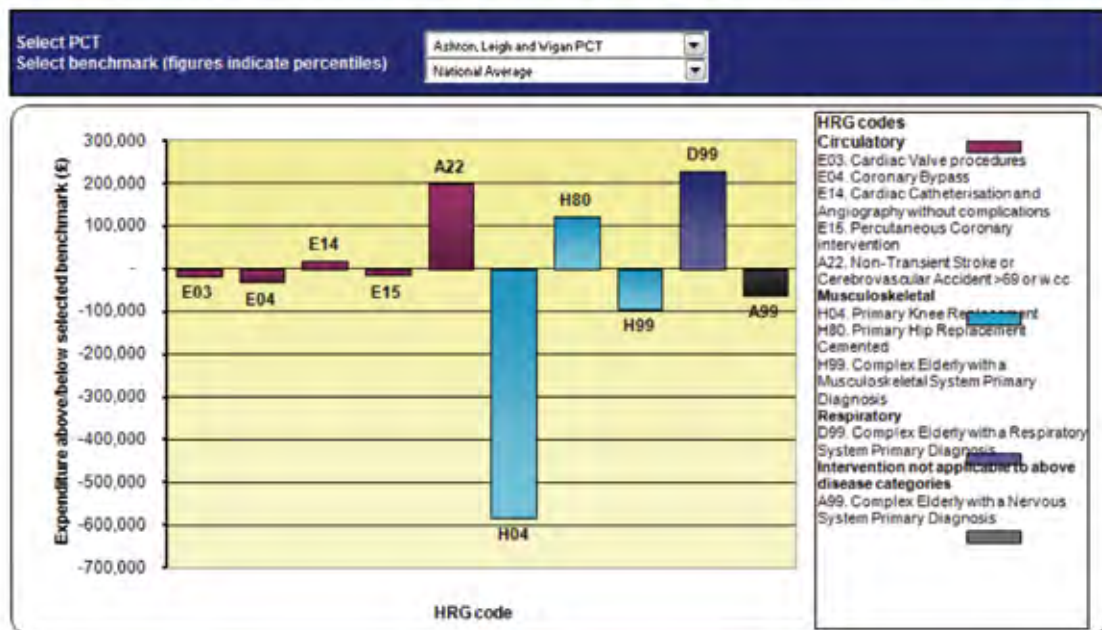
### Birmingham East and North PCT - Total Admissions per 1000 Population

Period/Year: Annual - 2008/2009; Cost; Applied Filters: 10: Problems of circulation (Programme Budget Category)



Screen shot 4

### PCT inpatient expenditure above or below the benchmark for high expenditure interventions in 2008-09.



Screen shot 5

The ***Inpatient Variation Expenditure Tool (IVET)*** allows PCTs to compare spend on inpatient admissions for high-volume disease areas and procedures (see Screen shot 5). This tool adjusts expenditure rates to take account of the health needs of the population.

Using these tools PCTs should gain a good understanding of relative expenditure, health outcomes, and drivers of spend at a fairly detailed level for their populations.

## Implementation

Once potential programmes have been identified for further investigation, then a reliable method, such as marginal analysis, is required to prioritise investments that deliver the greatest health benefits for patients. Programme budgeting and marginal analysis (PBMA) is a tool for putting some science behind the art of managing scarcity and competing demands within a finite budget. A ***video learning module*** that explores the definitions, tools, and practical application of PBMA is available at: <http://www.healthknowledge.org.uk/interactive-learning/pbma>.

## Other resources

The Right Care Programme has produced a set of bespoke PCT ***Health Investment Packs*** for each PCT in England. The packs present selected outputs from the above tools for the spend of a particular PCT against one disease group. The Health Investment Packs have been made available to PCTs, but can also be downloaded from the NHS Information Centre website (available at: <http://www.rightcare.nhs.uk/>).

An ***e-Guide*** to using the analysis tools described above is available on the Health Investment Network website. Using one PCT as a case study, the e-Guide gives detailed guidance on how to access and use the tools, and their various presentations, to build a picture of how health expenditure is applied.

The ***Commissioning to Maximise Value – Third Annual Population Value Review*** provides a contextual guide to the health investment process. It has been developed:

- to encourage commissioners to reflect on the pattern of spending they have created or inherited;
- to help commissioners facing demands for additional resources refer back to those working in the relevant programme budget, rather than transferring money from another programme budget.

The Commissioning to Maximise Value – Third Annual Population Value Review can be downloaded from the Right Care website, available at: <http://www.rightcare.nhs.uk/apvr>

# Methods

## Selecting the topics

In selecting which maps of variation to include in the NHS Atlas, the intention was to provide a selection across a range of specialties, and we considered it vital to engage with clinicians in the choice of topics. Therefore, we have consulted with the National Clinical Directors (NCDs), and various Department of Health teams, and also with some Public Health Observatories and specialist observatories to identify examples that they feel highlight unexpected levels of variation within their area of expertise. In some instances, the choices represent issues where there are existing policy initiatives designed to improve quality and increase value.

The maps included in the NHS Atlas tend to reflect the programme budgets for which there are NCDs. It is highly unlikely that the level of unwarranted variation is less in programme budgets that do not have an NCD.

Inevitably, we were unable to include every variation suggested, by reason of space, time, or the availability of data. However, it is our intention that the first iteration of the NHS Atlas represents only the start of a conversation between the NHS and the public about reducing unwarranted variations. Further updates to the NHS Atlas will be published as other data become available, and an online version of the NHS Atlas will be accessible via the Right Care website (<http://www.rightcare.nhs.uk>). The editors welcome suggestions for additions to the range of maps.

## Making modest estimates of variation

Professor Sir Michael Richards, the NCD for Cancer, has developed the heuristic of excluding the five highest and five lowest results when reviewing a range of data about quality and outcome. The reason for this is that in his experience there is often some artefact that explains why an “outlier” is an “outlier”, for example, failure to make an accurate return, or the accidental omission of part of the dataset.

We believe the data on which these maps are based are as accurate as possible, but to make allowance for the

possibility of artefacts, after stating the variation using data from all PCTs, we have then given the variation when the five PCTs with the highest results and the five PCTs with the lowest results have been excluded. When the map is by local authority boundary, after stating the variation using data from all local authorities, as there are more than double the number of PCTs, we have excluded the local authorities with the 10 highest results and the local authorities with the 10 lowest results. For the two maps by SHA boundary, as there are so few SHAs, we did not exclude any results.

## Order of appearance

The maps are presented in order of ICD classification, followed by some topics, such as diagnostic services or prescribing, that do not fall readily into a single programme budget category; there is no other significance in the order of appearance.

## Converting data to maps

The data for each of the indicators included in this report are displayed as both a chart and a map. London is consistently shown as an inset on the PCT and local authority maps because the detail for these small areas is otherwise lost.

The data within the maps are ranged thematic displays, which group the geographic areas into ranges and allow the reader to view and compare areas on the map without having to look at individual values of that area.

There are several methods available to group individual data into ranges. The method used in this analysis is quantiling. Quantiles build ranges (in this case five) that display the distribution of a variable. They were calculated by first ranking the data values from highest to lowest then splitting the values into five ranges (quintiles). Each quintile includes a range of values that is within each fifth of the cumulative total of all the values. The quintiles do not necessarily contain equal numbers. This is a more complex method than simply sorting the data and splitting geographic areas equally into five ranges and it better illustrates the distribution of



the particular indicator. The quintile ranges are shaded light blue (lowest value) to dark blue (highest value) on both the charts and maps. The ranges and their shading do not indicate whether a high or low value for an area represents either good or poor performance.

The charts have been originally produced in Microsoft Excel 2007 and the maps originally created using MapInfo Professional 10.0.

## Standardisation

Standardisation allows like to be compared with like, by making sure that differences in the number of events (e.g. deaths or infections) observed in two or more populations are not due to differences in the age and sex profile between the different populations. (For example, suppose population A has a higher death rate than population B. However, if population A also has a higher proportion of older people, then we would expect there to be more deaths and it would be misleading to infer that people are dying at a faster rate in population A than population B.) The two main methods of standardisation are directly standardised rates (DSRs) and indirectly standardised rates.

**Directly standardised rates** adjust for differences in age and sex distribution by applying the observed rates (e.g. of death or infection) for each age band in the study population to a standard population structure to obtain a weighted average rate.

**Indirectly standardised rates** adjust for the differences in age and sex distribution by applying the observed rates (e.g. of death or infection) for each age band in a standard population (e.g. England) to the population of the same age groups in the study area.

Definition available at: [http://www.lho.org.uk/LHO\\_Topics/Data/Methodology\\_and\\_Sources/AgeStandardisedRates.aspx](http://www.lho.org.uk/LHO_Topics/Data/Methodology_and_Sources/AgeStandardisedRates.aspx)

APHO technical briefing available at: <http://www.apho.org.uk/resource/item.aspx?RID=48457>

## Indicators weighted by “need”

There are three sources of information for the indicators that have been weighted by “need”: NHS comparators, programme budgeting, and hospital episode statistics (HES).

- For Maps 1 and 2, the source of information is NHS comparators
- For Maps 7 and 19, the source of information is programme budgeting
- For Map 22 the bar chart associated with Map 12 and bar charts 1 and 2 associated with Map 21, the source of information is HES
- For the bar chart associated with Map 20, the source of information is programme budgeting.

The programme budgeting indicators use weighted populations (specifically the Department of Health [DH] unified weighted population) in the rate. This is a PCT allocation population, so it is a raw population that has been adjusted by age and sex as well as ‘need’ variables that are specifically called Hospital & Community Health Services (HCHS) weighting. The HCHS is modelled (by Brunel University) under five services for acute, mental health, maternity, and HIV care. They include variables such as Disability Living Allowance (DLA), income deprivation, and distance to service. The method effectively weights up or down the raw population for every PCT, so the rate goes up or down depending on modelled “need” to each PCT.

In the HES and NHS comparator indicators, the “need” element of the standardisation uses the Person Based Resource Allocation (PBRA) methodology from the DH that adjusts the denominator population for “need” variables including deprivation. Using methods by various organisations including Plymouth University and the Nuffield Trust, it is essentially the same as the method used in the HCHS method for need as explained for the programme budgeting indicators.

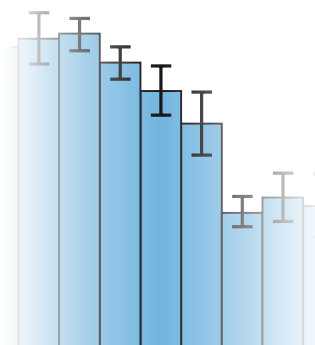
## Confidence intervals

Some of the indicators are expressed with confidence intervals to give an indication of the level of uncertainty of the calculation: the smaller the confidence interval, the more reliable the indicator.

Ideally, the measurement of a variable such as a good outcome should be measured by assessing the whole population of patients that has received a particular intervention. However, this is not always possible. Therefore, research and audit are often based on the study of a sample of the population. Even when the sample is selected randomly, there is a probability that the results for the sample will not reflect the results that would have been obtained had the whole population of patients been investigated. When 95% confidence intervals are provided on a bar chart (shown as a vertical line with a short horizontal line at each end, see Figure 4), it means that there is a 95% probability that the true measure lies within the range shown, and a 5%

probability that the true measure lies outside the range of values shown.

**FIGURE 4**

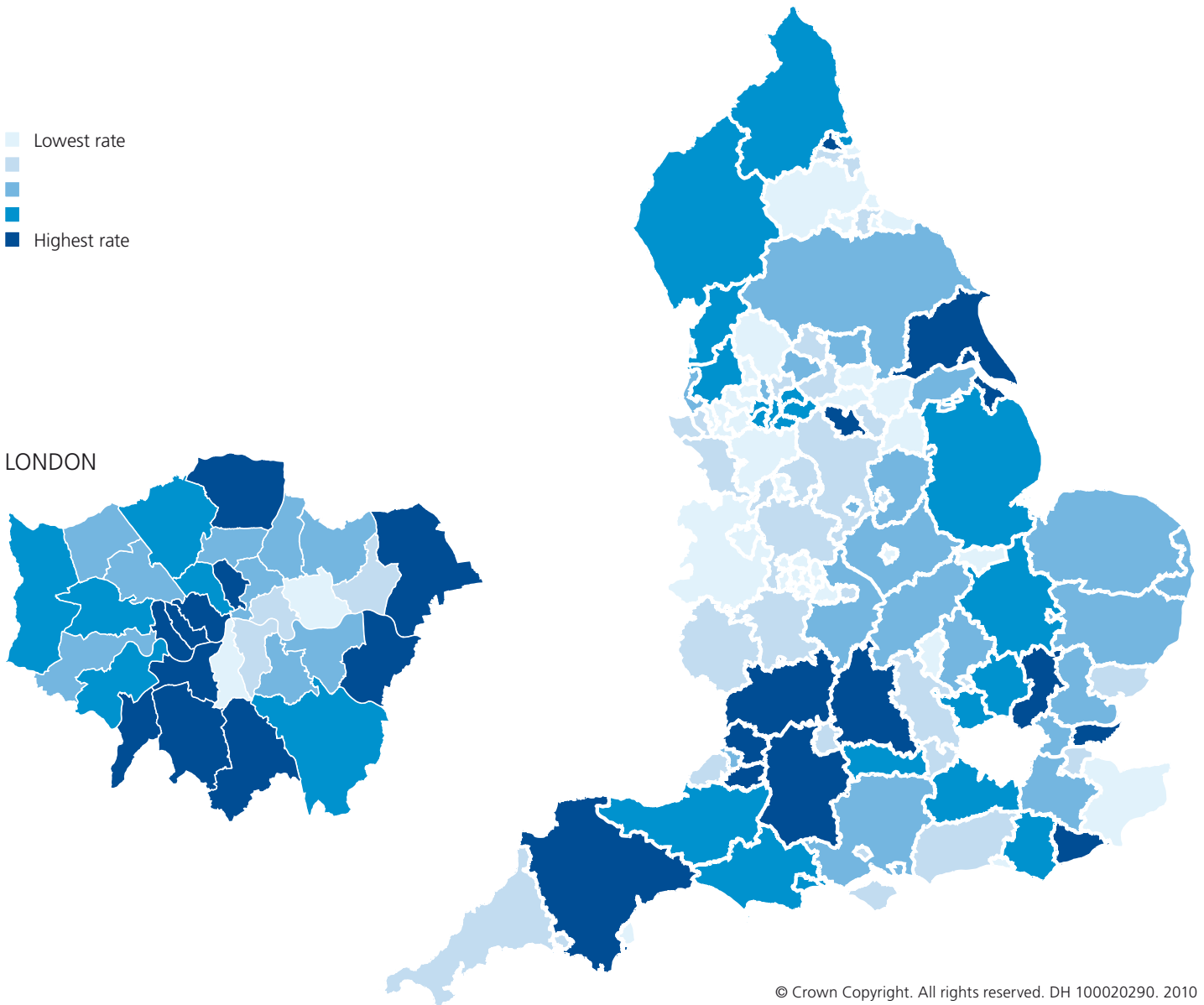


**Further information on the methods, including the metadata for the maps, can be found on the Right Care website, available at:**  
<http://www.rightcare.nhs.uk>

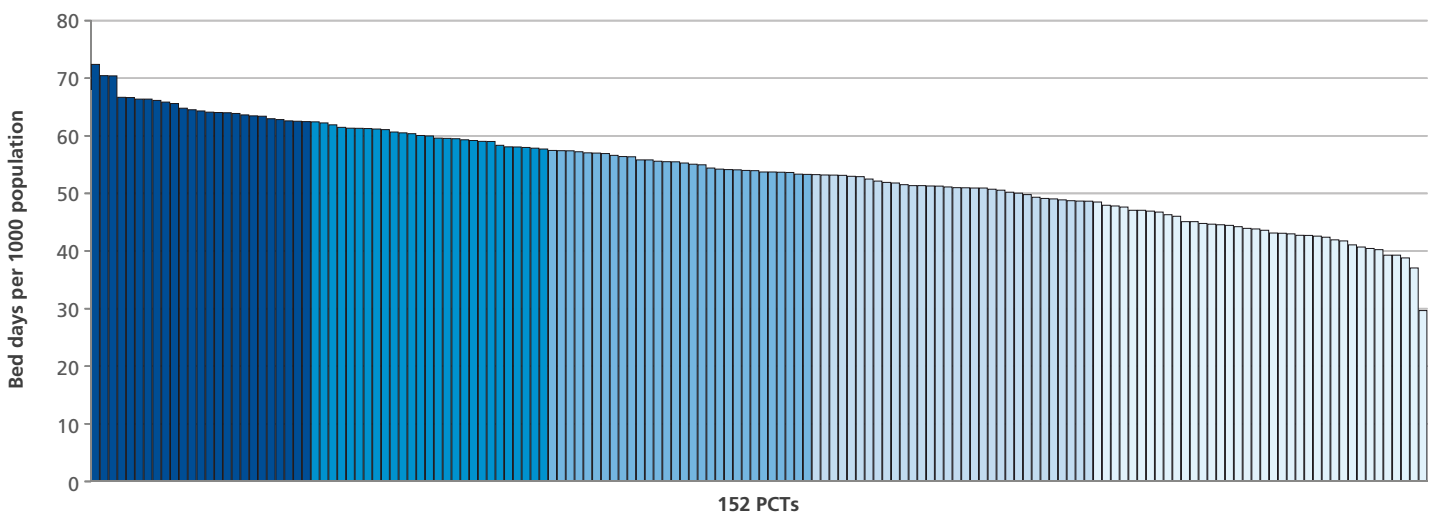
CANCERS AND TUMOURS

# Map 1: Number of cancer bed-days per 1000 population by PCT

Weighted by age, sex, and need; Q4 2008/09–Q3 2009/10



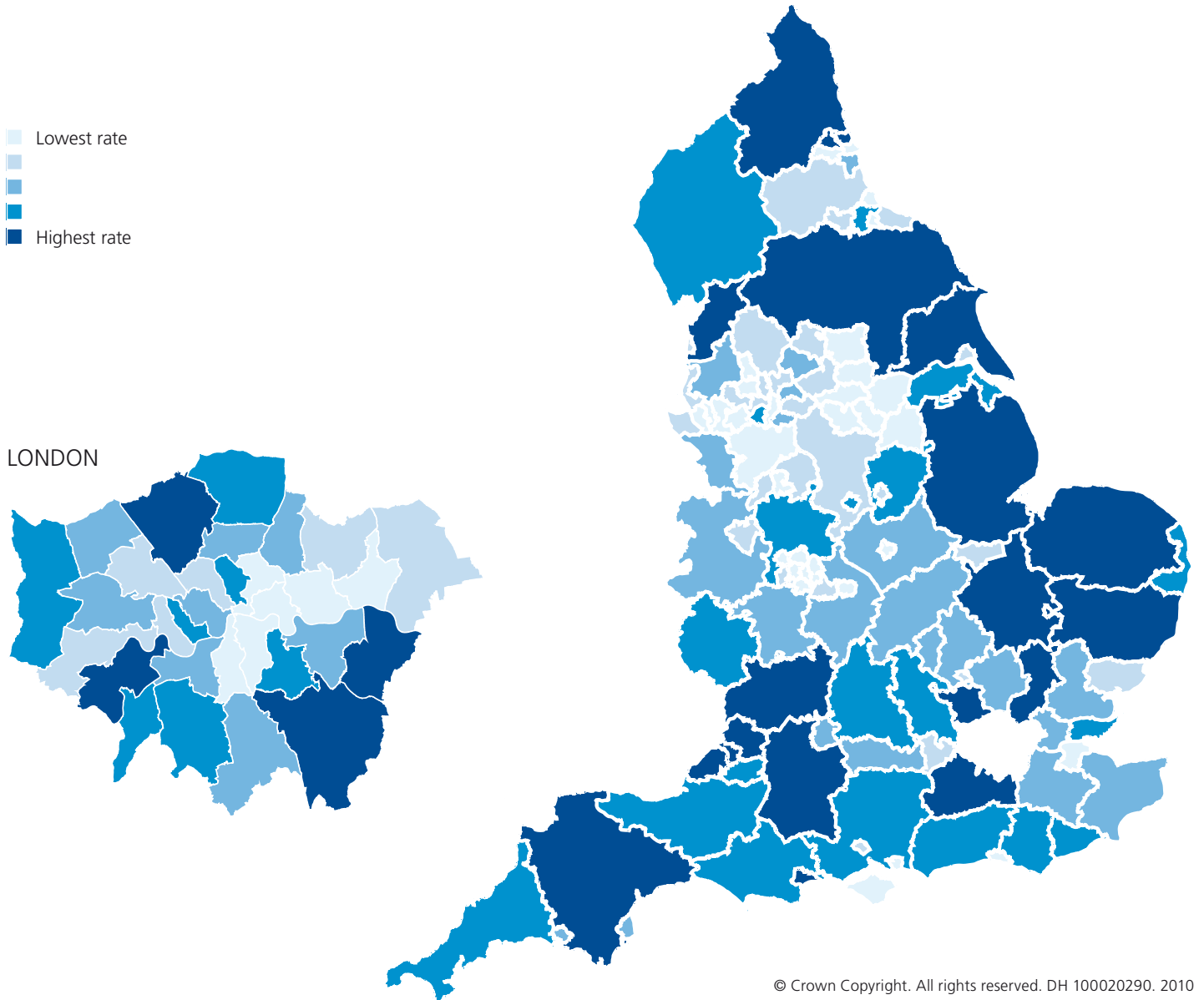
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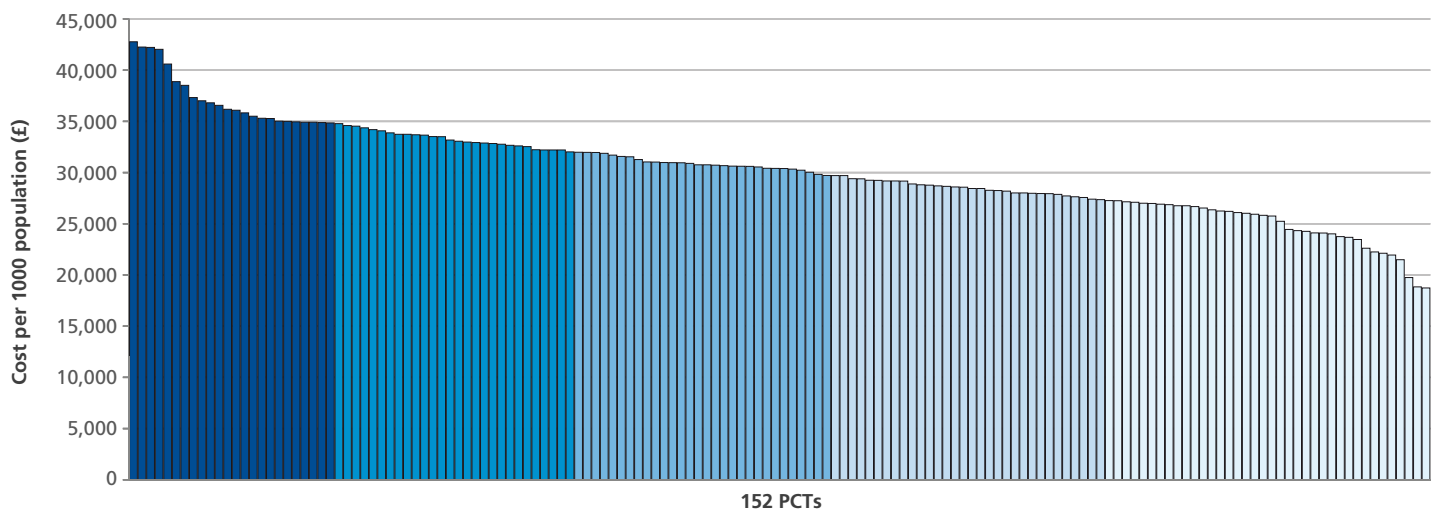
### CANCERS AND TUMOURS

## Map 2: Cancer inpatient expenditure per 1000 population by PCT

Weighted by age, sex, and need; Q4 2008/09–Q3 2009/10



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## Context

Inpatient stays are the single largest component for cancer expenditure, accounting for almost half of the total cancer budget. Inpatient stays, as measured by the number of bed-days, vary widely across the country. These variations cannot be explained by differences in the incidence of cancer.

## Magnitude of variation

Wide variations in bed utilisation are observed among primary care trusts (PCTs) for both elective and emergency admissions.

There is a twofold variation in the number of cancer bed-days per 1000 population. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation ranges from 40 bed-days per 1000 population to 65 bed-days per 1000 population.

Similarly, there is a greater than twofold variation in cancer inpatient expenditure per 1000 population. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation ranges from about £22,000 per 1000 population to about £38,000 per 1000 population.

## Options for action

There is major scope for reducing elective bed utilisation by:

- increased use of day-case and 23-hour admissions;
- implementing enhanced recovery programmes (also known as fast track surgery), some elements of which are similar to integrated care pathways (see “Resources” below)

The aims of an enhanced recovery programme are:

- To improve patient outcomes;
- To speed up a patient’s recovery after surgery.

The focus of an enhanced recovery programme is to ensure that patients are active participants in the recovery process.

The four elements that comprise an enhanced recovery programme are:

- Pre-operative assessment, planning, and preparation before admission;
- Reducing the physical stress of the operation;
- A structured approach to immediate post-operative and peri-operative management, including pain relief;
- Early mobilisation.

Practical management of an enhanced recovery programme is supported by:

- Staff training, and learning;
- Improved processes and room layout;
- Procedure-specific care plans.

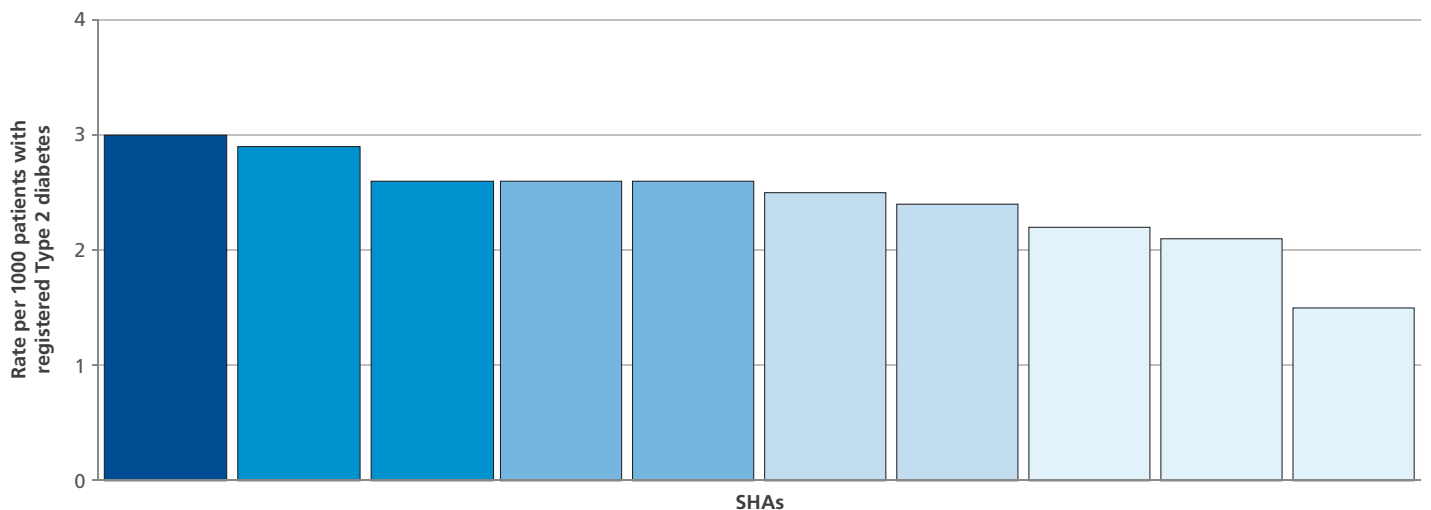
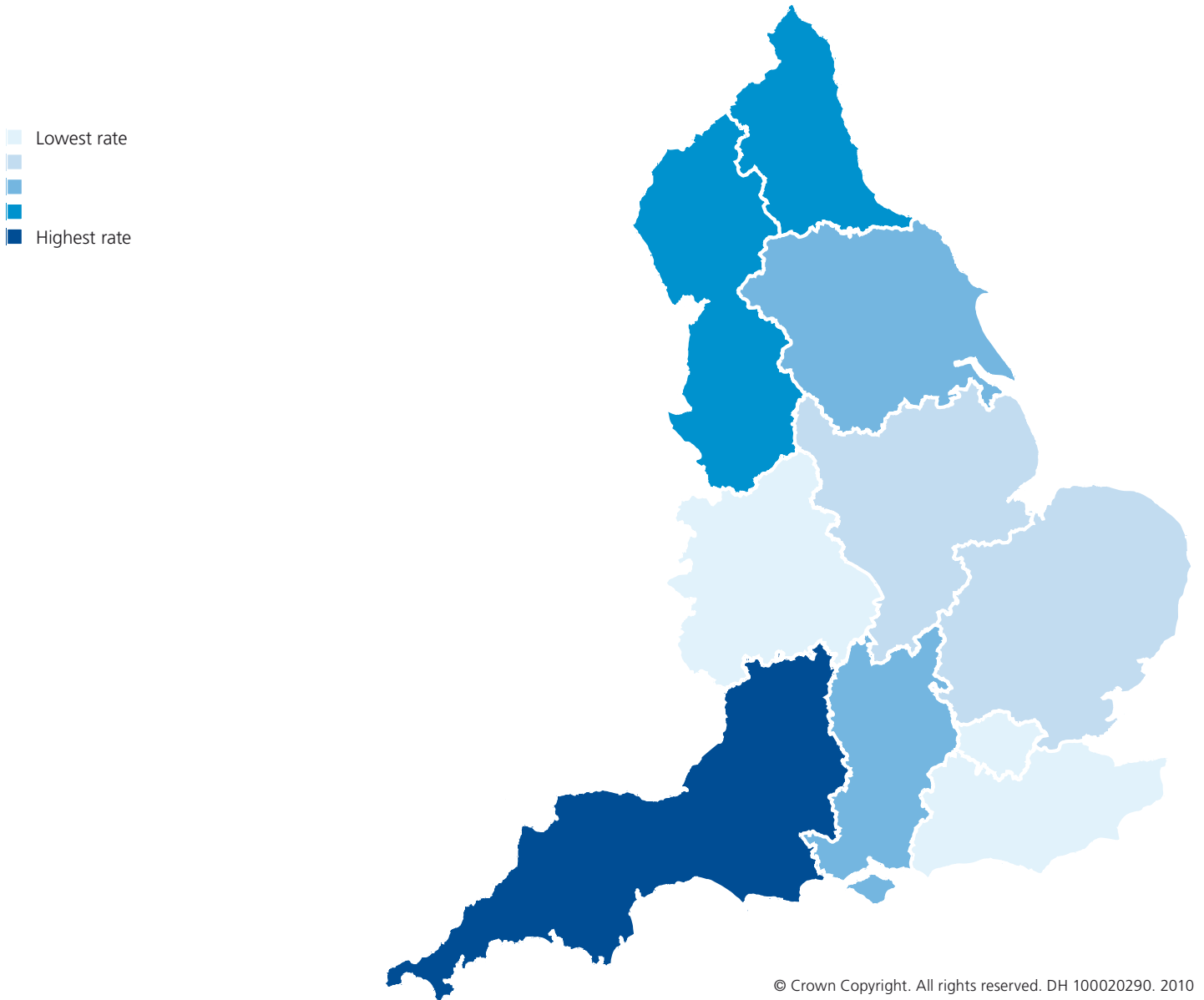
Emergency admissions can often be avoided by increased use of ambulatory care services. Lengths of stay can also be reduced.

## RESOURCES

- To guide the commissioning of services for people with cancer, NICE has published Cancer Service Guidance, available at: <http://guidance.org.uk/CSG>
- To provide comparative information to drive improvements in cancer commissioning, the National Cancer Action Team (NCAT) and the National Cancer Intelligence Network (NCIN) have produced an online resource, the Cancer Commissioning Toolkit, available at: <http://www.cancertoolkit.co.uk>
- Further information about Enhanced Recovery Programme is available at: [http://www.institute.nhs.uk/quality\\_and\\_service\\_improvement\\_tools/quality\\_and\\_service\\_improvement\\_tools/enhanced\\_recovery\\_programme.html](http://www.institute.nhs.uk/quality_and_service_improvement_tools/quality_and_service_improvement_tools/enhanced_recovery_programme.html)
- The Association of Public Health Observatories (APHO) has developed a disease prevalence model that commissioners can use to estimate the prevalence of cancer, available at: <http://www.apho.org.uk/resource/view.aspx?RID=48308>

**ENDOCRINE, NUTRITIONAL AND METABOLIC PROBLEMS**

Map 3: Incidence of major amputations in a five-year period (2004/05-2008/09) per 1000 patients with registered Type 2 diabetes in 2008/09 by SHA



## Context

Diabetes is a common multisystem disorder characterised by a raised blood glucose level; 90% of people with diabetes have Type 2. In 2010, 3.1 million adults in England have diabetes (diagnosed and undiagnosed), which is 7.4% of the adult population. In 2030, it is estimated that there will be 4.6 million adults with the disorder, which would be about 9.5% of the population.

Diabetes affects every system in the body, and the complications of diabetes include heart attack, stroke, high blood pressure, blindness, kidney failure, gangrene, and amputations.

There are over 70 amputations a week, of which 80% are potentially preventable. Despite this, in 2007/08, nearly a quarter (23%) of people with diabetes did not have a foot check. The number of amputations in people with Type 2 diabetes is rising.

## Magnitude of variation

There is a twofold variation among strategic health authorities (SHAs) in the incidence of major amputations per 1000 patients with registered Type 2 diabetes.

## Options for action

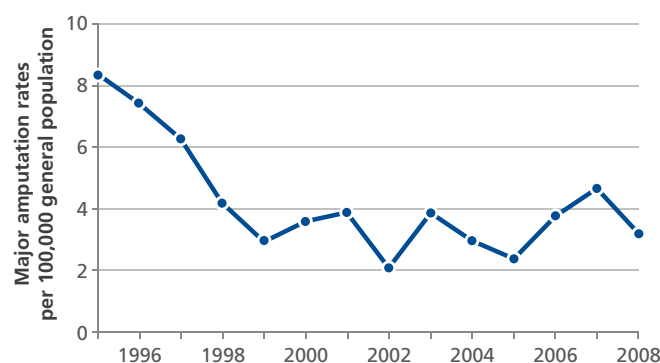
To reduce major amputations, establish integrated multi-disciplinary specialist diabetes foot teams (MDT). With the establishment of MDTs, some English centres have been able to reduce amputation rates substantially (see Table and Figure below). NB: The rates used for the bar chart accompanying the map, in the table, and in the figure are all different.

### RESOURCES

- NHS Diabetes has produced a commissioning resource, entitled "Commissioning Diabetes Without Walls" together with 13 separate commissioning guides, available at: [http://www.diabetes.nhs.uk/commissioning\\_resource/](http://www.diabetes.nhs.uk/commissioning_resource/)
- NHS Diabetes will also be publishing cost-benefit analyses.
- The National Diabetes Information Service includes the National Diabetes Audit (1.6 million patients), hospital audit, APHO prevalence data (see below), prescribing, and Diabetes Community Health Profiles, available at: <http://ndis.ic.nhs.uk/pages/index.aspx>
- The Association of Public Health Observatories (APHO) has developed a disease prevalence model that commissioners can use to estimate the prevalence of diabetes, available at: <http://www.apho.org.uk/resource/view.aspx?RID=48308>

Centre	Major amputations per 10,000 people with diabetes		
	Length of time MDT in operation (years)	Rate prior to establishment of MDT	Rate after MDT in operation for specified length of time
Ipswich – see Figure	11	36.4	6.7
Torbay	3	31.5	10.2

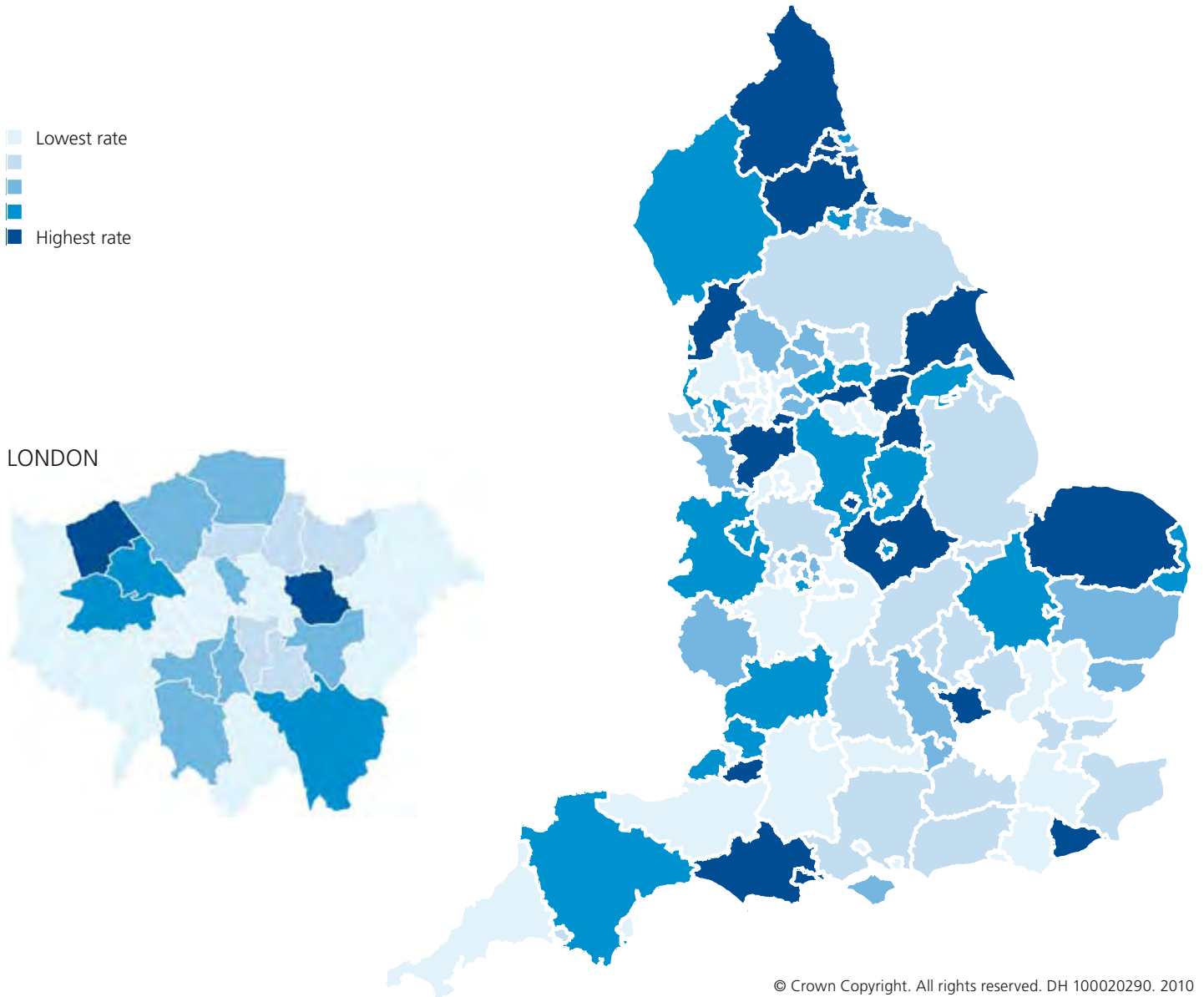
Ipswich major amputation rates 1995–2008



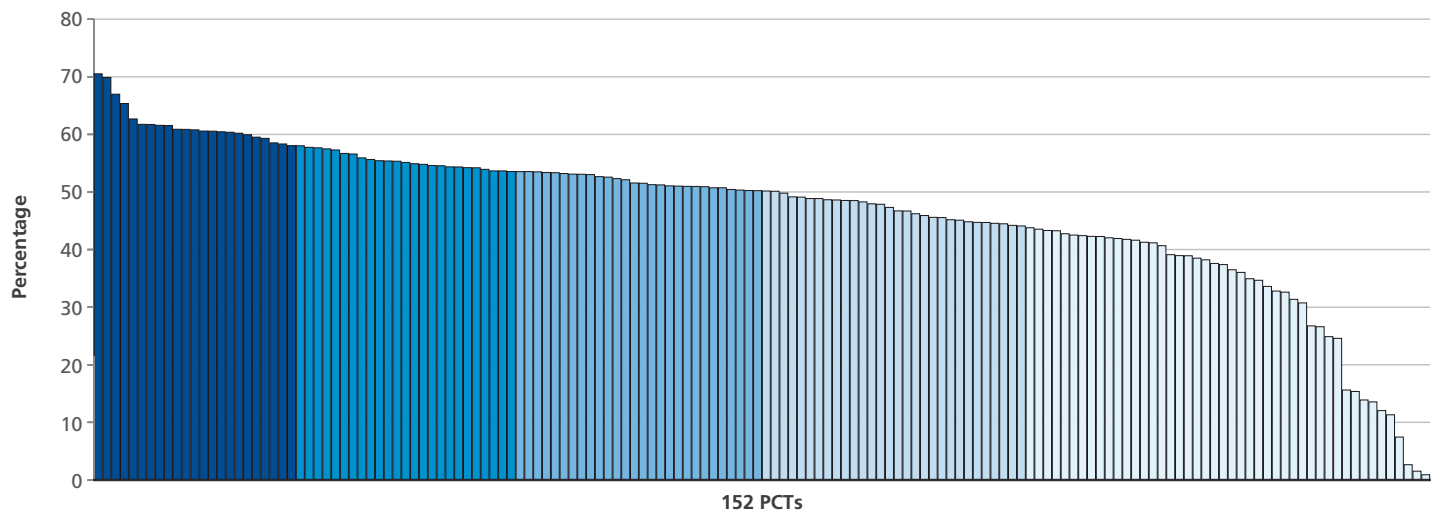
ENDOCRINE, NUTRITIONAL AND METABOLIC PROBLEMS

# Map 4: Percentage of people with diabetes receiving nine key care processes by PCT

2008/09



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## Context

The National Service Framework for Diabetes (see “Resources”) sets out the framework for developing services, and improving outcomes, for people with diabetes.

