REPORT TO THE NATIONAL AUDIT OFFICE

QUALITY OF CARE FOR STROKE AND TIA IN GENERAL PRACTICE USING THE NEW GMS CONTRACT INDICATORS

Report prepared by:

Professor Julia Hippisley-Cox	**Professor of General Practice**
Mr Justin Fenty	**Research statistician**
Mr Gavin Langford	**IT/programmer**
Professor Mike Pringle	**Professor of General Practice**
Dr Carol Coupland	**Senior Lecturer in Medical Statistics**

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3.1 Overall achievements

- This report focuses on the quality of care for patients with stroke or TIA in 413 general practices spread throughout the UK. It reports on changes over the first 12 months of the new General Medical Services Contract for GPs. It has been produced by QRESEARCH - new general practice database QRESEARCH developed by the University of Nottingham in conjunction with EMIS – the largest supplier of general practice computer systems in the country. We would like to acknowledge the contribution of the practices involved in QRESARCH and also Dr David Stables, Medical Director of EMIS for help in creating the database.

3.1.1 Primary Prevention of Stroke (in the overall population)

- Of the 1.2 million patients aged 45 years and over, smoking status had been recorded at least once in 83% by April 2004. Of these patients 22% were recorded as smokers and 38% of these patients had smoking cessation advice recorded on the computer within the preceding 15 months.

- By 2005, smoking status was recorded in 87% of patients aged 45 years and older. Of those patients, 20% were recorded as smokers, an absolute decrease of 2% over the 12 month period. Of those known to be smokers, 52% had smoking cessation advice recorded on the computer within the preceding 15 months.

- In 2004, 77% of all patients aged 45 and over had a recorded blood pressure rising to 81% by 2005.

- Of patients aged 45 years and over with blood pressure recorded in the last 5 years, 77% had a blood pressure of less than or equal to 150/90 mmHg in 2004. By 2005 this had risen to 82%.

3.1.2 Secondary prevention of recurrent stroke (in patients with stroke/TIA)

- In 2004, the age-standardised prevalence of stroke or TIA overall was 14.5 per 1000 and varied between regions with highest rates in the North East (18.9 per 1000 registered patients) and lowest rates in the East of England (11.6 per 1000 registered patients). The situation was very similar in 2005.

- Overall, the extent to which the targets in the Quality and Outcomes Framework were met rose between April 2004 and April 2005 for all indicators except indicator 2 (MRI or CT scans in newly diagnosed stroke patients)[1]. The largest increases were for indicators 3 (smoking status recorded), 7 (cholesterol recorded) and 8 (cholesterol <= 5mmol/l).

- In 2004 the overall level of achievement of indicators ranged from 41% (indicator 8: cholesterol control) to 89% (indicator 5: blood pressure recording). In 2005, the overall level of achievement ranged from 46% (indicator 2: MRI or CT scan) to 95% (indicator 5).

- There was a substantial improvement in the percentage of patients achieving indicator 8 (cholesterol <=5mmol/l) from 41% in 2004 to 55% in 2005. This improvement is already likely to have had a substantial benefit at a population level [See text]. If this trend continues then the new GMS contract maximum threshold of 60% should be met in the next 12 months.

- In 2004 and in 2005, all the minimum payment threshold targets set in the Quality and Outcomes Framework were met for all indicators for this population as a whole.

- In 2004 the new GMS contract maximum thresholds were met by this population as a whole by only two indicators: indicator 4 (smoking cessation advice) and indicator 8 (blood pressure recording). By 2005 the maximum thresholds for a further 3 indicators had been met: indicator 3 (smoking recorded), indicator 6 (blood pressure <=150/90mmHG) and indicator 10 (flu vaccination).

- For each indicator at least 97% of all practices achieved the minimum threshold by 2005 with the exception of indicator 2 where 74% of all practices achieved the minimum threshold.

- The proportion of practices achieving the maximum thresholds increased between April 2004 and April 2005 for all indicators except indicator 2, where it dropped from 23% to 11%. The proportion of practices achieving the maximum threshold ranged from 5% (indicator 7) to 88% (indicator 5) in 2004, and from 11% (indicator 2) to 99% (indicator 5) in 2005.

- There were regional variations in the proportion of practices achieving the maximum thresholds for some of the indicators. However the patterns were complex and no general trends were evident.

3.2 Analysis of inequalities

[1] Note: The majority of analyses against QoF indicators in this report has been undertaken by treating the relevant populations within the QRESEARCH database as if they were in a single population.

- In general, men, as a group, had higher levels of recording and achievement of control for indicators compared with women. In April 2004, the most marked difference was for indicator 8 (cholesterol <=5mmol/l) achieved by 50% of males and 32% of females. This finding was statistically significant. However gender inequalities were less in 2005 with indicator 8 achieved in 62% of males and 47% of females. The differences were even less when adjusted for age and deprivation.

- The level of achievement of indicators 9 (use of aspirin or equivalent in patients with non-haemorrhagic stroke) and 10 (flu vaccination) in patients under 65 years remained noticeably lower than in patients 65 years and over across 2004 and 2005. This is as expected since the elderly are perceived to be at higher risk and the policy emphasis for flu vaccination has been on the elderly; but the gap needs to be addressed.

- The level of achievement of indicators 7 (cholesterol recorded) and 8 (cholesterol <=5mmol/l) in patients 85 years and over remained noticeably lower than in patients under 85 years across 2004 and 2005.

- The only difference in levels of achievement of indicators by rurality was found for indicator 2 where patients from rural areas had higher levels of achievement compared with patients from urban areas (43% vs. 52% respectively). This difference remained significant after adjusting for deprivation, age and sex on multivariate analysis. The pattern was very similar for 2005.

- There was no real evidence of inequalities by deprivation. Levels of achievement of the indicators were very similar for the most affluent with the most deprived patients.

3.3 Recommendations

In the light of the findings in this study as set out in this report, we make the following recommendations:

1. The Quality and Outcomes Framework should be revised to include better measures of primary prevention of stroke and TIA. This could include the following additional measures :

    - Overall population levels of blood pressure control
    - Overall population levels of smoking
    - Overall population levels of patients who stop smoking
    - Overall population levels of obesity and exercise
    - Consideration should be given to stroke prevention in patients with co-morbidities which increase risk of stroke or TIA. This includes patients with atrial fibrillation (who may need aspirin or an equivalent antiplatelet or anticoagulant)

2. The Quality and Outcomes Framework could be improved to include better assessment of effective secondary prevention for patients with existing stroke or TIA. For example, how many patients with existing stroke or TIA suffer a recurrent event and what opportunities for care may have been missed for these patients.

3. Several of the indicators could be adapted slightly to make the information even more clinically useful. For example,

    - Indicator 1 could be expanded to include the prevalence and incidence of stroke or TIA (rather than just whether the practice has at least one patient with a stroke or TIA as at present). If stroke prevention is effective then we would expect a decrease in stroke incidence over time.

    - Indicator 2 could be adapted to include the result of the MRI or CT scan so that this is readily available at the point of care.

4. Age and gender inequalities are now more marked than deprivation inequalities. Therefore age and gender inequalities in both primary and secondary prevention of stroke should be systematically monitored and action taken to remedy undesirable trends.

5. There is substantial variation between practices. Practice level monitoring should be undertaken reporting on outliers and their progress. These analyses will need to be adjusted for the socio-demographic characteristics of the population.

6. The rationale for the different number of points attributed to each of the clinical indicators is not entirely clear. This should be reconsidered especially given the under-achievement of indicator 2 (referral for MRI or CT scan) which also happens to be associated with the lowest number of points.

7. A further audit of primary and secondary prevention of stroke should be undertaken at regular intervals. If QRESEARCH were used, the findings would be easily compared and trends more reliably identified.

4 Context

The National Audit Office (NAO) report to Parliament on the effectiveness, economy and efficiency of Government spending. As part of its work examining spending by the Department of Health, the NAO is reporting on the value for money of Stroke Services in England.

The NAO report will focus on the key question: ***Are the Department of Health and the NHS providing a well managed and effective stroke care service in England?***

The answer will depend on the answers to the following sub-questions:

Is the NHS providing effective and high quality stroke care services?

- Is the NHS doing enough to ensure there is sufficient awareness and primary prevention of stroke?
- Are there sufficient measures in place to maximise secondary prevention?
- Is the NHS effectively treating acute stroke?
- Do stroke patients, and those affected by stroke, have sufficient access to effective post-treatment support?

Is the Department of Health managing and supporting the stroke care programme well?

- Are services effectively managed and monitored?
- Are all services effectively co-ordinated to provide a cohesive overall care programme?

QRESEARCH has been invited to examine the evidence base from primary care on the extent to which GPs are effectively managing risk factors and preventing stroke and whether key targets and milestones are being reached.

5 Background to QRESEARCH

- QRESEARCH is now the largest aggregated general practice database in the world. Version 6 of the database has over 29 million person years of observation from 488 practices spread throughout the UK with representation in every Strategic Health Authority. It is updated every quarter.

- QRESEARCH is run as a not-for-profit organization developed by the University of Nottingham in conjunction with Egton Medical Information Services (EMIS) – the largest supplier of general practice computer systems in the country. Whilst it has recently been established, the data held within the database extend back to the early 1990's.

- Its primary purpose is to enable high quality academic research. It is also used to undertake analyses to inform the health service and clinical practice.

- The data quality has been examined and found to be of high quality. Data quality reports are available on the website or from QRESEARCH and are summarized in the appendix (page 60).

- QRESEARCH contains socio-economic data [deprivation, rurality etc] linked to the patients postcode but without the postcode being extracted to preserve anonymity. Further details of these measures are contained in the appendix (page 60)

- Practices contribute data for free in exchange for feedback.

- It is regulated by an advisory board comprising of representatives of national professional and patient organizations. Trent Multi-Centre Research Committee has approved the overall set up of QRESEARCH and approves individual research projects using the data.

5.1 Version of database

The latest version of the QRESEARCH database (version 6, downloaded 1st April 2005) has been used for this project. This contains data for 488 practices in total. Of these, 413 practices had completely uploaded data by 1st April 2005 and so have been included in this analysis (the remaining 65 practices were still transferring data on 1st April 2005).

5.2 Quality indicators

On 1st April 2004, the Quality and Outcomes Framework (QOF) was introduced for primary care practices in the UK. Its aim is to provide incentives in order to achieve higher quality care. The Quality and Outcomes Framework sets out a range of clinical and organisational indicators against which practices are assessed. Achievement against these indicators earns practices Quality and Outcomes Framework points with associated financial rewards.

Basic principles underlying the development of the QOF are

1. The number of indicators in each clinical area should be kept to a minimum number compatible with accurate assessment of patient care
2. Data should never be collected twice
3. Data should never be collected purely for audit purposes

The Quality and Outcomes Framework covers 11 clinical disease areas and one of these is Stroke/Transient Ischaemic Attack. In addition, there are two quality indicators for primary prevention relating to the recording of smoking and blood pressure. We have used these definitions in order to measure the quality of primary and secondary prevention of stroke in this report.

6 Primary prevention of stroke

6.1 Methodology for primary prevention of stroke

Ethical committee approval for this project was obtained from Trent Multicentre Research Ethics Committee.

The National Audit Office is interested in the primary prevention of stroke i.e. preventing stroke in patients who have never had a stroke before. For this analysis of primary prevention, we identified patients aged 45 years and older who were registered on 1st April 2004 and 1st April 2005. We then determined the level of recording of smoking and blood pressure using the two appropriate indicators for primary prevention as specified in the new GMS contract:

6.2 Summary of Quality and Outcomes Framework indicators used for primary prevention of stroke

indicator	Quality Indicator
1	% patients over 45 years with smoking recorded at least once
2	% of patients aged 45 and over with a recorded BP in the last 5 years

It is important to realise that there are many other dimensions to the primary prevention of stroke. The levels of smoking and blood pressure control are obvious extensions to these two indicators. Weight, diet and exercise are important. Those at higher risk (with diabetes, ischaemic heart disease or atrial fibrillation) could be targeted for special analyses. However, this study has been designed to look only at the relevant indicators within the Quality and Outcomes Framework.

However, we did additionally determine the proportion of patients recorded as a smoker and the proportion of these with smoking cessation advice recorded.

7 Secondary prevention of stroke

7.1 Methodology

We identified two study populations to undertake the analysis of quality of care for the secondary prevention of stroke (i.e. the prevention of stroke in patients who have already had either a stroke or a TIA) The first study population was all patients registered on the 1st April 2004 (the date the new GMS contract was implemented). The second study population was all patients registered on the 1st April 2005. From each of these

populations, we identified patients recorded with a stroke or TIA. The list of Read codes used to identify patients with stroke or TIA can be found in appendix 1 (see page 61). Many of these patients will have been recorded on the basis of clinical findings, while most of those diagnosed more recently will have had a scan to confirm the nature of the stroke or TIA more objectively.

For each patient with stroke or TIA, we determined whether they achieved each of ten quality indicators as defined in the new General Medical Services contract. We compared levels of achievement at the start of the new GMS contract with the levels achieved at the end of the first year of the new GMS contract.

7.2 Overview of indicators for secondary prevention of stroke and TIA

The following table summarises the indicators included in the Quality and Outcomes Framework. The rationale for each indicator is discussed in the main report.

indicator	Quality Indicator	Maximum threshold	Points
Stroke 1	the practice can produce a register of patients with stroke and TIA		4
Stroke 2	% of new patients with presumptive stroke (presenting after 01/04/03) who have been referred for confirmation of the diagnosis by MRI or CT	80%	2
Stroke 3	% of patients with previous stroke or TIA with smoking recorded in last 15 months except never smokers where it only needs to be recorded once.	90%	3
Stroke 4	% of patients with previous stroke or TIA who smoke with a record of smoking cessation advice within the last 15 months	70%	2
Stroke 5	% of stroke or TIA with a recorded BP in the last 15 months	80%	2
Stroke 6	% of patients with stroke or TIA in whom BP (measured in last 15/12) is 150/90 or less	70%	5
Stroke 7	% of patients with stroke or TIA who have a total cholesterol recorded in the last 15 months	90%	2
Stroke 8	% of patients with stroke or TIA whose last measured serum cholesterol (measured in last 15/12) is 5 mmol/l or less	60%	5
Stroke 9	% of patients with a stroke known to be non-haemorrhagic or history of TIA, who have a record that aspirin (or alternative anti-platelet therapy) or anticoagulant is being taken	90%	4
Stroke 10	% of patients with TIA or stroke who have had an immunisation in the preceding 1st Sept to 31st March	85%	2

7.3 Regional variations in secondary prevention of stroke

We determined the variation in achievement of the indicators by Government Office Region and Country by comparing the results for each geographical area on 1st April 2004 and then again on 1st April 2005.

We directly age-standardised the prevalence rates for stroke or TIA using the UK population (2001).

We have provided separate tabulations for each of the government regions in England and for Scotland and Wales. Northern Ireland was not tabulated separately as there was only one practice contributing to this version of the QRESEARCH database.

7.4 Trends in inequalities in secondary prevention of stroke

We examined differences between different subgroups in the achievement of the indicators of the new GMS contract. In particular, we examined whether there were differences between

- Males compared to females
- Urban compared to rural areas
- Age bands: <65; 65-74; 75-84 and 85plus.
- Deprived areas compared with affluent areas.

We used unconditional logistic regression to compare differences between the above groups. We defined practice as a clustered variable. We simultaneously adjusted for all four factors and for year. We examined interactions terms for sex and year where appropriate. We calculated adjusted probabilities with 95% confidence interval. We used STATA version 8.2 for all the analyses.

8 Results for primary prevention

8.1 Study population

There were 413 practices with complete data for the entire 12 month period between 1st April 2004 and 1st April 2005. The total number of patients registered with these 413 practices on 1st April 2004 was 2,901,748 and on 1st April 2005 was 2,934,111. The median list size of the 413 practices included in this analysis was 6,324 (inter quartile range 4363 to 9134).

Table 1 shows the number of practices and registered patients in each of the geographical regions in England and in Scotland, Wales and Northern Ireland. The vast majority of practices were from England (398 practices), with nine from Wales, five from Scotland, and one from Northern Ireland. Practices within England were spread throughout every geographical region, with at least 23 practices in each region. The age-sex structure of the population in 2004 was similar to the 2001 census.

8.2 Smoking and blood pressure recording

Table 2 shows the proportion of patients 45 years and over with a smoking history recorded at least once. In April 2004, there were 1.2 million patients aged 45 years and over registered with the QRESEARCH practices and of these 83% had a smoking history (which includes non-smoking) recorded at least once. Recording rates were highest in women aged 45 to 74 years. By 2005, smoking recorded was recorded in 87% of patients aged 45 years and over.

Of those patients aged 45 and older with a smoking history recorded on 1st April 2004, 219,110 (22%) were recorded as smokers. Of these, 76,865 (38%) had smoking cessation advice recorded on the computer within the preceding 15 months.

Of those patients aged 45 and older with a smoking history recorded on 1st April 2005, 216,974 (20%) were recorded as smokers. Of these, 113,480 (52%) had smoking cessation advice recorded on the computer within the preceding 15 months.

Traditionally smoking cessation advice has been recorded in the free text part of the general practice clinical record and hence is not available for analysis. When the Quality and Outcomes Framework was published many practices started to use codes to record this activity. It is therefore difficult to interpret these findings since there will be changes in recording habit in addition to continuing "catch up" by some practices.

Table 2 also shows the percentage of patients aged 45 and over with a recorded blood pressure in the last 5 years. In 2004, 77% of patients aged 45 and over had a recorded

blood pressure with the highest rates in women aged 75 and over where coverage reached 86%. By 2005, this had risen to 81% overall and 89% in women over 75 years and over.

Of patients aged 45 years and over with blood pressure recorded in the last 5 years, 77% had a blood pressure of less than or equal to 150/90 mmHg in 2004. By 2005 this had risen to 82%.

9 Results of secondary prevention

9.1 Prevalence of stroke or TIA

There were 45,538 patients with a diagnosis of TIA or stroke registered on 1st April 2004 and 45,208 with a diagnosis of TIA or stroke registered on 1st April 2005.

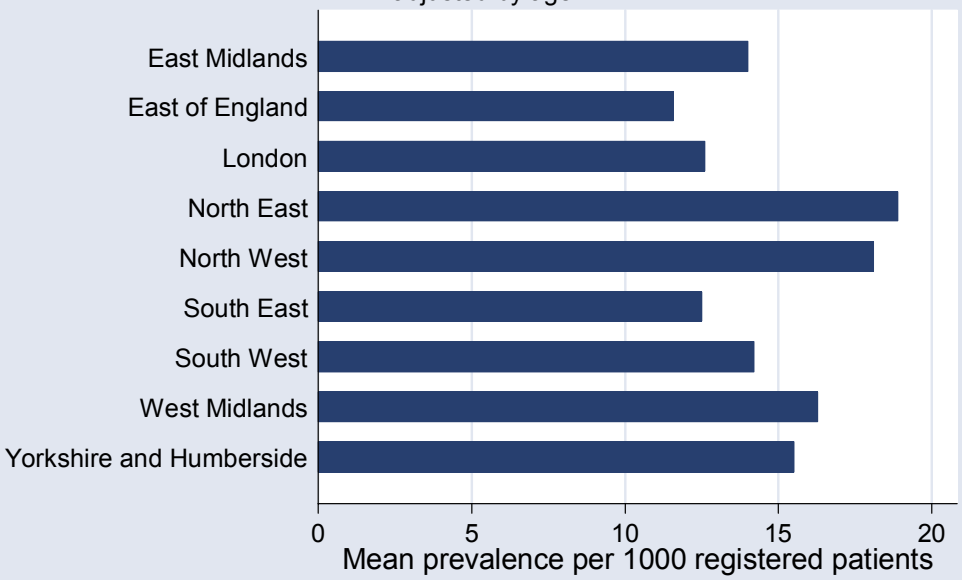
The overall crude prevalence (45,538 with stroke or TIA in a population of 2901748) of stroke was 15.7 per 1000 in 2004 and this varied considerably by geographical area.

The following charts show how the prevalence of stroke or TIA (adjusted by age) varied across the UK in 2004. Table 1 has the corresponding tabular data for crude prevalence rates and also the prevalence rates directly standardised by age to the UK population (2001). Table 3 shows the number of patients with stroke or TIA in each region.

In 2004, the crude prevalence was highest in the North East where it was 21.0 per 1000 registered patients. The lowest crude prevalence was found in London (9.3 per 1000 registered patients). Some of the variation in prevalence rates was explained by age. The age-standardised prevalence of stroke or TIA overall was 14.5 per 1000 and varied between regions with highest rates in the North East (18.9 per 1000 registered patients) and lowest rates in the East of England (11.6 per 1000 registered patients).

The following two charts show the prevalence for stroke or TIA (adjusted by age) in 2004 and 2005. There was very little change in prevalence rates across the two years with the overall crude rate (45,208 with Stroke or TIA in a population of 2,934,111) being 15.4/1000. The overall adjusted prevalence was 14.2/1000.