The National Institute for Health and Clinical Excellence (NICE) has recommend nine key care processes for people with diabetes, which include weight, blood pressure, blood glucose, blood cholesterol, urine, and foot checks. For people with diabetes, the results from these key checks are vital in managing and monitoring their condition.

Evidence-based treatment of these risk factors reduces the development of complications, and the early identification of complications allows treatment to slow progression to heart disease, stroke, and blindness. It has been estimated that 11.6% of deaths in people aged 20–79 years in England are attributable to diabetes, with a range among PCTs of 9.3–17.1%.

The National Diabetes Information Service (see “Resources” Map 3) includes the National Diabetes Audit (NDA), and 2008/09 was the sixth year in which it was conducted. The adult audit included 1,620,278 individual patient records, which is 74.9% of the 2.2 million people with diagnosed diabetes.

Thus, in 2008/09, the NDA showed that only 50.8% of people with Type 2 diabetes, and 32.2% of those with Type 1 diabetes, had received all nine key care processes. Measuring urine albumin creatinine ratio (UACR), which detects the earliest stage of kidney disease and is particularly important as kidney failure is increasing in people with diabetes, is still the lowest rate care process at 68.1% in those with Type 2 diabetes and at 51.3% in those with Type 1 diabetes. Blood pressure measurement remains the most frequently recorded process at 96.5% in people with Type 2 diabetes, and at 88.8% in those with Type 1 diabetes.

Although the audit results for adults with diabetes are the focus of this map, the national audit of children with diabetes also shows a variation in the extent to which children receive the nine key care processes. In 2008/09, despite the fact that 90% of children and young people had a record of HbA1c, only 5% of those aged over 12 years had all nine key care processes recorded.

## Magnitude of variation

There is a 35-fold variation in the percentage of people with diabetes receiving nine key care processes. When the five PCTs with the highest percentages and the five PCTs with the lowest percentages are excluded, a fivefold variation remains.

More needs to be done to ensure that everyone with diabetes receives all the recommended annual checks to help manage their condition, and reduce the risk of developing serious complications.

## Options for action

The actions that need to be taken to reduce this variation are listed in the Primary Care Quality and Outcomes Framework (QOF).

In addition, the complications of diabetes can be prevented by healthy eating, regular exercise, and not smoking.

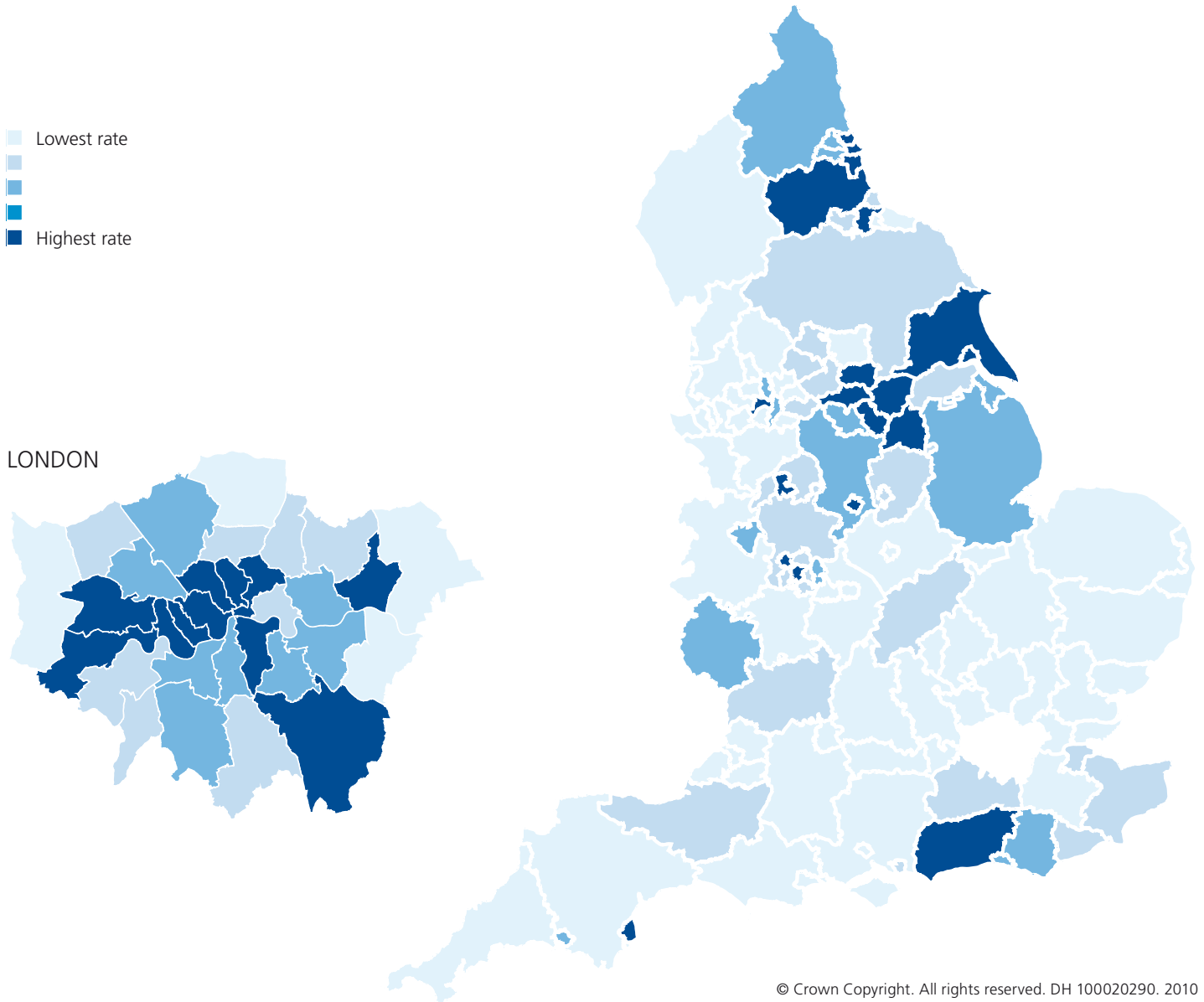
## RESOURCES

- › The National Service Framework for Diabetes has two parts:  
National service framework for diabetes: standards (2001), available at: [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4002951](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4002951)  
National Service Framework for Diabetes: Delivery Strategy (2003), available at: [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4003246](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4003246)
- › NHS Diabetes has produced a commissioning resource (includes “Commissioning Diabetes Without Walls”, and 13 separate commissioning guides), available at: [http://www.diabetes.nhs.uk/commissioning\\_resource/](http://www.diabetes.nhs.uk/commissioning_resource/)
- › NICE has produced extensive clinical guidance (CG) on the care of patients with diabetes, e.g. CG15, CG87, available at: <http://guidance.nice.org.uk/Topic?EndocrineNutritionalMetabolic>
- › Ensuring that patients have access to information and education helps to remind them to attend for tests, and encourages concordance with treatment. The free patient information booklet entitled “Diabetes care and You” produced by Diabetes UK is available at: <https://www.diabetes.org.uk/OnlineShop/New-to-Diabetes/What-diabetes-care-to-expect/>

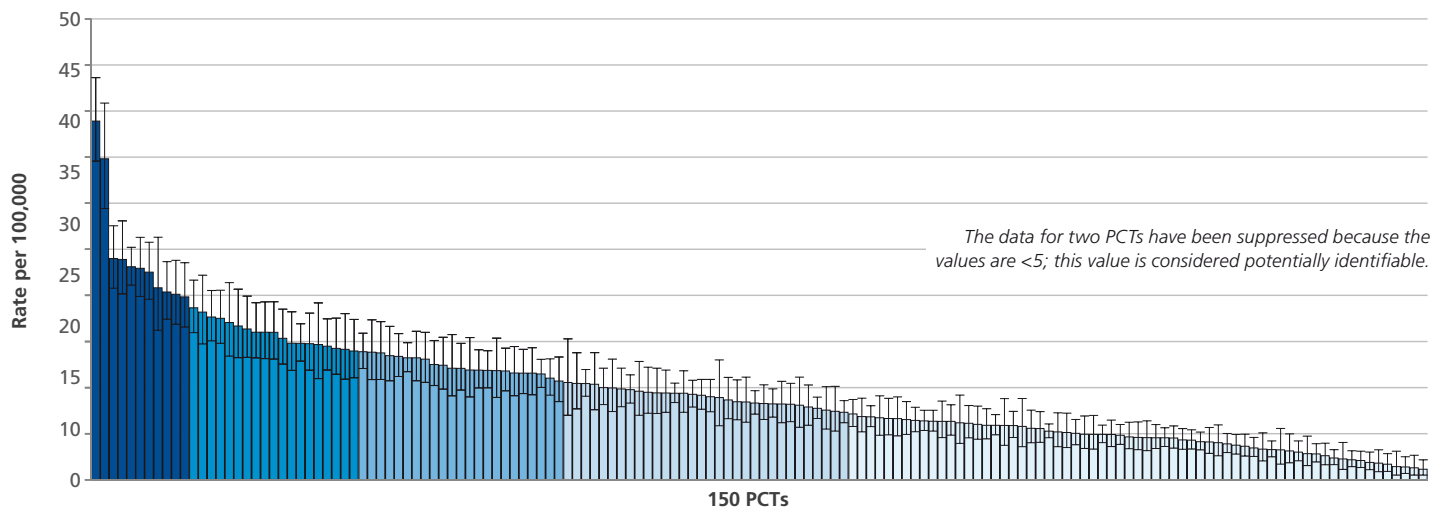
ENDOCRINE, NUTRITIONAL AND METABOLIC PROBLEMS

Map 5: Directly standardised rate of bariatric procedures in hospital per 100,000 population by PCT

2007/08–2009/10



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## Context

“Bariatric surgery” is a generic term used to define a group of procedures that are performed to facilitate weight loss. The three most commonly performed bariatric surgery procedures in the UK are:

- › adjustable gastric banding;
- › gastric bypass;
- › sleeve gastrectomy.

The number of NHS-commissioned bariatric surgery procedures in England has been increasing rapidly in recent years, although levels of activity vary widely among geographical areas.

## Magnitude of variation

There is a 38-fold variation in the rate of bariatric procedures in hospital: from 1.1 per 100,000 population to 38.9 per 100,000 population. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation is still large at 12-fold.

The potential reasons for variation include:

- › Access to/provision of bariatric surgery – as it is a relatively recent development, it may be that areas where rates are lowest do not have access to, or have not introduced, the surgery as a routine form of intervention.
- › Deprivation, the highest rates are in areas within or adjacent to the most deprived areas.

Obesity prevalence may also be one reason for some of the variation, but at present it is not possible to compare rates of admission for bariatric surgery with obesity prevalence by PCT because these data are not available (modelled estimates are based on national rates and therefore may not be representative).

In addition, lack of data on activity in the private sector can make it difficult to interpret variations.

## Options for action

In the National Institute for Health and Clinical Excellence (NICE) clinical guideline, CG43, bariatric surgery is recommended as a treatment option for people with morbid obesity, or who have a lower body mass index (BMI) coupled with other significant disease.

However, bariatric surgery should be offered *only* when all appropriate non-surgical measures have been unsuccessful, except in adults with a BMI of  $>50 \text{ kg/m}^2$ , who may be offered surgery as a first-line treatment option, and which should be part of a comprehensive package of obesity services provided by a multidisciplinary team.

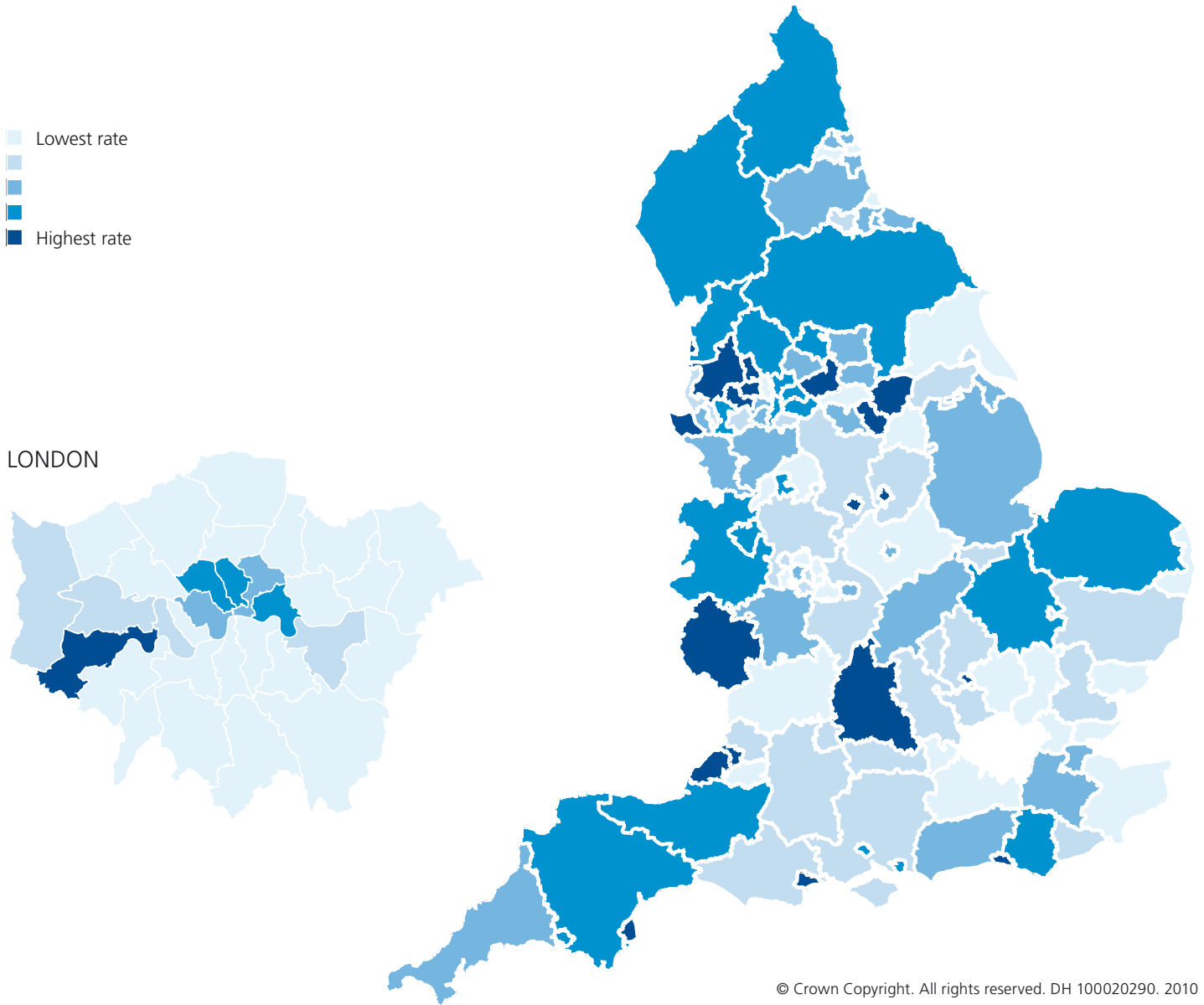
## RESOURCES

- › NICE clinical guideline 43, “Obesity: guidance on the prevention, identification, assessment and management of overweight and obesity in adults and children”, available at: <http://www.nice.org.uk/nicemedia/live/11000/30365/30365.pdf>
- › The National Obesity Observatory was established as a single point of reference for information on data and evidence related to obesity, overweight, underweight, and their determinants, available at: <http://www.noo.org.uk/>

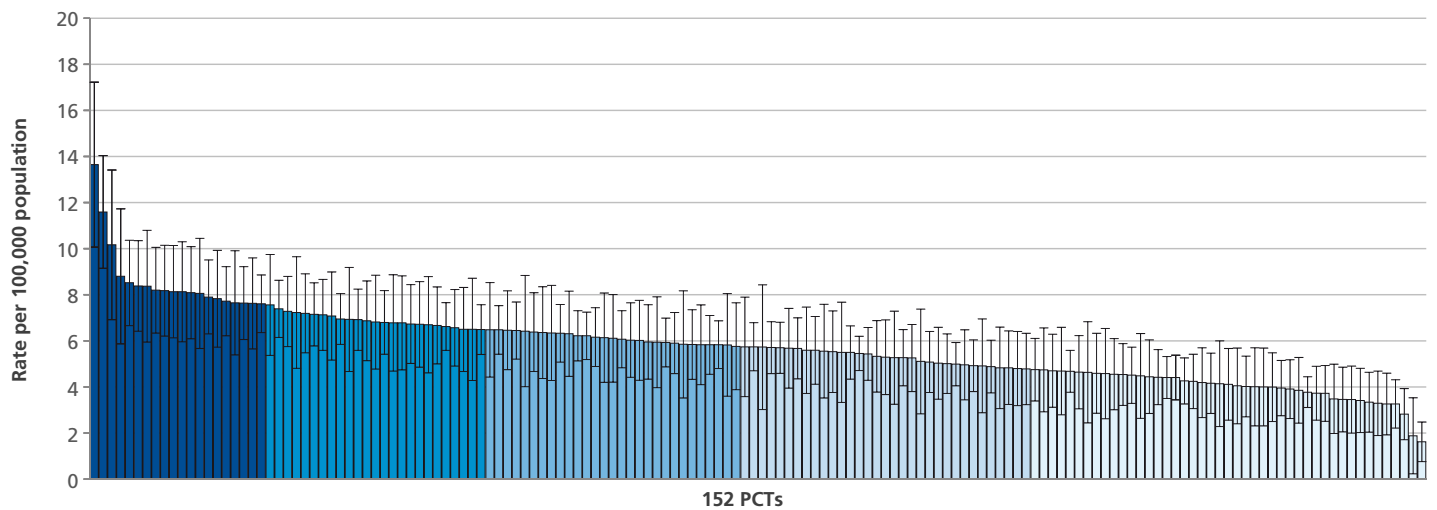
### MENTAL DISORDERS

## Map 6: Directly standardised rate of suicide mortality per 100,000 population by PCT

2006–2008



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## Context

About 5000 people a year in England take their own lives. Suicide is more common in high-risk groups such as young adult men, with suicide being the most common cause of death in men under the age of 35 years. Risk is also elevated in particular groups such as people with severe mental illness (a 12-fold increased risk), people who have a history of deliberate self-harm (30-fold increased risk), and people in prison (a 20-fold increased risk for women in prison).

In the White Paper *Saving Lives: Our Healthier Nation*,<sup>1</sup> there was a target to reduce the death rate from suicide by at least 20% by the year 2010 (from a 1997 baseline rate). The National Suicide Prevention Strategy for England<sup>2</sup> was published in September 2002 with the aim of supporting the White Paper target. Since 1969, there has been a decline in age-standardised death rates from suicide, and particularly since the publication of the National Suicide Prevention Strategy.

The mortality rate from suicide is an important measure of mental well-being and mental ill-health in any given population. However, it should not be used as the sole measure of the effectiveness of local mental health services because mental well-being is affected by a wide range of factors, of which the provision of health and social care services is only one. Risk factors for suicide include being male, living alone, unemployment, alcohol or drug misuse, and mental illness.

Although suicide, like many other conditions, is a problem that has contributory social factors that are not amenable to healthcare interventions, the quality of healthcare services offered to a population is a factor in the rate of suicide.

At present, there are no appropriate quality indicators available to create a population-based map of suicide prevention services.

## Magnitude of the variation

The suicide mortality rate varies by geographical area and social class. There is about a sevenfold variation in suicide mortality per 100,000 population among PCTs. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation is twofold.

## Options for action

In order to tackle any variation in mortality from suicide, it is vital to understand the needs and the living and working conditions of the population concerned.

### RESOURCES

- › National Confidential Inquiry into Suicide and Homicide by People with Mental Illness (NCI/NCISH)  
<http://www.medicine.manchester.ac.uk/psychiatry/research/suicide/prevention/nci/>
- › Safety First: Five-year report of the National Confidential Inquiry into Suicide and Homicide by People with Mental Illness. Available at:  
[http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4006679](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4006679)

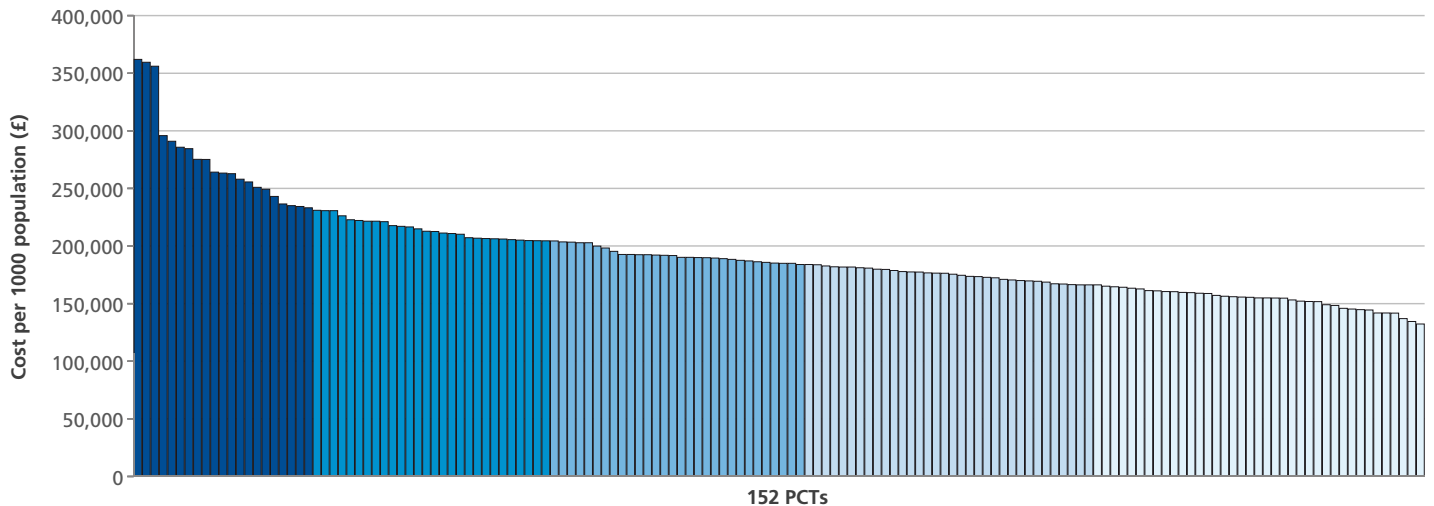
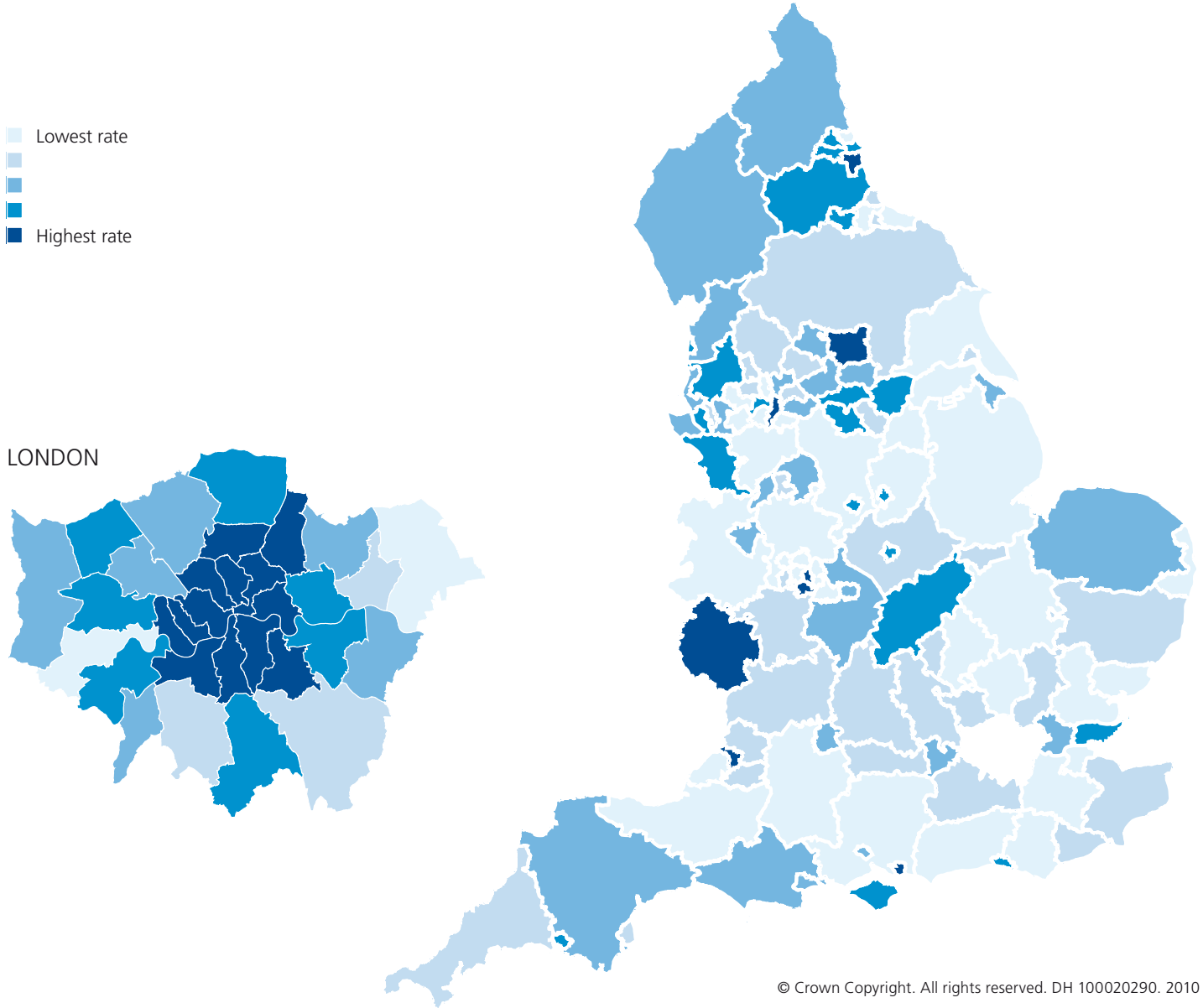
<sup>1</sup> Department of Health. *Saving Lives: Our Healthier Nation*. London: 1999.

<sup>2</sup> Department of Health. *National Suicide Prevention Strategy for England*. London: Department of Health, 2002.

### MENTAL DISORDERS

## Map 7: Mental health expenditure per 1000 population by PCT

Weighted by age, sex, and need 2008/09



## Context

Historically, expenditure on specialised mental health services has predominantly been based on patterns of previous expenditure, and not on the assessed needs of the population.

Mental health expenditure per 1000 weighted population includes all NHS expenditure on secondary and tertiary mental health services (including specialised care for dementia), for all ages including children and older people. It also includes expenditure on drugs prescribed by GPs for mental health problems. It does *not* include expenditure on mental health services in primary care, and social care.

Expenditure on mental health services represents the highest level of spend of any programme budget for every PCT in England.

## Magnitude of variation

The variation in mental health expenditure per 1000 population is over 2.5-fold. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation in expenditure is twofold, ranging from about £140,000 to about £280,000 per 1000 population.

Some of this variation is due to the variation in the number of bed-days among PCTs, part of which reflects a reliance on providing rehabilitation and recovery services through inpatient stays. Inpatient care is also a vital component of the care pathway for some mental health problems, e.g. people with an acute relapse of a psychotic illness such as schizophrenia.

## Options for action

- To tackle any unwarranted variation in expenditure on specialised mental health services, undertake a careful mental health needs assessment across all ages in the community.
- Variation in the number of bed-days can indicate a need to investigate the appropriateness of care received by some patients.
- Community mental health services such as the crisis resolution and home treatment (CRHT) teams can reduce the number of bed-days, and make a significant contribution to reducing reliance on

inpatient stays as a way of treating some patients with mental health problems. The National Audit Office (NAO) found that introduction of CRHT teams contributes to reduced pressure on beds, treats some people who would otherwise have been admitted to hospital, and supports earlier discharge in up to 40% of the patient sample investigated.<sup>1</sup>

## RESOURCES

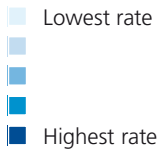
- The national psychiatric morbidity survey programme provides information about the prevalence of relevant disorders. <http://www.statistics.gov.uk/statbase/Product/asp?vlnk=8258&More=N>
- A Brief (Number 4) outlining a method by which the findings of the national psychiatric morbidity survey can be applied locally, *Estimating the Prevalence of Common Mental Health Problems*, is available at: [http://www.nepho.org.uk/uploads/doc338\\_52\\_Brief%2004.pdf](http://www.nepho.org.uk/uploads/doc338_52_Brief%2004.pdf) This Brief is accompanied by an Excel spreadsheet setting out the results of the analysis for PCTs and local authorities in England: *Estimating the Prevalence of Common Mental Health Problems Additional Data* <http://www.nepho.org.uk/mho/Needs>
- A Brief (Number 3) outlining a method by which the numbers of people with dementia can be predicted from population projections, *Estimating Future Numbers of Dementia*, is available at: [http://www.nepho.org.uk/uploads/doc339\\_52\\_Brief%2003.pdf](http://www.nepho.org.uk/uploads/doc339_52_Brief%2003.pdf) This Brief is accompanied by an Excel spreadsheet setting out tables providing projected numbers of sufferers for PCTs and local authorities in England 2008-2025: *Estimating the Future Numbers of Dementia Additional Data* <http://www.nepho.org.uk/mho/Needs>
- The Audit Commission's briefing about improving the efficiency of the adult mental health acute care pathway, *Maximising resources in adult mental health* (June 2010), is available at: <http://www.audit-commission.gov.uk/nationalstudies/health/financialmanagement/Pages/100623maximisingresources.aspx>
- The Audit Commission mental health benchmarking club provides benchmarking data to inform service planning, allowing mental health trusts to investigate:
  - Spend – variations and trends in spend per head of population, and variations in health versus local government spend;
  - Economy – whether value for money is being achieved in the inputs to services;
  - Efficiency – whether efficient use is being made of inputs to services.<http://www.audit-commission.gov.uk/health/trustpractice/ourservices/mentalhealthtrusts/pages/benchmarkingclub.aspx>

<sup>1</sup> National Audit Office. Helping people through mental health crisis: the role of crisis resolution and home treatment services. London: National Audit Office, 2007.

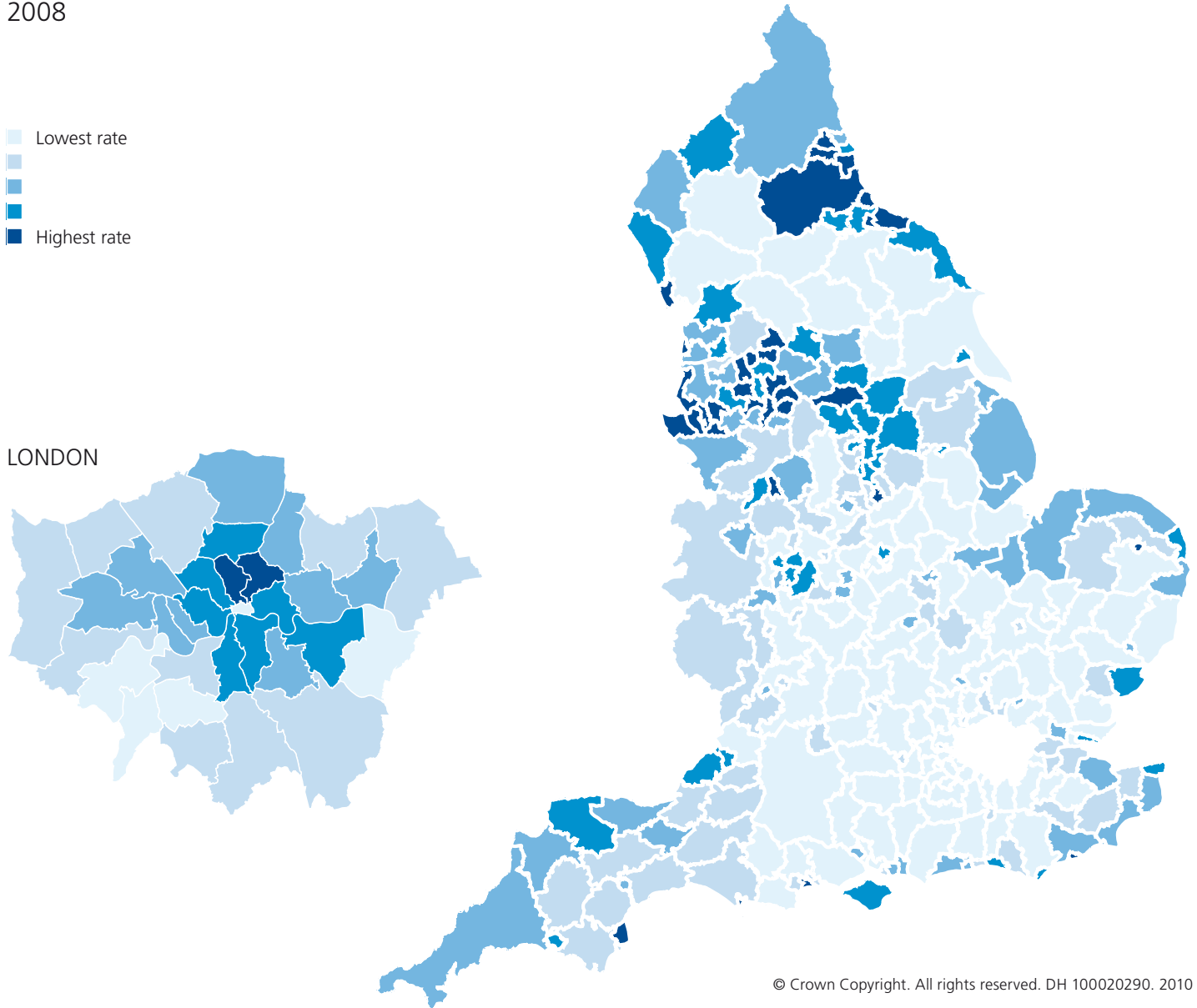
**MENTAL DISORDERS**

Map 8: Claimants of Incapacity Benefit/Severe Disablement Allowance with mental or behavioural disorders per 1000 working-age population by local authority

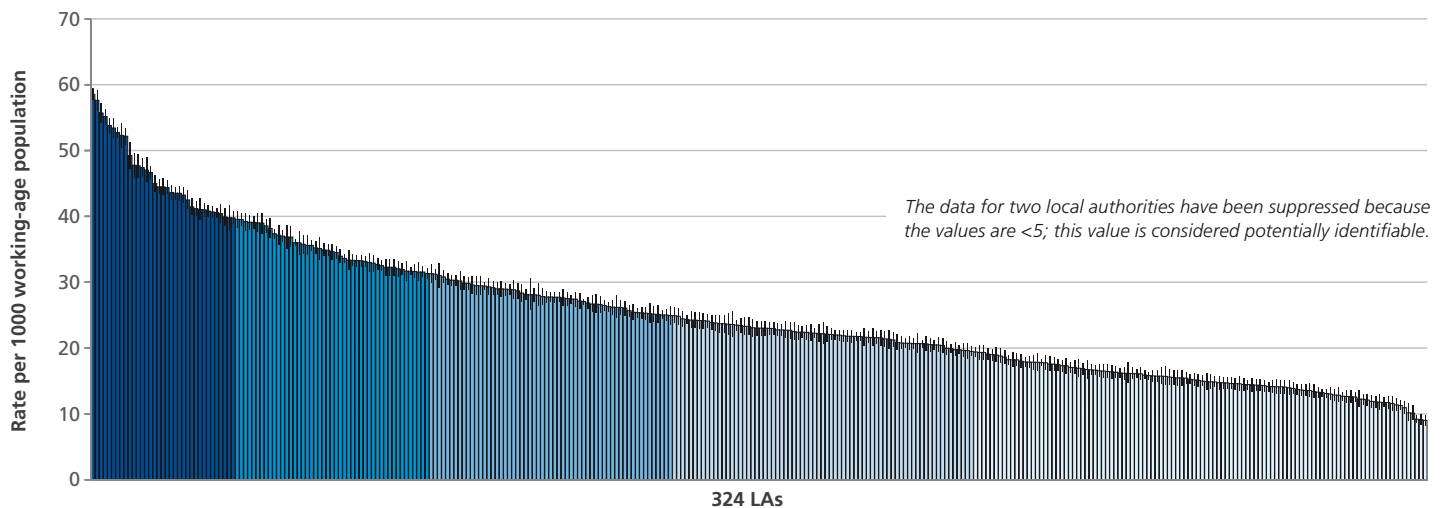
2008



LONDON



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## Context

In England, mental illness is the principal reason for Incapacity Benefit payment: about 44% of the 2.6 million people currently on long-term health-related benefits have a mental or behavioural disorder as their primary condition.<sup>1</sup> The Department for Work and Pensions has estimated that there are one million people receiving Incapacity Benefit for mental health problems, only 100,000 of whom have a severe and enduring mental illness. This means that there are 900,000 people receiving benefits who are suffering from common, potentially treatable problems such as unipolar depression and anxiety.

Mental ill-health is the single largest cause of disability-adjusted life-years (DALYs) in England. One DALY is one lost year of healthy life and the burden of disease as a measure of the gap between current health status and an ideal situation where everyone lives into old age free from disease and disability.<sup>2</sup>

The World Health Organization (WHO) estimated that in 2004 in the UK out of a total of 7.72 million DALYs, 2.06 million were the result of neuropsychiatric conditions, that is, 26.7% of the total.<sup>3</sup> Once neurological disorders including epilepsy, Parkinson's disease, multiple sclerosis, insomnia, and migraine have been excluded and self-inflicted injury included, 22.8% of the burden of disease is due to mental disorder.<sup>4</sup> In comparison, cardiovascular disease represents 16.2% of the burden, and malignant neoplasms 15.9%.

The mental disorders with the highest score were:

- Unipolar depressive disorders (558,000 DALYs, or 7.2% of the total);
- Alcohol use disorders (355,000 DALYs, or 4.3% of the total);
- Alzheimer's and other dementias (303,000 DALYs, or 3.9% of the total);
- Drug use disorders (156,000 DALYs, or 2.0% of the total).

There is an increasing need to address population mental health and well-being for three main reasons:

1. the clinical or health-related consequences of mental ill-health for the individuals concerned;
2. the distinct benefits of mental well-being in addition to the absence of mental illness;
3. the economic consequences of ill-health not only for the individual, but also for the community, and the national economy; the most recent estimate of the wider cost of mental illness in England is 105.2 billion per year.<sup>4</sup>

## Magnitude of variation

There is an almost sixfold variation among local authorities in England in claimants of Incapacity Benefit/Severe Disablement Allowance with mental or behavioural disorders per 1000 working population. When the 10 local authorities with the highest rates and the 10 local authorities with the lowest rates are excluded, a fourfold variation remains.

## Options for action

Better diagnosis and treatment, together with interventions across healthcare services and local government to improve population mental well-being, will help to improve the mental well-being of the local population and prevent mental ill-health, particularly for higher risk groups such as families in lower socio-economic groups, and families where there are dependent children.