Prevalence of stroke or TIA per 1000 registered patients by geographical area in 2004 adjusted by age



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(database version 6)

Prevalence of stroke or TIA per 1000 registered patients by geographical area in 2005 adjusted by age

source QRESEARCH 2003-5
(database version 6)

9.2 Characteristics of patients with stroke or TIA

Table 4 shows the demographic characteristics of patients with stroke or TIA registered on 1st April 2004 and 1st April 2005.

Of the 45,538 patients with either a stroke or TIA registered on 1st April 2004, 51% were females and 49% were male.

Of all the patients with either a stroke or a TIA, then 42% had a pure stroke, 47% had a recorded history of TIA and 11% had a history of both stroke and TIA. Some of these patients will have had recurrent strokes and/or TIAs. Those patients who have both stroke and TIA recorded may have had an initial stroke, followed by a TIA or an initial TIA followed by a stroke.

Of all the patients with either a stroke or TIA, then 52% were from urban areas, 41% from rural areas and 7% had a missing rurality score.

21% of stroke or TIA patients were from the most affluent quintile as determined by the Townsend deprivation score and 18% were from the most deprived quintile. The comparable figures for the population of QRESEARCH as a whole are 22% for the most affluent quintile compared with 21% for patients from the most deprived quintile.

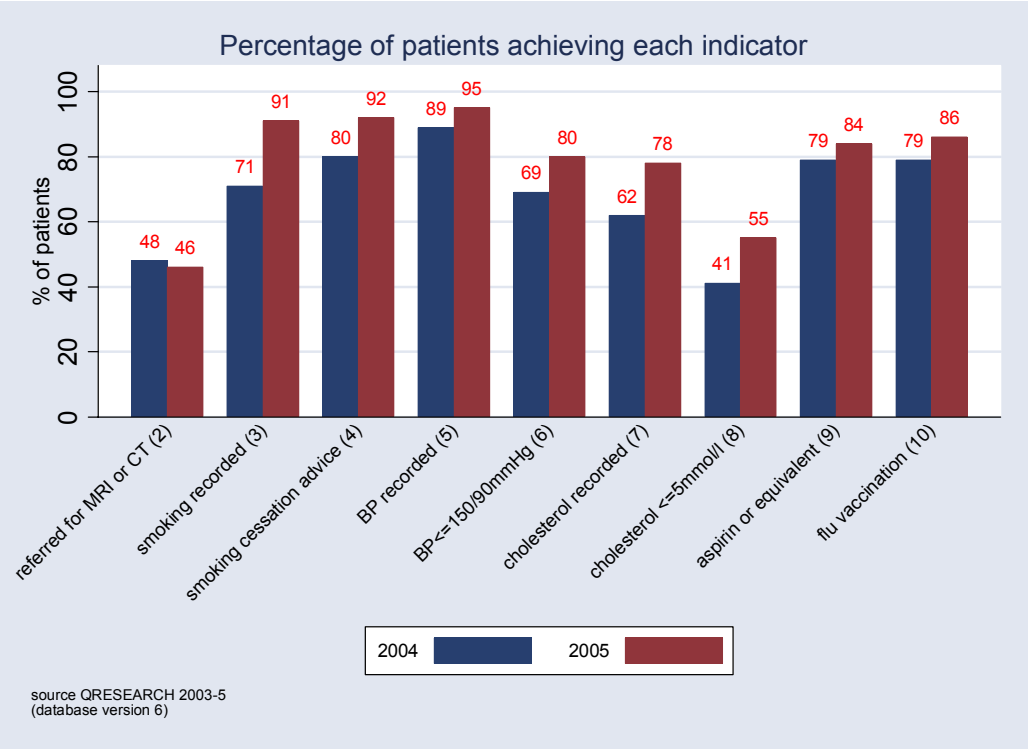
The pattern for all these characteristics was similar in 2004 and 2005.

9.3 Summary of quality indicators

In the next section, we give an overview of all levels of achievement for the quality indicators at baseline and after 12 months. In the sections that follow, we discuss variations by age, sex, deprivation, rurality and geographical area. From a clinical point of view, it is the absolute percentages for the individual indicators which are most important. We have also included an analysis compared against the 'minimum and maximum thresholds' set within the quality and outcomes framework – the minimum threshold for all indicators is 25% and the maximum threshold varies for each indicator. These thresholds relate to triggers for payment – once the maximum threshold is reached then exceeding this will not result in additional remuneration unless the threshold is increased with time.

9.3.1 Percentage achievement

The next chart (and corresponding table 5) shows levels of achievement for all the indicators as of 1st April 2004 and at 1st April 2005.



In 2004, there was considerable variation in the overall level of achievement for each indicator ranging from 41% for indicator 8 (cholesterol control) to 89% for indicator 5 (blood pressure recording).

However, in 2005, the lowest level of achievement across the indicators was for indicator 2, MRI or CT scan (46%) and the highest level was for indicator 5 (95%).

There was an increase in levels of achievement for every indicator except for indicator 2 where there was a modest decline (see 9.4.2 for discussion).

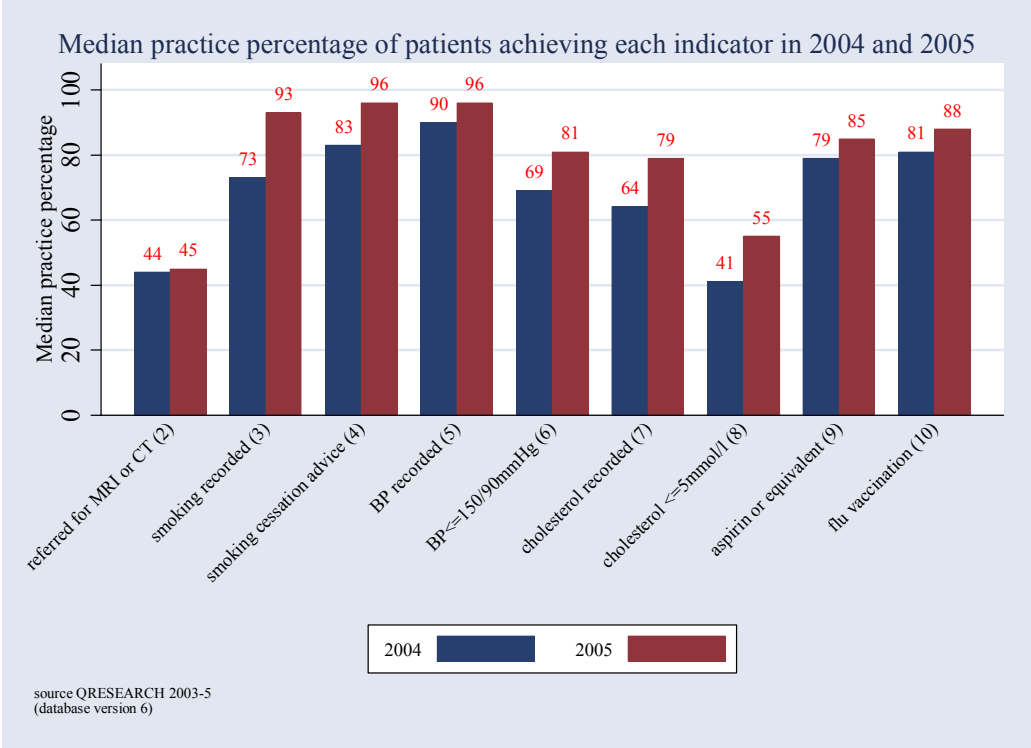
The greatest relative increase for any indicator was found for indicator 8 (cholesterol <= 5mmol/l) where there had been a 34% increase over the 12 months.

There was no correlation found between the relative increase in achievement of indicators and the number of points associated with each indicator (correlation coefficient 0.4, p=0.24).

9.3.2 Inter-practice variation

Table 6 shows the extent of the variation between all the practices for the quality indicators. (See section 11.5.1 for an explanation of the terms median and inter-quartile ranges).

The following graph shows the median practice percentage of patients achieving each of the indicators. The median practice percentage of patients achieving the indicators increased for every indicator between April 2004 and April 2005. The largest increases were for indicators 7 (cholesterol recorded) where the median rose from 64% to 79% (a relative increase of 23%) and indicator 8 (cholesterol <=5mmol/l) where the median rose from 41% to 55% (a relative increase of 34%).



In 2004, the largest variation between practices (i.e. the largest interquartile range) was found for indicator 2 (referral for MRI or CT scan). At least a quarter of all practices had no patients achieving indicator 2 (information which has not traditionally been coded in general practice). The variation between the practices for indicator 2 (MRI or CT scan) was much greater than the variation for any of the other indicators.

The smallest variation between practices was found for indicator 5 (blood pressure recording), 9 (aspirin or equivalent) and 10 (flu vaccination).

The degree of variation between practices reduced for most indicators over the 12 month period. By April 1st 2005 the most dramatic improvement was, as expected, for indicator 2 (patients with incident stroke referred for MRI or CT Scan) – the inter-quartile range dropped from 80% to 40% - where recording habits will have changed. However, Indicator 2 though it still remained the indicator with the highest degree of variation between practices. There was little change for indicators 8, 9 and 10.

9.4 Comparison against targets

We assessed the overall percentage of patients achieving each indicator and compared this percentage against the minimum and maximum thresholds set for the new GMS contract.

In this report the overall performance for the patients in this sample is compared against the minimum and maximum thresholds for individual indicators. These thresholds were set and apply at individual practice level so a threshold can be exceeded in the overall national sample but not met in a significant number of individual practices. We have therefore included a practice level analysis as well.

At a national level, the minimum thresholds were met for all indicators in both 2004 and 2005. The maximum payment thresholds were reached for two of the nine indicators; indicator 4 (smoking cessation) and indicator 5 (blood pressure recording).