1 Department of Work and Pensions (DWP). First release. DWP Quarterly Statistical Summary 17 February 2010.

2 Lopez, A. D. et al. Global Burden of Disease & Risk Factors. New York: World Bank and Oxford University Press, 2006.

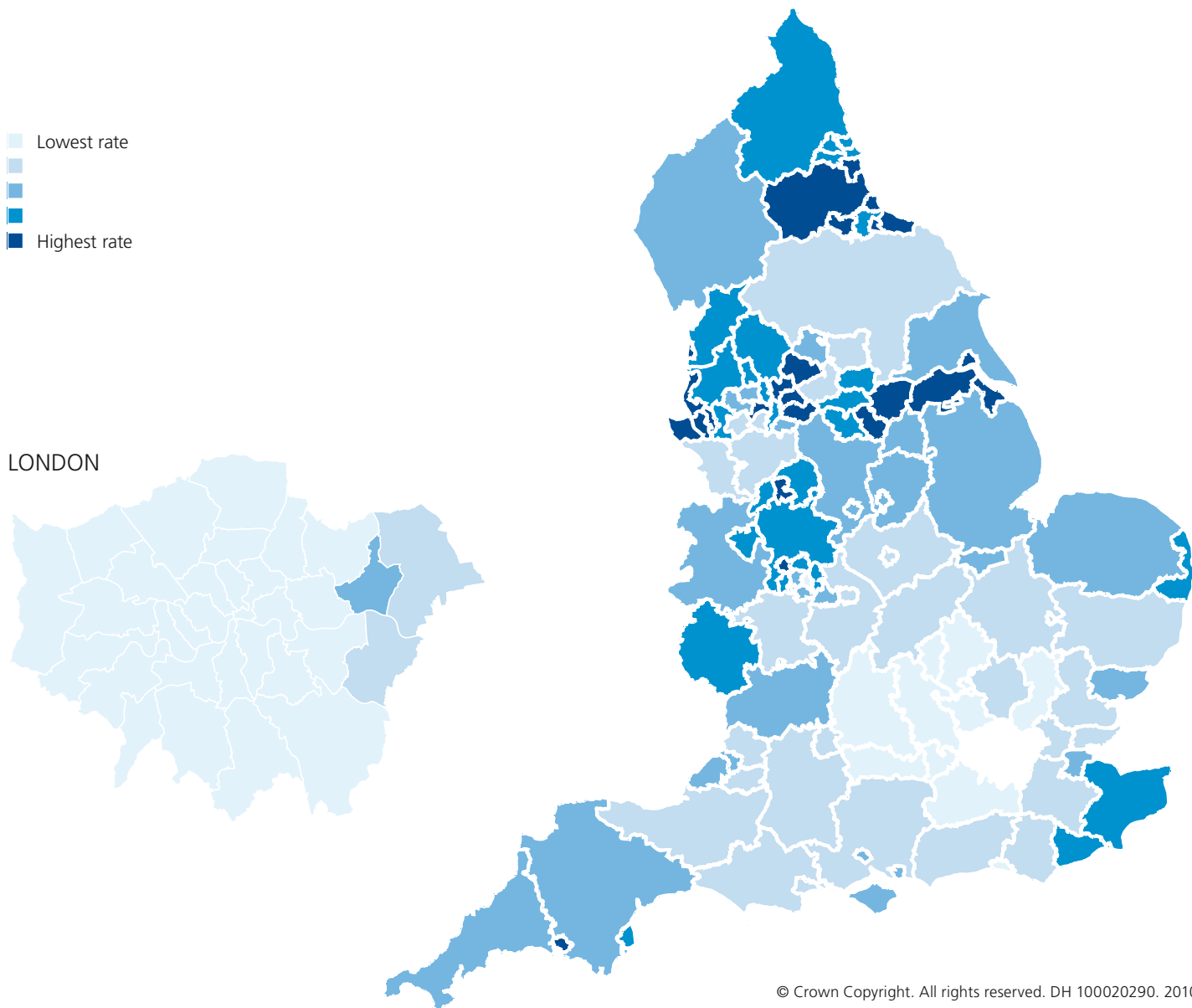
3 World Health Organization (WHO) The global burden of disease report. WHO, Geneva: 2008. Available at: [http://www.who.int/healthinfo/global\\_burden\\_disease/estimates\\_country/en/index.html](http://www.who.int/healthinfo/global_burden_disease/estimates_country/en/index.html)

4 Centre for Mental Health. The economic and social costs of mental health problems in 2009/10. Centre for Mental Health, 2010. Available at: [http://www.centreformentalhealth.org.uk/pdfs/Economic\\_and\\_social\\_costs\\_2010.pdf](http://www.centreformentalhealth.org.uk/pdfs/Economic_and_social_costs_2010.pdf)

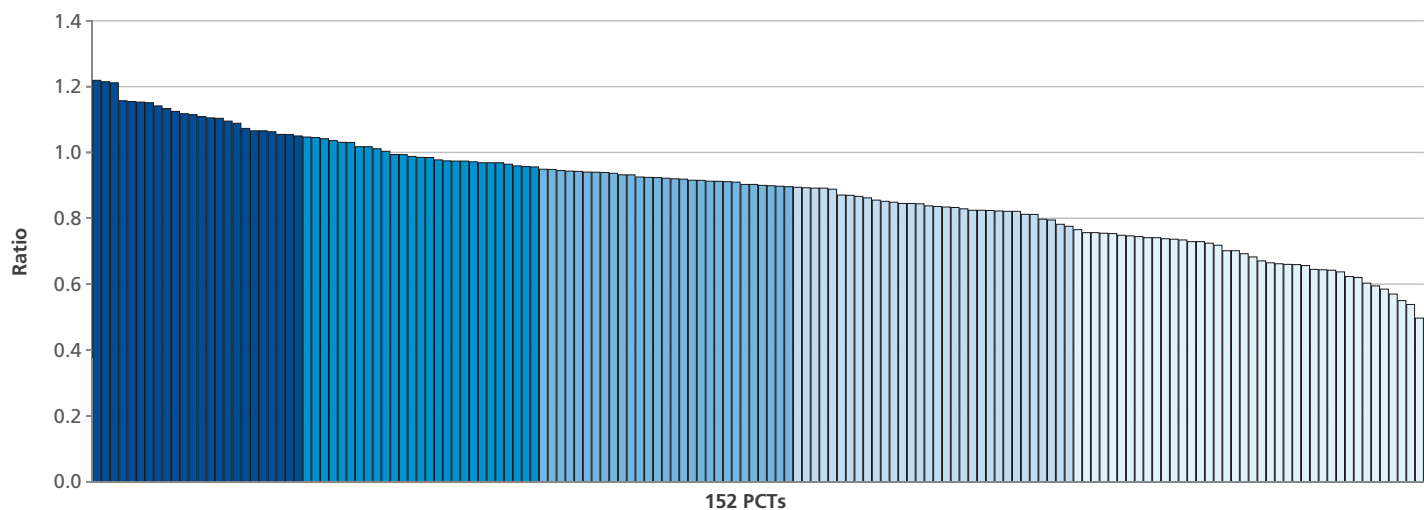
### NEUROLOGICAL PROBLEMS

## Map 9: Ratio of reported to expected prevalence of epilepsy by PCT

2008/09



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## Context

*“It is acknowledged that no exact figures for the numbers of people with epilepsy can be produced due to the complicating factors such as mis-diagnosis rates, and inconsistent reporting.”<sup>1</sup>*

Unmet need is the presence of people in the population who have a health problem recognised as requiring healthcare but who are not receiving health services due to either deficiencies in service provision or difficulties in accessing services. However, for some acute health problems, such as fractured neck of femur (see Map 23), unmet need is an irrelevant concept because the diagnosis is clear: 100% of patients reach hospital, and almost all of them have an operation. For chronic conditions, where need is less clear cut and where clinical judgement determines whether a person is referred to specialist services, the relationship between need and service provision is variable from one part of the country to another, from one county or conurbation to another, and even from one clinician to another.

For such conditions, it is vital to measure or estimate prevalence, that is, the percentage of the population affected by the condition:

### **Number of people with condition – number in contact = unmet need**

Once unmet need has been assessed, issues of equity can be addressed by estimating whether the unmet need is greater in some subgroups of the population, such as older people or people belonging to a particular ethnic group.

The example that has been chosen for the Atlas is epilepsy for several reasons:

- it is a major health problem with social dimensions;
- there are very wide variations in practice;
- many people have the diagnosis wrongly made, as emphasised in the Joint Epilepsy Council’s report quoted above.

Misdiagnosis rates in the United Kingdom, where a diagnosis of epilepsy is incorrectly made, are between

20% and 31%. Using an assumed rate of 23%, this equates to 105,000 people with a diagnosis of epilepsy who are receiving anti-epileptic drugs (AEDs) but who do not have the condition.

## Magnitude of variation

The variation in the ratio of reported to expected prevalence of epilepsy among PCTs is just over twofold. When the five PCTs with the highest ratios and the five PCTs with the lowest ratios are excluded, the variation is almost the same at just under twofold.

## Options for action

In future, organisations need to commission services based on estimates of unmet need and not on past patterns of activity. It is important, therefore, for commissioners to know whether the prevalence of epilepsy in their area is correct and does not:

- **exclude** unidentified cases of epilepsy, which means that case ascertainment needs to be secure;
- **include** wrongly diagnosed cases of epilepsy.

Case ascertainment can be improved by:

- Ensuring all GP practices meet the QOF target for reviewing cases of people with epilepsy;
- Identifying those communities where there is poor reporting of epilepsy due to fear of stigmatisation;

It is also important to ensure that there is an effective epilepsy service for the population with access to a coordinated system integrating:

- specialists in epilepsy;
- investigations (EEG, telemetry, and MRI);
- support services (specialist nurse practitioners in epilepsy and social services).

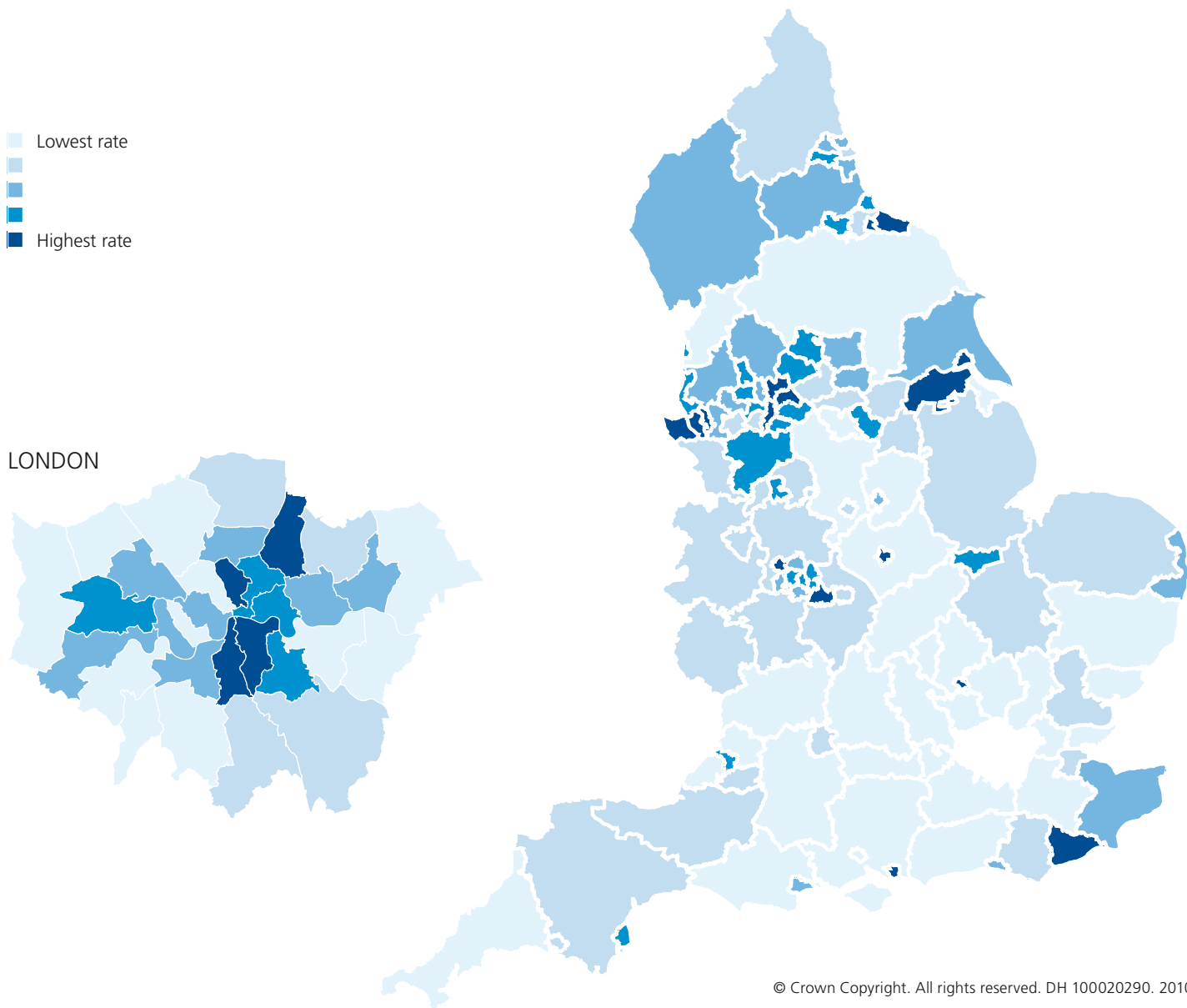
This will improve the accuracy of diagnosis, provide better data, and act as an information and communication resource for people with epilepsy, who will be more likely to engage with health services.

<sup>1</sup> Joint Epilepsy Council (2005) Epilepsy prevalence, incidence and other statistics.

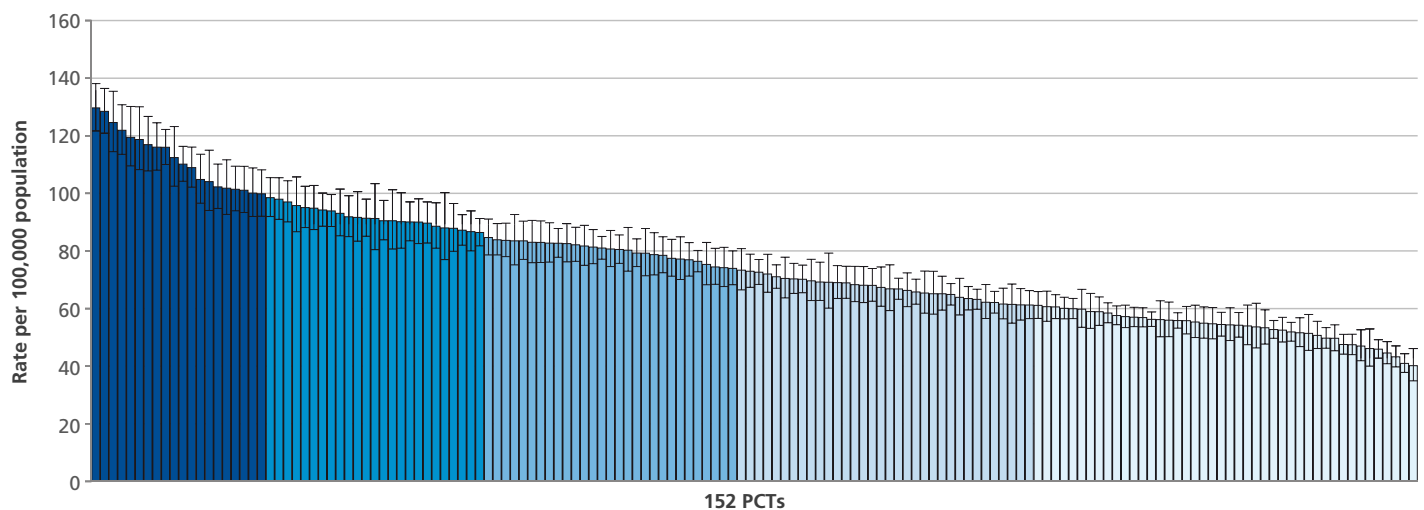
NEUROLOGICAL PROBLEMS

Map 10: Directly standardised rate of emergency admissions in persons with epilepsy per 100,000 population by PCT

2006/07–2008/09



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## Context

Epilepsy is common: about one in 100 people have the condition. Epilepsy is defined as the recurring tendency to have seizures. Many more people will have single or provoked seizures but will not be diagnosed with epilepsy (the life-time prevalence of a single seizure is as high as 1 in 20 of the population). Epilepsy is an important condition because it has implications for the opportunities available to a person to lead a full life; people with epilepsy are less likely to be employed, or be able to drive. They have reduced life chances, and 1 in 5 have learning and intellectual disabilities.

When people present at emergency departments as the result of a loss of consciousness or a first seizure, some will make a full recovery, can be discharged home, and can be investigated as an outpatient. For others, it may be necessary to admit them for a short time to establish whether the seizure is the first indication of a serious brain disorder, such as a tumour or brain haemorrhage.

## Magnitude of variation

The variation across England in the rate of emergency admissions in people with epilepsy per 100,000 population is over threefold. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation is over twofold.

Some of this variation can be accounted for by the prevalence of epilepsy. People in lower socio-economic groups are more likely to experience epilepsy (25% higher prevalence in socially deprived areas). Although there are no consistent racial differences in epilepsy, lower income is associated with epilepsy in all ethnic groups. Epilepsy is also associated with increasing age, vascular disease, and abuse of alcohol.

However, the variation in emergency admissions cannot be explained in terms of prevalence alone. Any unwarranted variation in emergency admissions for epilepsy is probably due to several other reasons, including:

- › appropriateness of clinical management (e.g. the protocol used in the emergency department);
- › differences in control of the condition (e.g. compliance with drug treatment).

## Options for action

- › Establish a local epilepsy service to enable not only the identification of people who have epilepsy but also the differentiation of people who have a serious brain disorder.
- › Develop community-based epilepsy services with effective links to epilepsy specialists (often hospital based).
- › Develop an emergency department protocol for people presenting with seizures, which avoids admission.
- › Establish "First Seizure Services", which have links to the emergency department and epilepsy service, with access to appropriate diagnostic investigations, including magnetic resonance imaging (MRI), electroencephalography (EEG), and telemetry.
- › Establish and train specialist nurse practitioners in epilepsy.

In addition, general practitioners can help to improve the control of epilepsy, and thereby reduce emergency admissions, by using their register of patients with epilepsy:

- › To review patients' prescriptions once a year;
- › To identify ways to increase patient concordance with drug regimens.

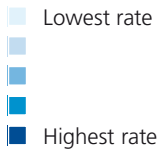
## RESOURCES

- › NICE clinical guidance, CG20, "The epilepsies: the diagnosis and management of the epilepsies in adults and children in primary and secondary care", is available at: <http://www.nice.org.uk/Guidance/CG20>

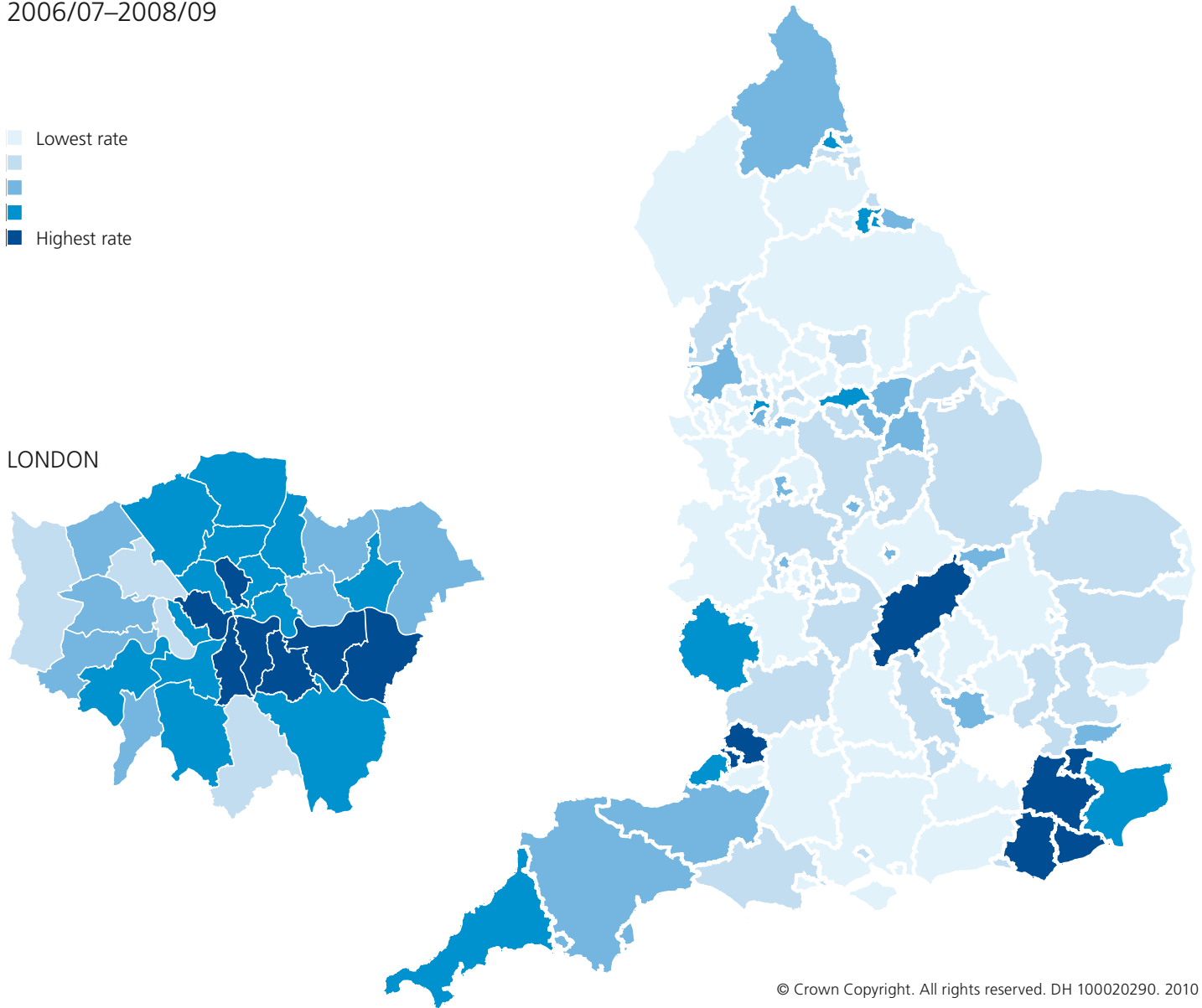
NEUROLOGICAL PROBLEMS

Map 11: Directly standardised rate of elective admissions in persons diagnosed with epilepsy per 100,000 population by PCT

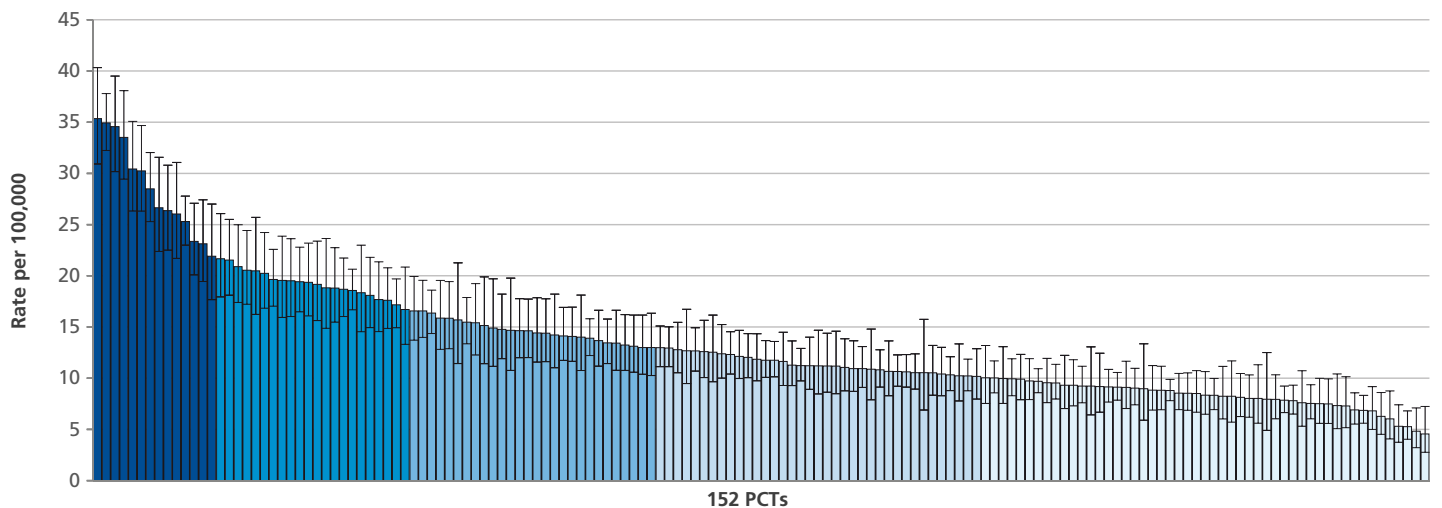
2006/07–2008/09



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## Context

It is important to diagnose epilepsy safely. Even in the best of services, 5% of patients may have other conditions. It is important, therefore, to have access to epilepsy specialists with specialist investigation, including telemetry monitoring services, to have the capacity:

- to diagnose the condition securely;
- to ensure that a patient's drug regimen is conferring appropriate and effective control of their condition;
- to identify those who would benefit from surgical intervention.

The main epilepsy organisations in the third sector have identified the wide variation across the country in people going forward for epilepsy surgery, and have argued that not enough people with the condition are given the opportunity to have such surgery. This variation in rates of epilepsy surgery could be related to:

- variation in access to telemetry services, and to epilepsy surgery centres;
- variation in the practice of individual clinicians.

Elective admission for people with epilepsy should be a rare occurrence; however, it is needed when people are being assessed for epilepsy surgery, for monitoring and management of people with severe life-threatening epilepsy, and for diagnosis of other conditions that might be misdiagnosed as epilepsy (e.g. non-epileptic seizure disorders).

## Magnitude of variation

The variation in rates of elective admission for people diagnosed with epilepsy per 100,000 population is wide at sevenfold. When the five PCTs with the highest rates and the five PCTs with the lowest rates have been excluded, the variation is greater than fourfold.

When investigating variation in the elective admissions for people with epilepsy, it should not be assumed that low rates of admission are a sign of good practice. There should be some activity as a result of admitting people whose condition it is difficult to control. However, high rates of admission could indicate that people are being admitted for a routine work-up, despite the fact that it is not necessary to do this in a hospital setting. High activity could indicate that there is a neurosciences centre within the PCT generating elective activity.

## Options for action

- Identify the hospital generating high activity; ascertain whether it is a tertiary neuroscience centre, or whether there is variation among individual clinicians.
- Ensure local emergency departments have guidelines for the management of first seizures and epilepsy.
- Establish a local epilepsy service that includes "First Seizure Services" and access to appropriate diagnostic investigations (MRI, EEG, and telemetry).
- Ensure patients have access to specialist nurse practitioners in epilepsy.
- Ensure that the treatment of epilepsy in primary care is effective and appropriate, including patient monitoring, and an annual review of medication.
- Ensure that patients with refractory epilepsy have access to tertiary-based epilepsy surgery programmes.

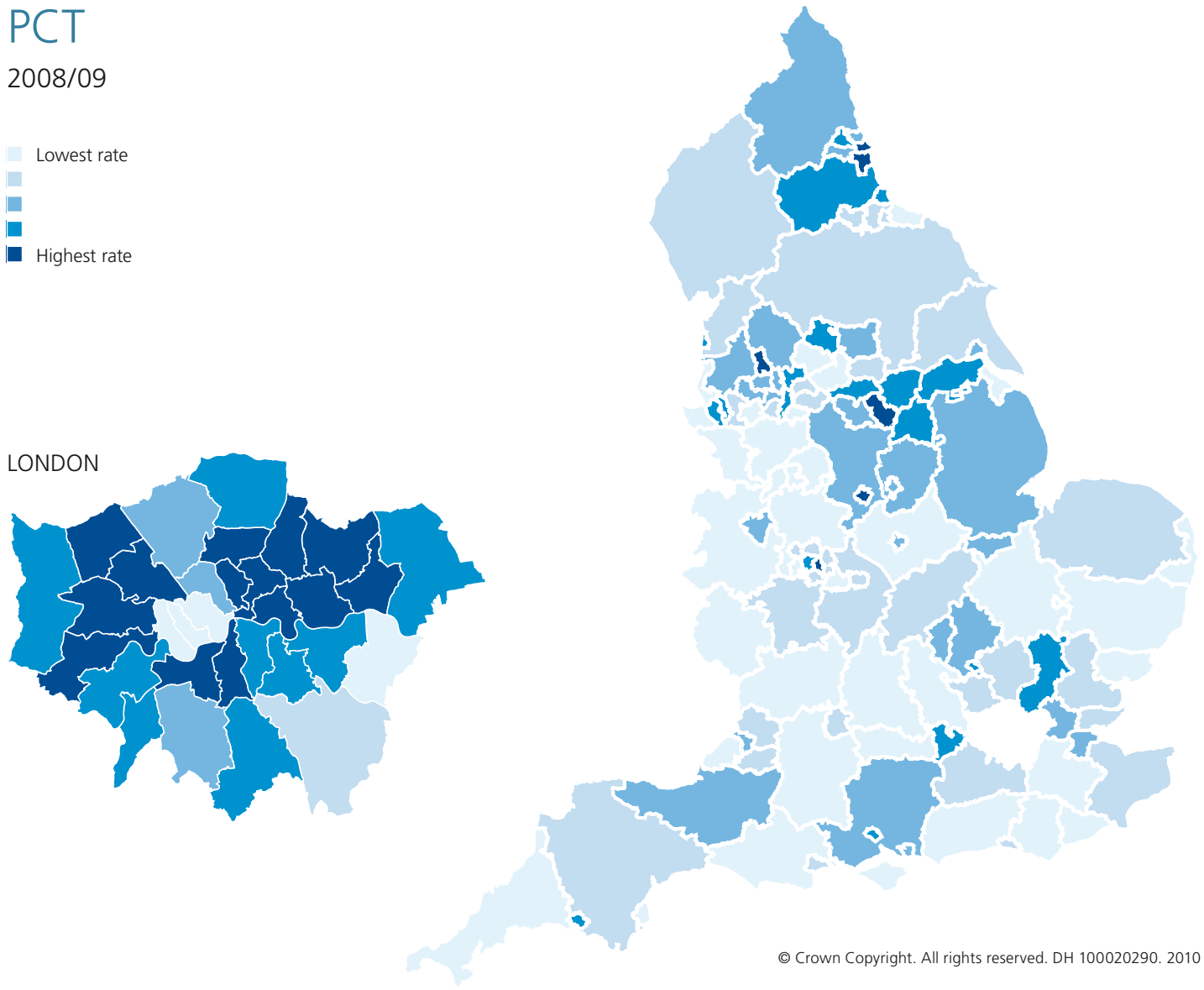
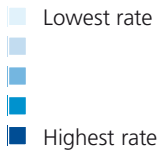
## RESOURCES

- NICE clinical guidance, CG20, "The epilepsies: the diagnosis and management of the epilepsies in adults and children in primary and secondary care", is available at: <http://www.nice.org.uk/Guidance/CG20>

**PROBLEMS OF VISION**

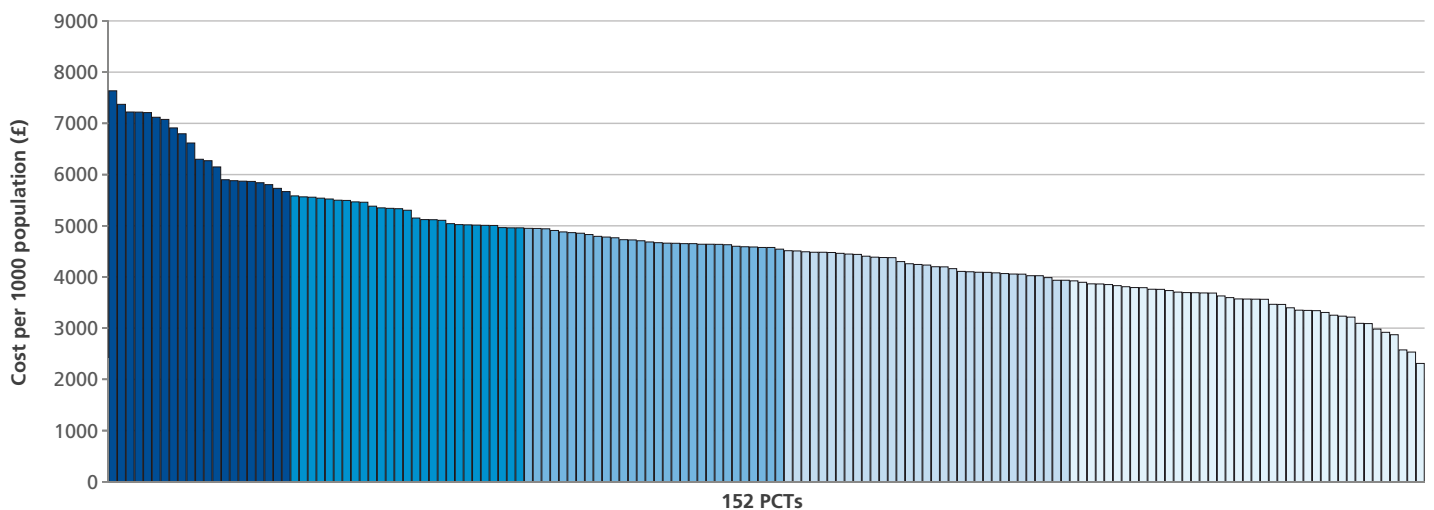
Map 12: Directly standardised rate of cataract surgery recorded in hospital admissions per 10,000 population by PCT

2008/09



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Rates of expenditure on phako-emulsification cataract extraction and insertion of lens per 1000 population by PCT Weighted by age, sex, and need; 2008/09





## Context

Cataract extraction (phako-emulsification) with intra-ocular lens implantation for age-related cataract is the commonest surgical intervention performed in the NHS: in 2008–09, over 300,000 operations were performed in England, predominantly as a day-case procedure (97%).<sup>1</sup> The average age for persons having cataract surgery is 76 years.<sup>2,3</sup>

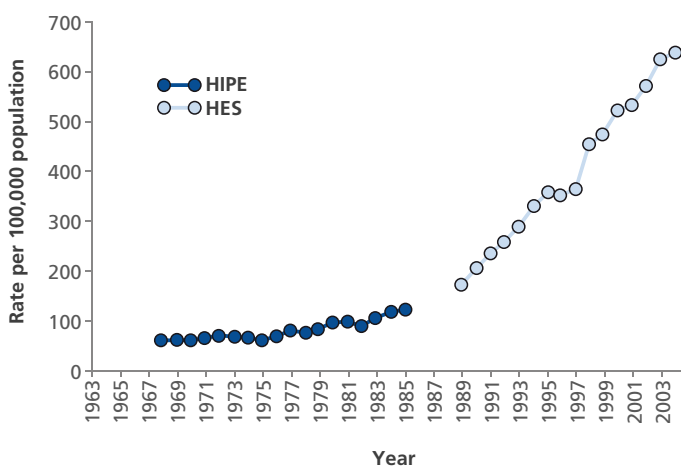
The clinical effectiveness of cataract surgery is well established,<sup>4</sup> as is the added value of second-eye surgery.<sup>5</sup>

Waiting times for cataract surgery have fallen sharply as a result of successive Department of Health policies with a consequent lowering of thresholds for intervention. Indeed, the rate of operations per 100,000 population has increased significantly over the time period 1989–2004 (see graph). In 2007, it was found that the increase in annual admission rates occurred at all ages and in both sexes.<sup>6</sup> The authors raised the question of “over-servicing”, although in their research it was not possible to distinguish between appropriate and inappropriate interventions.

## Magnitude of variation

There has been a 1.5-fold variation in the rate of cataract surgery among the NHS English Regions from 2003 to 2008: London and the North East had the highest rates, and the West Midlands the lowest rate during this period.<sup>7</sup>

There is a 2.8-fold variation in cataract surgery rates per 10,000 population among PCTs (see map). When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, there is a twofold



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variation. This level of variation is reflected in expenditure on phako-emulsification cataract extraction and lens insertion per 1000 population, with a greater than threefold variation becoming more than twofold once the five PCTs with the highest rates and the five PCTs with the lowest rates have been excluded (see bar chart).

These variations are likely to be influenced by several factors including local demography, local needs, and access to, and uptake of, NHS services.

## Options for action

Considerable resources have been invested in the Vision programme budget to increase the rate of operation, and many people have benefitted as a result. Increased resources have also been invested in the treatment of macular degeneration and diabetic retinopathy. In planning for the next three years, the value derived from continuing to increase investment in cataract surgery needs to be considered not only with respect to the benefit for people waiting for their first cataract operation, or for their second eye to be treated, but also with respect to the opportunity costs, namely, the value that would be derived from investing resources in the treatment of macular degeneration, diabetic retinopathy or glaucoma. At the same time, this will need to be balanced with the demand for surgery, which is likely to continue, to meet the needs of an ageing population.<sup>8</sup>

This type of marginal analysis within a programme budget allows those responsible for the population to engage with people who have visual impairment, and discuss with them what offers best value for this population group.

## RESOURCES

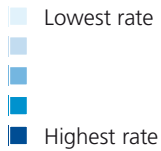
- Guidelines for Cataract Surgery: The Royal College of Ophthalmologists 2004 (2010 update under consultation). Available at: <http://www.rcophth.ac.uk/docs/publications/published-guidelines/FinalVersionGuidelinesApril2007Updated.pdf>

- 1 HES online NHS Information Centre [www.hesonline.nhs.uk](http://www.hesonline.nhs.uk)
- 2 Johnston et al Eye 2005; 19: 788–794.
- 3 Desai P et al Br J Ophthalmol 1999; 83: 893–896.
- 4 Lundstrom M et al J Cataract Refract Surg 2009; 35: 504–13.
- 5 Laidlaw DA et al Lancet 1998; 352: 925–29.
- 6 Keenan T et al Br J Ophthalmol 2007; 9: 901–904.
- 7 HES e-Atlas <http://www.apho.org.uk/default.aspx?RID=39400>
- 8 Office for National Statistics <http://www.statistics.gov.uk/default.asp>

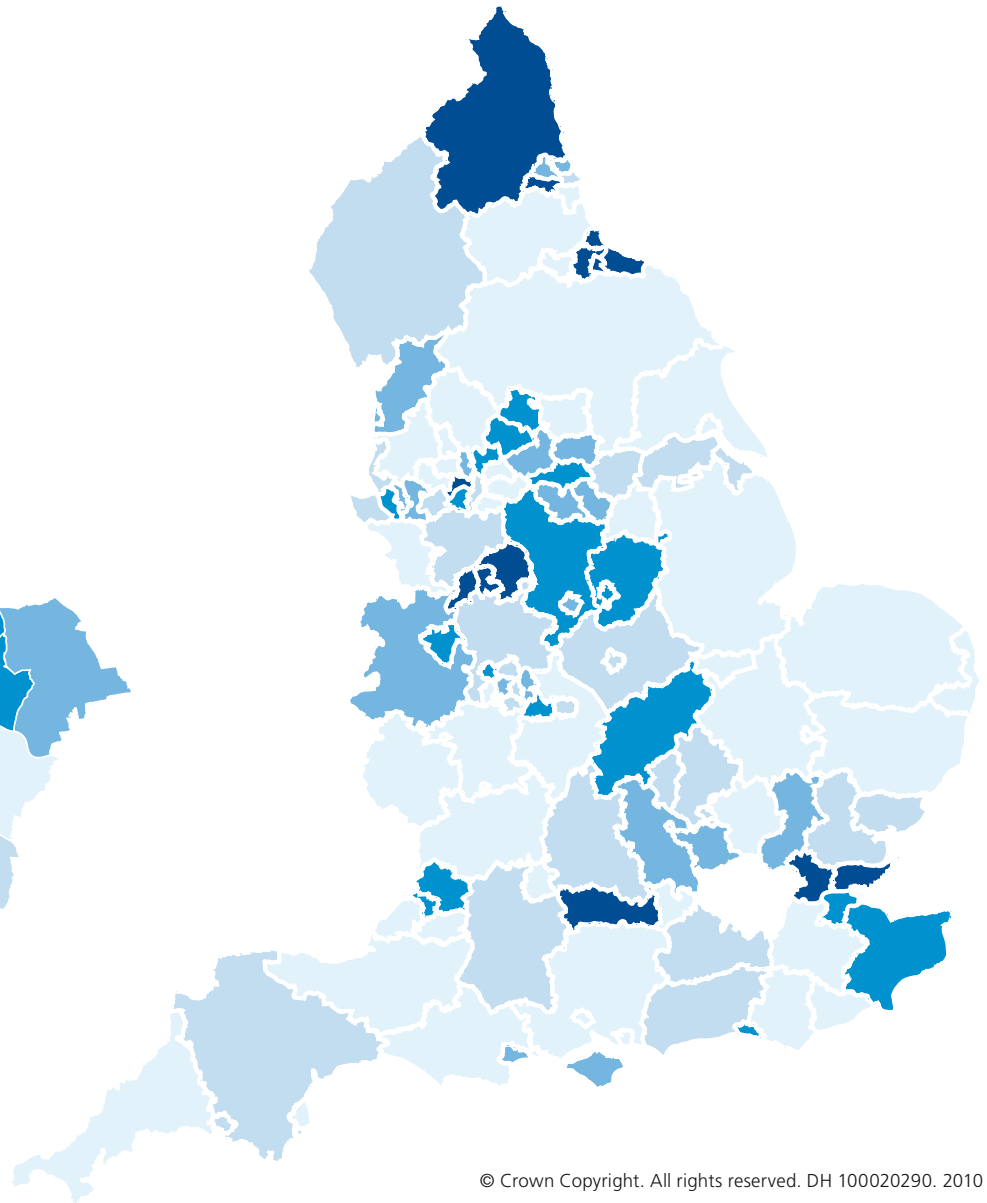
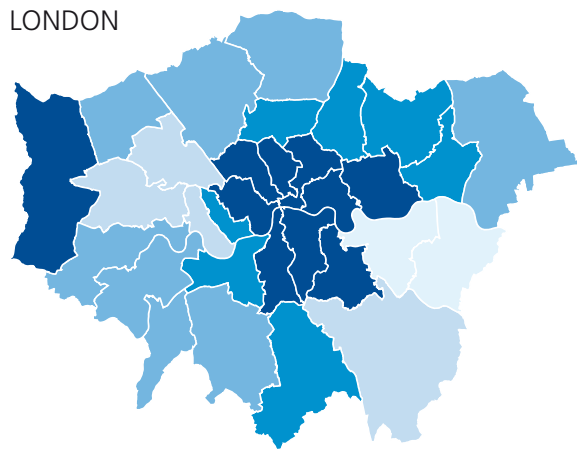
**PROBLEMS OF CIRCULATION**

Map 13: Percentage of patients admitted to hospital following a stroke who spend 90% of their time on a Stroke Unit by PCT

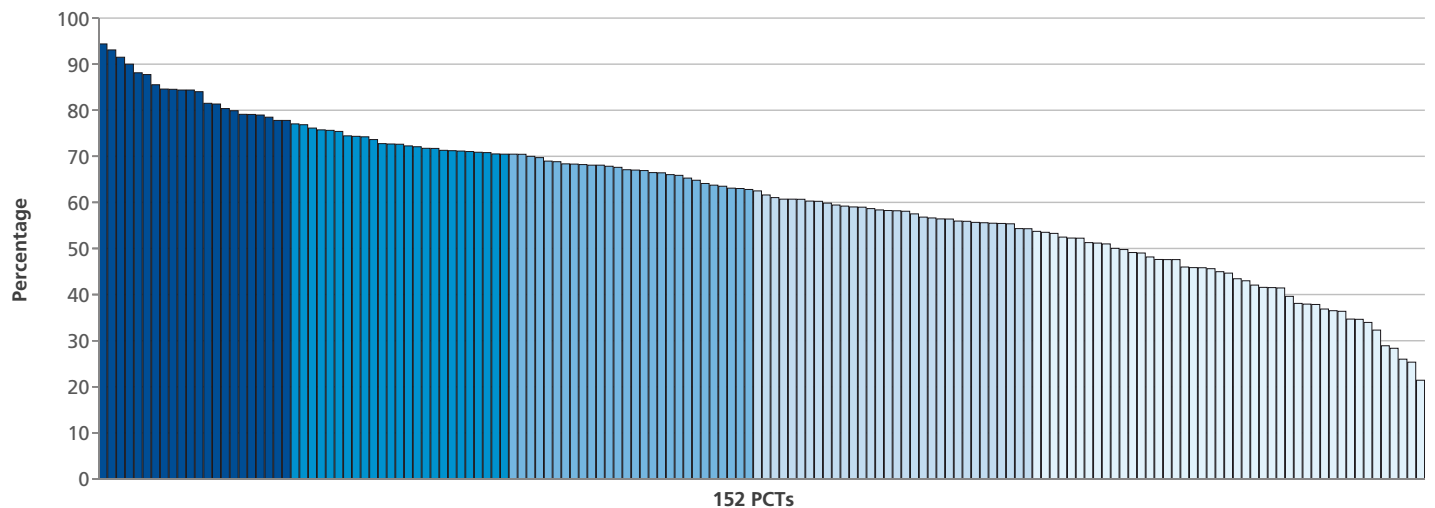
2009/10



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## Context

The National Stroke Strategy (see “Resources”) sets out the changes necessary to improve outcomes for people with stroke. As a consequence, this “Vital Sign”, which is the focus for this map, was developed.

NICE Guidance (see “Resources”) provides a clear standard: all people with suspected stroke should be admitted directly to a specialist acute stroke unit following initial assessment from the community or the emergency department. It also requires that:

- People seen by ambulance staff, with sudden onset of neurological symptoms, are screened to diagnose stroke or transient ischaemic attack (TIA). People with persisting neurological symptoms who screen positive are transferred to a stroke unit within 1 hour;
- Patients with suspected stroke are admitted directly to a specialist acute stroke unit, and assessed for thrombolysis, receiving it if clinically indicated;
- Patients with acute stroke receive brain imaging within 1 hour of hospital arrival if they meet indications for immediate imaging.

Stroke patients admitted to a stroke unit are less likely to die, and more likely to leave hospital independent, and go home as opposed to go into institutional care than those who are not.

## Magnitude of variation

There is a greater than fourfold variation among PCTs in the percentage of patients admitted to hospital following a stroke who spend 90% of their time on a stroke unit. When the five PCTs with the highest percentages and the five PCTs with the lowest percentages are excluded, there is an almost threefold variation.

In 2009, 75% of stroke patients were admitted to medical assessment units and not directly to stroke units.<sup>1</sup> Almost half of hospitals in the Royal College of Physicians National Sentinel Audit of Stroke reported the need to admit patients to non-specialist beds because a stroke unit bed was not immediately available. The Audit concludes that “given the evidence ... about the low quality of care provided on such units this is unacceptable”. The Audit also showed there is a similar number of stroke unit beds as there are people with stroke in UK hospitals, but general medical admissions can occupy stroke unit beds, which are not then available for stroke patients.

## Options for action

Redesigning whole systems is key to improving access to specialist stroke units. Many changes can be accomplished within existing resources, but all stroke units need:

- Continuous physiological monitoring for 24 hours;
- Immediate access to scanning;
- Direct admission from the emergency department or ambulance service;
- Specialist ward rounds seven days a week;
- Nurses trained in swallow screening, and stroke assessment and management.<sup>1</sup>

In the Stroke Improvement Programme case studies (see “Resources”), the following were effective:

- Ring-fencing stroke-unit beds for stroke patients;
- Developing a flexible stroke-skilled workforce;
- Working with the ambulance service – in some places, they are authorised to take patients directly to the stroke unit;
- Moving to six-days-a-week therapy services.

## RESOURCES

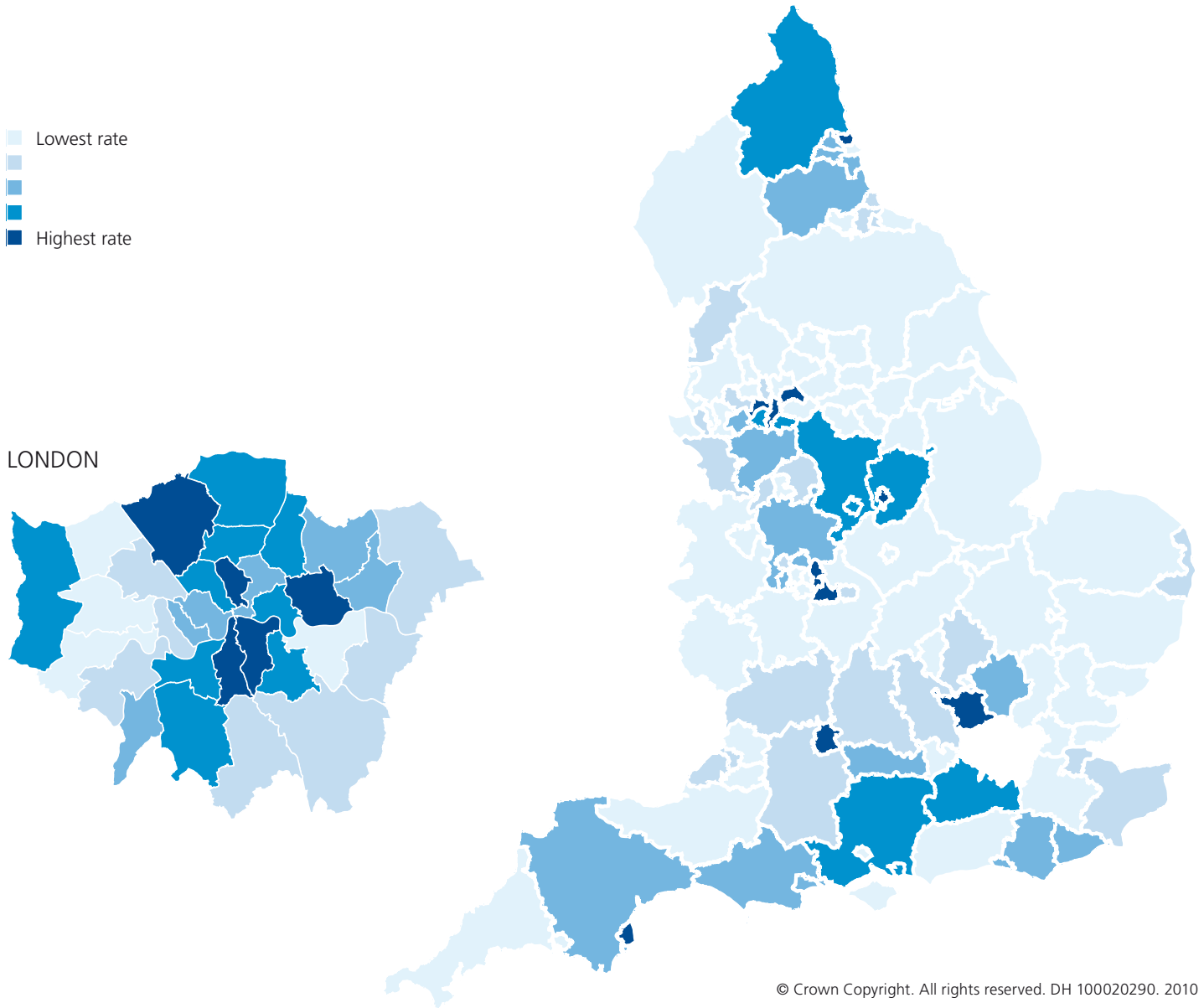
- The Association of Public Health Observatories (APHO) has developed disease prevalence models that commissioners can use to estimate the prevalence of stroke, cardiovascular disease, and hypertension. Available at: <http://www.apho.org.uk/resource/view.aspx?RID=48308>
- NICE Guidance, CG68 – National Collaborating Centre for Chronic Conditions. Stroke: National Clinical Guideline for diagnosis and initial management of acute stroke and transient ischaemic attack (TIA). London: Royal College of Physicians, 2008.
- Accelerating Stroke Improvement (NHS Improvement Stroke Improvement Programme) <http://www.improvement.nhs.uk/stroke/AcceleratingStrokeImprovement/tabid/134/Default.aspx>
- Imaging to Support Stroke (NHS Improvement: Diagnostics Improvement) <http://www.improvement.nhs.uk/diagnostics/ImagingtoSupportStroke/tabid/97/Default.aspx>
- Asset Toolkit - to help health care organisations improve and transform stroke services for patients (April 2010). [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4134498](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4134498)
- Going up a Gear: practical steps to improving stroke care (NHS Improvement – Stroke Improvement Programme) <http://www.improvement.nhs.uk/stroke/NationalProjects/Goingupagear/tabid/133/Default.aspx>

1 Royal College of Physicians (RCP) National Sentinel Audit of Stroke. London: RCP, 2010.

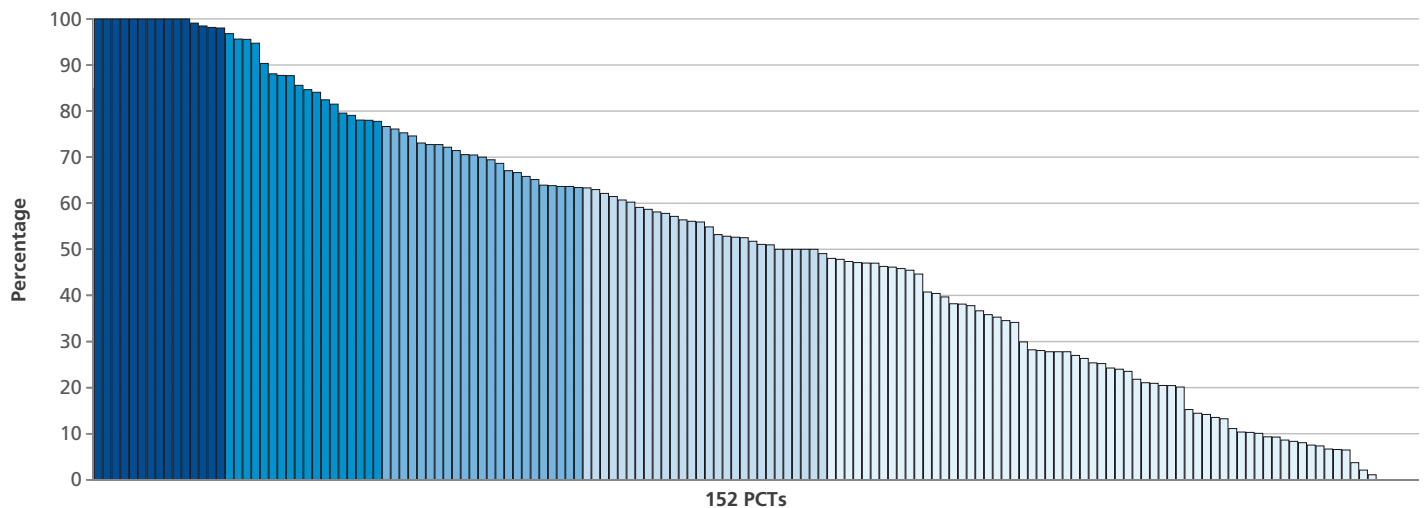
PROBLEMS OF CIRCULATION

# Map 14: Percentage of transient ischaemic attack (TIA) cases with a higher risk who are treated within 24 hours by PCT

2009/10



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## Context

The National Stroke Strategy sets out the changes required to improve outcomes for stroke, and the percentage of transient ischaemic attack (TIA) cases with a higher risk who are treated within 24 hours is a “Vital Sign” developed as a consequence of the strategy.

Although people with a suspected TIA may have no neurological symptoms at the time of assessment (within 24 hours), the risk of stroke in the first four weeks after a TIA can be as high as 20%.

High-risk TIA patients should be seen, investigated, and treated within 24 hours of referral. For low-risk TIA patients, the time-frame is one week. Presentation with a TIA is an opportunity for:

- stroke prevention;
- reduction in mortality from stroke;
- avoidance of expenditure on longer-term treatment, rehabilitation, and care.

In the NICE Clinical Guidance for Stroke (see “Resources”), it is recommended that people with a suspected TIA should be assessed as soon as possible for their risk of subsequent stroke using a validated scoring system, such as ABCD2. Those at high risk of stroke (an ABCD2 score of 4 or above) should have aspirin (300 mg daily) started immediately, specialist investigation within 24 hours of the onset of symptoms, and measures for prevention and risk reduction introduced as the diagnosis is confirmed.

## Magnitude of variation

The standard method used to identify variation for the NHS Atlas is to exclude the five PCTs with the highest percentages and the five PCTs with the lowest percentages. For this indicator, it is very encouraging to note that when this method is applied, there are still some PCTs where 100% of TIA cases with a higher risk of stroke are treated within 24 hours. During 2009/10, five PCTs did not have any high-risk TIA cases, thus the number of PCTs for which variation could be assessed is 147. When the five PCTs with the highest percentages and the five PCTs with the lowest percentages are excluded, there is a greater than 10-fold variation.

Caution is needed when interpreting this variation.

Potential reasons for the variation include:

- data collection – diagnostic coding for outpatients does not routinely occur in most Trusts, and there has been variation in the data collection processes for the TIA Vital Sign;
- some Trusts have established a 9-to-5 service, but have no arrangements for out of hours and weekends, and some have relatively small numbers of TIA cases, which may have deterred them from establishing 24/7 arrangements.

## Options for action

In the Stroke Improvement Programme case studies (see “Resources”), there are effective solutions to improve timely access for people with TIA:

- Define a clear pathway for high- and low-risk patients across primary and secondary care.
- Streamline the referral route with a single point of contact for all cases of TIA.
- Tailor the weekend service to local need.
- NHS Providers may need to work in a clinical network to ensure out-of-hours service provision.
- Formalise relationships between 5-day services and the nearest 7-day service so the out-of-hours patient pathway is clear.
- Use limited-sequence MRI brain imaging in TIA (examples on NHS Improvement Diagnostics Improvement website, see “Resources”).

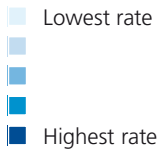
## RESOURCES

- NICE Guidance, CG68 – National Collaborating Centre for Chronic Conditions. Stroke: National Clinical Guideline for diagnosis and initial management of acute stroke and transient ischaemic attack (TIA). London: Royal College of Physicians, 2008.
- Going up a Gear: practical steps to improving stroke care (NHS Improvement Stroke Improvement Programme) <http://www.improvement.nhs.uk/stroke/NationalProjects/Goingupagear/tabid/133/Default.aspx>
- Imaging to Support Stroke (NHS Improvement Diagnostics Improvement). <http://www.improvement.nhs.uk/diagnostics/ImagingtoSupportStroke/tabid/97/Default.aspx>

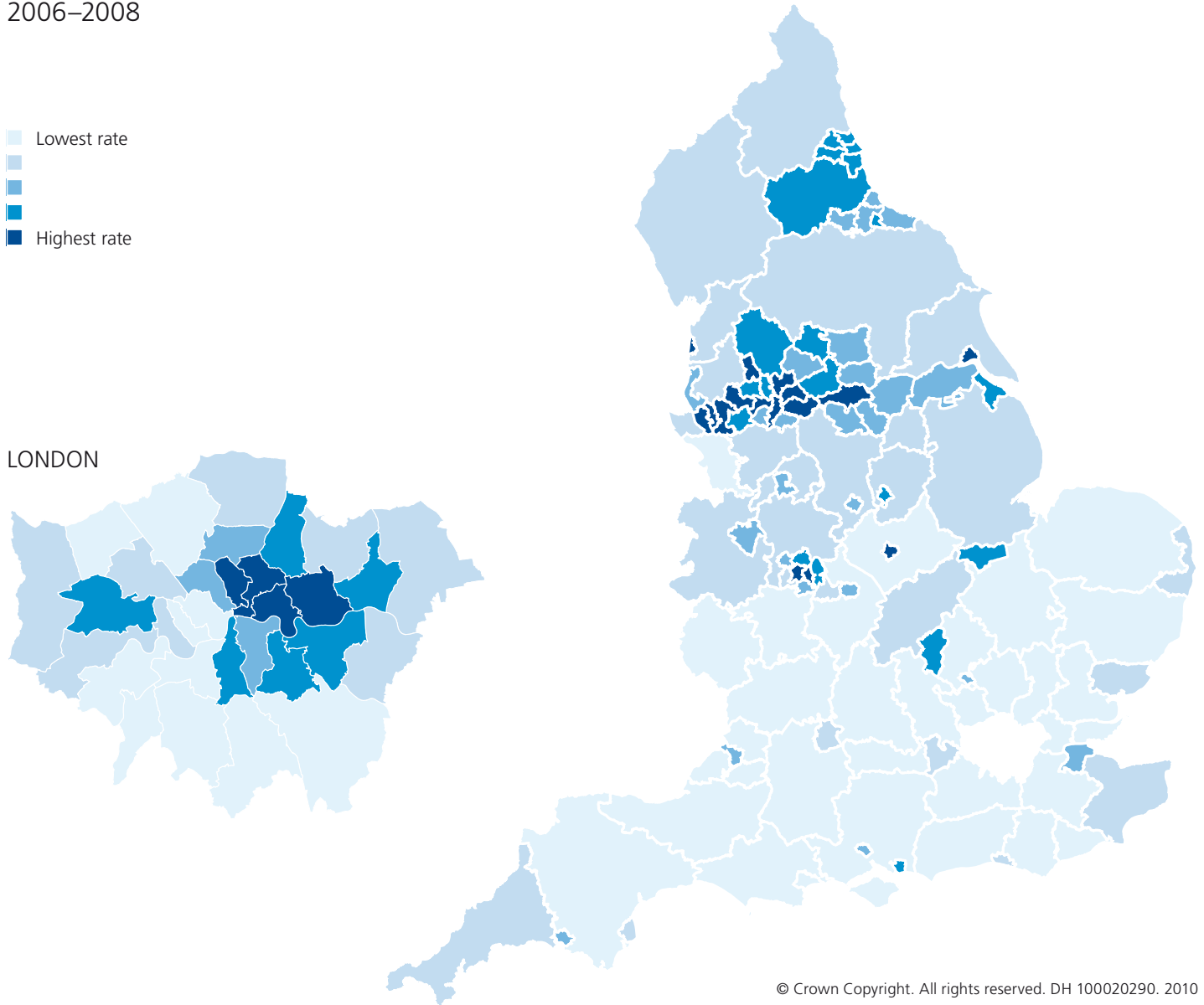
**PROBLEMS OF CIRCULATION**

**Map 15: Directly standardised rate of coronary heart disease mortality in persons aged under 75 years per 100,000 population by PCT**

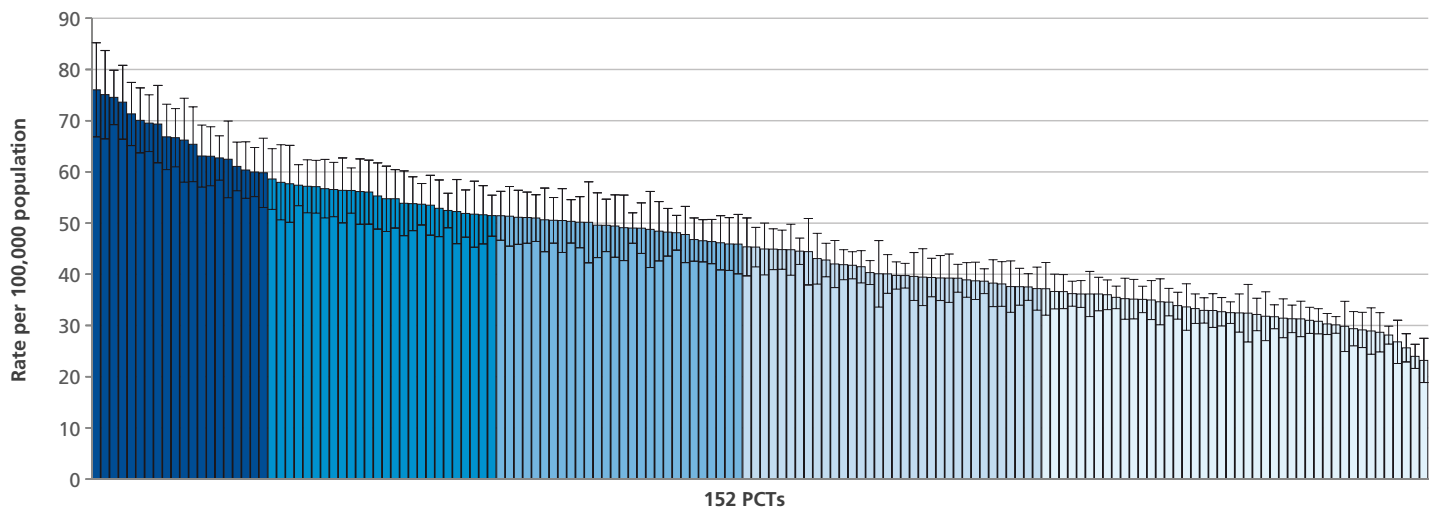
2006–2008



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## Context

Since the publication of the National Service Framework for coronary heart disease (see “Resources”), there has been a substantial reduction in coronary heart disease (CHD) mortality rates for people aged less than 75 years: the rate has fallen by 53%, from 89 per 100,000 in 1995–97 to 42 per 100,000 in 2006–08.

This fall in the CHD mortality rate is much greater than reductions in the all cause and other circulatory disease mortality rates for people less than 75 years over the same time period:

- › a reduction of 26% in all cause mortality, from 397 per 100,000 to 296 per 100,000;
- › a reduction of 39% in other circulatory diseases, from 52 per 100,000 to 32 per 100,000.

## Magnitude of variation

The variation among PCTs in CHD mortality rates in people aged under 75 years per 100,000 population is greater than threefold. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation is greater than twofold.

However, the most important aspect of the variation is its link to health inequalities. Mortality rates are lower in populations which are wealthier when compared with mortality rates in populations which are deprived. Although the relative difference in CHD mortality rates between PCTs and local authorities with the worst levels of health and deprivation (former Spearhead Group<sup>1</sup>) and all other PCTs and local authorities has been reduced, the absolute difference remains.

## Options for action

Early detection and prevention present the best opportunities for narrowing the health inequalities gap for CHD mortality.

### RESOURCES

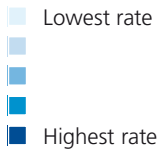
- › Department of Health, Coronary heart disease: national service framework for coronary heart disease modern standards and service models. London: Department of health, 2000. Available at: [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4094275](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4094275)
- › Mortality data are available from the National Centre for Health Outcomes Development (NCHOD), The NHS Information Centre. Available at: <http://www.nchod.nhs.uk/NCHOD/Compendium.nsf/217490fcc66bd94802573a30020fcb6/ab63fe43f87c1fb7802577b500410779!OpenDocument>
- › The Association of Public Health Observatories (APHO) has developed disease prevalence models that commissioners can use to estimate the prevalence of coronary heart disease, cardiovascular disease, and hypertension. Available at: <http://www.apho.org.uk/resource/view.aspx?RID=48308>

1 The former Spearhead Group was made up of local authorities and PCTs based on local authority areas that were in the bottom fifth nationally for three or more of the following five indicators – male life-expectancy at birth, female life-expectancy at birth, cancer mortality rate in people aged <75 years, cardiovascular disease mortality rate in people aged <75 years, and Index of Multiple Deprivation (Local Authority Summary) average score. [http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/documents/digitalasset/dh\\_4095413.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_4095413.pdf)

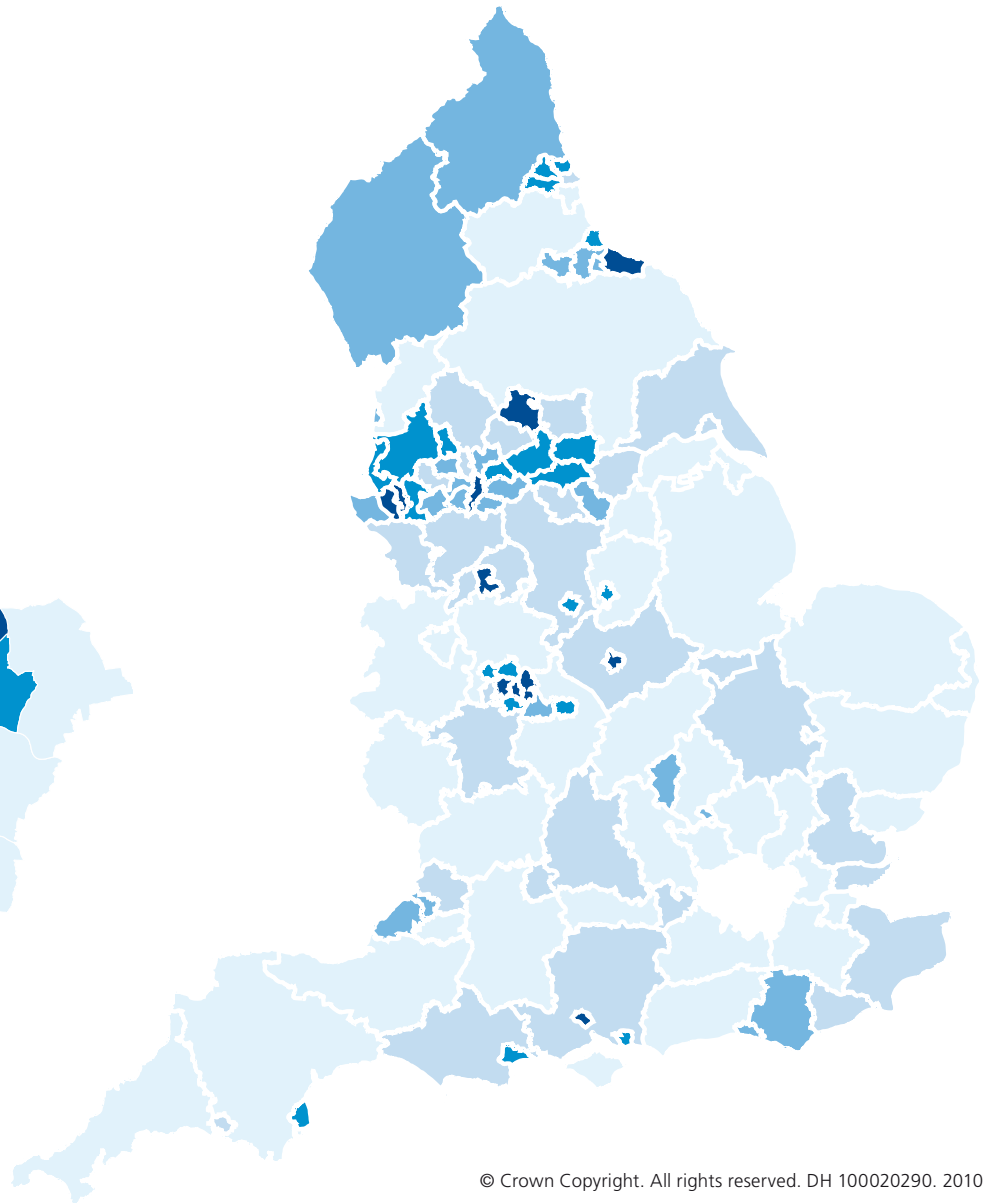
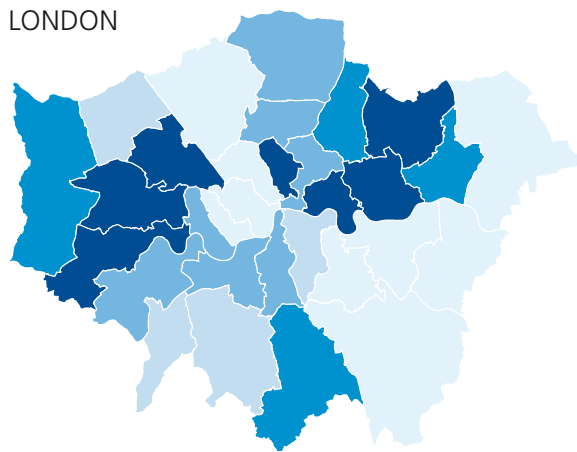
**PROBLEMS OF THE RESPIRATORY SYSTEM**

**Map 16: Directly standardised rate of emergency admissions in persons aged 18 years and over with asthma per 100,000 population by PCT<sup>1</sup>**

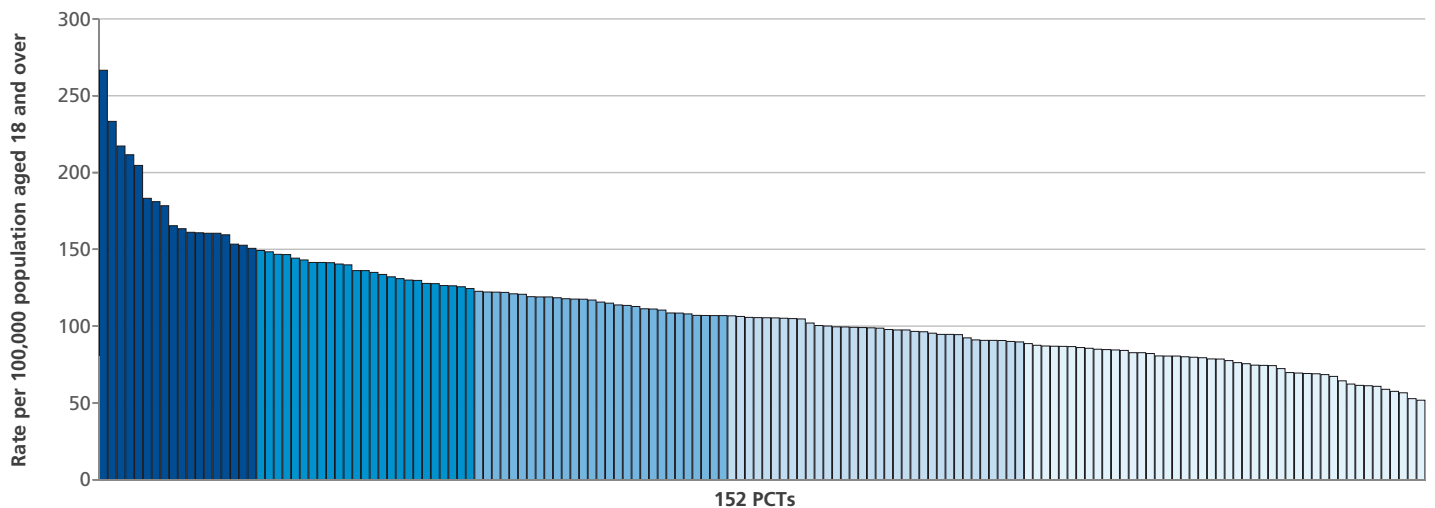
2008/09



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## Context

There are no accurate data on the prevalence of asthma. The incidence has to be estimated from prescribing data. However, in 2008/09, there were 41,870 admissions for asthma in the 18 years and older age-group. This represents 59% of all admissions for asthma. The overwhelming majority (92.5%) of admissions are emergency admissions, which are costly for the NHS, and represent an often frightening, and sometimes life-threatening, disruption to patients' lives.

The goal of asthma care is to control symptoms, and enable people to lead a normal life, so that they are able to undertake the activities of daily life according to their expectations. An emergency admission indicates a loss of control of a person's asthma. Although these admissions are sometimes necessary for the correct management of severe exacerbations, a proportion could be avoided by optimising prior care, and by working with patients to help them manage their own care and alter their treatment themselves at the first sign of a change in symptoms or clinical condition.

## Magnitude of variation

There is a fivefold variation among PCTs in the emergency admissions rate in people aged 18 years and over with asthma per 100,000 population. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation is threefold.

Some of this variation can be accounted for by local population characteristics, but much is unwarranted due to a range of factors in the provision of asthma care, and to patients' understanding of their condition. What is achievable for patients in one area should be possible in all areas if best practice is adopted in the NHS.

## Options for action

Local areas could review the following:

- The number of staff in primary care who have received training to diagnose and treat asthma effectively;
- The number of healthcare professionals familiar with, and managing patients in line with, the 2008 British Guideline on the Management of Asthma (see "Resources");
- The number of patients with personalised asthma self-management action plans, and the number of staff trained to support patients in self-management;
- The number of short-acting bronchodilators used in a month by one person;
- The percentage of patients who are on inhaled corticosteroids when leaving hospital after an acute admission.
- The percentage of patients who are reviewed within seven days following an acute admission.

Reducing unwarranted variation in admissions will improve outcomes for patients while reducing expenditure.

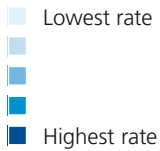
### RESOURCES

- British Thoracic Society (BTS) 2008 British Guideline on the Management of Asthma – updated June 2009 (next update available late 2010/early 2011). Available at: <http://www.brit-thoracic.org.uk/clinical-information/asthma/asthma-guidelines.aspx>
- Asthma UK provides a range of helpful resources for clinicians and patients, available at: <http://www.asthma.org.uk/>

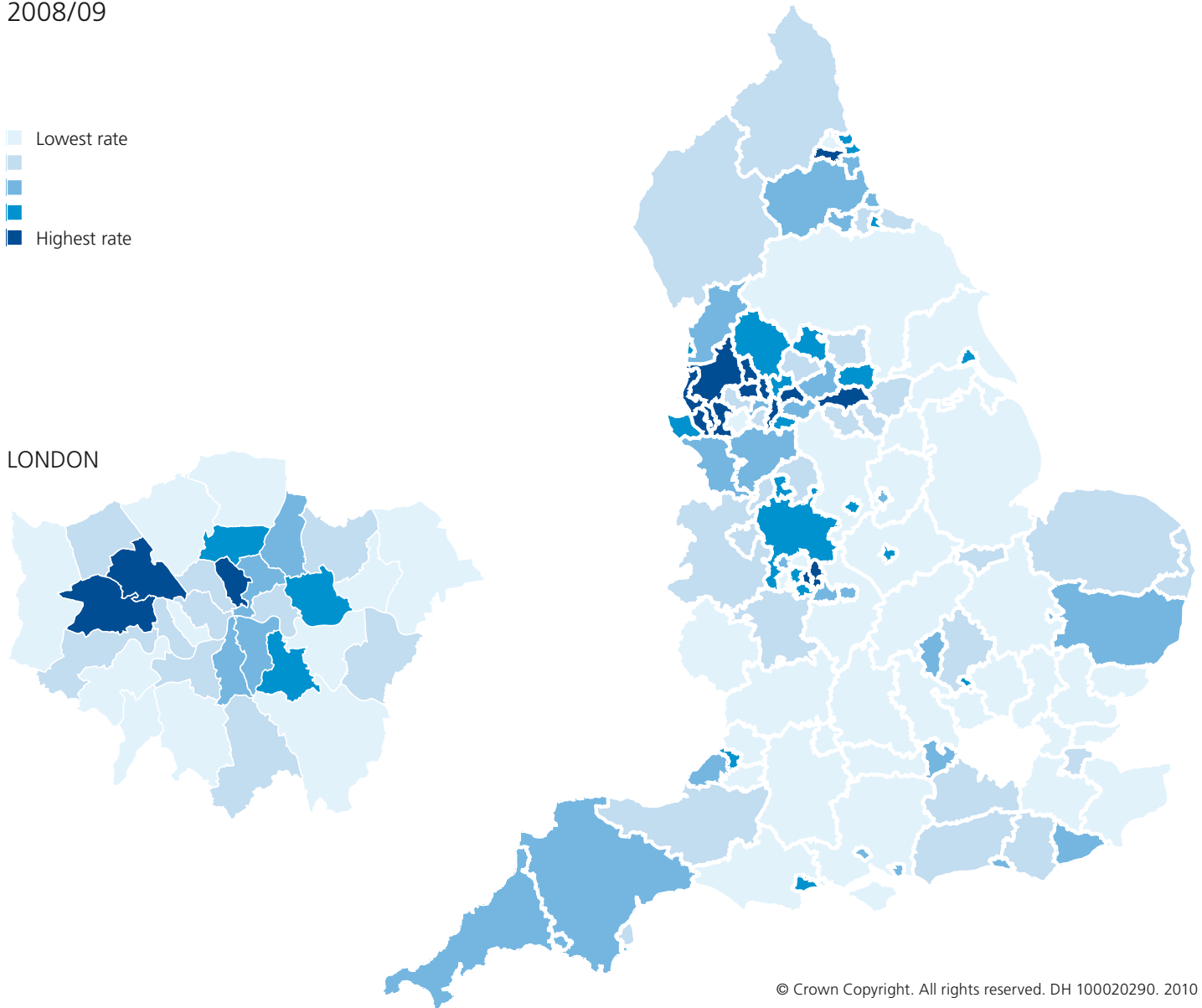
**PROBLEMS OF THE RESPIRATORY SYSTEM**

Map 17: Rate of emergency admissions in persons aged 18 years and under with asthma per 100,000 population by PCT<sup>1</sup>

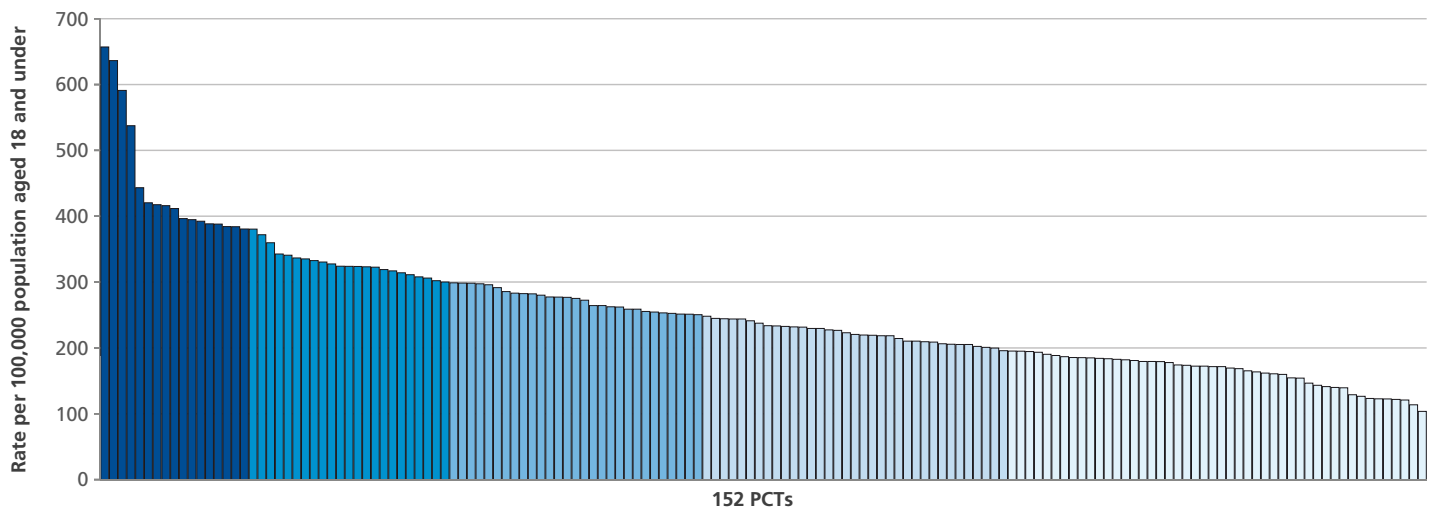
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## Context

Asthma is the most common long-term medical condition in childhood, and the hospitalisation of children should be avoided unless absolutely necessary.

## Magnitude of variation

There is a sixfold variation among PCTs in the emergency admissions rate for asthma in people aged 18 years and under per 100,000 population. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation is almost fourfold.

Although asthma is influenced by environmental factors, even among PCTs in the urban region of London there is a greater than twofold variation in the emergency admissions rate (see London inset).

This level of variation implies considerable scope for improvement in some PCTs.

## Options for action

Commissioners and clinicians need to look at the variation in their patch (see "Resources"), and seek to understand the reasons for that variation

Commissioners should consider the whole care pathway, which encompasses public health, primary care, the emergency department, and secondary care. There are existing good-quality guidelines for the management of asthma developed by the British Thoracic Society (BTS), which commissioners can use to improve care (see "Resources").

Commissioners could consider shifting resources to the education and engagement of children and their families in preventer therapy.

To improve the management of childhood asthma, strong leadership is required, usually from a paediatrician who has an interest in respiratory disease, supported by children's nurses.

Each child should have an Asthma Care Plan.

Pharmacies have an important role in the management of asthma:

- › through giving patients advice on the use of inhalers;
- › by helping patients understand their prescriptions.

The voluntary sector is also helpful in the management of childhood asthma, in particular Asthma UK.