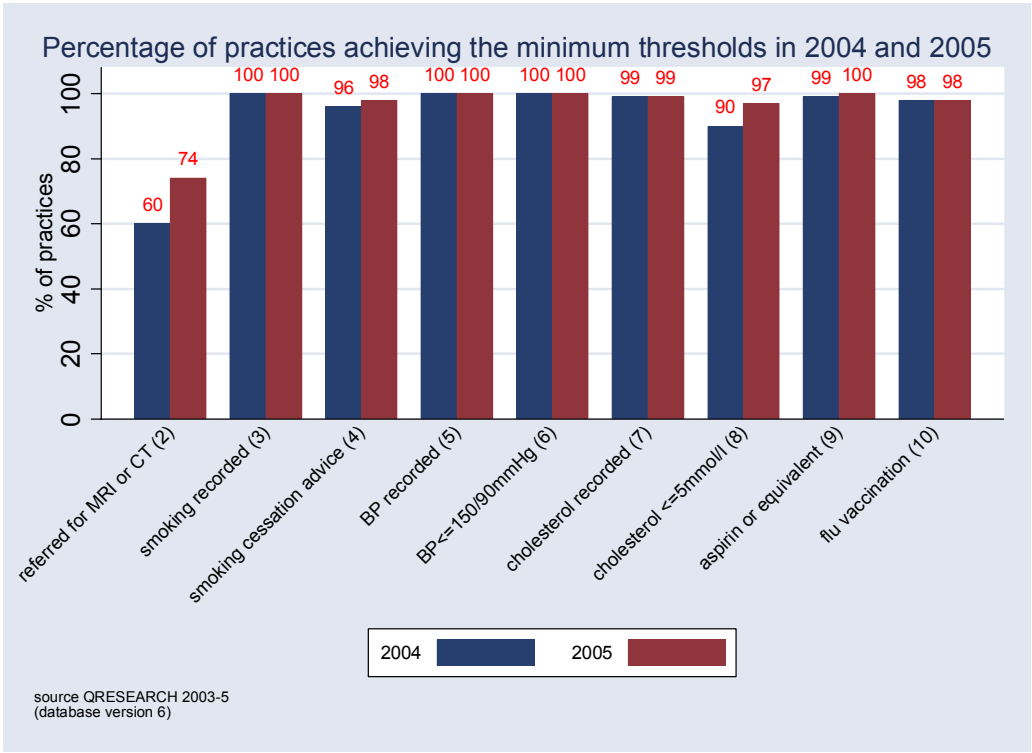
By April 2005, the maximum payment thresholds were reached for a further three of the nine indicators; indicator 3 (smoking recorded); 6 (blood pressure < 150/90 mm Hg); 10 (flu vaccination).

Substantial improvement against maximum payment threshold measures were found for indicator 8 (cholesterol <= 5 mmol/l) although it remained just below the maximum threshold level.

The proportion of practices achieving the minimum threshold ranged from 60% (indicator 2) to 100% (indicators 3, 5 and 6) in 2004 and from 74% (indicator 2) to 100% (indicators 3, 5, 6 and 9) in 2005.

The proportion of practices achieving the maximum threshold ranged from 5% (indicator 7) to 88% (indicator 5) in 2004 and from 11% (indicator 2) to 99% (indicator 5) in 2005. The largest increase (both relative and absolute) is seen with indicator 3 where the percentage of practices achieving the maximum threshold increased from 16% in 2004 to 68% in 2005, a relative increase of 325%. There are increases for all other indicators except indicator 2, where 23% of practices achieved the threshold in 2004 but only 11% in 2005.

The following two graphs show the proportion of practices which achieved the minimum and maximum thresholds for the indicators in 2004 and 2005.



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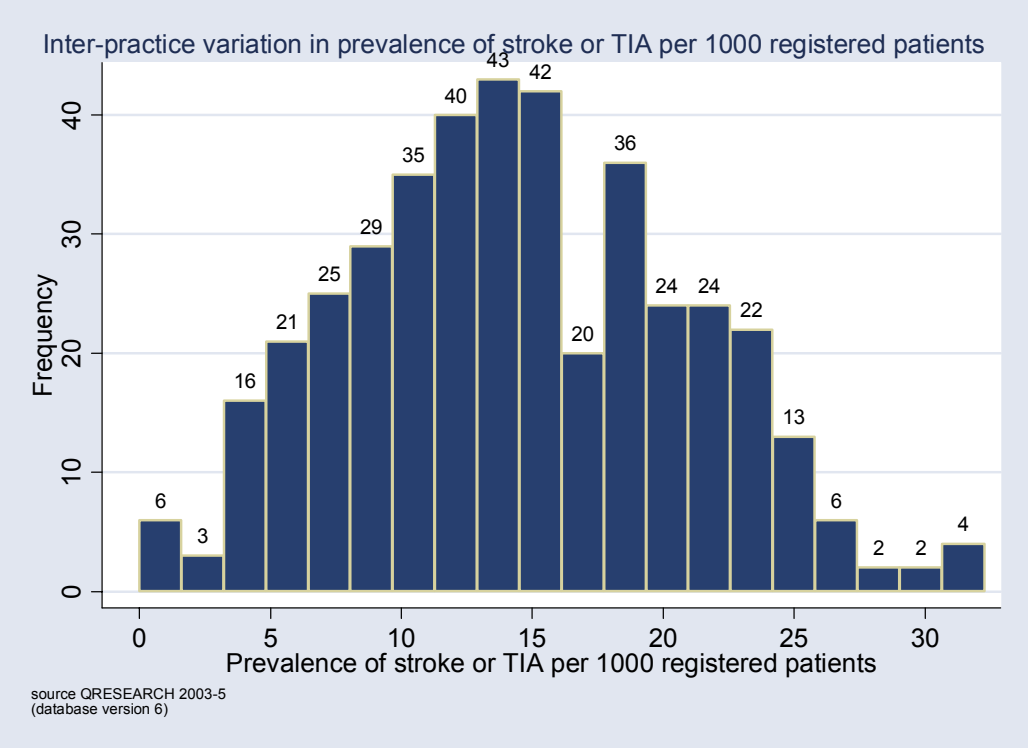
(database version 6)

9.4.1 Indicator 1: the practice has a register of patients with stroke or TIA

In order to meet this indicator, then practices need to have at least one patient with a recorded diagnosis of stroke or TIA. There is no numerator or denominator information required. If a practice does not have any patients with stroke or TIA then it cannot achieve any of the indicators. The requirement for a stroke register was also made in the National Service Frameworks for Coronary Heart Disease and for Older people

There was one practice which did not have any patients with stroke or TIA and therefore did not achieve indicator 1. There were a further eight practices who had particularly low prevalence rates and we suspect this is because of low computer recording rather than a genuine low prevalence.

The next chart shows the variation between practices for the prevalence rate of stroke or TIA per 1000 registered patients. The median prevalence was 14.7 per 1000 registered patients. This is, of course, the recorded prevalence. Some patients with stroke may not be recorded; some recorded cases may not, in fact, have had a stroke. However the recording of such an important diagnosis is likely to be accurate.



9.4.2 Indicator 2: Newly diagnosed stroke patients referred for MRI or CT scan

Indicator 2 records whether patients with a newly diagnosed stroke (diagnosed after April 2003) have evidence of having been referred for an MRI or CT scan.

The maximum payment threshold for indicator 2 in the new GMS contract is 80% and the minimum threshold is 25%. At a national level the minimum threshold was achieved in both years but the maximum threshold was not achieved either at baseline or by 1st April 2005.

At baseline, 48% of patients with a stroke (diagnosed after April 2003) had a record of having had a CT or MRI scan as shown in Table 5 . The percentage fell slightly to 46% after 12 months. This may be due to a delay in recording - scans are generally undertaken under the direction of a specialist whilst a patient is admitted to, or has an outpatient appointment at, hospital. The hospital would then notify the general practitioner to inform them whether or not the patient had been scanned. If the discharge letter didn't make it clear whether a scan had been done or not, then the GP would then consider a referral. Absence of evidence for having referred a patient for an MRI or CT scan could therefore be due to the following:

- The patient was not referred
- The patient was referred (or had a scan organised by the hospital during admission) but the general practice didn't enter it into the patients' electronic record after being informed

Some patients may not have been referred for a scan because of the lack of a local clinic or scanning facilities.

9.4.3 Indicator 3: Stroke or TIA patients with smoking status recorded in the last 15 months

Smoking is associated with an increased risk of stroke and therefore general practitioners are required to record the smoking status of patients with stroke or TIA. This needs to be done for each patient within the preceding 15 months.

At baseline, 71% of patients had a recorded smoking status in the last 15 months as shown in Table 5. This increased to 91% over the 12 month study period – a relative increase of 29%.

The maximum payment threshold for indicator 3 in the new GMS contract is 90% and the minimum threshold is 25%. At a national level the minimum threshold was met in both years. The maximum threshold was not met in 2004 but was achieved by April 2005.

9.4.4 Indicator 4: Stroke or TIA current smokers offered cessation advice recorded in the last 15 months

Smoking cessation treatments (such as nicotine replacement therapy and buproprion) are now available on the NHS and recommended by the National Institute for Clinical Excellence. General practitioners are therefore required to offer patients who smoke advice on cessation which then needs to be recorded on the clinical computer system.

The maximum payment threshold for indicator 4 in the new GMS contract is 70%. At a national level the minimum and maximum thresholds were met in 2004 and 2005.

At baseline, 80% of current smokers had been offered smoking cessation advice in the last 15 months as shown in Table 5. This increased to 92% over the 12 month study period – a relative increase of 15%. This contrasts with the lower level of smoking cessation advice (52%) offered to smokers in the whole population aged 45 years and over.

For indicator 4, over 25% of practices achieved 100% levels as shown in Table 6.

9.4.5 Indicator 5: Stroke or TIA patients with blood pressure recorded in the last 15 months

High blood pressure is also a risk factor for stroke and hence general practitioners are required to measure and record blood pressure for all patients with a stroke or TIA every 15 months.

The maximum payment threshold for indicator 5 in the new GMS contract is 80% and the minimum threshold is 25%. At a national level the minimum and maximum thresholds were met in 2004 and 2005.

At baseline, 89% of patients had a blood pressure reading within the last 15 months as shown in Table 5. At the end of 12 months, this has increased to 95% - a relative increase of 7%.

Indicator 5 had the highest overall level of achievement of all the indicators at baseline and at follow up. This is likely to be because the recording of blood pressure is well established within primary care for secondary prevention, following on from the MRC trials in the 1970's and 1980's.

9.4.6 Indicator 6: Stroke or TIA patients with blood pressure <=150/90 mmHg in the last 15 months

The risk of stroke is strongly and persistently related to the usual level of both systolic blood pressure and diastolic blood pressure. This relation holds for primary and secondary stroke, both ischemic and hemorrhagic. Blood pressure-lowering therapy is

now established as the most important measure for primary and secondary stroke prevention. The Perindopril Protection Against Recurrent Stroke Study (PROGRESS) has provides very good evidence that lowering the blood pressure of patients with preexisting cerebrovascular disease also reduces the incidence of secondary stroke. This PROGRES study demonstrated a 26-28% reduction in incidence of stroke using a flexible regimen involving a combination of anti-hypertensive agent[1].