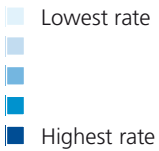
## RESOURCES

- › Use the ChiMat DMIT tool to identify local variation, available at: <http://www.chimat.org.uk/resource/view.aspx?QN=CHMTDMIT>
- › British Thoracic Society (BTS) 2008 British Guideline on the Management of Asthma – updated June 2009 (next update available late 2010/early 2011). Available at: <http://www.brit-thoracic.org.uk/clinical-information/asthma/asthma-guidelines.aspx>
- › Asthma UK provides a range of helpful resources for clinicians and patients, available at: <http://www.asthma.org.uk/>

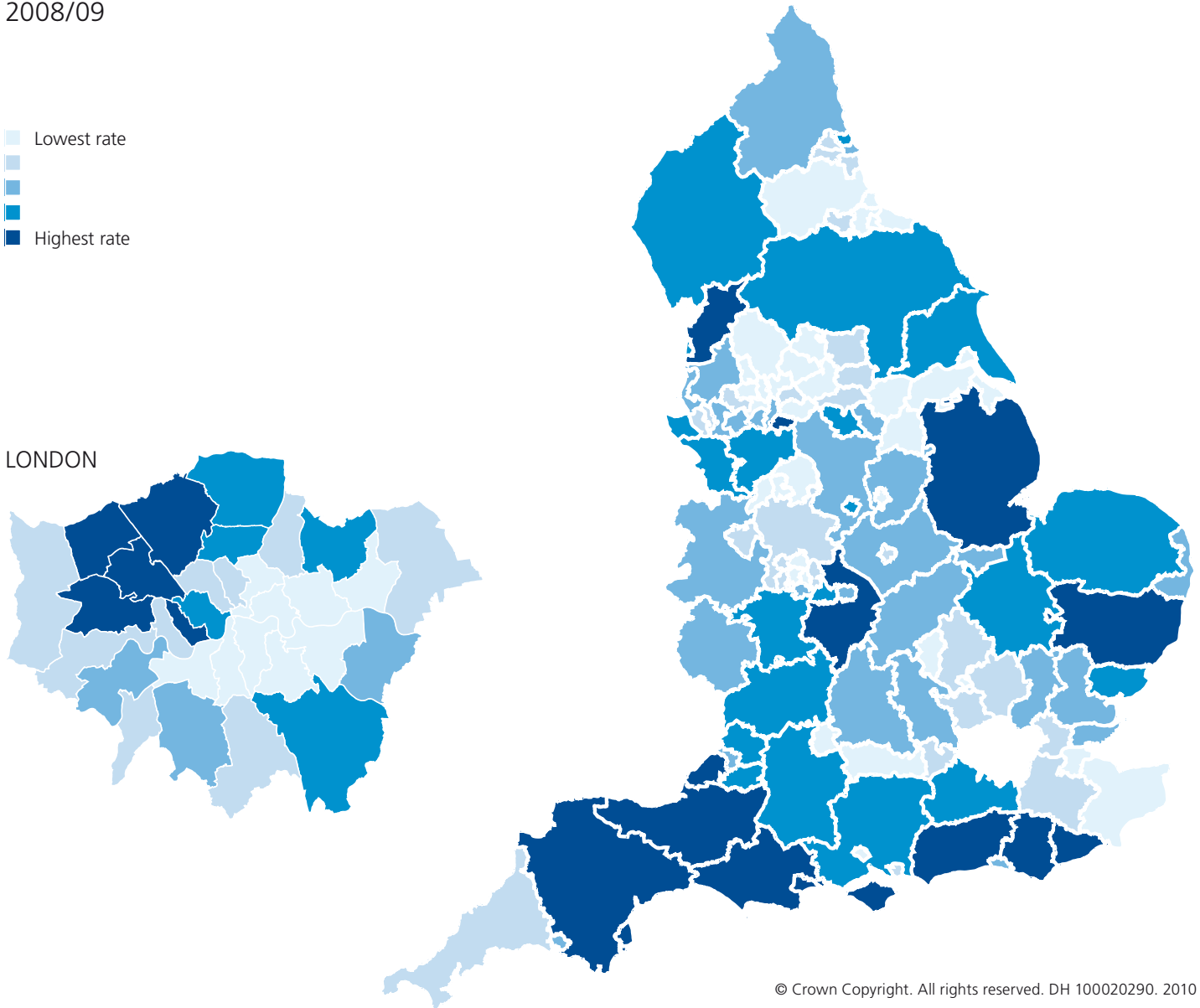
PROBLEMS OF THE RESPIRATORY SYSTEM

Map 18: Emergency bed-days per 1000 population weighted by chronic obstructive pulmonary disease (COPD) prevalence by PCT

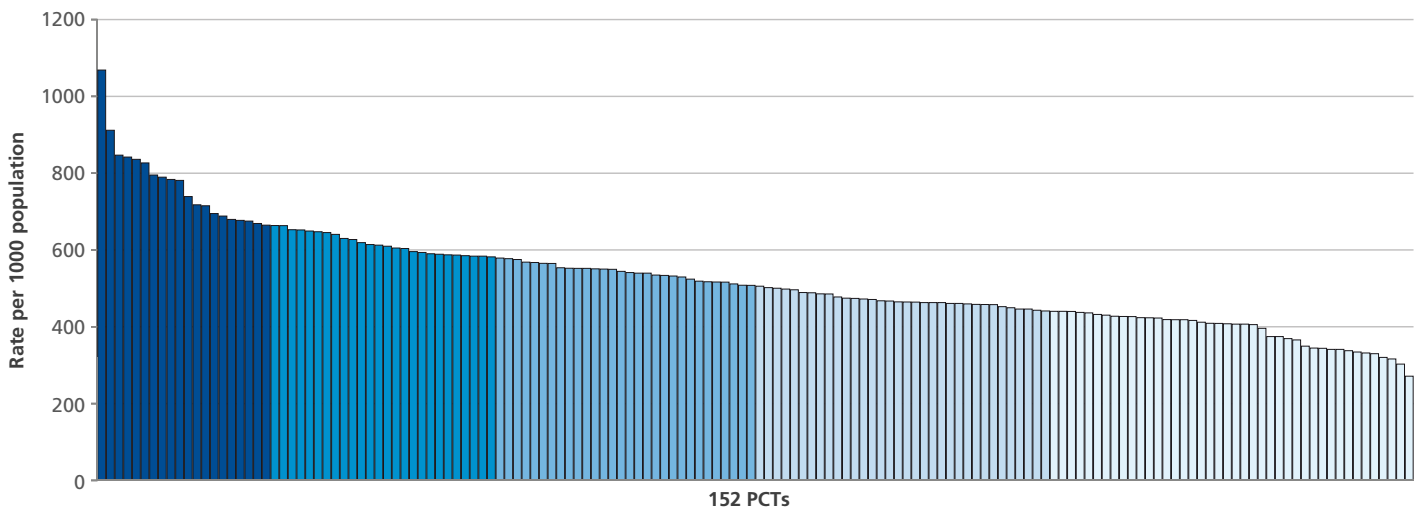
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## Context

Chronic obstructive pulmonary disease (COPD) is associated with:

- high levels of mortality – one person dies in England and Wales from COPD every 20 minutes, a loss of about 25,000 lives every year;
- high levels of morbidity – one in eight emergency admissions to hospital are for COPD, the second largest cause.

Following hospital admission for an exacerbation, 30% of people with COPD are likely to be re-admitted within a three-month period.

Some use of hospital resources is avoidable, and admission to hospital carries potential risks as well as potential benefits. Variation can be observed in several aspects of care for patients with COPD, including:

- non-elective admission rates;
- length of stay;
- re-admission rate;
- practice level admission expenditure.

## Magnitude of variation

“Bed-days” is a combined measure determined by both admission rate and length of stay. There is a fourfold variation among PCTs in emergency bed-days per 1000 population weighted by COPD prevalence. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation is greater than twofold.

Some variation can be accounted for by local population characteristics, but much is unwarranted due to the different ways that services are organised and delivered locally.

What is achievable for patients in one area should be possible in all areas if best practice is adopted in the NHS. Excess time spent in hospital is often associated with poor outcomes for patients, and increased expenditure, and does not reflect modern healthcare practices.

## Options for action

- In general practice, the factors most likely to reduce bed-days are accurate diagnosis and assessment of severity, identification of the presence of co-morbid conditions, and support for self-management. When combined, these are the essential elements of high-quality care.

- In hospital, the factors most likely to reduce bed-days are triage for early supported discharge or hospital at home, early establishment of blood gas status and assessment for non-invasive ventilation, access to specialist respiratory care and a structured admission episode, and optimal management including management of any co-morbid conditions.

Reducing unwarranted variation in emergency bed-days will improve outcomes for patients while reducing expenditure.

If the NICE guidance (see “Resources”), based on evidence of clinical and cost effectiveness, was systematically applied in primary and secondary care, there would be a substantial reduction in unwarranted variation, and a substantial improvement in patient outcomes.

The consultative national strategy for COPD (see “Resources”) provides the rationale and evidence for a fundamental change in the way in which care is delivered to people with COPD to ensure improved outcomes, and reduce the healthcare burden.

The work being done by the National Clinical Directors for Respiratory Disease and clinicians at a local level will lead to better use of existing resources through the development of a system of care, integrating services that are often delivered in an uncoordinated and piecemeal way.

## RESOURCES

- NICE Clinical Guideline (CG) 101 COPD (update), available at: <http://guidance.nice.org.uk/CG101>
- Consultation on a Strategy for Services for Chronic Obstructive Pulmonary Disease (COPD) in England is available at: [http://www.pcrs-uk.org/copd\\_qrg/qrg\\_strategy\\_in\\_full.pdf](http://www.pcrs-uk.org/copd_qrg/qrg_strategy_in_full.pdf)
- National COPD Audit, under the auspices of the National COPD Resources and Outcomes Project, is available at: <http://www.rcplondon.ac.uk/copd>

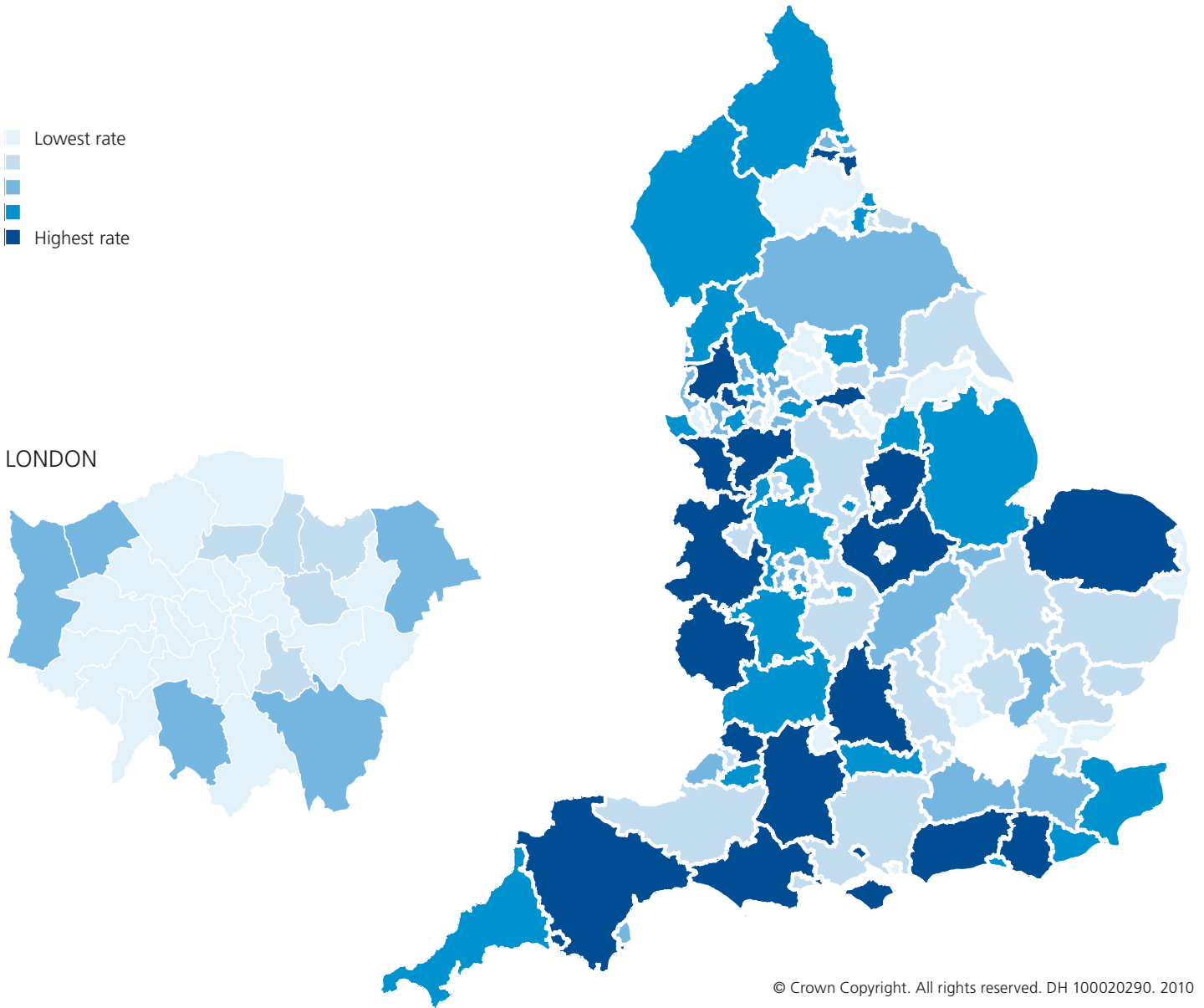
Other resources to support commissioning and clinical practice in COPD can be found on the following websites:

- British Lung Foundation, available at: <http://www.lunguk.org/>
- Primary Care Respiratory Society, available at: <http://www.pcrs-uk.org/>
- British Thoracic Society, available at: <http://www.brit-thoracic.org.uk/>
- IMPRESS, available at: <http://www.impressresp.com/>
- Association of Public Health Observatories COPD Expected Prevalence Model, available at: <http://www.apho.org.uk/resource/item.aspx?RID=48313>

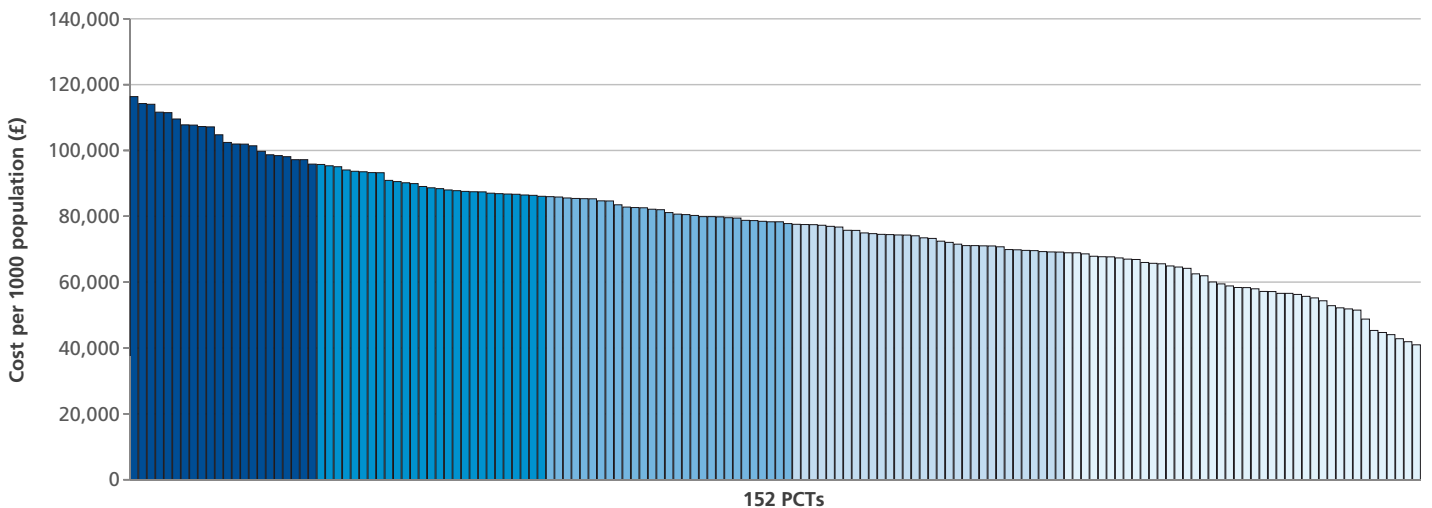
PROBLEMS OF THE MUSCULO-SKELETAL SYSTEM

# Map 19: Musculo-skeletal expenditure per 1000 population by PCT

Weighted by age, sex, and need; 2008/09



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## Context

The national programme budget for musculo-skeletal disease in England for the financial year 2008/09 was £4,214,927,000<sup>1</sup> (see Table 1, page 13).

## Magnitude of variation

The variation among PCTs in musculo-skeletal expenditure is almost threefold, ranging from just over £40,000 per 1000 population to almost £120,000 per 1000 population. When the five PCTs with the highest rates of expenditure and the five PCTs with the lowest rates of expenditure are excluded, the variation is still greater than twofold.

The degree of variation in investment in musculo-skeletal services does not reflect the variation in the incidence, prevalence or severity of osteo-arthritis or rheumatoid arthritis (see bar chart accompanying Map 20, which shows the severity of osteoarthritis).

## Options for action

In October 2010, individualised Health Investment Packs were made available to every PCT showing spend on programme budgets locally. For PCTs where expenditure on musculo-skeletal disease is much greater when compared with other PCTs, the packs provide more detailed information, including that for expenditure on prescribed medication and on hospital care. This information will help commissioners to identify how:

- to increase the value obtained from the resources invested;
- to reduce unwarranted variation.

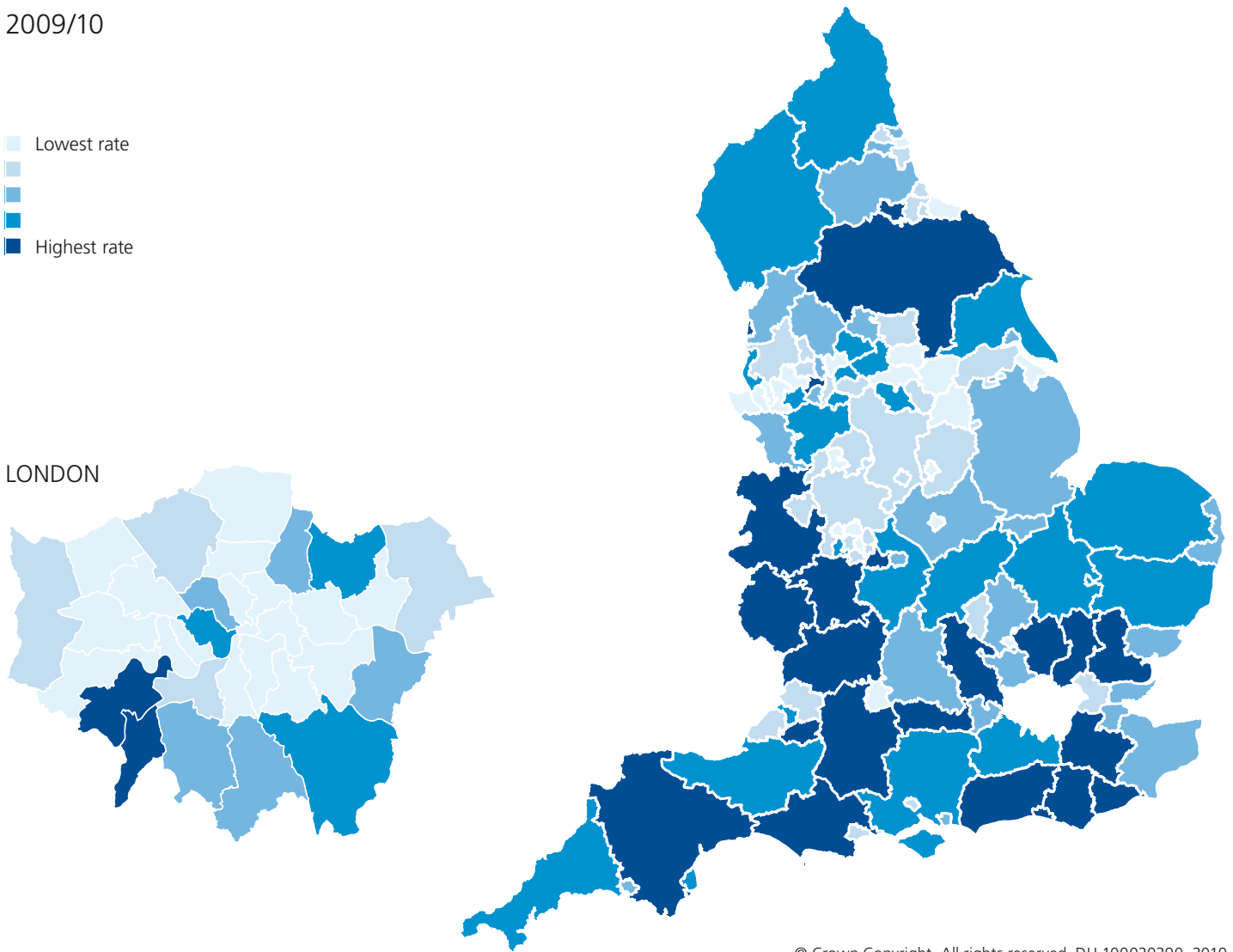
There is little understanding of the relationship between spend and health outcome. However, in June 2010, Oldham PCT launched a project to focus on the musculo-skeletal programme budget: the PCT commissioned a “prime vendor” to be accountable clinically and financially for the whole musculo-skeletal programme budget.

<sup>1</sup> This excludes expenditure on general medical services, personal medical services, SHAs and miscellaneous.

**PROBLEMS OF THE MUSCULO-SKELETAL SYSTEM**

**Map 20: Mean (average) pre-operative EQ-5D Index score for knee replacement surgery by PCT**

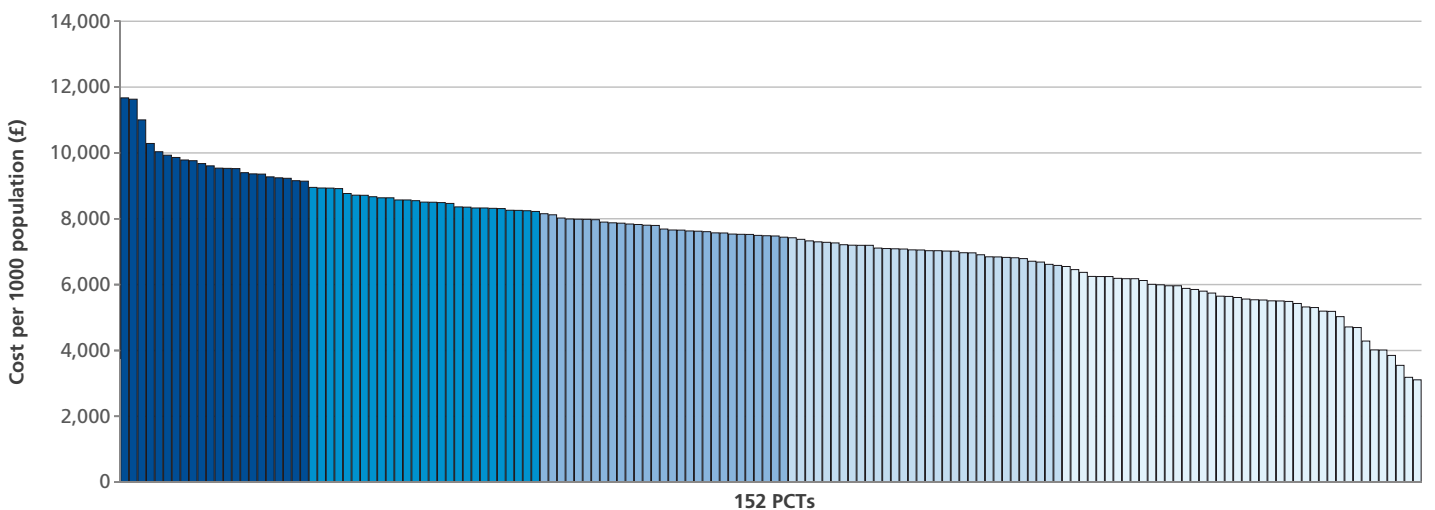
2009/10



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**Primary knee replacement inpatient admission expenditure per 1000 population by PCT**

Weighted by age, sex, and need; 2008/09





## Context

There is wide variation in expenditure on total knee replacement across England.

## Magnitude of variation

Despite allowing for natural variation due to age, the variation among PCTs in primary knee replacement inpatient admission expenditure per 1000 population is almost fourfold, ranging from around £3000 to almost £12,000 (see bar chart). When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation is greater than twofold.

Variation is unwarranted when it cannot be explained by variation in patient need or patient preference for surgery. Unwarranted variation in knee replacement could be due to differences in:

- access to health services;
- clinical practice – some orthopaedic consultants are more likely to recommend a knee replacement operation for the same level of clinical need when compared with their peers.

The National Patient Reported Outcome Measures (PROMs) data suggest twofold variation in the severity of knee symptoms and disability prior to surgery (see map and London inset for mean [average] pre-operative EQ-5D Index score).

The PROMs data also reveal that those areas of the country with the highest rates of total knee replacement have PROMs with the lowest pain and disability scores. Those areas with the greatest need and the poorest access to knee replacement surgery tend to be more deprived, and those areas with the lowest level of need and the highest surgery rates tend to be wealthier.<sup>1</sup> These findings are consistent with the Inverse Care Law where people with the greatest need (in this case, the worst knee arthritis disease severity scores) in the most deprived areas have the lowest surgical intervention rates, whereas people in the wealthiest areas have the least symptoms of pain and disability and the highest surgical intervention rates.

One reason to be concerned about undertaking an intervention when a patient's symptoms are less severe

is that the patient is less likely to perceive a significant benefit, and, if there are any adverse effects of surgery, to regard the intervention as having been of little value.

Although 92% of knee replacement respondents recorded joint-related improvements following their operation, only 77% recorded an increase in their general health (EQ-5D), and only 50% an increase in their general health on a visual analogue scale (EQ-5D VAS score).<sup>2</sup> Data from the National Joint Registry show that roughly one in five people (20%) who have had a knee replacement are either dissatisfied with the result or are unsure if they are satisfied, possibly due to unrealistic expectations of surgery.

## Options for action

One measure to reduce unwarranted variation is shared decision-making, where patient decision aids support an individual in making a fully informed decision while taking account of the risks and benefits of surgery for them as an individual, and their own values and preferences in relation to different treatment options. Support for patient decision-making has been shown to reduce both over-use and under-provision of "discretionary surgery", and lead to a better patient experience with at least as good outcomes as standard care.<sup>3</sup>

This strategy is likely to be more acceptable and more effective than the use of an arbitrary treatment threshold, which has been shown to have limited effectiveness, and limited patient and professional acceptability.

## RESOURCES

- NHS East of England is leading the National Shared Decision Making Programme as part of the QIPP Right Care Programme. The aim is to embed patient decision aids and shared decision-making in routine NHS care. Contact, marion.collicot@eoe.nhs.uk
- Ottawa Hospital Research Institute has a Patient Decision Aids website, with an A-Z Inventory of decision aids on particular topics, an Implementation Toolkit, a Development Toolkit, an online tutorial to help develop skills in providing decision support, and a personal decision guide for patients, available at: <http://decisionaid.ohri.ca/index.html>

1 Judge A, Welton NJ, Sandhu J, Ben-Shlomo Y. Equity in access to total joint replacement of the hip and knee in England: cross sectional study. *BMJ* 2010;341:c4092. doi: 10.1136/bmj.c4092.

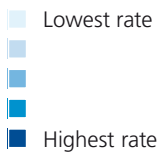
2 Source: <http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1295>

3 O'Connor AM et al. Decision aids for people facing health treatment or screening decisions. *Cochrane Database of Systematic Reviews* 2009, Issue 3. Art. No.: CD001431. doi: 10.1002/14651858.CD001431.pub2.

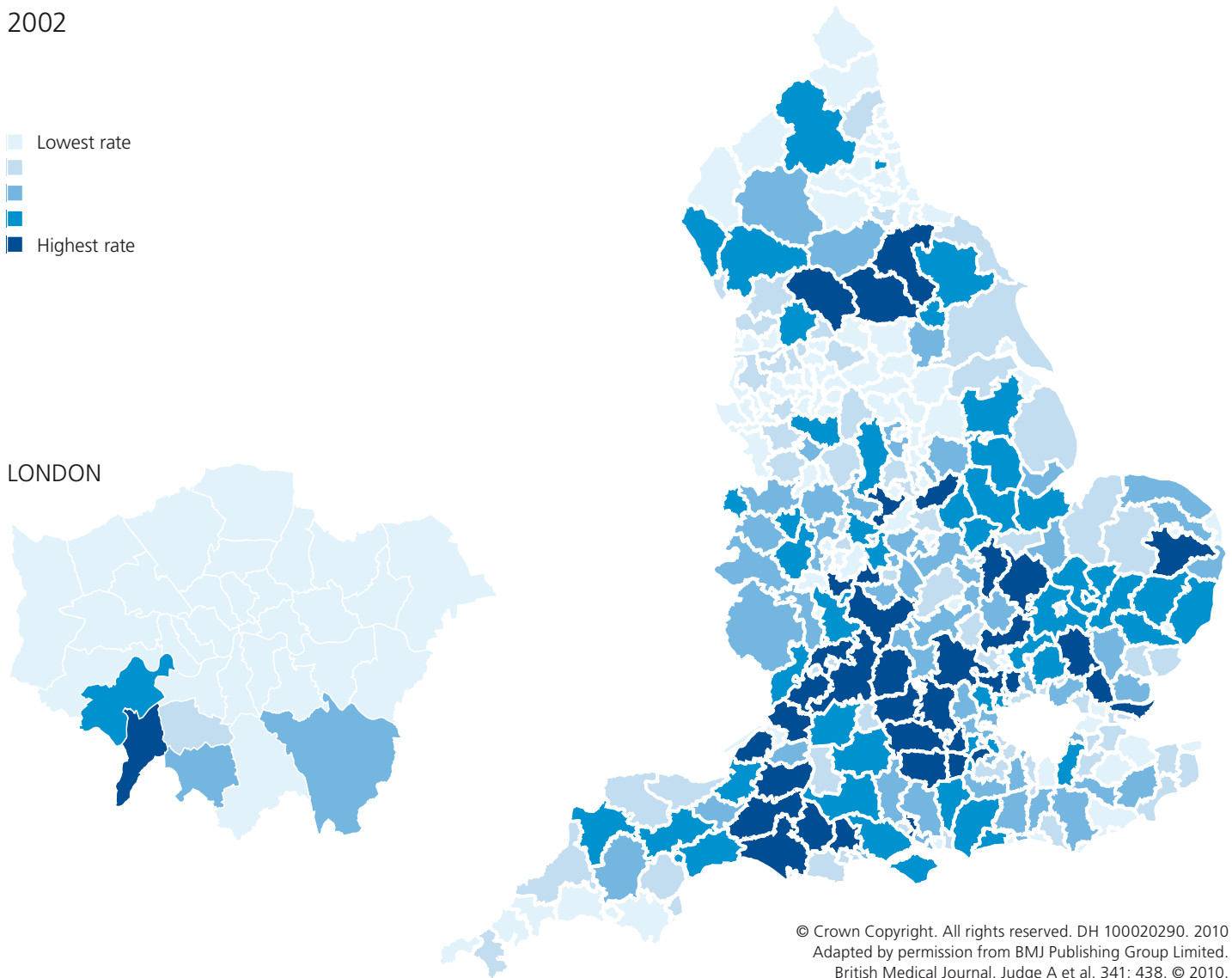
**PROBLEMS OF THE MUSCULO-SKELETAL SYSTEM**

**Map 21: Rate of provision of hip replacement per 1000 people in need by local authority**

2002

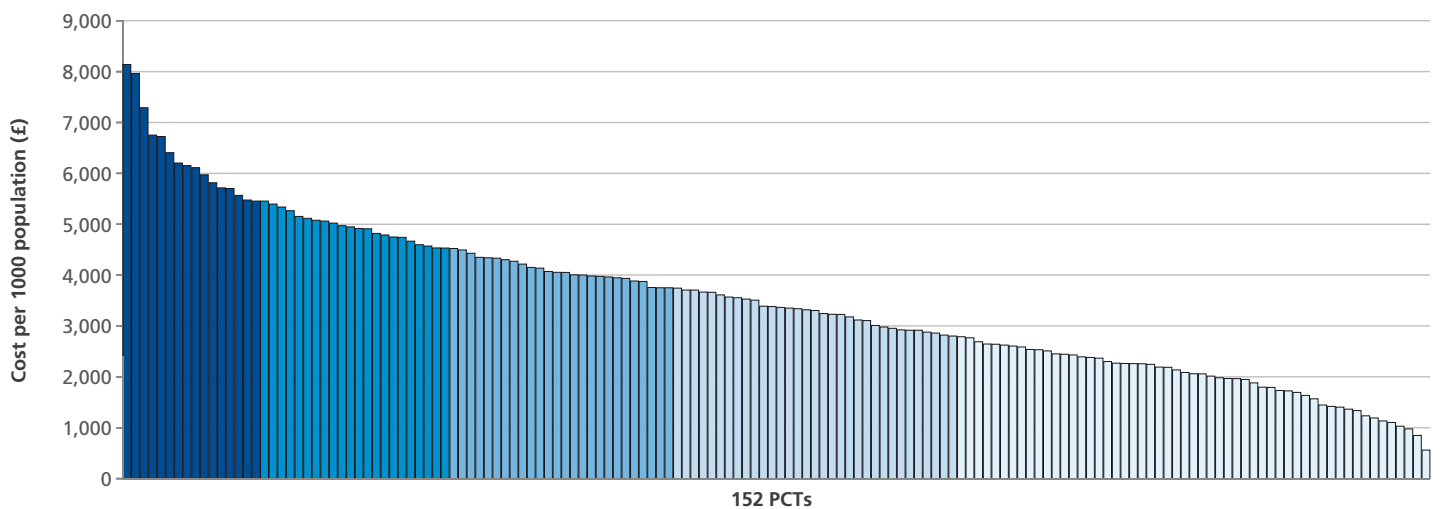


LONDON



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British Medical Journal, Judge A et al. 341: 438. © 2010.

**Bar chart 1: Rate of primary cemented hip replacements expenditure per 1000 population by PCT** Weighted by age, sex, and need; 2008/09



## Context

Hip replacement was voted the greatest operation of the 20th century in a poll in *The Lancet*. It has transformed the quality of life of many people, and the number of hip replacements has increased considerably over the last decade.

## Magnitude of variation

There are major variations in hip replacement rates among geographical areas that cannot be explained solely by differences in need because the data have been corrected to take account of, among other factors, the number of older people in the population, which is the principal determinant of need.

When analysed by local authority boundary, the variation in rate of provision of hip replacement per 1000 people in need is almost 14-fold (see map and London inset). When the 10 local authorities with the highest rates and the 10 local authorities with the lowest rates are excluded, there is a greater than fourfold variation.

When analysed by PCT boundary, the variation in rates of expenditure for cemented primary hip replacement per 1000 population is 16-fold. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, there is a sixfold variation (see bar chart 1).

The rate of expenditure for uncemented primary hip replacement per 1000 population also varies substantially among PCTs at greater than 30-fold. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, an almost 10-fold variation remains (see bar chart 2). For a set of questions commissioners could ask providers about their activity with respect to the use of cementless hips for hip replacement, see Box below.

### **Questions commissioners could ask providers about their activity with respect to the use of cementless hips for hip replacement**

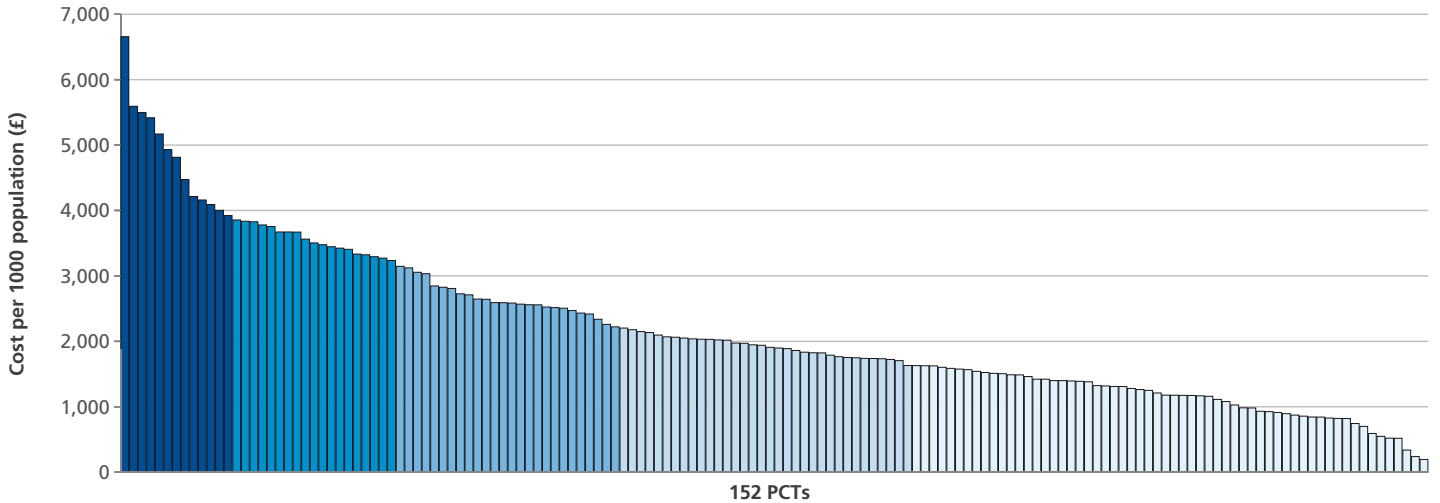
- What are the indications for a cementless hip, and have these changed over time?
- Is there variation among different clinicians?
- Has the evidence base for cementless fixation changed?
- Is survival for cementless hip replacements equivalent to that for cemented hip replacements?

*(continued over)*

### PROBLEMS OF THE MUSCULO-SKELETAL SYSTEM

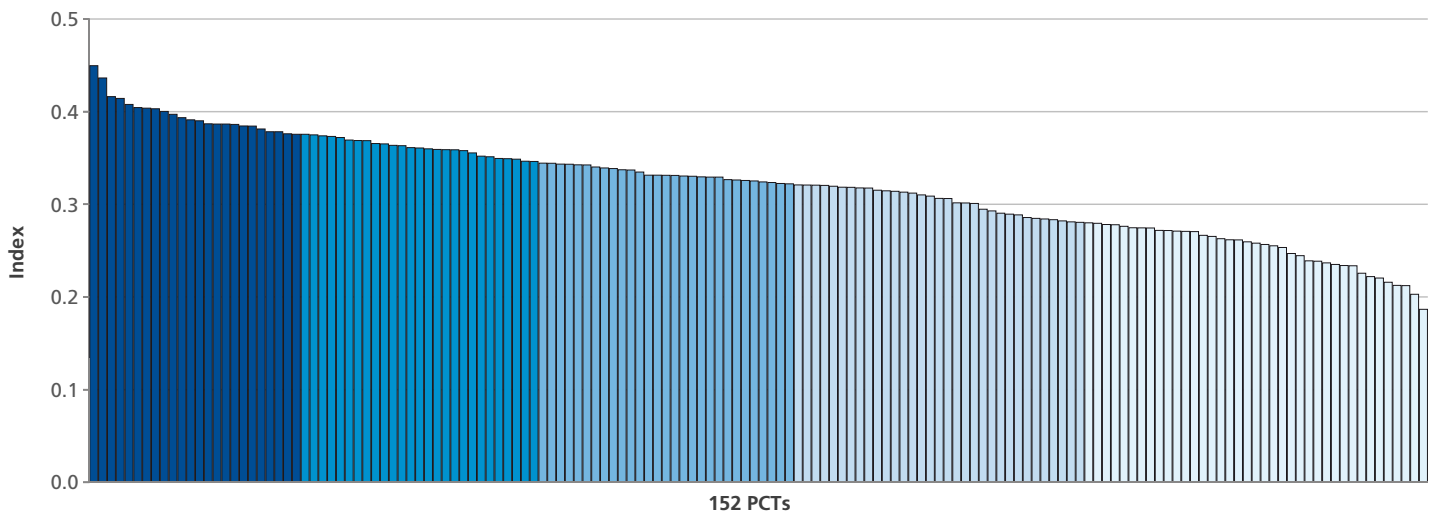
Bar chart 2:  
Rate of primary uncemented hip replacements expenditure per 1000 population by PCT

Weighted by age, sex, and need; 2008/09

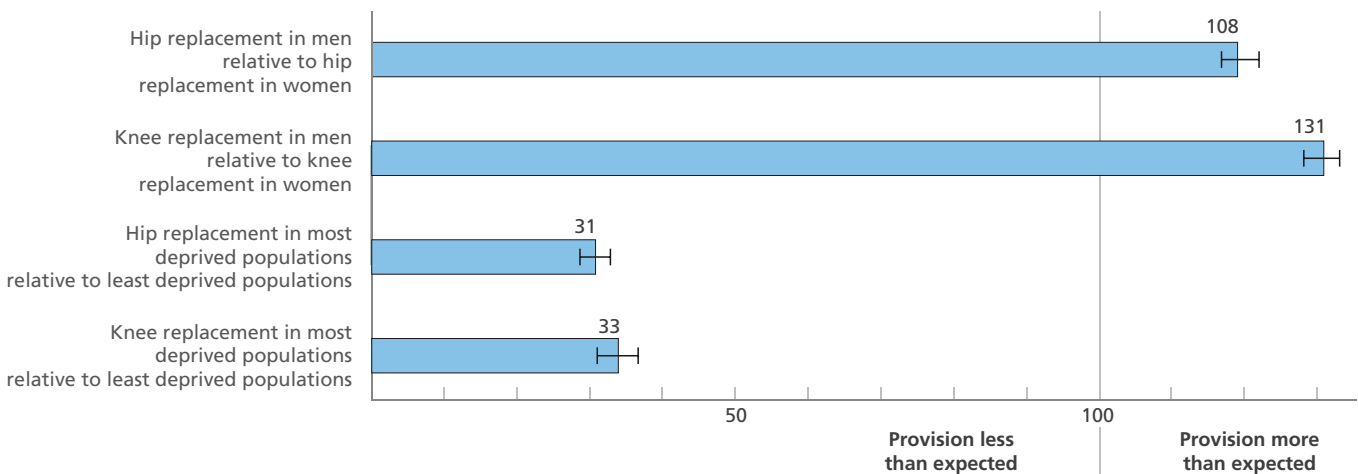


Bar chart 3:  
Mean (average) pre-operative EQ-5D Index score for hip replacement surgery by PCT

2009/10



### Illustration of the Inverse Care Law



Such variations in operative rate and expenditure are considerable, but not unusual. What is important is the additional analysis that reveals variation in the relationship between provision of the operation and need for the operation. The patient questionnaire known as the patient reported outcome measure (PROM) is used not only to assess the outcome of hip replacement but also to measure the need for the operation, by assessing the severity of disease pre-operatively. National data show that the variation in the mean (average) pre-operative EQ-5D Index score for hip replacement surgery among PCTs was greater than twofold, and when the five PCTs with the highest scores and the five PCTs with the lowest scores are excluded, an almost twofold variation remains (see bar chart 3).