There are various clinical targets for blood pressure - the level in the GMS contract is a systolic blood pressure of 150 mm Hg or less **and** a diastolic blood pressure of 90 mm Hg or less.

The maximum payment threshold for indicator 6 in the new GMS contract is 70% and the minimum threshold is 25%. At a national level the minimum threshold was met but the maximum threshold was not met narrowly in 2004. The maximum threshold was achieved by April 2005.

At baseline, just over two thirds of patients had a controlled blood pressure reading (69%) as shown in Table 5. This increased to 80% over the 12 months – a relative increase of 17%.

This level of improvement is likely to have had a significant effect at a population level in terms of reducing the incidence of further strokes[1].

9.4.7 Indicator 7: Stroke or TIA patients with cholesterol recorded in the last 15 months

Patients with a stroke or TIA need to have regular measurements for cholesterol and treatment if the level is high. Therefore indicator 7 reflects the percentage of people with a previous stroke or TIA who have had a cholesterol blood test in the previous 15 months. Patients who decline to have the test are automatically excluded from the denominator for this indicator.

The maximum payment threshold for indicator 7 in the new GMS contract is 90% and the minimum threshold is 25%. At a national level the minimum threshold was met in both years but the maximum threshold was not met in either 2004 or April 2005.

At baseline, less than two thirds of patients (62%) had a cholesterol recorded as shown in Table 5. This increased to just over three quarters (78%) at the end of 12 months – a relative increase in recording of 25%.

*9.4.8 Indicator 8: Stroke or TIA patients with last cholesterol <= 5 mmol/l**

Indicator 8 refers to the proportion of patients with a last cholesterol measurement of 5 mmol/l or less in the preceding 15 months. Lower cholesterol is generally thought to reduce the risk of a non-haemorrhagic stroke[2].

The maximum payment threshold for indicator 8 in the new GMS contract is 60% and the minimum threshold is 25%. At a national level the minimum threshold was met in both years but the maximum threshold was not met in either 2004 or April 2005.

However, the most substantial improvement observed over the 12 months study period occurred in indicator 8. At baseline, only 41% of patients had a cholesterol value of 5 mmol/l or less as shown in Table 5. This increased to 55% over the 12 months – a relative increase of 34%. If this trend continues (which is likely) then the maximum threshold should be met within the next 12 months.

Given that lowering cholesterol reduces risk of non-haemorrhagic stroke by 23%, then this level of improvement is likely to have had a significant effect at a population level[2].

9.4.9 Indicator 9: Non-haemorrhagic stroke or TIA patients taking aspirin or equivalent

Patients who have a non haemorrhagic stroke should be prescribed aspirin or an equivalent anti-platelet drug or warfarin (BNF March 2005). The proportion of patients who have been prescribed aspirin or an equivalent or who are recorded as taking it (for example aspirin bought over the counter) in this way comprises indicator 9. Patients with an allergy or intolerance to the medication are automatically excluded from this indicator.

The maximum payment threshold for indicator 9 in the new GMS contract is 90% and the minimum threshold is 25%. At a national level the minimum threshold was met in both years but the maximum threshold was not met in either 2004 or April 2005.

At baseline, 79% of patients of patients with a non –haemorrhagic stroke had evidence of taking aspirin or an equivalent as shown in Table 5. This increased to 84% over the 12 month period – a relative increase of 7%.

9.4.10 Indicator 10: Flu vaccination in the preceding 1st Sept - 31st March

Flu vaccination is recommended for patients at high risk of influenza, a category that includes patients with stroke or TIA. This indicator therefore measures the proportion of patients who have had a flu vaccination in the preceding 6 months (i.e. 1st September to 31st March in each year). Patients with a contraindication to the vaccination and those who decline are automatically excluded from the denominator.

The maximum payment threshold for indicator 10 in the new GMS contract is 85% and the minimum threshold is 25%. At a national level the minimum threshold was met in both years. The maximum threshold was not met in 2004 but was achieved by April 2005.

Vaccine uptake rates by 1st April 2004 were 79% rising to 86% over the next 12 months – a relative rise of 8%.

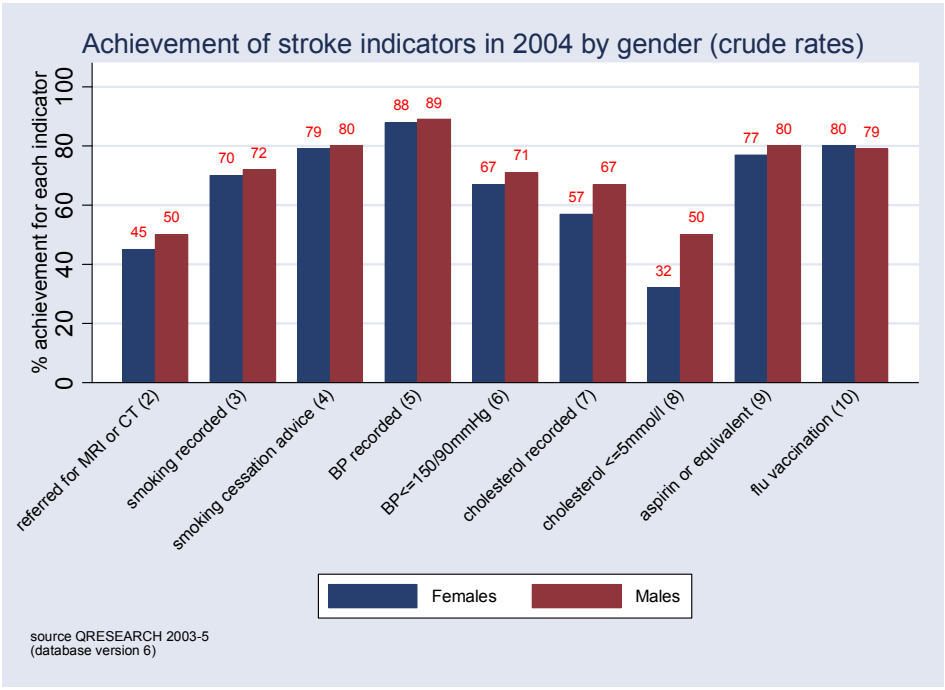
9.4.11 Summary for all indicators

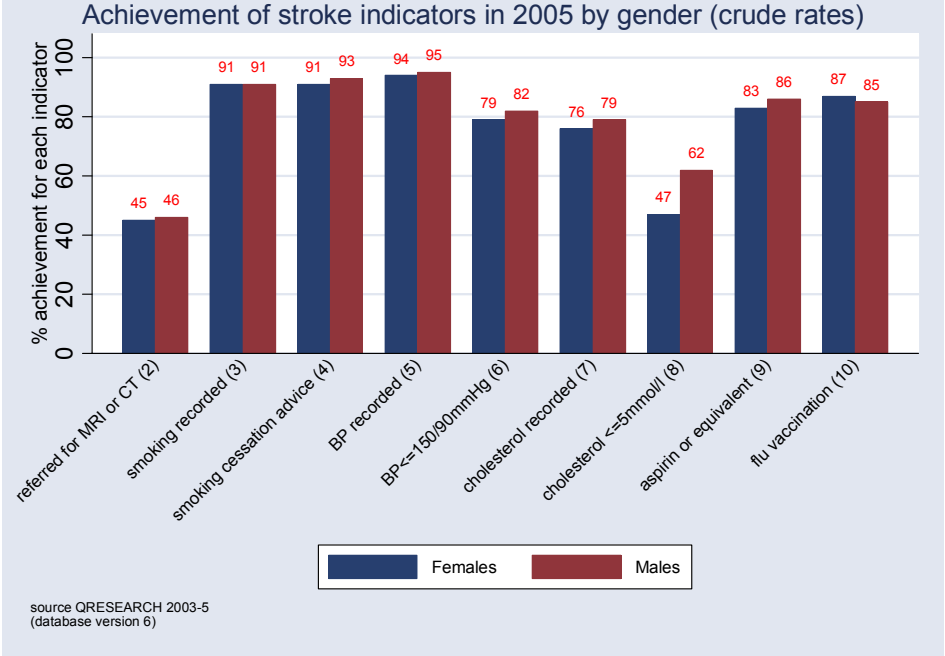
- There was an increase in levels of achievement for every indicator except for indicator 2 where there was a modest decline.
- The greatest relative increase for any indicator was found for indicator 8 (cholesterol <= 5mmol/l) where there had been a 34% increase over the 12 months.
- By April 2004, the maximum payment thresholds were reached at the national level[2] for two of the nine indicators; indicator 4 (smoking cessation) and indicator 5 (blood pressure recording).
- By April 2005, the maximum payment threshold were reached for a further three of the nine indicators; indicator 3 (smoking recorded); 6 (blood pressure < 150/90 mm Hg); 10 (flu vaccination).
- Substantial improvement against maximum payment threshold measures were found for indicator 8 (cholesterol <= 5 mmol/l) although it remained just beneath the threshold level.

9.5 Variations in achievement of indicators by sex

The next two charts show how the achievement of the indicators varied between males and females at baseline and after 12 months. The corresponding tabular data can be found in Table 7.

[2] As previously explained, the report applies the practice level thresholds to the national sample in this study.



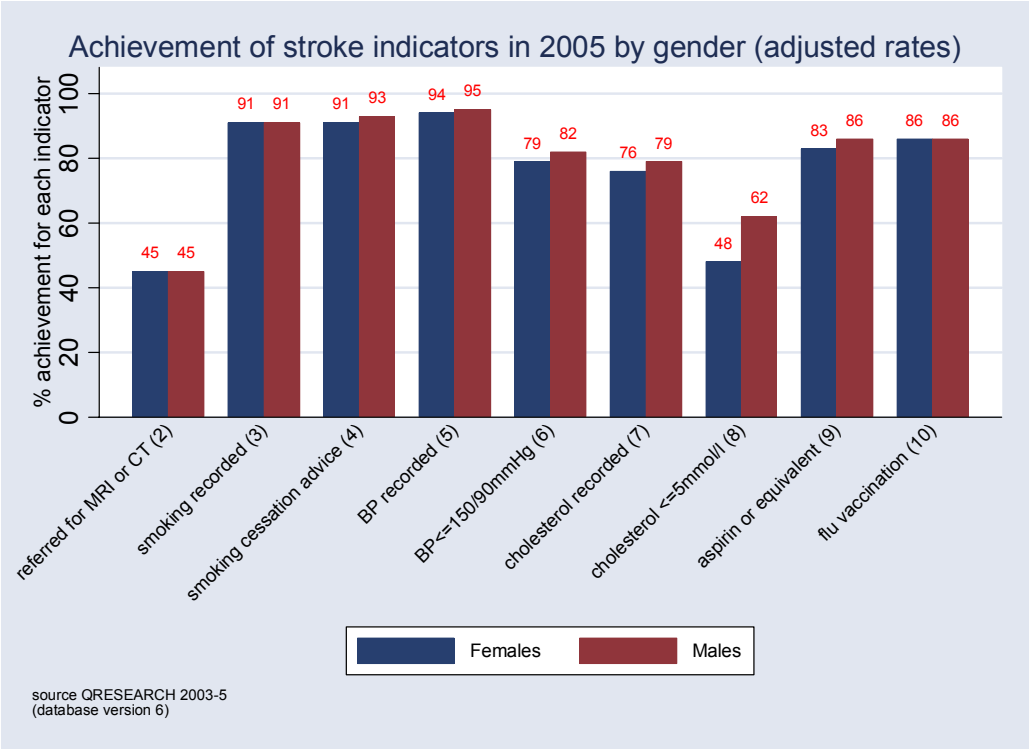


At baseline, the largest absolute difference in the levels of achievement of indicators between males and females was observed for indicator 8 (cholesterol control). 50% of males achieved indicator 8 compared with 32% of females. By 2005, 62% of males achieved the indicator compared with 47% of females.