These variations suggest that in some populations people are receiving hip replacement much earlier in the course of their arthritis, perhaps when they have less pain or disability.

A detailed analysis by Judge et al.<sup>1</sup> showed that this pattern was not random, and the relationship between provision and need was an example of the Inverse Care Law, that is, the most deprived populations had the lowest rate of hip and knee replacement (see figure). They concluded that “people in the affluent areas get most provision relative to need”.

Our capacity to relate expenditure to outcome, and the relationship these two variables express, i.e. value, will increase as more outcomes are measured.<sup>2,3</sup>

## Options for action

The need for health services for people with musculo-skeletal disease will increase as the population ages, and new drugs and new technologies are developed. It is necessary to have a discussion with both patient and professional groups:

- to identify priorities for treatment;
- to develop a plan to deliver these priorities by focusing on higher value interventions.

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1 Judge A, Welton NJ, Sandhu J, Ben-Shlomo Y. Equity in access to total joint replacement of the hip and knee in England: cross sectional study. *BMJ* 2010;341:c4092. doi: 10.1136/bmj.c4092.

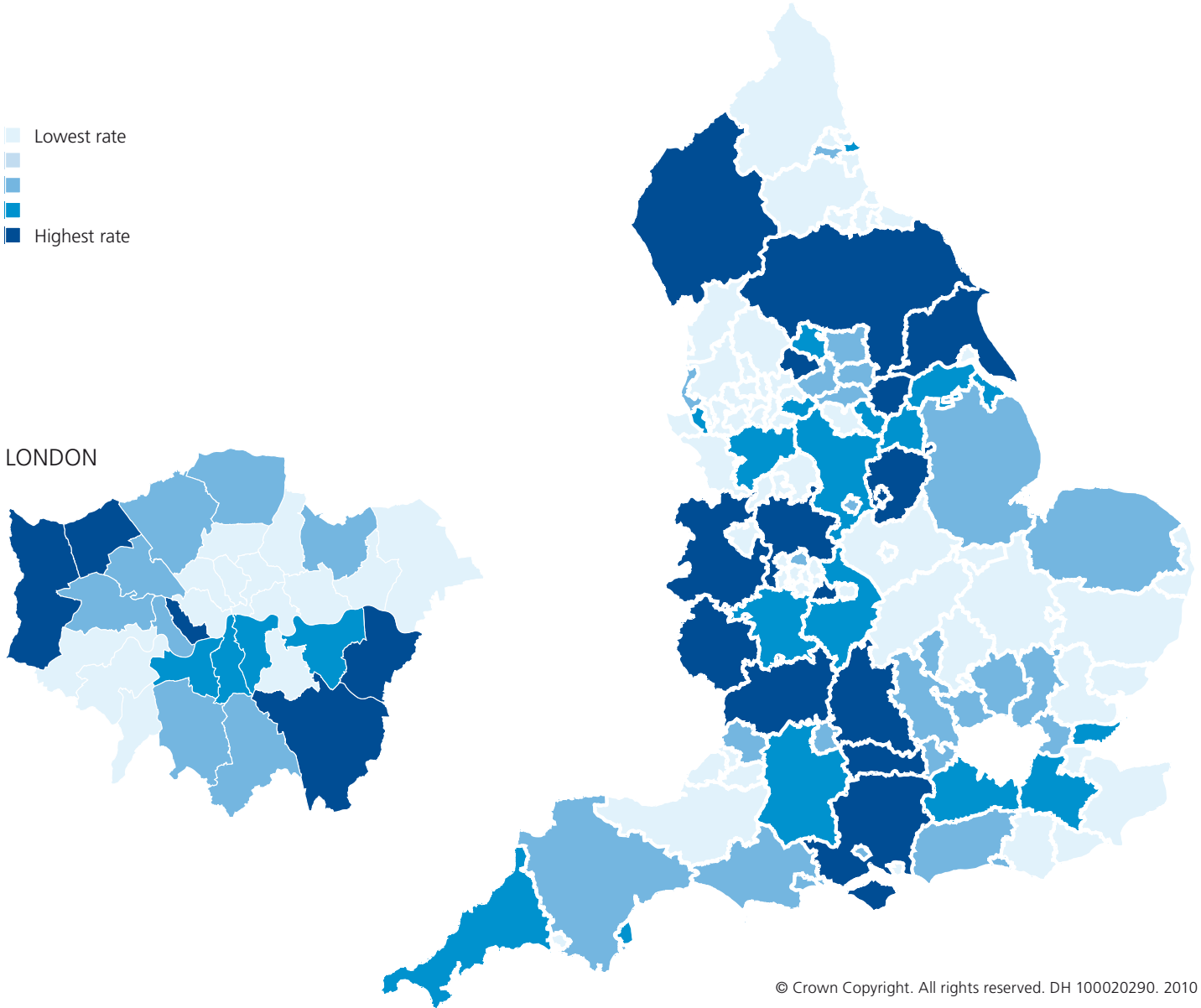
2 Appleby J. Which English hospital is best at hips? 29 September 2010. Available at: [http://www.kingsfund.org.uk/blog/which\\_english.html](http://www.kingsfund.org.uk/blog/which_english.html)

3 Devlin NJ, Appleby J. Getting the most out of PROMs. Putting health outcomes at the heart of NHS decision-making. Updated 13.08.10. London, The King's Fund: 2010.

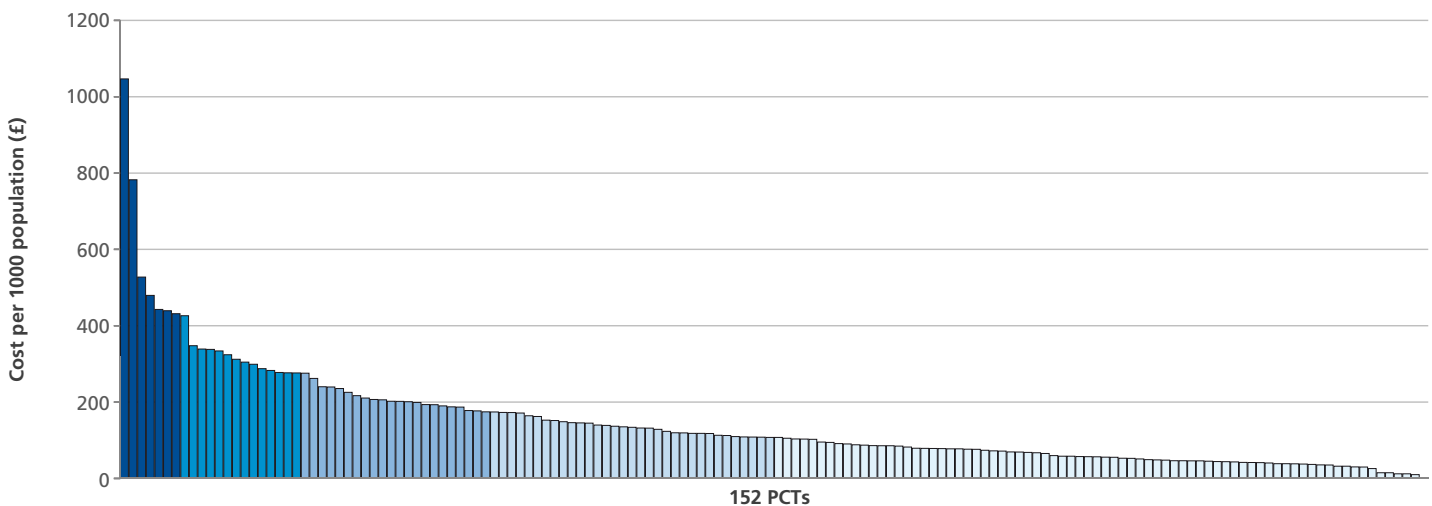
PROBLEMS OF THE MUSCULO-SKELETAL SYSTEM

# Map 22: Rate of anterior cruciate ligament reconstruction expenditure per 1000 population by PCT

Weighted by age, sex, and need; 2008/09



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## Context

Reconstruction of the anterior cruciate ligament of the knee is an operation for which the rate has increased rapidly during the last five years. Innovation is of vital importance: new technology, new drugs, and new ways of working are all essential to the provision of good-quality healthcare.

When an innovation makes treatment less risky or more acceptable to patients, its spread is likely to be quicker, and for surgical interventions the threshold for deciding whether to operate may change. This is because when an operation of significance to patients is made less hazardous or less demanding, it may be offered to people who are less fit or who have less severe disease.

The diffusion of an innovation from the innovator to the group known as early adopters and from thence to other adopters can be mapped. Mapping the spread of a new operation, both over time and geographically, is important.

## Magnitude of variation

The variation among PCTs in the rate of expenditure for anterior cruciate ligament reconstruction per 1000 population is 50-fold. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation among PCTs is ninefold.

## Options for action

There are no data available to inform commissioners how anterior cruciate ligament reconstruction is being used, for example, the proportion of operations being performed on people who need a stable knee joint for employment purposes compared with the proportion of people for whom the operation is primarily for the relief of symptoms. Nor is there any information about the proportion of operations performed only after the patient has been offered rehabilitation first. This information would be very useful especially in the light of the results of a recent randomised controlled trial in Sweden, reported in the *New England Journal of Medicine*, where it was found that:

“a strategy of rehabilitation plus early cruciate ligament repair was not superior to a strategy of rehabilitation plus optional delayed reconstruction. The latter strategy substantially reduced the frequency of surgical reconstructions”.<sup>1</sup>

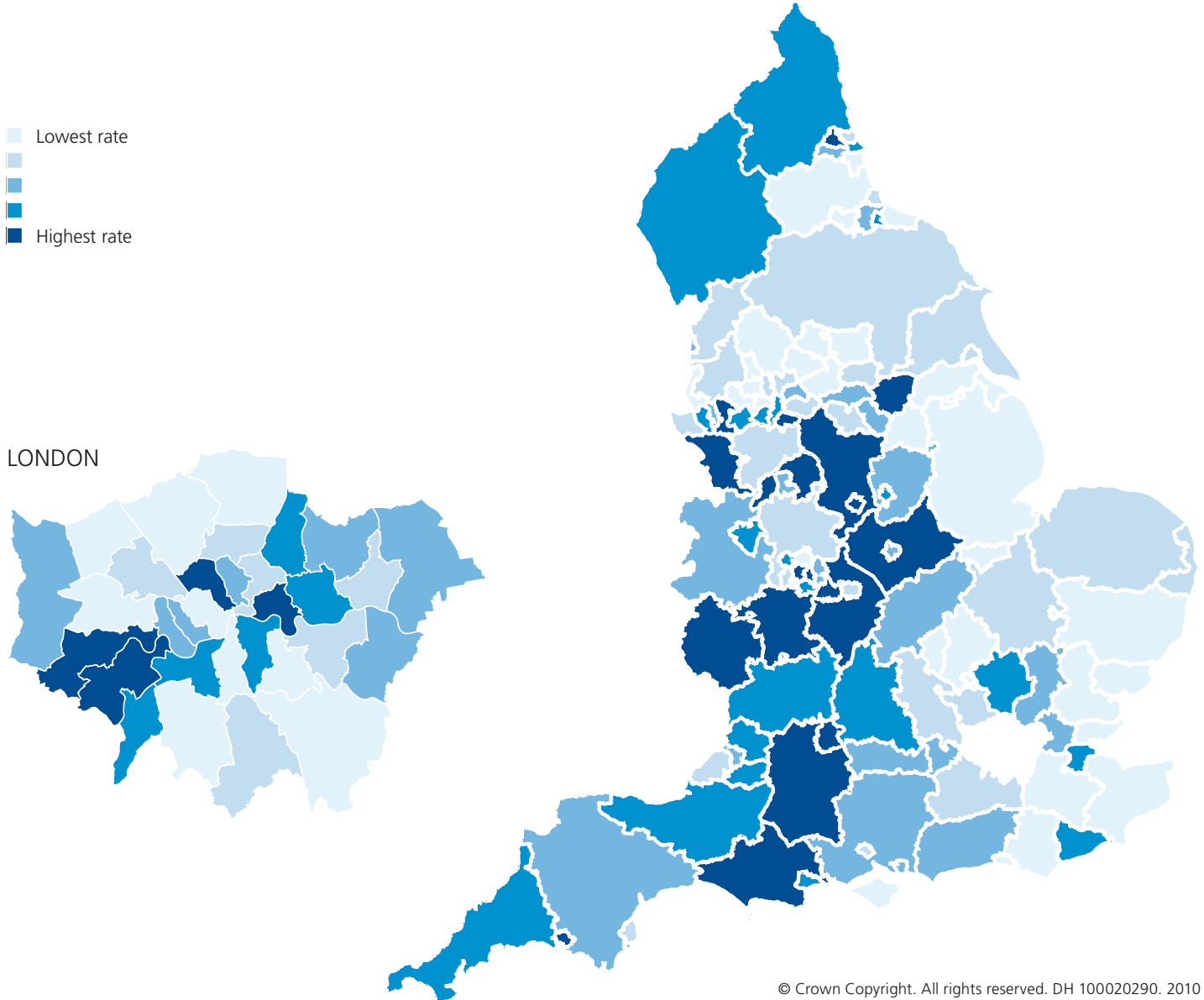
To reduce unwarranted variation, it is not sufficient to look at the operative trends, the whole care package needs to be evaluated.

1 Frobell RB et al. *New England Journal of Medicine* 2010: 363; 386-388.

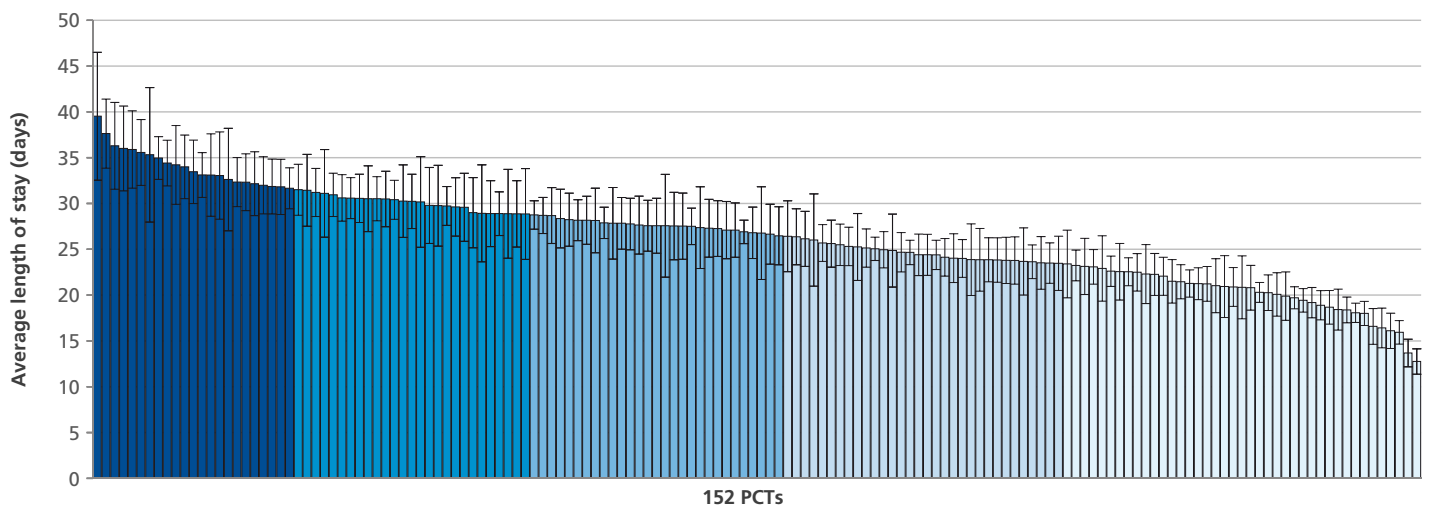
PROBLEMS DUE TO TRAUMA AND INJURIES

# Map 23: Average length of stay (days) for emergency admissions with fractured neck of femur by PCT

2008/09



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## Context

In the UK each year, there are an estimated 233,000 fractures primarily due to osteoporosis combined with a fall (fragility fractures), 77,000 of which are hip fractures. The incidence is rising as the population ages, and by 2016 it is predicted there will be 117,000 hip fractures in the UK, making this group of people a priority for the NHS.

Each year, 7% of people over 65 years will attend the emergency department as a result of falls.<sup>1</sup>

Fragility fractures for people over 60 years account for more NHS bed-days than those for stroke patients >60 years, cardiac ischaemia, heart failure, chronic obstructive pulmonary disease (COPD), and diabetes patients for all ages combined. Within one month, 10% of people with fractured neck of femur die in hospital; at one year, about one-third are dead. Whereas the incidence and outcomes for conditions such as stroke and heart attack have improved considerably, there is no corresponding improvement in outcomes for fractures.

## Magnitude of variation

The variation among PCTs in average length of stay for emergency admissions with fractured neck of femur is threefold. When the five PCTs with the longest average lengths of stay and the five PCTs with the shortest average lengths of stay are excluded, a twofold variation remains.

## Options for action

Best Practice Tariff (BPT) for hip fracture, begun in April 2010, provides a tariff uplift for each patient treatment complying with certain clinical criteria (see "Resources"), which can create incentives for service improvement. Compliance is monitored through the National Hip Fracture Database (NHFD), a national audit project (see "Resources"). As of 1 November 2010, 100% of eligible hospitals in England (n = 176) were registered with the NHFD and of those 94% (n = 166) were regularly submitting data.

The NHFD reviews patient outcomes such as time to surgery, length of stay, incidence of pressure sores, falls assessment, secondary osteoporosis prevention, and 30-day adjusted mortality. The data are reported to PCT commissioners. Since its inception in 2007, the NHFD has had a favourable impact on hip fracture care by promoting improved integration of care, and secondary prevention.

There is clear professional guidance on best practice for hip fracture care in the "Blue Book", produced jointly by the British Geriatrics Society and the British Orthopaedic Association (see "Resources"). This will be reinforced by forthcoming NICE guidance on hip fracture,<sup>2</sup> which will complement existing NICE guidance on falls prevention, and secondary prevention of fragility fracture (see "Resources"). NICE has also issued guidance on the prevention of osteoporosis, one of the causes of fragility fractures (see "Resources").

## RESOURCES

- The National Hip Fracture Database (NHFD), a joint venture of the British Orthopaedic Association and the British Geriatrics Society, has been designed to facilitate improvements in the quality and cost-effectiveness of hip fracture care. Available at: <http://www.nhfd.co.uk/>
- The "Best Practice Tariff (BPT) for Fragility Hip Fracture Care User Guide", developed in conjunction with the Department of Health Payment by Results team, and the guidance entitled "The care of patients with fragility fracture", 2nd edition, 2007 (known as the "Blue Book"), which gives details of service models that support good care of osteoporotic fracture patients, are under the "Resources" section of the NHFD website (see above).
- The NHFD National Report 2010 is available at: [http://www.ccad.org.uk/nhfd.nsf/NHFD\\_National\\_Report\\_2010.pdf](http://www.ccad.org.uk/nhfd.nsf/NHFD_National_Report_2010.pdf)
- NICE Clinical Guidelines (CG) 21 "The assessment and prevention of falls in older people", 2004. Available at: <http://guidance.nice.org.uk/CG21>
- NICE Technology Appraisal (TA) 160 "Osteoporosis – primary prevention", 2008. Available at: <http://guidance.nice.org.uk/TA160>
- NICE Technology Appraisal (TA) 161 "Osteoporosis – secondary prevention including strontium ranelate", 2008. Available at: <http://guidance.nice.org.uk/TA161>

1 Department of Health. Falls and fractures: developing a local joint strategic needs assessment. London, Department of Health: 2009.

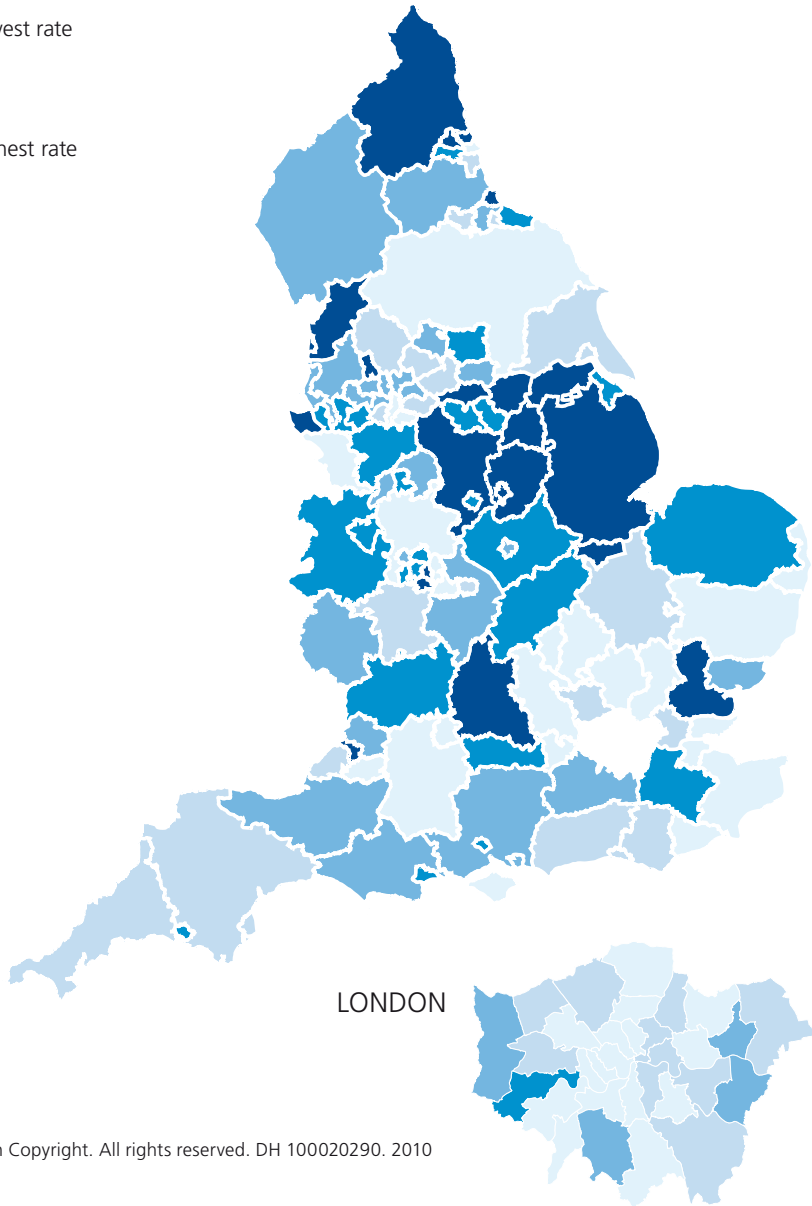
2 Scheduled for publication in June 2011.

PROBLEMS OF THE GENITO-URINARY SYSTEM

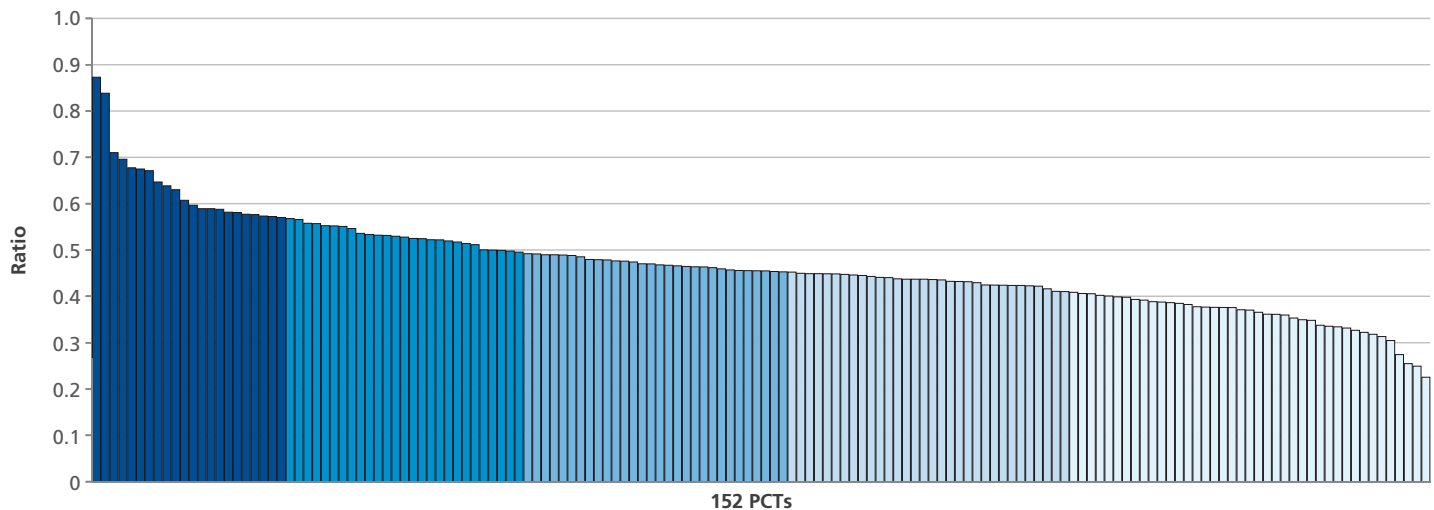
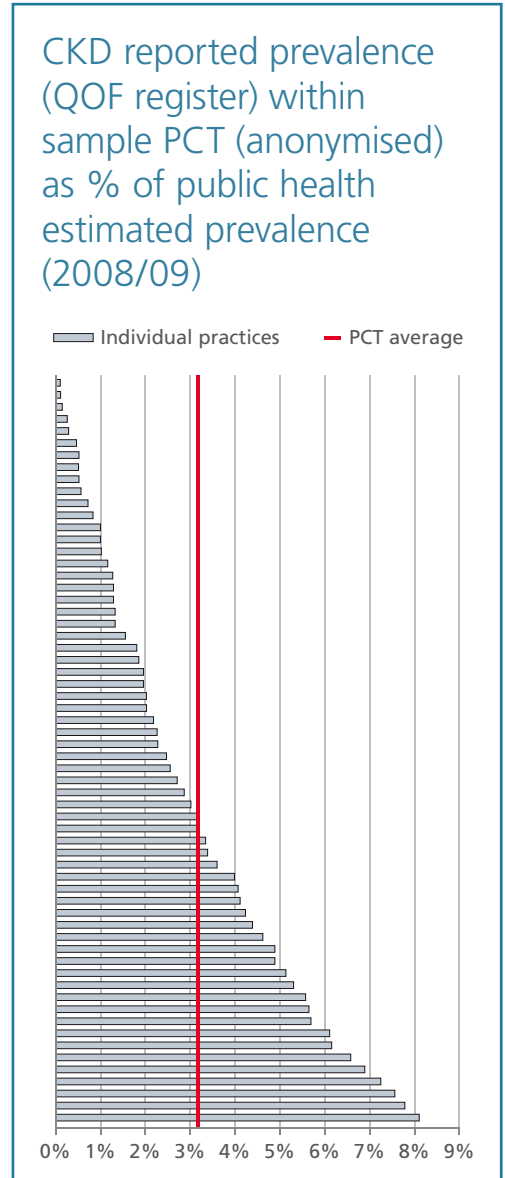
Map 24: Ratio of reported to expected prevalence of chronic kidney disease (CKD) by PCT

2008/09

■ Lowest rate  
■ Highest rate



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## Context

Chronic kidney disease (CKD) is a common, long-term, harmful but treatable condition, affecting about 3 million people in England. Most patients with CKD will have vascular events, particularly stroke and myocardial infarction, resulting in premature death. Only a minority will require treatment for end-stage renal disease. Effective treatment can reduce vascular risk and progression of kidney disease.

CKD is a public health issue.<sup>1</sup> Early identification and management can slow, halt, or reverse disease progression. Simple blood tests, and testing urine for proteinuria, can identify those at greatest risk of progression and in need of intensive management.

CKD management is an essential component of integrated vascular care: the letters CKD could also stand for 'Cardiac, Kidney and Diabetes'. CKD and proteinuria are independent risk factors for cardiovascular morbidity and mortality; diabetes is a leading cause of both CKD and end-stage renal disease. Integrated management of these conditions in primary care, providing holistic management, could lead to greater efficiency and better patient experience.

## Magnitude of variation

Optimal care for people with CKD, and the associated increased vascular risk, requires identification of the affected population to facilitate integrated management, thereby mitigating vascular risk and disease progression.

The Quality and Outcomes Framework (QOF) registers show large variation across England in the ascertainment of people with CKD:<sup>2</sup> between 30% and 70% of the predicted CKD population are unidentified.<sup>3</sup> The variation among PCTs in the ratio of reported to expected CKD prevalence is almost fourfold. When the five PCTs with the highest ratios and the five PCTs with the lowest ratios are excluded (see bar chart associated with map), there is a slightly greater than twofold variation in ascertainment among PCTs. Moreover, there is a 10-fold variation within PCTs (see figure in box).<sup>2</sup>

Addressing this variation is vital to improving outcomes and reducing harm for individuals, while significantly improving value. Levels of CKD ascertainment are lower

than those for diabetes, possibly because CKD is a relatively new concept.

## Options for action

NICE guidance (CG 73; see "Resources") describes those who should be assessed for CKD. It also provides a costing template for PCTs.

Analysing variation permits targeted quality improvement interventions, for which there is an evidence base. Optimal management of CKD populations in England saves resources, and improves patient outcomes (QI-CKD project; see "Resources").

Integrated care improves the survival of patients with diabetes and CKD.<sup>4</sup> Early identification and management can reduce the number of people who present late to renal units for unplanned dialysis. This group has worse outcomes and higher levels of hospitalisations, with associated increases in expenditure. Disease management programmes for CKD have been demonstrated to improve outcomes, and reduce hospital visits and admissions, resulting in increased value.

## RESOURCES

- NICE Clinical Guideline (CG) 73. Early identification and management of chronic kidney disease in adults in primary and secondary care. 2009. Available at: <http://www.nice.org.uk/Guidance/CG73>
- Quality Improvement in CKD (QI-CKD) is a large research programme in primary care run by the Health Foundation and Kidney Research UK. Tools from the QI-CKD study can enable targeted education and improvements in CKD management in primary care settings. NHS Kidney Care. Quality Improvement in Chronic Kidney Disease 2009 available at: [http://www.kidneycare.nhs.uk/\\_Whatworks-Casestudies-QualityImprovementinChronicKidneyDisease.aspx](http://www.kidneycare.nhs.uk/_Whatworks-Casestudies-QualityImprovementinChronicKidneyDisease.aspx)
- Gallagher H, de Lusignan S, Harris K, Cates C. Quality improvement (QI) strategies for the management of hypertension in chronic kidney disease (CKD) in primary care: a systematic review Br J Gen Pract 2010; 10.3399/bjgp10X502164
- The Association of Public Health Observatories (APHO) has developed a disease prevalence model that commissioners can use to estimate the prevalence of CKD, available at: <http://www.apho.org.uk/resource/view.aspx?RID=48308>

1 Schoolwerth AC, Engelgau MM, Hostetter TH et al. Chronic kidney disease: a public health problem that needs a public health action plan. *Prev Chronic Dis* 2006; 3: 1–6.

2 NHS Kidney Care and East Midlands Public Health Observatory Chronic Kidney Disease Primary Care Trust Profiles. 2010. Available at: [http://www.kidneycare.nhs.uk/\\_Ourworkprogrammes-KidneyDiseaseinPrimaryCare-ChronicKidneyDiseaseprofiles-KidneyDiseasePCTProfiles.aspx](http://www.kidneycare.nhs.uk/_Ourworkprogrammes-KidneyDiseaseinPrimaryCare-ChronicKidneyDiseaseprofiles-KidneyDiseasePCTProfiles.aspx)

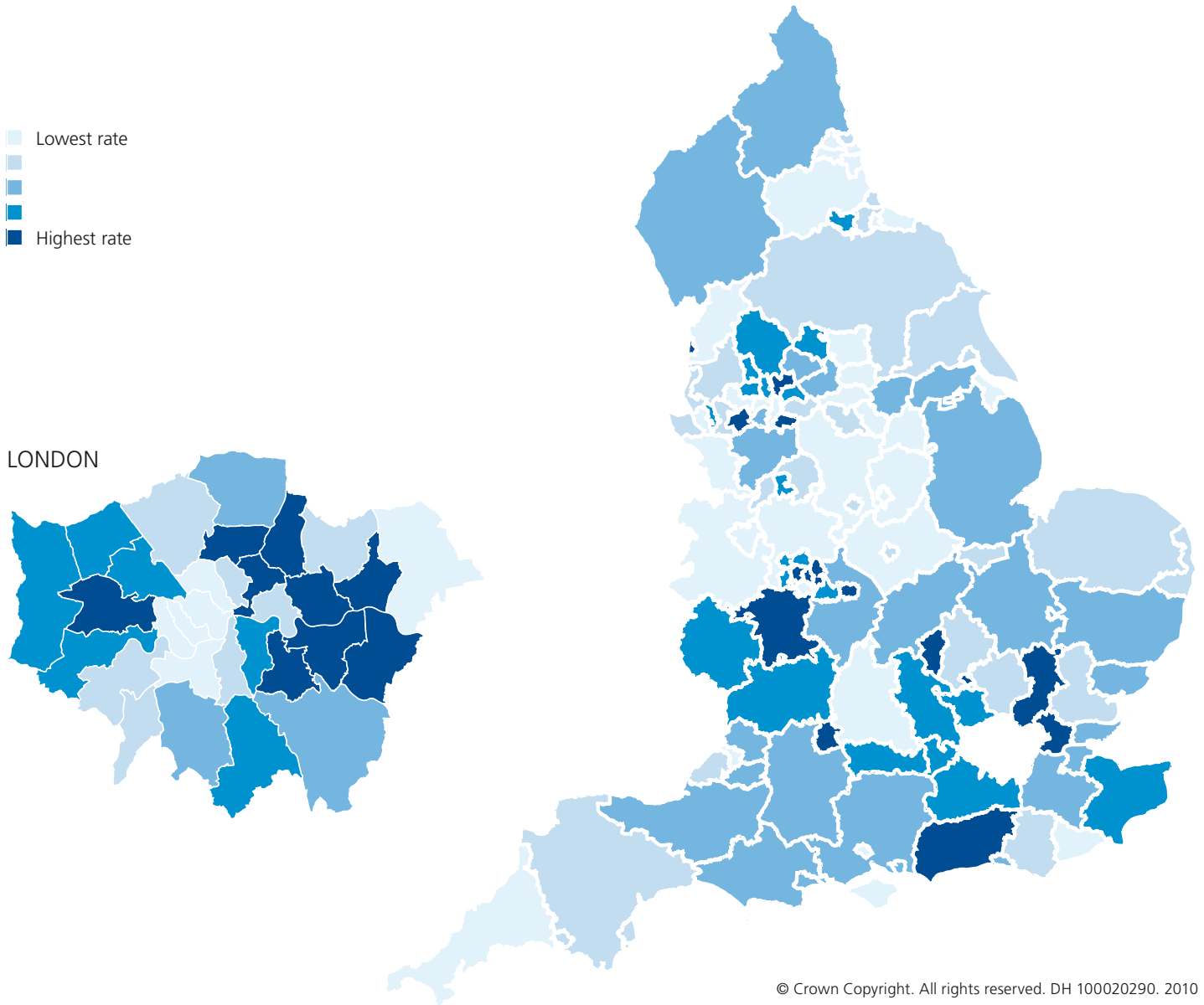
3 Stevens PE, O'Donoghue DJ, de Lusignan S et al. Chronic kidney disease management in the United Kingdom: NEOERICA project results. *Kidney Int* 2007; (72)1: 92–99.

4 Gaede P, Vedel P, Larsen N, et al. Multifactorial intervention and cardiovascular disease in patients with type 2 diabetes. *N Engl J Med*. 2003;348:383–393.

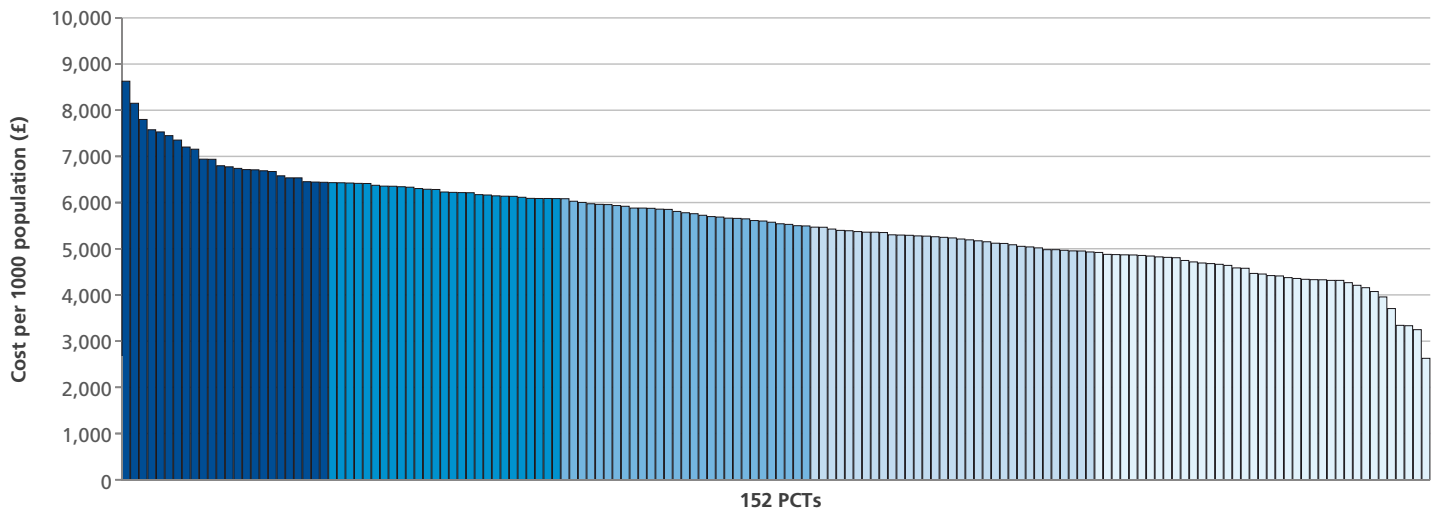
**MATERNITY AND REPRODUCTIVE HEALTH**

**Map 25: Rate of expenditure on Caesarean section (without complications) per 1000 population by PCT**

Weighted by age, and sex; 2008/09



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## Context

The latest NHS Maternity Statistics show that Caesarean section rates as a percentage of deliveries remain stable: in 2008/09, the rate was 24.6% (154,814), and in 2007/08, it was 24.6% (153,406) compared with 24.3% (145,051) in 2006/07.<sup>1</sup> There is no agreed optimum rate; the WHO recently admitted that there had been no evidence to justify their published figure of 15%.

About 40% of Caesarean sections are elective and planned; 60% are carried out as an emergency. 70% of Caesarean sections can be attributed to four indications:

- failure to progress in labour;
- fetal distress;
- breech presentation;
- repeat Caesarean section – by reducing first (primary) Caesarean section, it will reduce the self-perpetuating effect.

Variations in Caesarean section rates among maternity units in England and Wales prompted the National Caesarean Section Audit in 2001.<sup>2</sup>

## Magnitude of variation

The variation in rates of expenditure on Caesarean section (without complications) per 1000 population is approaching threefold. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation is almost twofold.

An interpretation of Caesarean section rates should be conducted in relation to other outcomes including maternal and perinatal morbidity and mortality rates, maternal satisfaction, medico-legal cases, and complaints.

Many factors are thought to have contributed to rising Caesarean section rates, including rising maternal age, obesity, more multiple pregnancies, and maternal choice. NICE Guidelines<sup>3</sup> found evidence that 6–8% of women surveyed during pregnancy expressed preference for Caesarean section. The preference for Caesarean section showed a consistent relationship with previous Caesarean section, previous negative birth experience, complication in current pregnancy, or fear of giving birth. The reason given for the stated preference was the perception that it was safest for the baby. However, in a recent editorial by Knight and Sullivan, they maintain “there is little evidence to suggest” that maternal choice:

“accounts for much variation in caesarean rates between hospitals. Variation is most probably related to differences in the thresholds for intervention at institutional and practitioner levels and variations in the preferred models of care.”<sup>4</sup>

## Options for action

Management of pregnancy and intrapartum care should be according to NICE guidelines (see “Resources”).

Factors known to reduce Caesarean section rates:

- one-to-one support in labour by an appropriately trained healthcare professional;
- offering external cephalic version (ECV) for breech presentation after 36 weeks;
- offering induction after 41 weeks;
- use of a partogram with a 4-hour action line in labour;
- involving consultants in the decision to perform a Caesarean section;
- doing fetal blood sampling before Caesarean section for abnormal cardiotocograph in labour;
- support for women who choose vaginal birth after Caesarean section.

## RESOURCES

- NICE guidelines on intrapartum care, induction of labour, and caesarean section, respectively, are available at: <http://guidance.nice.org.uk/CG55/Guidance/pdf/English>  
<http://guidance.nice.org.uk/CG70>  
<http://guidance.nice.org.uk/CG13>
- “Pathways to success: a self improvement toolkit – focus on normal birth and reducing Caesarean section rates”, developed by the NHS Institute for Innovation and Improvement to help organisations reduce Caesarean section rates. Available at: [http://www.institute.nhs.uk/index.php?option=com\\_joomla&Itemid=194&main\\_page=document\\_product\\_info&cPath=71&products\\_id=334&Joomcartid=icelaaaqohaneptr3jsgdqql0](http://www.institute.nhs.uk/index.php?option=com_joomla&Itemid=194&main_page=document_product_info&cPath=71&products_id=334&Joomcartid=icelaaaqohaneptr3jsgdqql0)
- Other useful resources developed by the NHS Institute for Innovation and Improvement are available at: [http://www.institute.nhs.uk/quality\\_and\\_value/high\\_volume\\_care/focus\\_on%3A\\_caesarean\\_section.html](http://www.institute.nhs.uk/quality_and_value/high_volume_care/focus_on%3A_caesarean_section.html)  
[http://www.institute.nhs.uk/building\\_capability/hi-supporting\\_info/promoting\\_normal\\_birth.html](http://www.institute.nhs.uk/building_capability/hi-supporting_info/promoting_normal_birth.html)

1 <http://www.hesonline.nhs.uk/Ease/servlet/ContentServer?siteID=1937&categoryID=1024>

2 <http://www.rcog.org.uk/news/national-sentinel-caesarean-section-audit-published>

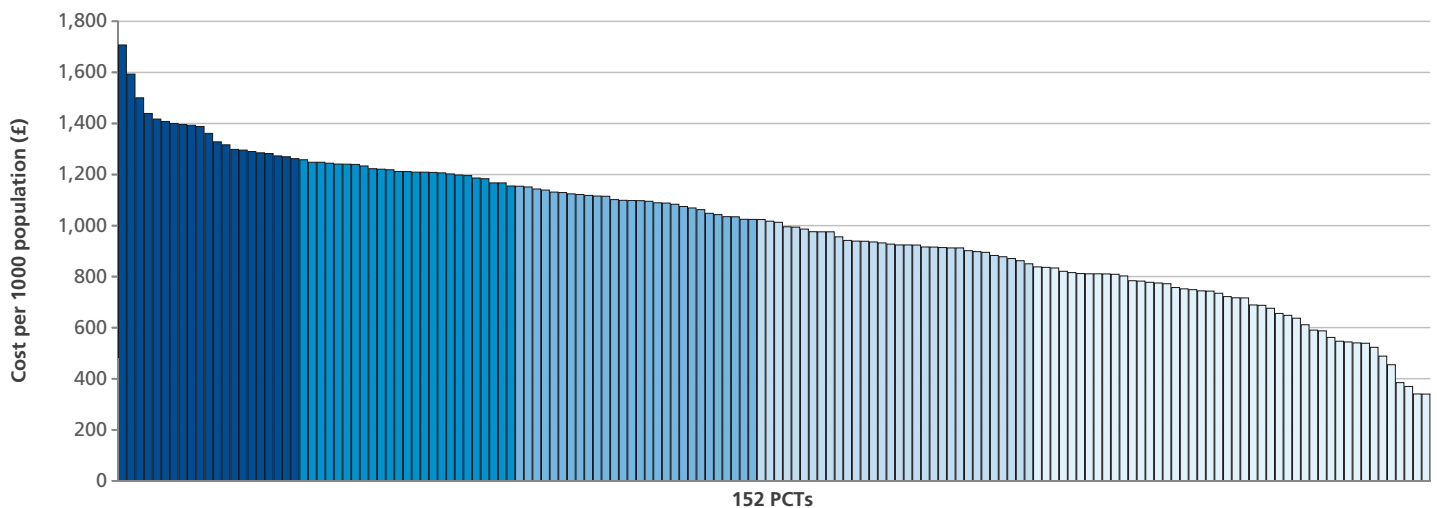
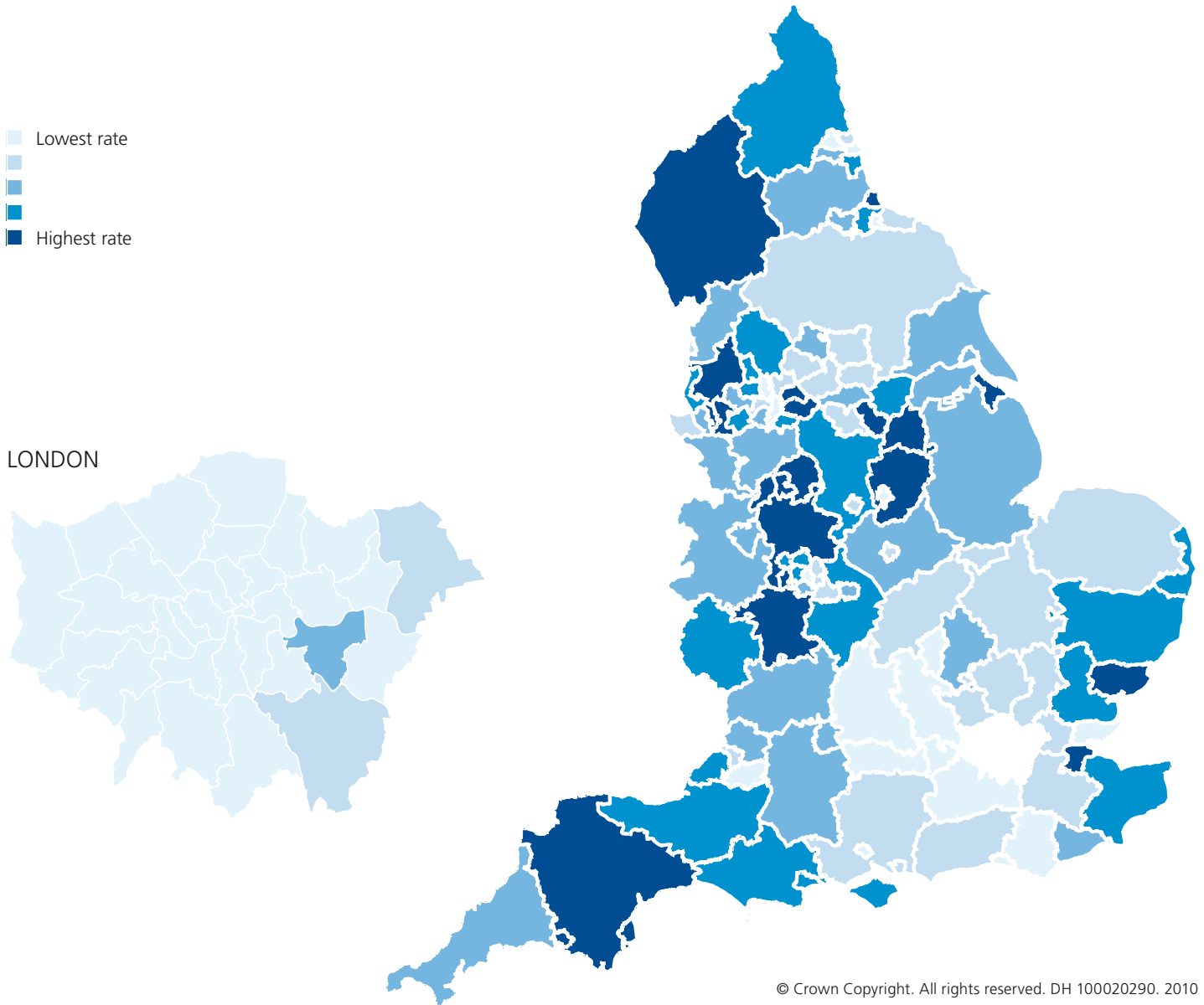
3 <http://guidance.nice.org.uk/CG13/Guidance/pdf/English>

4 Knight M, Sullivan EA. Variation in caesarean delivery rates. *BMJ* 2010;341:c5255 doi: 10.1136/bmj.c5255 (Published 6 October 2010)

**MATERNITY AND REPRODUCTIVE HEALTH**

**Map 26: Abdominal and vaginal excision of uterus inpatient admission expenditure per 1000 population by PCT**

Weighted by age, and sex; Q4 2008/09–Q3 2009/10



## Context

Variations in the rates of surgical operation have been studied between countries, and within countries. In one of the classic studies, it was found that hysterectomy varied more from one area to another than did appendicectomy, hernia repair, or cholecystectomy.<sup>1</sup>

A common indication for hysterectomy is cancer of the uterus, although there are other indications for this operation, and it is possible that variation arises as a consequence of these other indications. Sometimes another operative trend is responsible for a change in the hysterectomy rate: for instance, variations in the Caesarean section rate (see Map 25). A rising trend of Caesarean section over time can have an impact on the hysterectomy rate.

In the past, hysterectomy was an operation for which the culture of the gynaecological service influenced the rate. Furthermore, the views of women themselves contributed to the operative rate. The decision to undertake hysterectomy, therefore, is known as a patient preference-sensitive decision, in which patient preferences about both operative treatment and the risks of recurrence are of great importance.

Technological innovation also influences the rate of hysterectomy, and new technologies are now available for some of the indications for hysterectomy. For example, a technique known as uterine artery embolisation was developed for the treatment of symptomatic uterine fibroids. The safety and efficacy of uterine artery embolisation was compared with hysterectomy in a multicentre retrospective cohort study.<sup>2</sup> The conclusion was that uterine artery embolisation “results in fewer complications than hysterectomy”. However the new operation also had

side-effects, and it was found that some women required further treatment. The authors concluded that “both treatments appeared to be safe and effective in the medium term and the choice of treatment may be a matter of personal preference for each individual woman”.

## Magnitude of variation

The variation among PCTs in inpatient admission expenditure on abdominal and vaginal excision of the uterus per 1000 population is greater than fourfold. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation is approaching threefold.

## Options for action

The decision to have an operation is straightforward for a woman with cancer, but the decision about whether to have an operation, and which operation to have, to relieve symptoms depends on the preferences and values of individual women. For this reason, commissioners and clinicians should ensure that the principles of shared decision-making are put into practice in all gynaecological services: shared decision-making reduces unwarranted variation, and will increase value not only for individual women but also for the population.

## RESOURCES

- Ottawa Hospital Research Institute has a Patient Decision Aids website, with an A–Z Inventory of decision aids on particular topics, an Implementation Toolkit, a Development Toolkit, an online tutorial to help develop skills in providing decision support, and a personal decision guide for patients, available at: <http://decisionaid.ohri.ca/index.html>

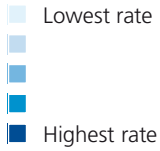
1 McPherson K, Wennberg JE, Hovind OB, Clifford P. Small-area variations in the use of common surgical procedures: an international comparison of New England, England, and Norway. *New England Journal of Medicine* 1982; 307 (21): 1310-4.

2 Dutton S, Hirst A, McPherson K, Nicholson T, Maresh M. A UK multicentre retrospective cohort study comparing hysterectomy and uterine artery embolisation for the treatment of symptomatic uterine fibroids (HOPEFUL study): main results on medium-term safety and efficacy. *British Journal of Obstetrics and Gynaecology* 2007; 114 (11): 1340-51.

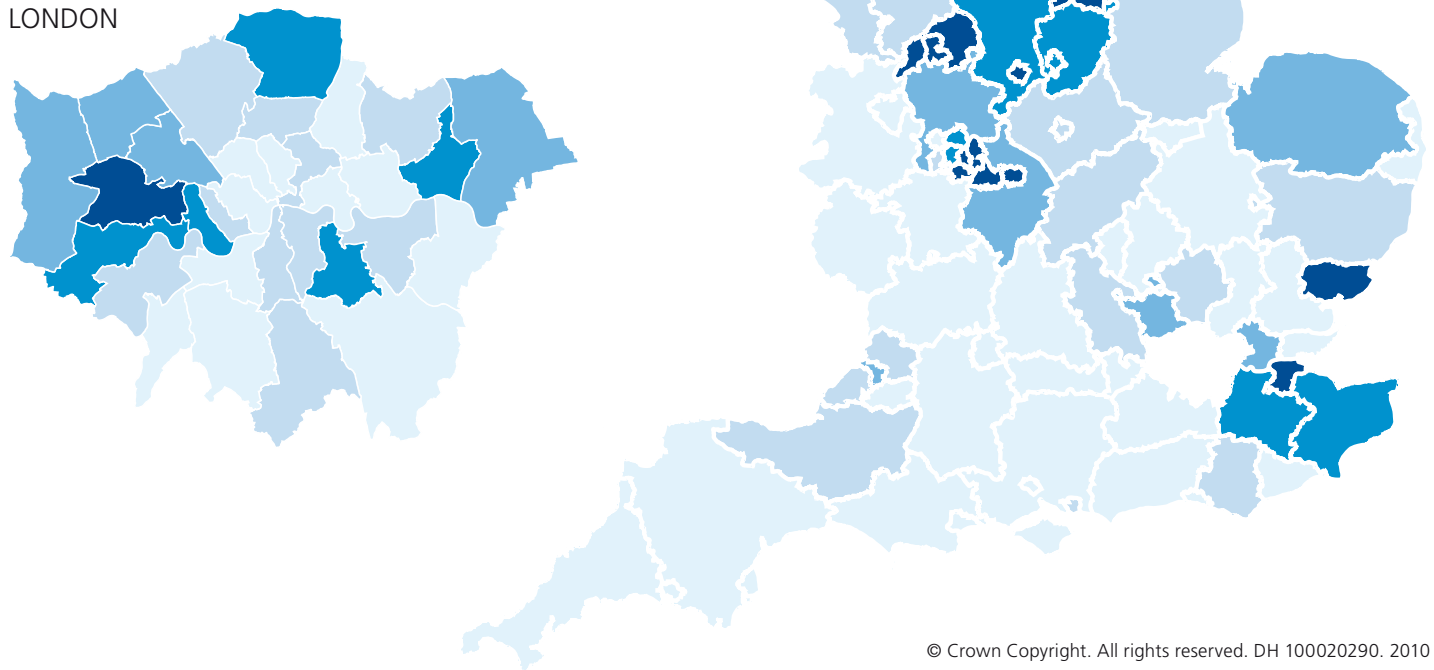
**SCREENING**

Map 27: Percentage of babies screened in the NHS Newborn Hearing Screening Programme (NHSP) referred to diagnostic services by PCT

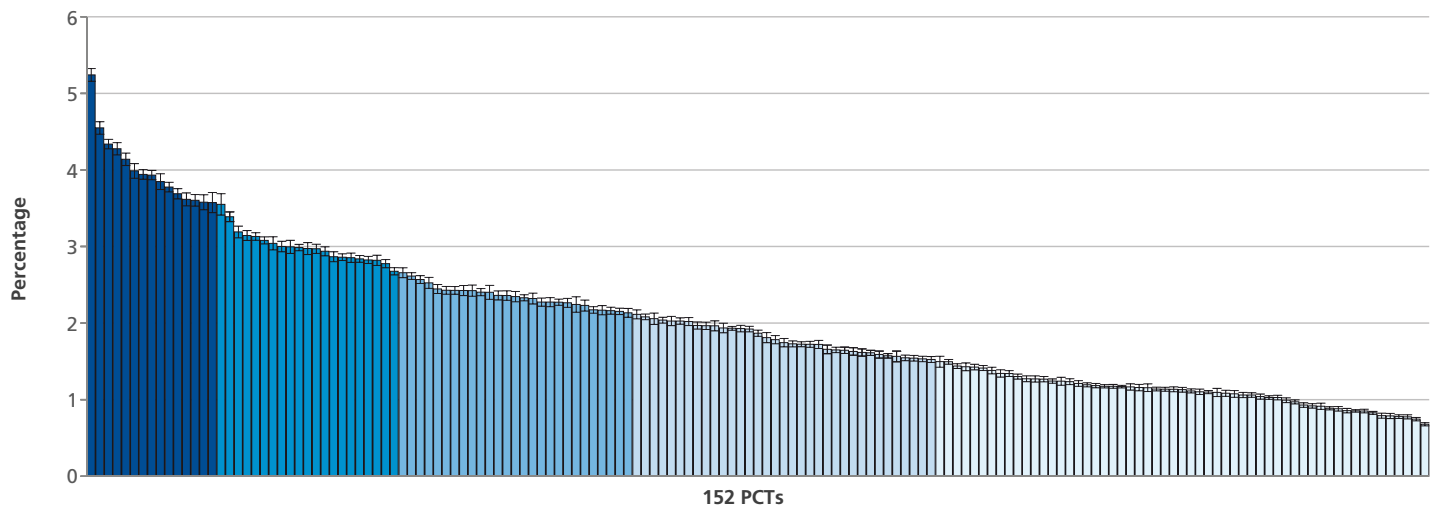
2009



LONDON



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## Context

Congenital deafness, which has a major genetic aetiology, has a major impact on child development. Early identification via the NHS Newborn Hearing Screening Programme (NHSP) greatly reduces this impact. Through NHSP, children are referred to paediatric diagnostic audiology services if they have a poor response in either one ear or both ears at screening. The average referral rate to paediatric diagnostic audiology services is 2%: for about 0.5% of these referrals, this is because babies do not have a clear response in both ears, and for 1.5% of referrals it is because there is not a clear response in either the left or the right ear.

As a result of this diagnostic assessment, children are diagnosed as permanently deaf, borderline, or not deaf. Of the 1000 children identified as deaf by the NHS NHSP in a year, 660 will have bilateral deafness, and, of those, 160 will be profoundly deaf.

There are 20,000 permanently deaf children in England, who receive services from the NHS (including genetic services due to major genetic aetiologies), social services, and education services. About £250 million is spent on paediatric audiology and related services for families and their children in a year.

## Magnitude of variation

The variation among PCTs in the percentage of babies screened in the NHSP referred to diagnostic services is greater than fivefold, ranging from <1% to >5%. When the five PCTs with the highest percentages and the five PCTs with the lowest percentages are excluded, the variation is fourfold.

As a national protocol is applied in the NHSP, using standard procedures and standard equipment, and the mean referral rate is 2%, there should not be such a wide variation. The reason for this variation probably lies in the way the protocol is applied.

In areas where there is under-referral to paediatric diagnostic audiology services, it means that children who are deaf are being missed. In areas where there is over-referral, it means that paediatric diagnostic audiology services will have increased expenditure, and undergone an increase in capacity, both of which may incur opportunity costs for diagnostic services elsewhere.

In 2009, of the 673,398 babies screened, 13,603 babies were referred for electrophysiological diagnosis. However, if there was a maximum referral rate of 2%, a reasonable expectation is that 5829 babies would have been referred (a 57% reduction).

Over-referral of babies for diagnostic assessment is harmful due to the anxiety it causes in parents at an early stage in parenthood, which is very stressful. In addition, it represents a use of resources that is of lower value.

## Options for action

It is important to carry out regular quality control of the local screening programmes, as a complement to formal external quality assurance, to ensure that the national protocol is applied effectively and consistently.

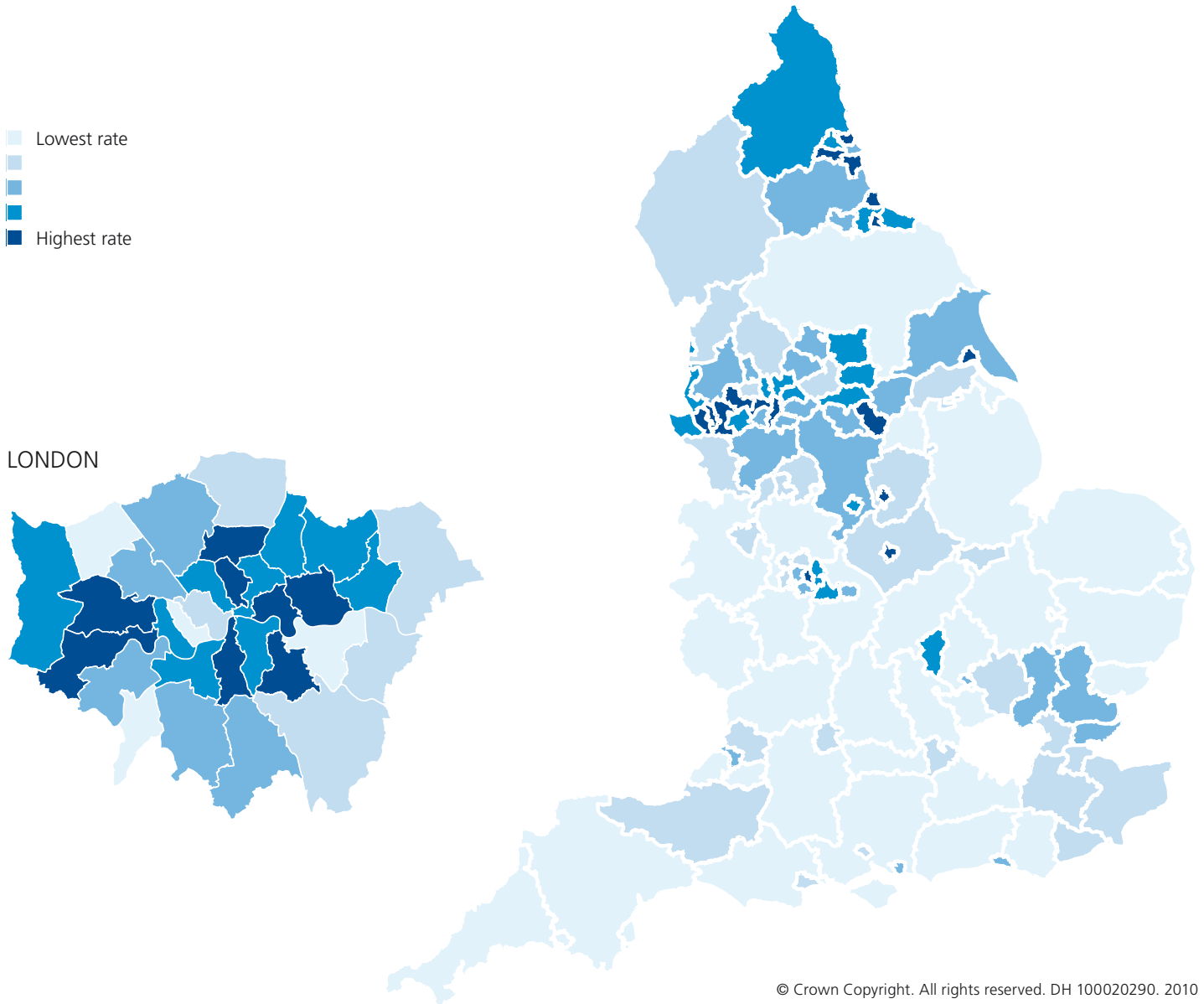
## RESOURCES

- › The NHS Newborn Hearing Screening Programme (NHSP) provides both Public Information and Resources for Professionals on its website, available at: <http://hearing.screening.nhs.uk/>
- › The NHSP is unique in that it captures data by NHS number. Both process and outcome data are collected, covering the number of children born, the number of children screened, the outcome of screening, the outcome of referral, follow-up after diagnosis, and will include detail on longer term outcomes. The NHSP runs an online query service relating to this national information system, with information available at: <https://www.qa-programme.com/nhsptrends> Click on "login" for the instructions needed to obtain a password.

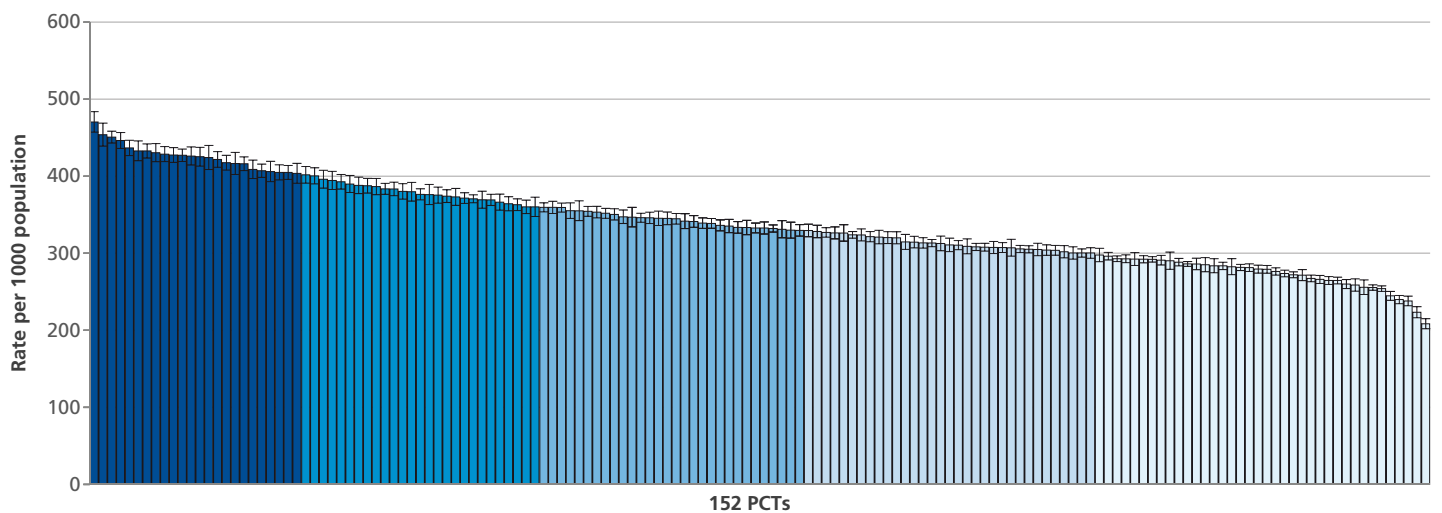
### OLDER ADULTS

## Map 28: Directly standardised rate of emergency admissions in persons over 75 years per 1000 population by PCT

2008/09



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## Context

People older than 75 years, especially those with two or more long-term conditions, account for:

- 40% of emergency admissions;
- 50% of bed-days;
- >50% of re-admissions;
- >80% of delayed transfers of care.

Some planned admissions to hospital can be beneficial for frail older people with multiple conditions. Acute health problems that arise in addition to pre-existing disease can result in a significant and permanent loss of function and disability, unless they are accurately diagnosed and effectively treated. However, inappropriate admission can have severe adverse effects for older people, and lead to irreversible loss of physical and mental functional ability.

## Magnitude of variation

The variation among PCTs for the rate of emergency admissions in people over 75 years per 1000 population is greater than twofold. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation is almost twofold.

Greater variation is observed when examining the data from the Care Quality Commission on the outcomes of emergency admission. The variation in the percentage of people over 85 years old admitted to a care home after emergency admission from their own home is fourfold: in some populations, only 5% of people are discharged to a care home (the best outcome), whereas in others 20% are discharged to a care home.

## Options for action

Where rates of emergency admission are lower, it is necessary to ensure that ageist attitudes are not leading to a failure to consider hospital referral early enough in the course of a deterioration for it to be reversed.

Where rates of emergency admission are higher, it is essential to ensure that inappropriate admissions do not occur, by developing integrated care services, focusing on the need to support people in nursing homes, and their carers, and to engage with out-of-hours GP services, which might refer at a lower threshold than the GP who knows the patient. This is especially important when end-of-life decisions have to be considered (see also Map 29).

The Integrated Care pilots (see “Resources”), a two-year programme launched in 2009, were designed to explore ways in which health and social care could be delivered to help drive improvements in health and well-being at a local level, and be based on local needs. These pilots provide a model for how commissioners can improve care for frail older people.

Some interventions for older people with multiple and complex problems are the same as those used to empower people with a single long-term condition. The promotion of self-care, case management, and risk stratification are now central to the work being promoted by the Department of Health (see “Resources”). However, because older people with complex problems are supported by several agencies, their need is for integrated care. The barriers to integrated care have been analysed by Ham and Smith (see “Resources”). There is a Cochrane Review on alternatives to hospital admission (see “Resources”).

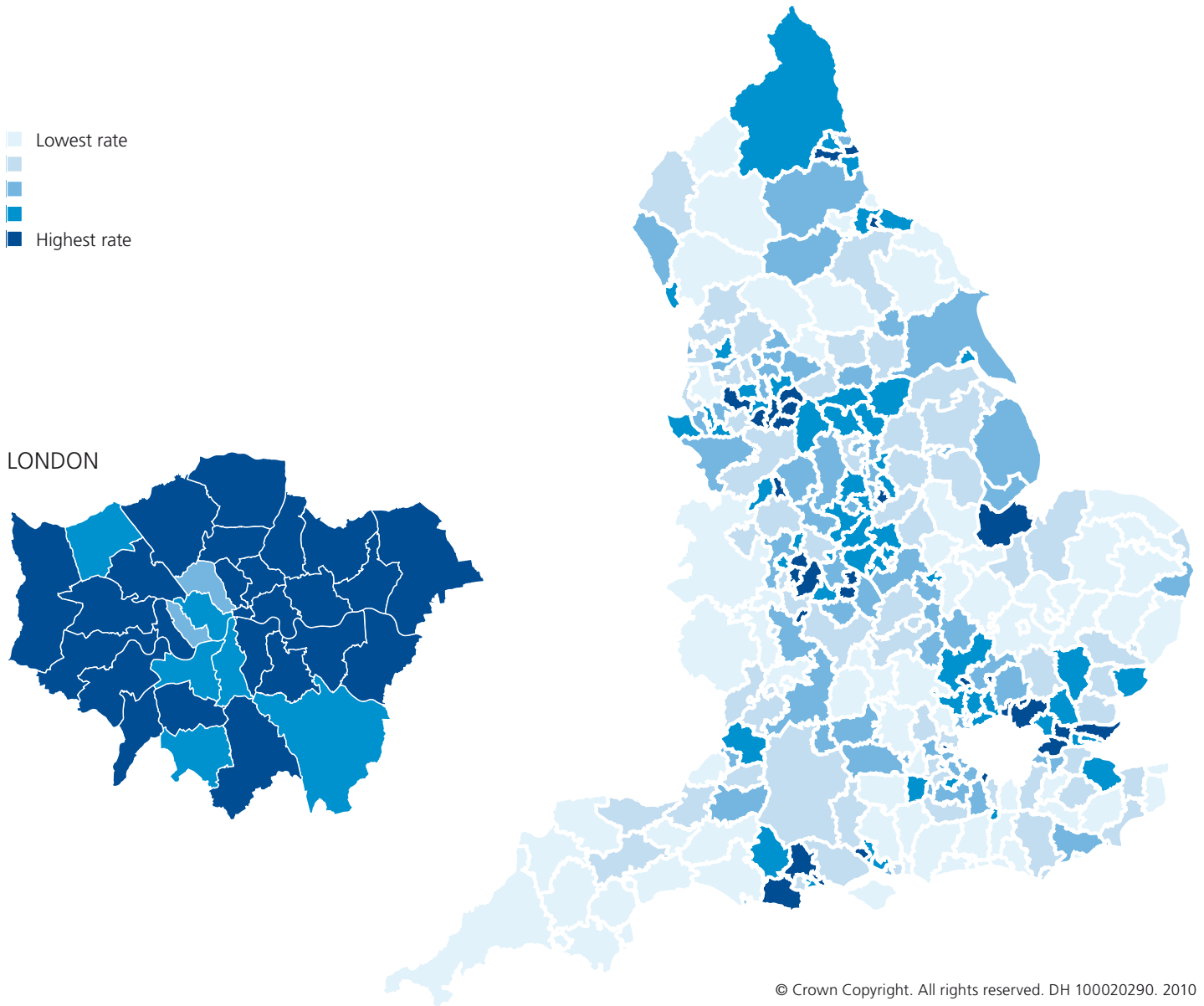
## RESOURCES

- “Integrated care pilots: an introductory guide” is available at: [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_106206](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_106206)
- Information on Integrated Care pilot sites and other resources are available at: <http://www.dhcarenetworks.org.uk/Integration/ICP>
- Information on the Integrated Care network, including an online guide and other resources, is available at: <http://www.dhcarenetworks.org.uk/Integration/icn>
- Department of Health. “Improving the health and well-being of people with long-term conditions”, 2010. Available at: <http://webarchive.nationalarchives.gov.uk/+www.dh.gov.uk/en/Healthcare/Longtermconditions/index.htm>
- National Service Framework for long term conditions, 2005. Available at: [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4105361](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4105361)
- Ham C, Smith J. “Removing the policy barriers to integrated care in England”. Nuffield Trust, London: 2010. Available at: <http://www.nuffieldtrust.org.uk/publications/detail.aspx?id=145&prID=721>
- Shepperd S et al. “Admission avoidance hospital at home”, 2010. Available at: <http://onlinelibrary.wiley.com/doi/10.1002/14651909.cd007491>

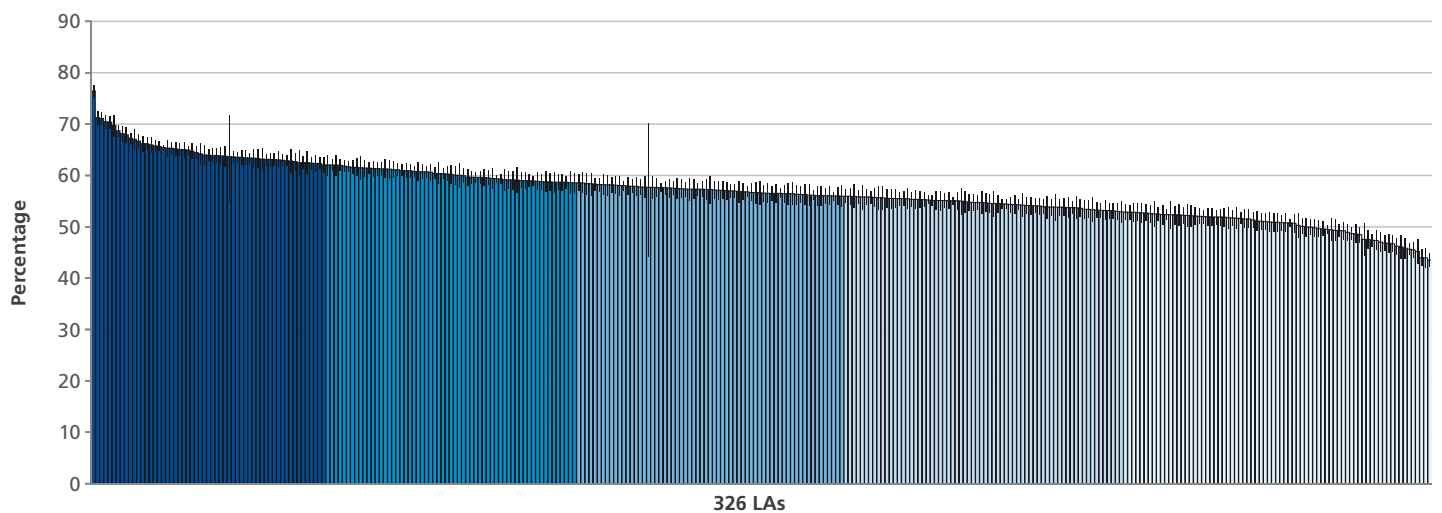
END-OF-LIFE CARE

# Map 29: Percentage of all deaths in an area that occur in hospital by local authority

2006–2008



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## Context

Over 450,000 people die in England each year; more than half of these deaths occur in hospital. If possible, people should have the opportunity to die in a place of their choosing; unnecessary hospitalisation of the dying is to be avoided whenever feasible.

## Magnitude of variation

In 2006–08, 58% of all deaths in an area occurred in hospital. The variation among local authority areas was between 44% and 76%. In half of all local authorities, the proportion of deaths in hospital was either below 53% or above 61%. Thus, there is much variation among localities. This suggests that community-based services are not always available to support people where they would prefer to be cared for, leading to potentially inappropriate use of the acute sector.

People should be admitted to hospital only on the basis of need, regardless of incidental factors such as age and frailty. Furthermore, hospitalisation should not be used as the default setting for care when it is clear that admission is medically unnecessary and contrary to someone's expressed wishes.

## Options for action

As for all of the other variations highlighted in the NHS Atlas, at least some part of the variation could be reduced by better management of the available resources.

Care of the dying is provided by a range of agencies including the NHS, local authority social services, charities, and hospices. Commissioners need to consider how this care is best coordinated.

Over 80% of deaths are in people aged 65 years or older. Elderly patients are more likely to be suffering from multiple morbidities at death. Consideration should be given to the support of older people with multiple morbidities outside a hospital setting. A variety of places may constitute home for an elderly person, not only their own house but also settings such as an old people's residential home or a nursing home.

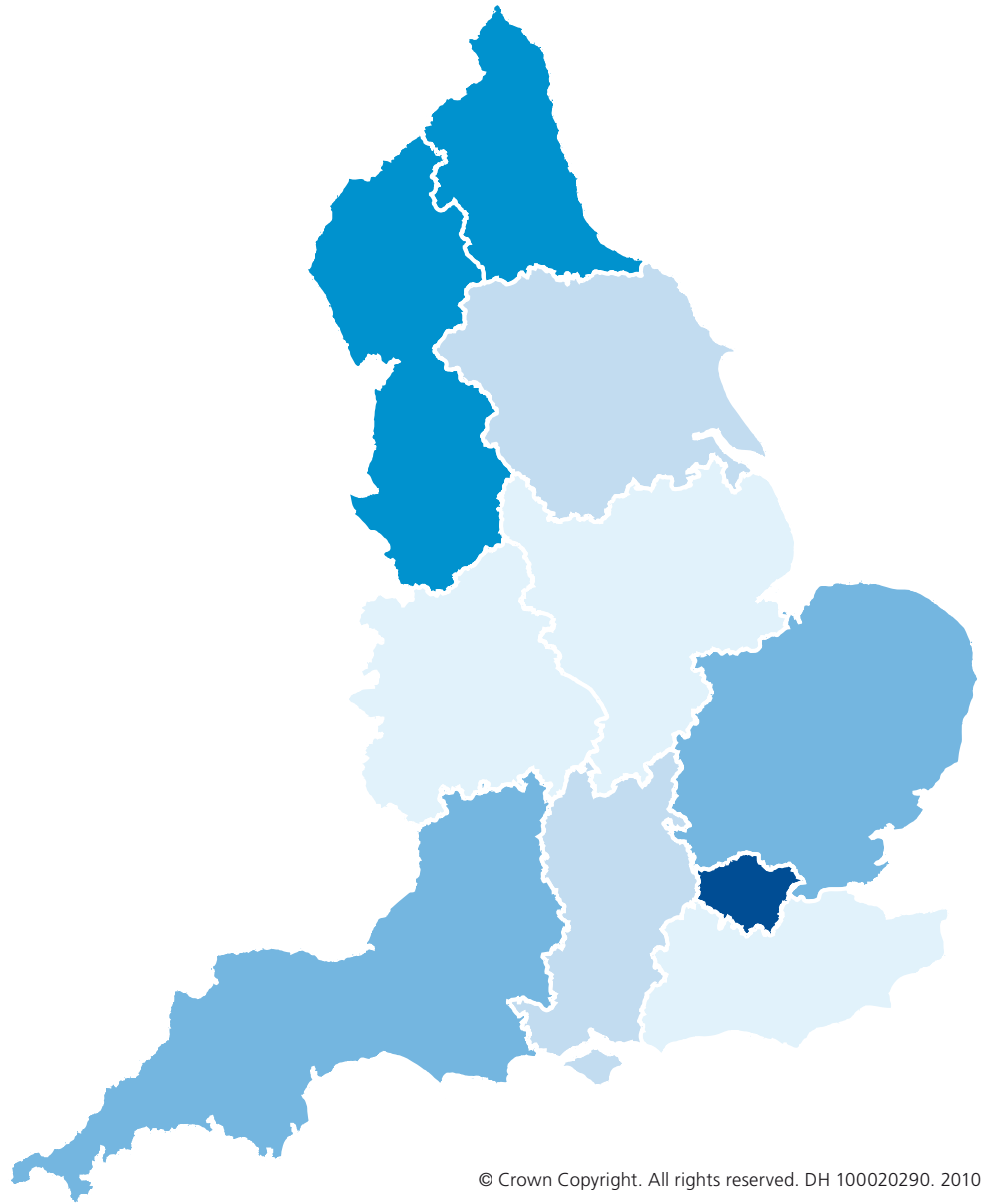
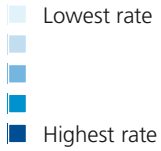
Each person for whom death would not be unexpected should have a care plan that addresses the individual's end-of-life care needs and preferences. The existence of such a care plan should be known by the GP, primary care services, social care services, ambulance services, and local hospitals.

Additional resources might need to be invested in some localities. However, this investment can be undertaken with confidence because unnecessary acute hospital admissions entail significant expenditure. It is clear that better value both for individual people and for the population is obtained by the shift of resources from hospital care to home care.