The second largest difference was for indicator 7 (cholesterol screening) where 67% of males achieved the indicator compared with 57% of females in 2004. By 2005, the corresponding results were 80% for males and 76% for females.

Apart from cholesterol screening and control (indicators 7 and 8) there was no substantial difference between males and females for the remaining indicators although there was a general tendency for women to have lower levels than men. The only exception to this was for flu vaccination where uptake levels in women were marginally higher than in men.

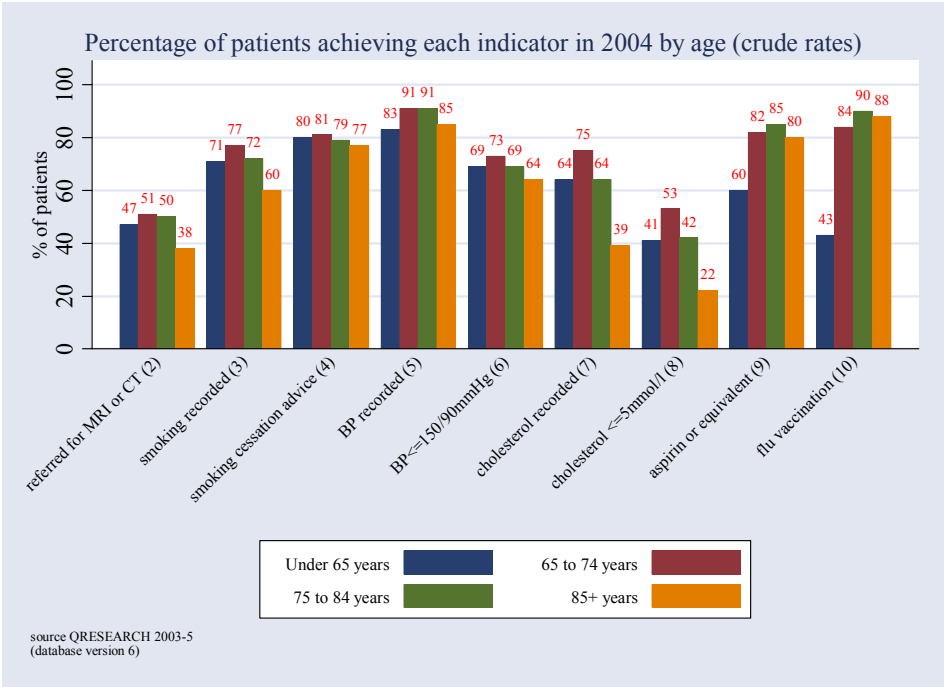
The next chart shows how the achievement of the indicators varied between males and females once the results had been adjusted by age and deprivation (see section 11.5.2 for an explanation of statistical adjustments).

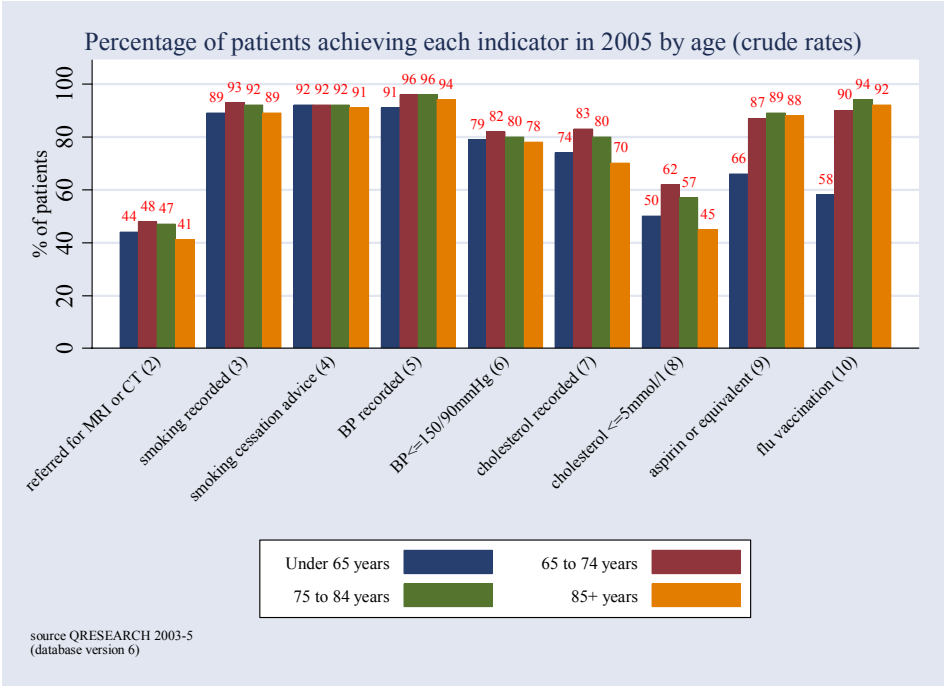


The differences observed for indicators 7 and 8 persisted despite adjustments for age and deprivation suggesting a genuine discrepancy based on gender. This is consistent with other studies which have found gender inequalities for patients with diabetes[3] [4] and for patients with coronary heart disease[5].

9.6 Variations in achievement of indicators by age

The next two charts show how the achievement of the indicators varied in four age bands at baseline and after 12 months. The corresponding tabular data can be found in Table 8.



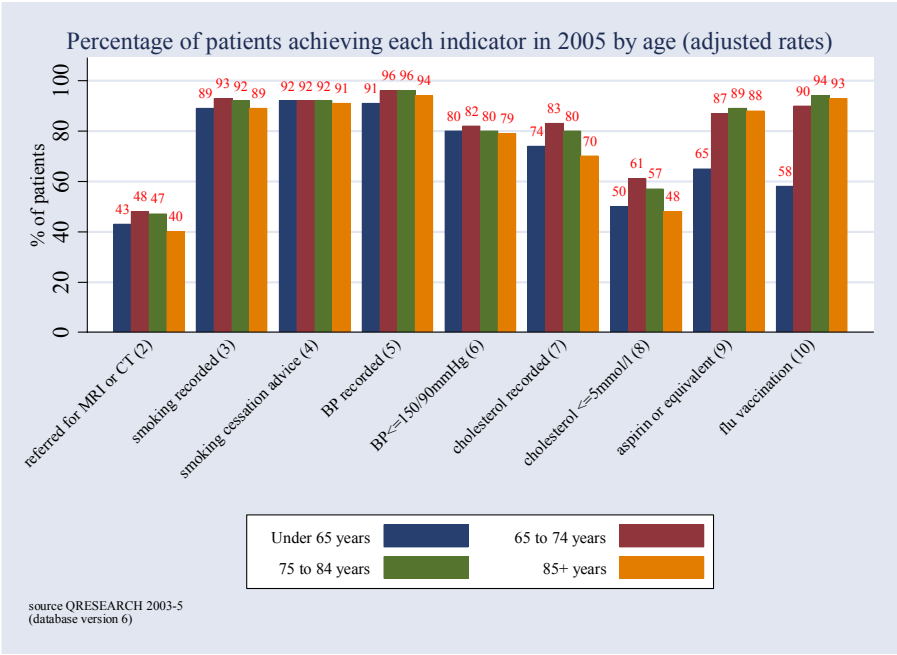


In 2004 the main differences were found for indicators 7 (cholesterol recorded), 8 (cholesterol <=5mmol/l), 9 (aspirin or equivalent) and 10 (flu vaccination). 60% of patients aged under 65 years achieved indicator 9 compared with more than 80% of patients aged 65 and over and 43% of patients aged under 65 years achieved indicator 10 compared with more than 80% of patients aged 65 and over.

A different pattern was noted for indicators 7 and 8. 39% of patients aged 85 years and over achieved indicator 7 compared with more than 60% of patients aged under 85 and 22% of patients aged 85 years and over achieved indicator 10 compared with more than 40% of patients aged under 85.

In April 2005 the age differences for indicators 7 and 8 had largely disappeared. However, the age differences for indicators 9 and 10 persisted. In part this will be due to policy (Flu vaccination has been traditionally targeted at the elderly) and part due to the perception of risk in younger people with stroke. It would be important to track these indicators to ensure that age inequalities narrow with time.

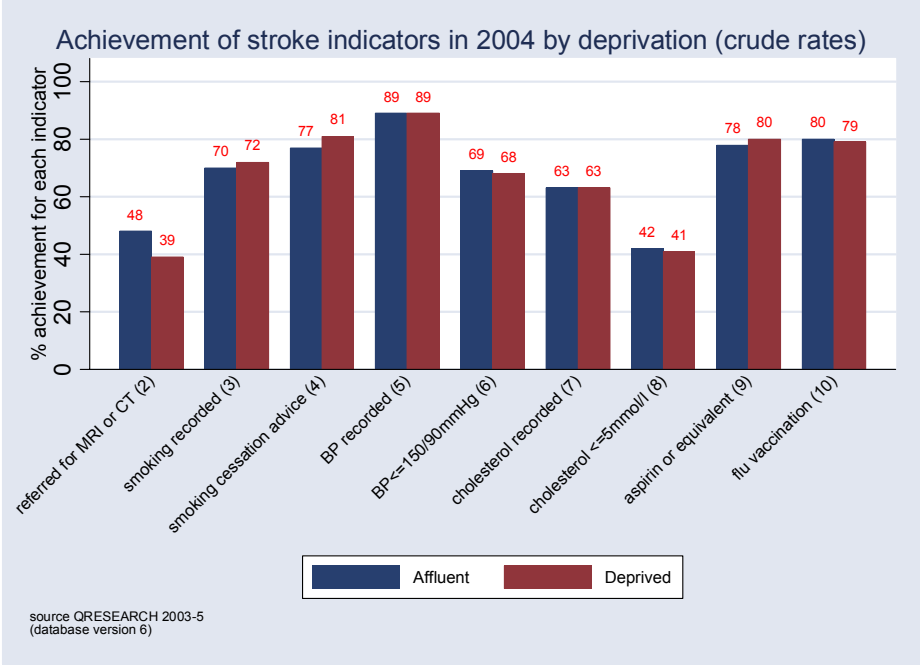
The following chart shows the rates adjusted for gender and deprivation in 2005. The results are similar to the crude rates.