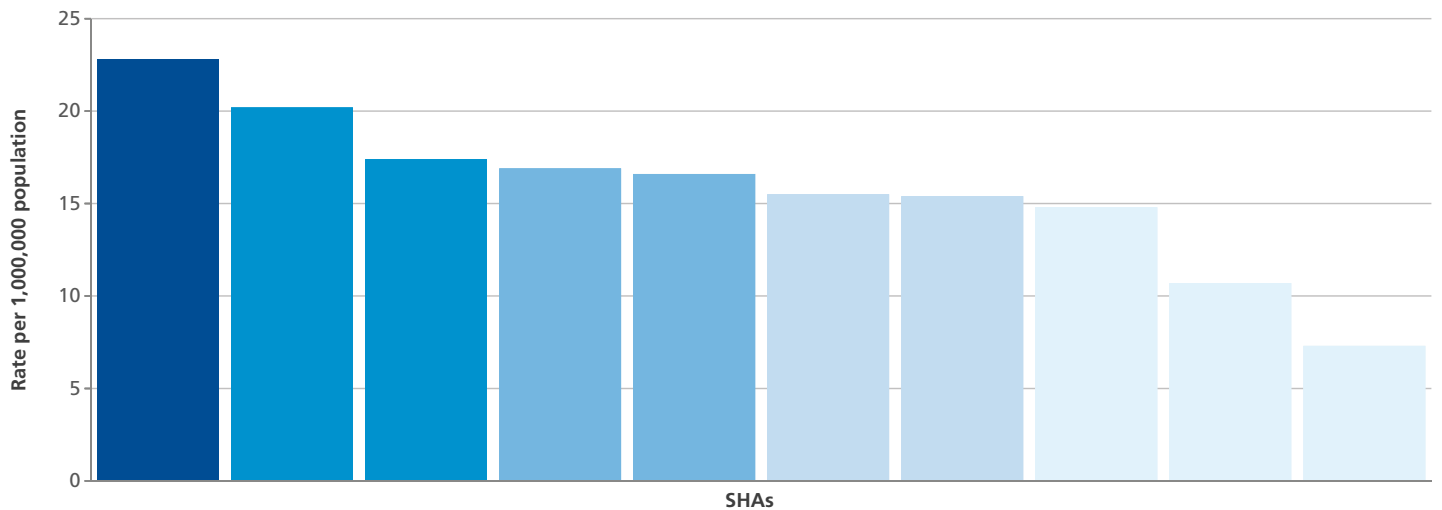
**ORGAN DONATION**

# Map 30: Organ donation rates per million population by SHA

2009/10



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## Context

Organ donation after death saves lives. One donor can help up to nine recipients.

There are nearly 8000 patients in England currently waiting for a transplant, and over 1000 people die each year before a transplant becomes available.

## Magnitude of variation

Although the number of people on the UK donor register is increasing,<sup>1</sup> the variation in organ donation rates per million population among SHAs is almost threefold.

If all regions achieved an organ donation rate of 22.8 per million population (the highest rate attained in 2009/10), there would be 38% more donors, and over 1000 more transplants each year in England.

Actual deceased donor numbers are supplied by NHS Blood and Transplant (NHSBT).

In addition, the NHSBT Potential Donor Audit (PDA) measures performance at every stage of the donation pathway. All patients who were suitable potential organ donors can be identified, and if donation did not occur the reasons why are also identified.

## Options for action

There is a need to identify every potential donor, and refer them to the Donor Co-ordinator network. This network comprises Specialist Nurses for Organ Donation, who are employed by NHSBT.

## RESOURCES

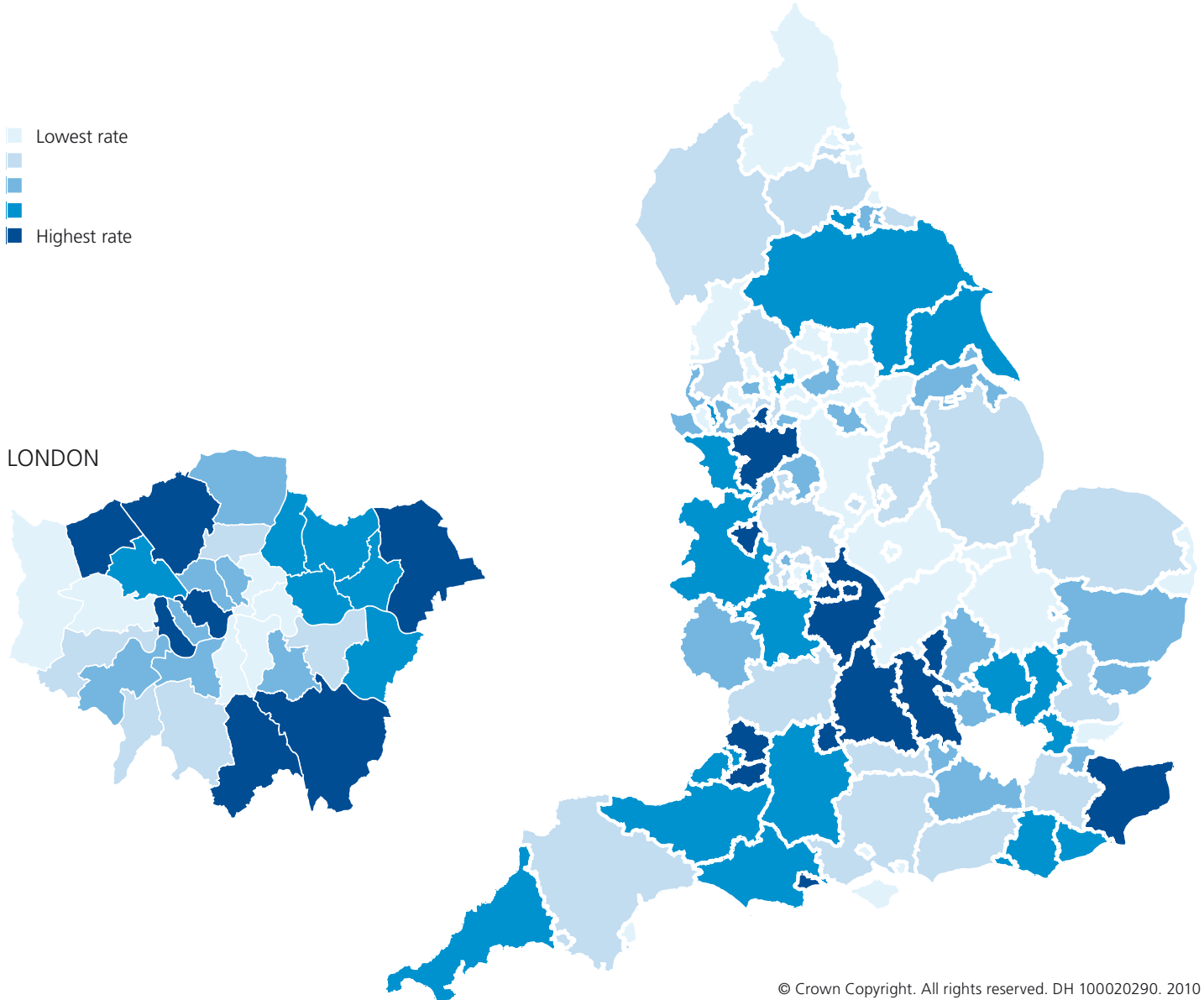
- › The NHS Blood and Transplant (NHSBT) website is available at: <http://www.nhsbt.nhs.uk>
- › The NHSBT PDA is available at: [http://www.uktransplant.org.uk/ukt/statistics/potential\\_donor\\_audit/potential\\_donor\\_audit.jsp](http://www.uktransplant.org.uk/ukt/statistics/potential_donor_audit/potential_donor_audit.jsp)

<sup>1</sup> <http://www.bbc.co.uk/news/health-11688102>

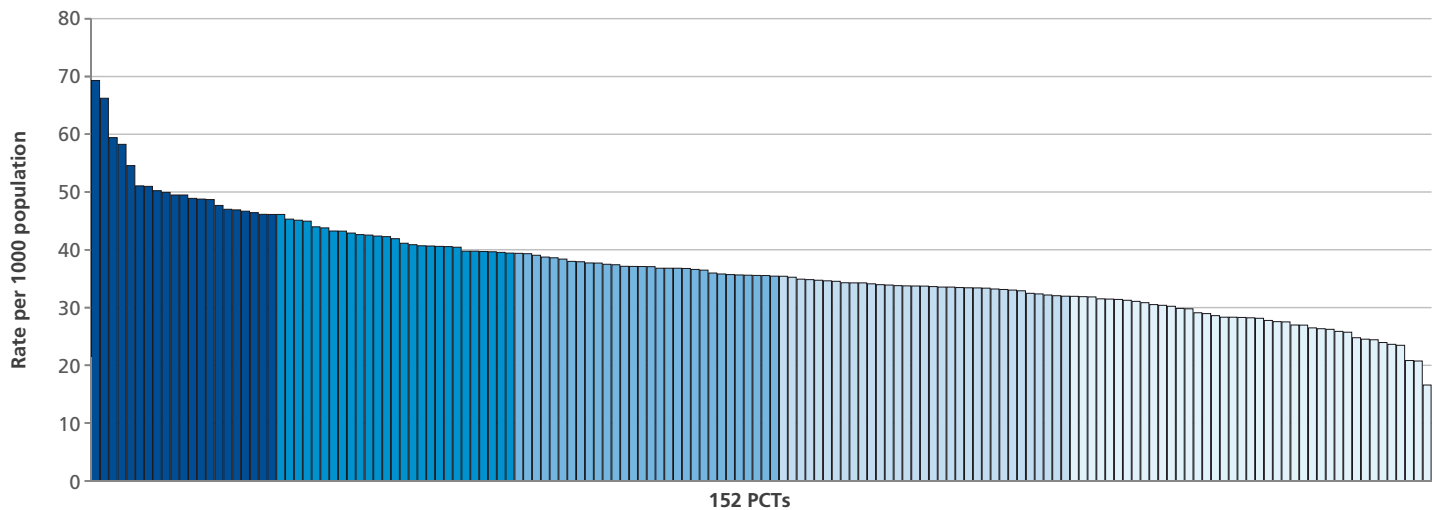
DIAGNOSTIC SERVICES

Map 31: Rate of magnetic resonance imaging (MRI) activity per 1000 population by PCT

2009/10



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## Context

Magnetic resonance imaging (MRI) is similar to a CT scan, but it does not use X-rays. Instead, MRI uses magnetism and radio waves to build up a series of cross-sectional images. As MRI pictures can be very precise, they can often provide as much information as looking at the tissues directly, which is why MRI has the potential to reduce the number of diagnostic procedures that need to be performed. The cost of MRI equipment means that it is used primarily at centres where it is kept most busy.<sup>1</sup>

## Magnitude of variation

There is fourfold variation among PCTs in the rate of MRI activity per 1000 population. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation is twofold.

Although some of this variation can be attributed to the availability of both equipment and workforce, much of the variation could be due to local clinical practices that have evolved over time, which may need re-assessing.

There is concern about the inappropriate use of MRI because of incidental findings, that is, findings unrelated to the original reason for undertaking MRI. Incidental findings can lead to unnecessary investigation and anxiety. In one systematic review and meta-analysis, the authors conclude that:

“Incidental findings on brain MRI are common, prevalence increases with age, and detection is more likely using high-resolution MRI sequences than standard resolution sequences. These findings deserve to be mentioned when obtaining informed consent for brain MRI in research and clinical practice.”<sup>2</sup>

## Options for action

To address any unwarranted variation, it is important to concentrate on applying evidence-based practice at a local level. This can be achieved by using evidence-based patient pathways for diagnostics, and the right diagnostic techniques.

The Royal College of Radiologists plays a leading role in the education of all clinicians.

## RESOURCES

- › Guidelines for diagnostic imaging have been produced for commissioners:  
<http://www.improvement.nhs.uk/CommissioningAWorldClassImagingService/tabid/65/Default.aspx>
- › The Royal College of Radiologists produces regularly updated referral guidelines (MBUR6) entitled “Making best use of clinical radiology services” (6th edition, 2007), which should be used to apply evidence-based practice and thereby resolve any unwarranted geographical variation in imaging activity.  
<http://www.rcr.ac.uk/content.aspx?PageID=995>

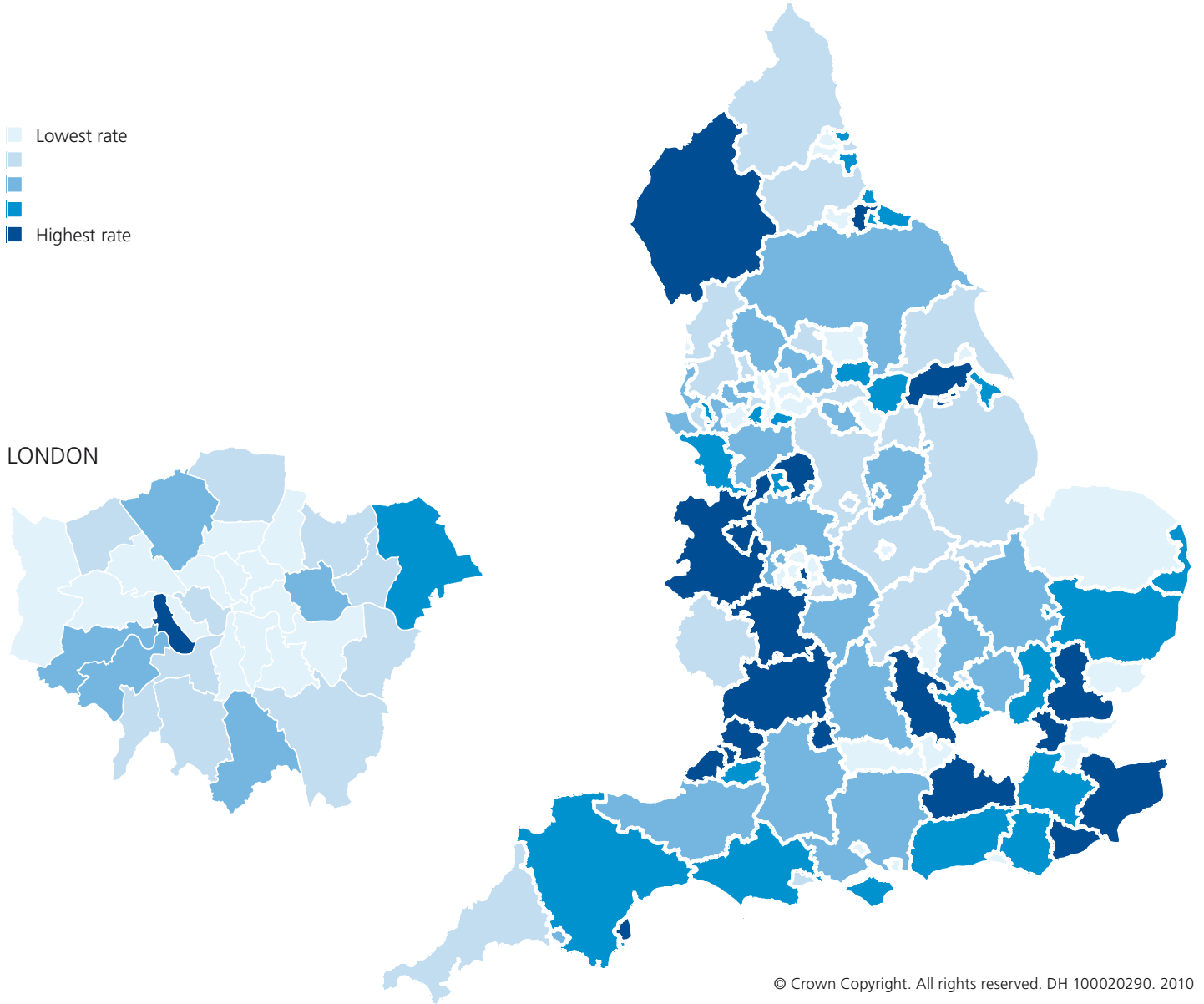
1 The Royal College of Radiologists. FAQs in radiology. Available at: <http://www.rcr.ac.uk/content.aspx?PageID=995>

2 Morris Z, Whiteley WN, Longstreth WT Jr, et al. Incidental findings on brain magnetic resonance imaging: systematic review and meta-analysis. *BMJ* 339:doi:10.1136/bmj.b3016 (Published 17 August 2009).

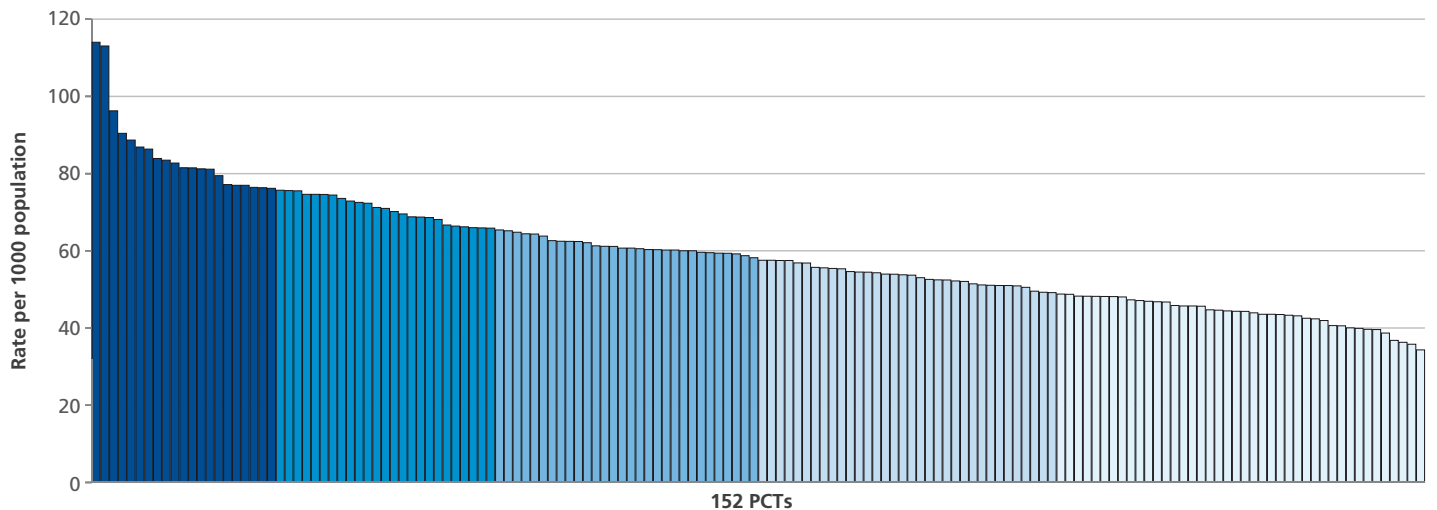
DIAGNOSTIC SERVICES

# Map 32: Rate of computed axial tomography (CT) activity per 1000 population by PCT

2009/10



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## Context

Computed axial tomography (a CAT or CT scan) is an X-ray technique using a scanner that takes a series of pictures across the body allowing a radiologist to view the images in a two- or three-dimensional form.<sup>1</sup>

It complements and supplements information obtained from MRI (see Map 31).

## Magnitude of variation

The variation among PCTs in the rate of CT activity per 1000 population is threefold. When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, the variation is greater than twofold.

Although some of this variation can be attributed to the availability of both equipment and workforce, much of the variation could be due to local clinical practices that have evolved over time, which may need re-assessing.

From the patient's perspective, it is important to reduce any unwarranted variation, especially in CT activity, because unlike MRI this intervention carries a heavy radiation burden, which is to be avoided whenever possible because of the potential harm it could inflict.

The over-use of CT in the United States of America is now a major public health concern, and articles published in the *New England Journal of Medicine* warn of the dangers:

“our findings that in some patients worrisome radiation doses from imaging procedures can accumulate over time underscores the need to improve their use”<sup>2</sup>

“we have to adopt a public health mind set ... and talk explicitly about the elements of danger in exposing our patients to radiation”.<sup>3</sup>

Although this is less of an issue in England, partly due to the leadership of the Royal College of Radiologists, whole-body screening is being promoted by private providers, which is of no benefit to the individuals concerned while increasing the level of radiation to which they are exposed, and generating referrals to the NHS.

## Options for action

To address any unwarranted variation, it is important to concentrate on applying evidence-based practice at a local level. This can be achieved by using evidence-based patient pathways for diagnostics, and the right diagnostic techniques.

## RESOURCES

- Guidelines for diagnostic imaging have been produced for commissioners:  
<http://www.improvement.nhs.uk/CommissioningAWorldClassImagingService/tabid/65/Default.aspx>
- The Royal College of Radiologists produces regularly updated referral guidelines (MBUR6) entitled “Making best use of clinical radiology services” (6th edition, 2007), which should be used to apply evidence-based practice and thereby resolve any unwarranted geographical variation in imaging activity.  
<http://www.rcr.ac.uk/content.aspx?PageID=995>

1 The Royal College of Radiologists. FAQs in radiology. Available at: <http://www.rcr.ac.uk/content.aspx?PageID=995>

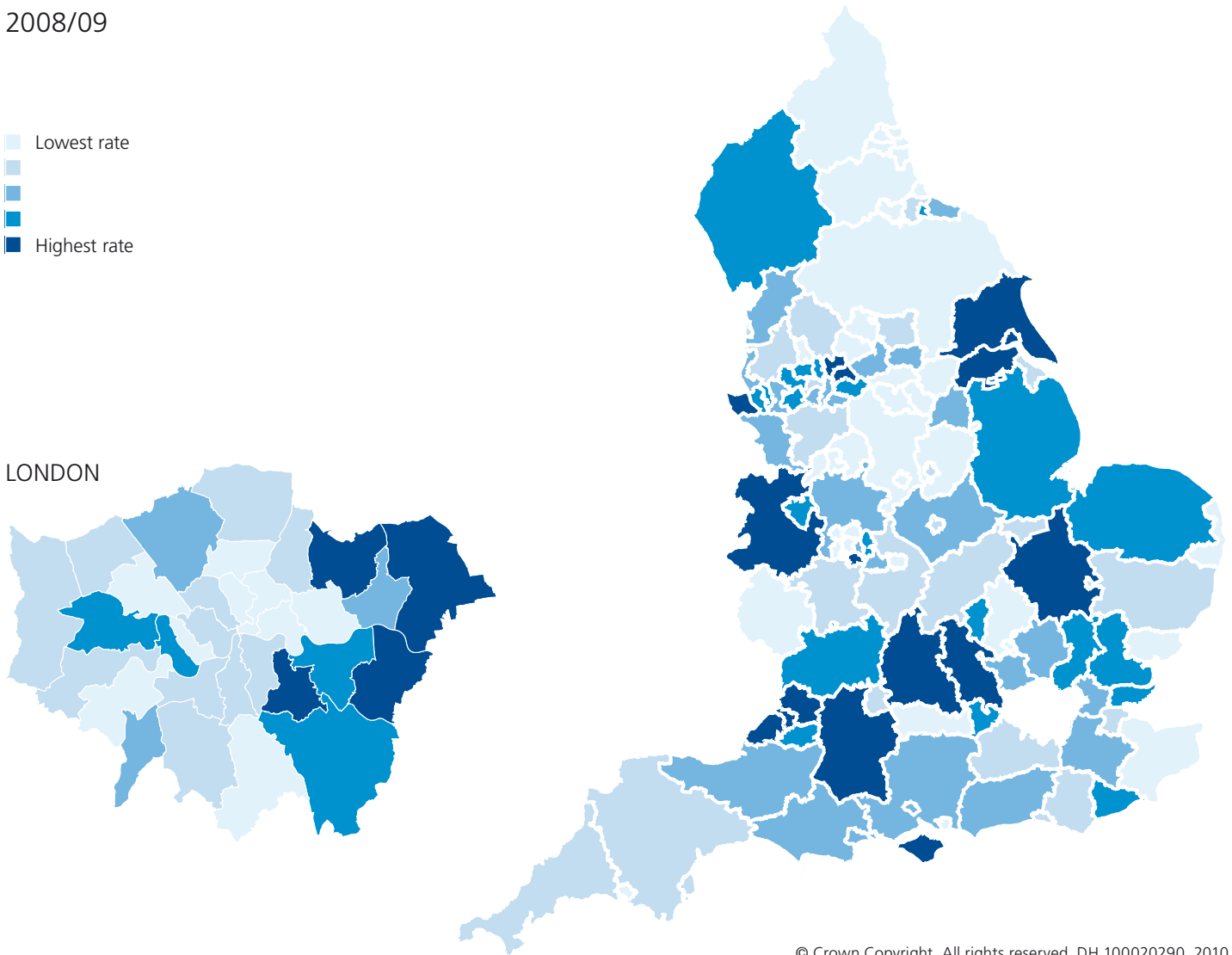
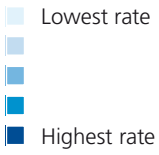
2 Fazel R et al. Exposure to low dose ionizing radiation from medical imaging procedures. *New England Journal of Medicine* 2009; 361:849-857.

3 Lauer MS. Elements of danger – the case of medical imaging. *New England Journal of Medicine* 2009; 361:841-842.

**PRESCRIBING**

# Map 33: Quinolone items per 1000 Antibacterial STAR(09)-PUs by PCT

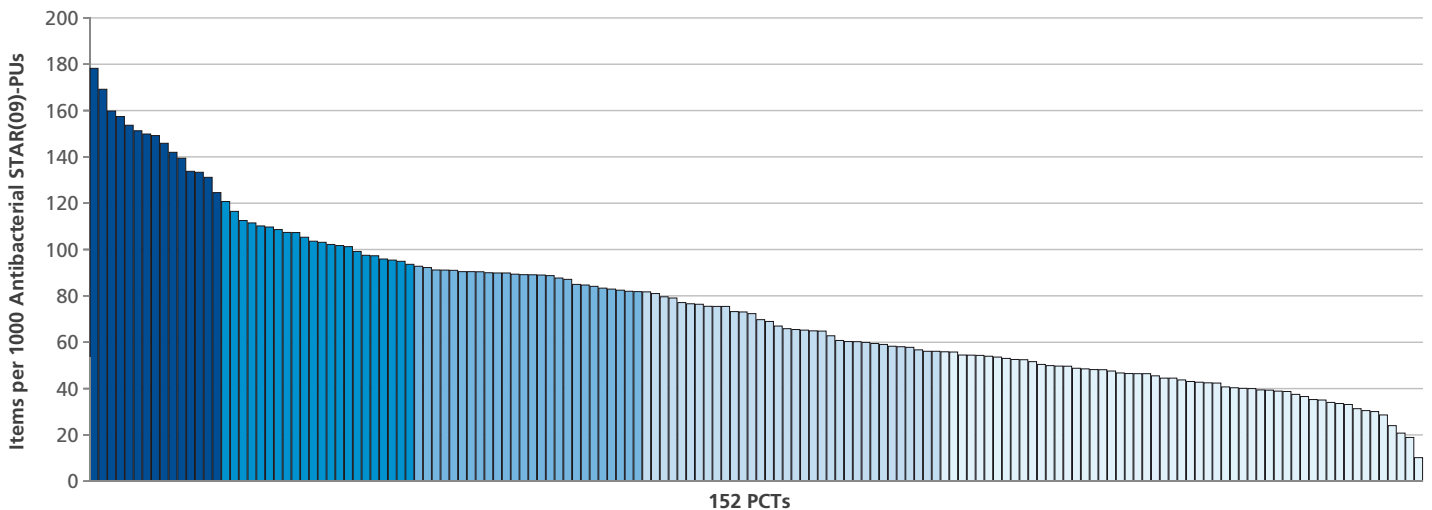
2008/09



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## Cephalosporin items per 1000 Antibacterial STAR(09)-PUs by PCT

2008/09



## Context

By a study of the map of cholera cases in Soho, John Snow concluded it was the water from the pump in Broad Street that was the cause of the cholera. This led to the first healthcare revolution, and dramatic improvements in the public health. The last 50 years have seen the advent of the second healthcare revolution driven not by public health measures but by scientific innovation, such as the artificial hip, and chemotherapy.

Antibiotics were one of the first miracles of the second healthcare revolution, and their impact worldwide has been immense. However, the expectation that after the development of antibiotics infectious diseases would pose only a minor challenge has proved to be unfounded. One reason is that new infectious diseases have evolved, notably HIV infection, but the second reason is the development of resistance to antibiotics.

Infection with methicillin-resistant *Staphylococcus aureus* (MRSA) is a modern epidemic created by the inappropriate use and over-use of an antibiotic. In their document entitled Key Therapeutic Topics,<sup>1</sup> the National Prescribing Centre (NPC) strongly reinforces the guidance of the Health Protection Agency (HPA).<sup>2</sup> Part of the NPC's analysis of trends is reproduced below, and their conclusion is forthright.

“Broad spectrum antibiotics such as quinolones and cephalosporins need to be reserved to treat resistant disease and should generally be used only when standard and less expensive antibiotics are ineffective. In primary care in England usage of these antibiotics accounts for a substantial proportion of all antibiotic daily doses: ciprofloxacin 4% and cephalosporins 9%.

The increase in the prescribing of quinolones (e.g. ciprofloxacin) in general practice is a particular cause for concern. They are recommended first-line by the HPA only in limited situations (e.g. acute pyelonephritis or acute prostatitis). Resistance to quinolones is increasing at a considerable rate e.g. quinolone resistant *Neisseria gonorrhoeae* (QRNG) – in which resistance is usually high-level and affects all the quinolones.”

## Magnitude of variation

There is a greater than threefold variation in the prescription of quinolone items per 1000 Antibacterial STAR(09)-PUs (Specific Therapeutic group Age-sex weightings Related Prescribing Units revised in July 2009; see map). When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, a threefold variation remains.

Furthermore, there is an almost 18-fold variation in the prescription of cephalosporin items per 1000 Antibacterial STAR(09)-PUs (see bar chart). When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, there is a fivefold variation.

Although the data from the National Prescribing Centre do not create a map as simple as John Snow's map of cholera cases, the message is just as important.

## Options for action

The National Prescribing Centre recommends the following options for local implementation:<sup>3</sup>

- Review and, where appropriate, revise current prescribing practice, and use implementation techniques to ensure prescribing meets Health Protection Agency guidance (see “Resources”).
- Benchmark and review the total volume of antibiotic prescribing against local and national data (see “Resources” for weblink to Prescribing Analysis Charts);
- Benchmark and review the use of quinolones and cephalosporin prescribing against local and national data.

## RESOURCES

- Health Protection Agency. Management of Infection Guidance for Primary Care for Consultation & Local Adaptation. Available at: [http://www.hpa.org.uk/web/HPAwebfile/HPAweb\\_C/1194947333801](http://www.hpa.org.uk/web/HPAwebfile/HPAweb_C/1194947333801)
- NHS Prescription Services provides charts based on an analysis of prescribing data at national and PCT level. There are Prescribing Analysis Charts relating to cardiovascular, gastrointestinal, central nervous system, NSAIDs and analgesics, endocrine, *antibiotics*, respiratory, wound management and skin, available at: <http://www.nhsbsa.nhs.uk/PrescriptionServices/942.aspx>

1 National Prescribing Centre. Key Therapeutic topics 2010/11 – Medicines management options for local implementation. Available at: [http://www.npc.co.uk/policy/qipp/resources/quipp\\_mm.pdf](http://www.npc.co.uk/policy/qipp/resources/quipp_mm.pdf)

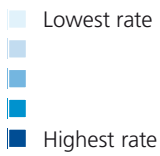
2 National Prescribing Centre. HPA updates guidance on the management of infections in primary care. <http://www.npci.org.uk/blog/?p=1796>

3 National Prescribing Centre. Key Therapeutic topics 2010/11 – Medicines management options for local implementation. Available at: [http://www.npc.co.uk/policy/qipp/resources/quipp\\_mm.pdf](http://www.npc.co.uk/policy/qipp/resources/quipp_mm.pdf)

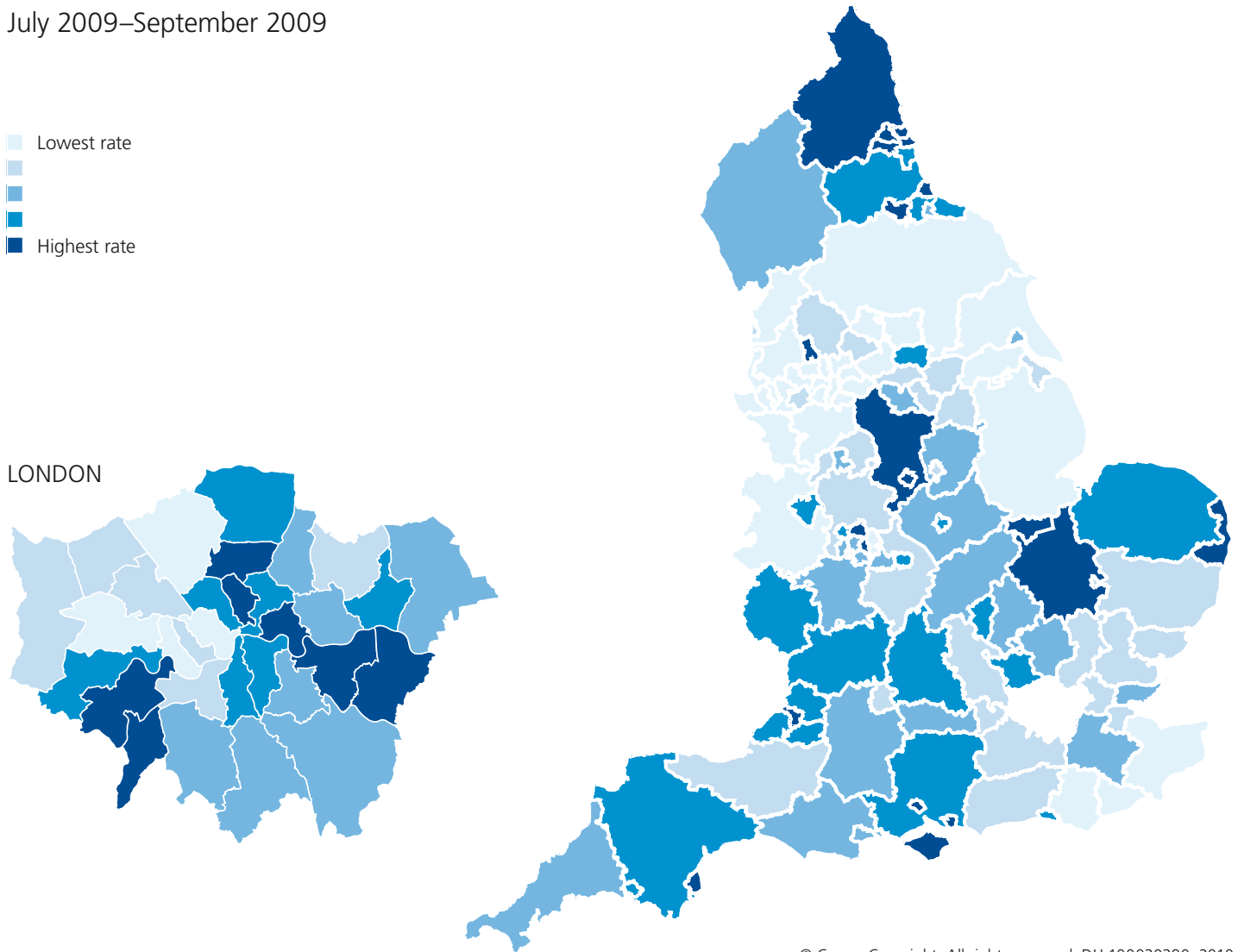
**PRESCRIBING**

# Map 34: Percentage of pravastatin/simvastatin items per all statins prescribed by PCT

July 2009–September 2009



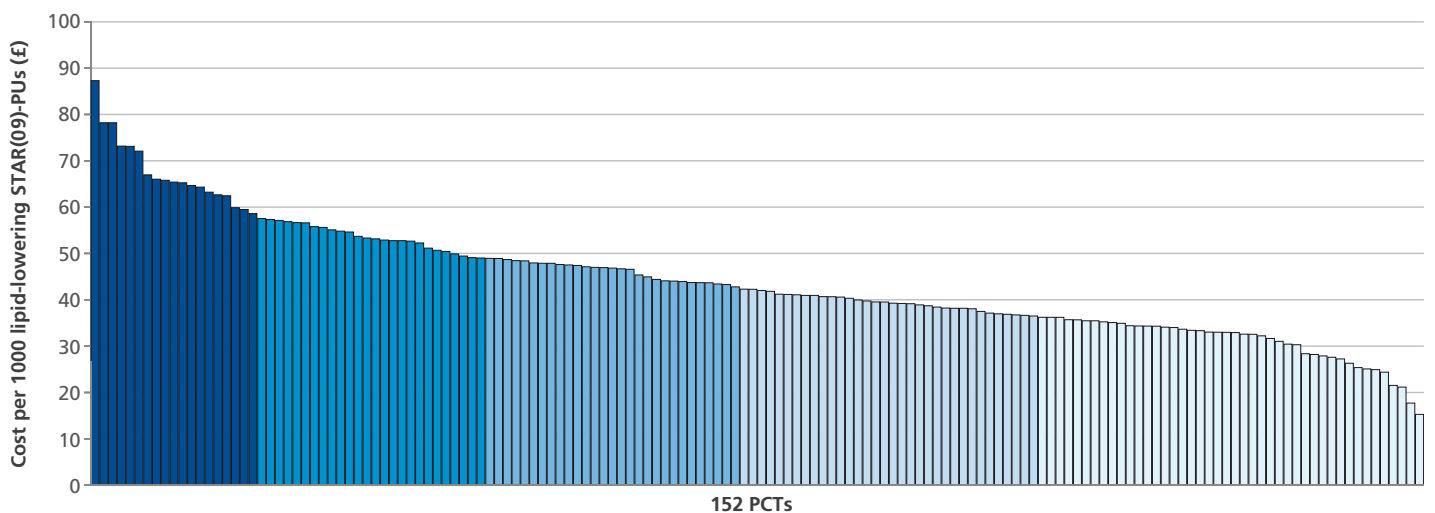
LONDON



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## Ezetimibe cost per 1000 lipid-lowering STAR(09)-PUs by PCT

July 2009–September 2009



## Context

The epidemic of heart disease can be reduced by prevention. Although there is much that individuals can do for themselves, the NHS has an important contribution to make. The introduction of the system for health checks represented a major commitment by the NHS to the control of the heart disease epidemic.

However, prevention needs to be simple if it is to be adopted widely, and the interventions available to healthcare professionals also need to be kept simple to promote and ensure their use especially as healthcare professionals work within the limits of the finite resource that is their time.

Statins have made an important contribution to the current trend in declining deaths from heart disease. Clear guidance is available on the use of statins and other drugs, such as Ezetimibe, which can be prescribed when an individual is not able to tolerate a statin.

## Magnitude of variation

There is a greater than 25% difference in the percentage of pravastatin/simvastatin per all statins prescribed among PCTs (see map). When the five PCTs with the highest percentages and the five PCTs with the lowest percentages are excluded, there is a difference of about 20%.

There is an almost sixfold variation in the Ezetimibe cost per 1000 lipid-lowering STAR(09)-PUs items across the country (see bar chart). When the five PCTs with the highest rates and the five PCTs with the lowest rates are excluded, there is a greater than threefold variation.

This variation in prescribing practice for both pravastatin/simvastatin and Ezetimibe is greater than can be explained by differences in the population.

## Options for action

The National Prescribing Centre (NPC) recommends the following options for local implementation:<sup>1</sup>

- Review and, where appropriate, revise prescribing of high-cost statins to ensure it complies with NICE guidance (see “Resources”);

- The use of low acquisition cost statins is promoted through the Better Care, Better Value (BCBV) Indicators – the National Audit Office highlighted the substantial savings still to be made by some NHS organisations through the use of low-cost statins.

The use of statins and of Ezetimibe are only two of the “Key Therapeutic Topics” covered by the NPC in their contribution to the Quality Improvement, Productivity and Prevention (QIPP) project.<sup>1</sup> The NPC’s primary mission is to improve health by better medicines management at a local level but, as the NPC emphasises, many of their recommendations would, if adopted, also increase value.

## RESOURCES

- NICE Guidance. Lipid modification. Clinical Guideline (CG) 67, available at: <http://www.nice.org.uk/cg67>
- NICE Guidance. Familial hypercholesterolaemia, Clinical Guideline (CG) 71, available at: <http://www.nice.org.uk/cg71>
- The NPC has also produced an MeReC Bulletin on lipid-modifying treatment, available at: [http://www.npc.co.uk/ebt/merec/cardio/cdlipids/merec\\_bulletin\\_vol19\\_no3.html](http://www.npc.co.uk/ebt/merec/cardio/cdlipids/merec_bulletin_vol19_no3.html)
- The Medicines and Healthcare Regulatory Agency (MHRA) has given advice to healthcare professionals on the increased risk of myopathy associated with the 80-mg/day dose of simvastatin in the May 2010 issue of the Drug Safety Update (Volume 3, Issue 10), available at: <http://www.mhra.gov.uk/Publications/Safetyguidance/DrugSafetyUpdate/index.htm>
- In MeReC Stop Press 1423, the NPC has placed the use of the simvastatin 80-mg/day dose in the context of the MHRA advice, the NICE guidance and the current evidence base, including the risks of other statins at high doses, available at: <http://www.npci.org.uk/blog/?p=1423>
- NHS Prescription Services provides charts based on an analysis of prescribing data at national and PCT level. There are Prescribing Analysis Charts relating to *cardiovascular*, gastrointestinal, central nervous system, NSAIDs and analgesics, endocrine, antibiotics, respiratory, wound management and skin, available at: <http://www.nhsbsa.nhs.uk/PrescriptionServices/942.aspx>

<sup>1</sup> National Prescribing Centre. Key Therapeutic topics 2010/11 – Medicines management options for local implementation. Available at: [http://www.npc.co.uk/policy/qipp/resources/quipp\\_mm.pdf](http://www.npc.co.uk/policy/qipp/resources/quipp_mm.pdf)





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## PERMISSION TO USE FIGURE 1 IN "FROM INSIGHT TO ACTION"

London Health Observatory (LHO)

## Moving to higher value

The NHS Atlas has been produced to help those who pay for or manage healthcare, including citizens and patients, in their journey to higher value, and better quality. However, a map alone is not enough. One also needs to know where one is on the map, and in what direction one has to travel.

Thus, a sextant, chronometer, and compass are needed, or in the era of the Internet a GPS. The Right Care Programme will launch an interactive version of the NHS Atlas, the equivalent of a GPS for the NHS, in 2011.

What is also vital in order to reach our desired destination is good leadership: the cartographer can make only a contribution; the leaders have to use the NHS Atlas to increase value and improve quality.



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