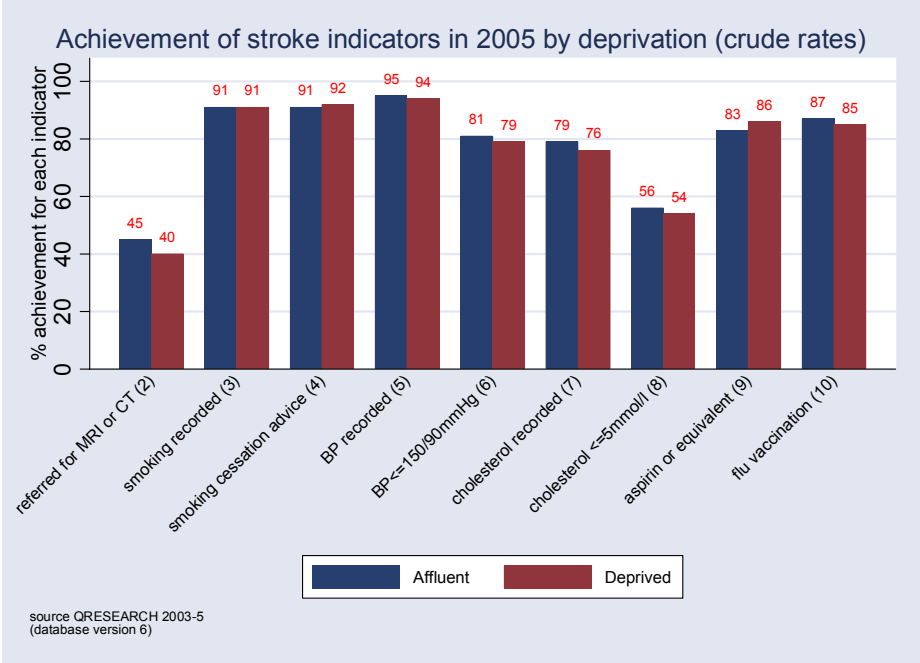


These findings are encouraging to some extent – an analysis of the impact of the 1st year of the implementation of the National Service Framework for Coronary Heart Disease showed that improvements occurred in just 12 months (2000-2001) but that age inequalities in care had not improved over the same period[6]. The fact that five years on there are very slight age inequalities suggests that general practice has been addressing this issue.

9.7 Variations in achievement of indicators by deprivation

The next two charts show how the achievement of the indicators varied between patients from the most affluent (top quintile for Townsend score) and most deprived areas (lowest quintile for Townsend score) at baseline and after 12 months. The corresponding tabular data can be found in Table 9.



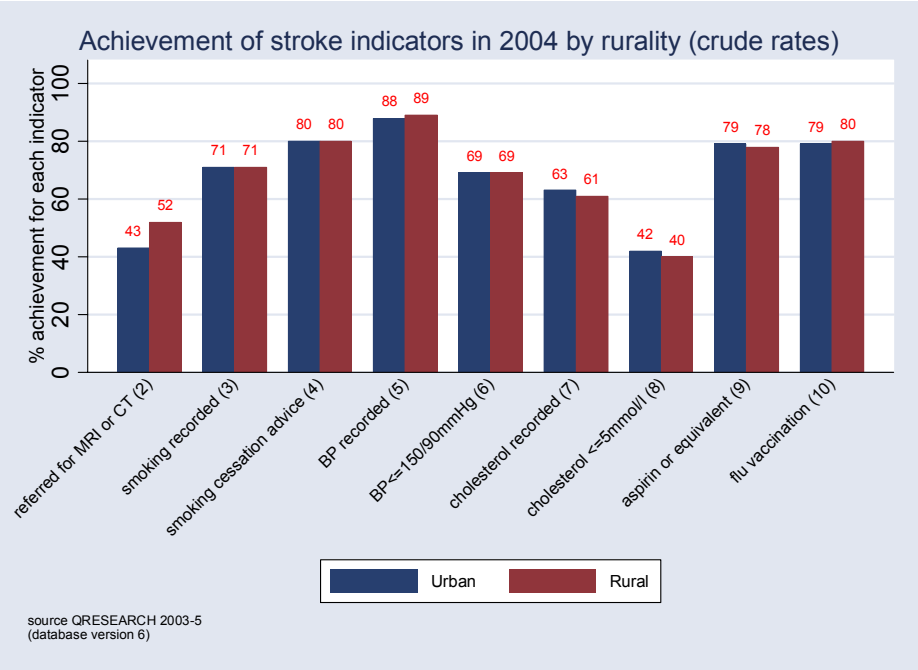


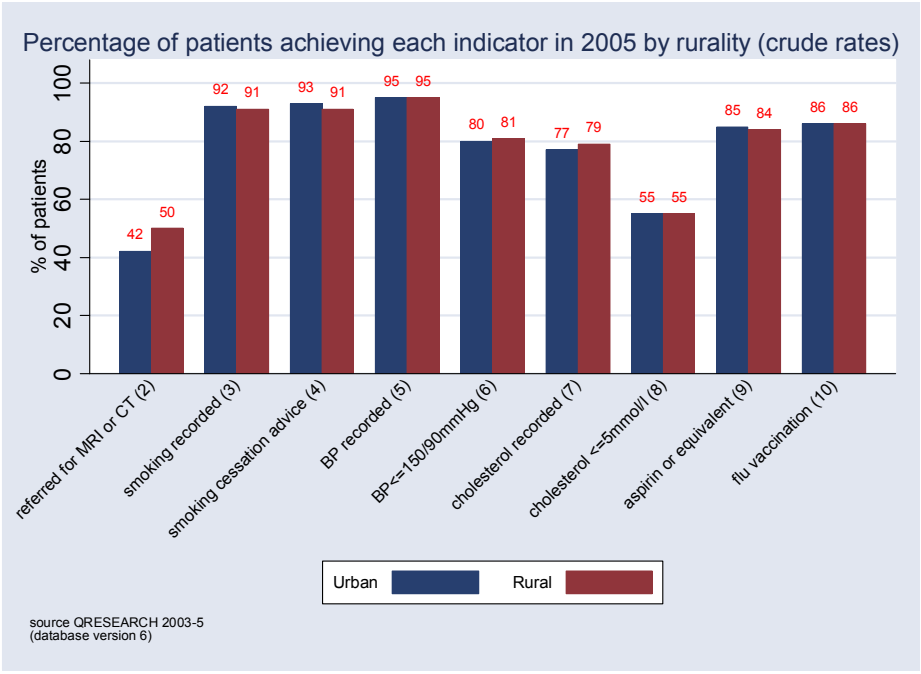
In 2004 the only indicator with a noticeable difference in achievement was indicator 2 (MRI or CT scan) where 48% of patients from the most affluent areas had a scan recorded compared with 39% of patients from the most deprived areas.

There was an increase in levels of achievement for all indicators over the 12 months (except for indicator 2) and the minor inequalities between affluent and deprived areas persisted.

9.8 Variations in achievement of indicators by rurality

The next two charts show how the indicators varied between patients living in rural and urban areas at baseline and after 12 months. The corresponding tabular data can be found in Table 10.




Percentage of patients achieving each indicator in 2005 by rurality (crude rates)
% of patients
0
20
40
60
80
100
42
50
92
91
93
91
95
95
80
81
77
79
55
55
85
84
86
86
referred for MRI or CT (2)
smoking recorded (3)
smoking cessation advice (4)
BP recorded (5)
BP<=150/90mmHg (6)
cholesterol recorded (7)
cholesterol <=5mmol/l (8)
aspirin or equivalent (9)
flu vaccination (10)
Urban
Rural
source QRESEARCH 2003-5
(database version 6)

The only difference in levels of achievement of indicators by rurality was found for indicator 2 where patients from rural areas had higher levels of achievement compared with patients from urban areas (43% vs. 52% respectively). This difference remained significant after adjusting for deprivation, age and sex on multivariate analysis. The pattern was very similar for 2005.

9.9 Results of multivariate analysis

We conducted a multivariate analysis as described in 7.4 in order to determine which factors remained important having taken all the other factors into account simultaneously. The summary results are presented in Table 11.

Females tended to be less likely than males to achieve the indicators and patients aged under 65 years or over 85 years tended to have lower levels of achievement than patients aged 65 to 84 years.

The inequality between males and females achieving indicator 8 (cholesterol <=5mmol/l) decreased slightly from April 2004 to April 2005.

The inequality between males and females achieving indicator 7 (cholesterol recorded) disappeared entirely over the 12 month period.

The inequalities between males and females achieving indicators 5 (BP recorded), 6 (BP<=150/90mmHg) and 9 (aspirin or equivalent) were consistent throughout the period.

No differences were found by level of deprivation or between patients from urban and rural areas.

9.10 Variations by geographical area

In this section we compare the achievement of quality indicators by geographical region. This has been done in two ways – by producing summary information for each area and also summary information for each indicator. The latter is intended to enable direct comparisons between the regions. We have used the median practice percentage for each indicator for each region in 2004 and 2005.

9.11 Summary by area

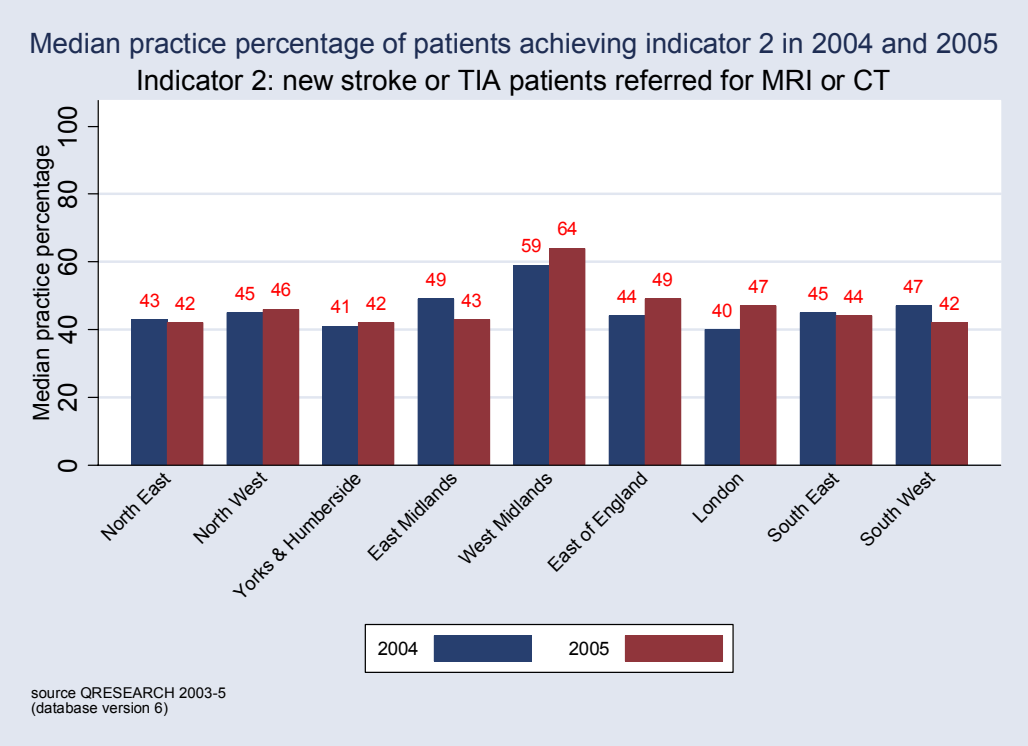
There are separate tabulations for each area which display all of the indicators with the total number of patients eligible for each indicator and those achieving the indicator. Table 12 to Table 22 show the achievement for each quality indicator by geographical areas.

9.12 Summary by indicator

Secondly, we have compared each indicator across the regions and presented the results in graphical format.

9.12.1 Indicator 2: Newly diagnosed stroke patients referred for MRI or CT scan by region

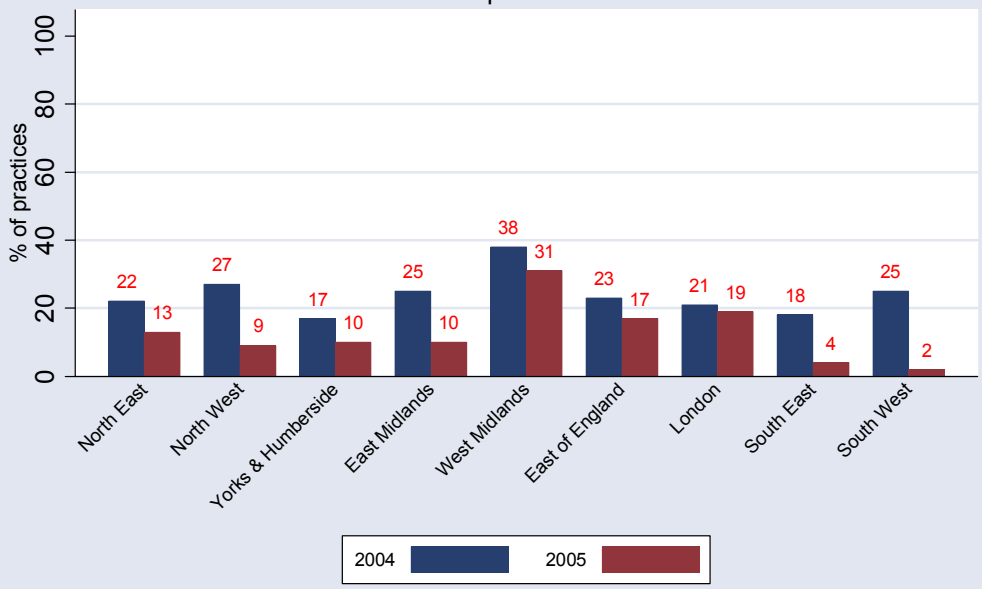
The maximum threshold for indicator 2 is 80%. The median practice percentage ranged from 40% (London) to 59% (West Midlands) in 2004, and from 42% (North East, Yorks. & Humberside, South West) to 64% (West Midlands) in 2005. The largest relative increase was in London where the median practice percentage rose from 40% to 47%, a relative increase of 18%. In the North East, the East Midlands, the South East and the South West the median practice percentage dropped over the 12 month period.



The proportion of practices achieving the maximum threshold ranged from 17% (Yorks. & Humberside) to 38% (West Midlands) in 2004, and from 2% (South West) to 31% (West Midlands) in 2005. Despite the fact that, in most regions, the median practice percentage increased, the proportion of practices attaining the maximum threshold dropped everywhere. The most dramatic decreases were in the South East (18% to 4%) and the South West (25% to 2%).

Percentage of practices achieving the maximum threshold by government region

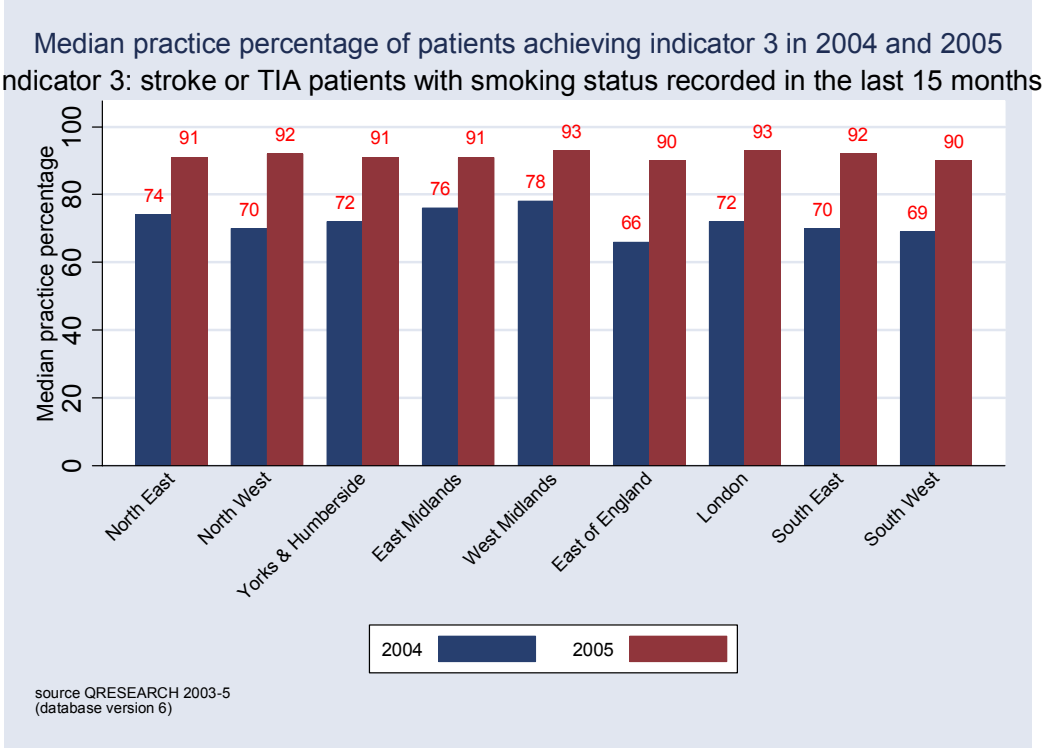
Indicator 2: new stroke or TIA patients referred for MRI or CT



source QRESEARCH 2003-5
(database version 6)

9.12.2 Indicator 3: Stroke or TIA patients with smoking status recorded by region

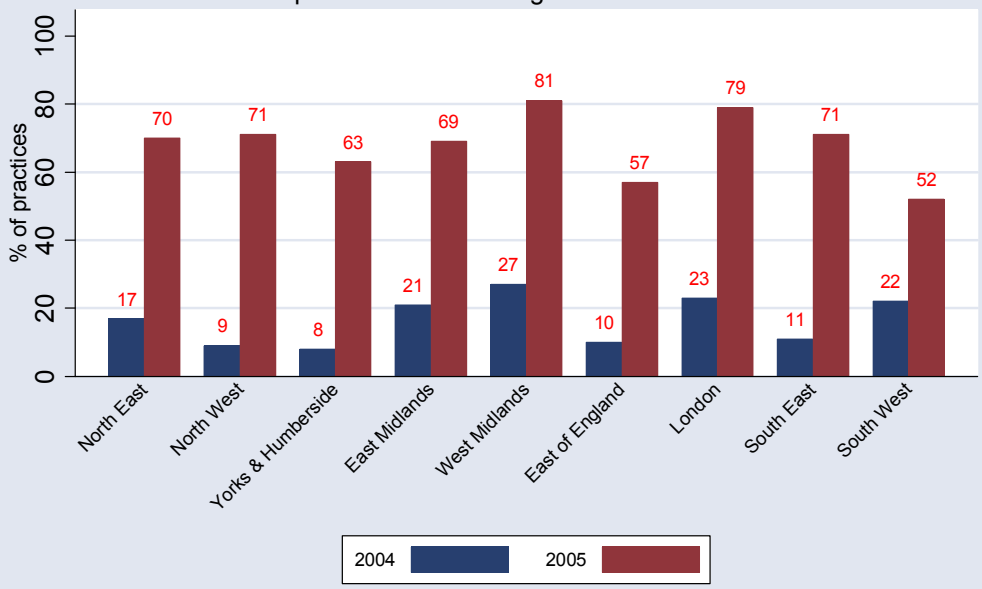
The maximum threshold for indicator 3 is 90%. The median practice percentage ranged from 66% (East of England) to 78% (West Midlands) in 2004, and from 90% (East of England, South West) to 93% (West Midlands, London) in 2005. The largest relative increase was in the East of England where the median practice percentage rose from 66% to 90%, a relative increase of 36%.



The proportion of practices achieving the maximum threshold ranged from 8% (Yorks. & Humberside) to 27% (West Midlands) in 2004, and from 52% (South West) to 81% (West Midlands) in 2005. There was a substantial increase in the percentage of practices achieving the threshold for indicator 3 in every region. The largest increase (both relative and absolute) was in the North West which rose from 9% to 71% over the 12 month period, a relative increase of 689%. Of all the indicators, indicator 3 showed the greatest increases over the 12 month period.

Percentage of practices achieving the maximum threshold by government region

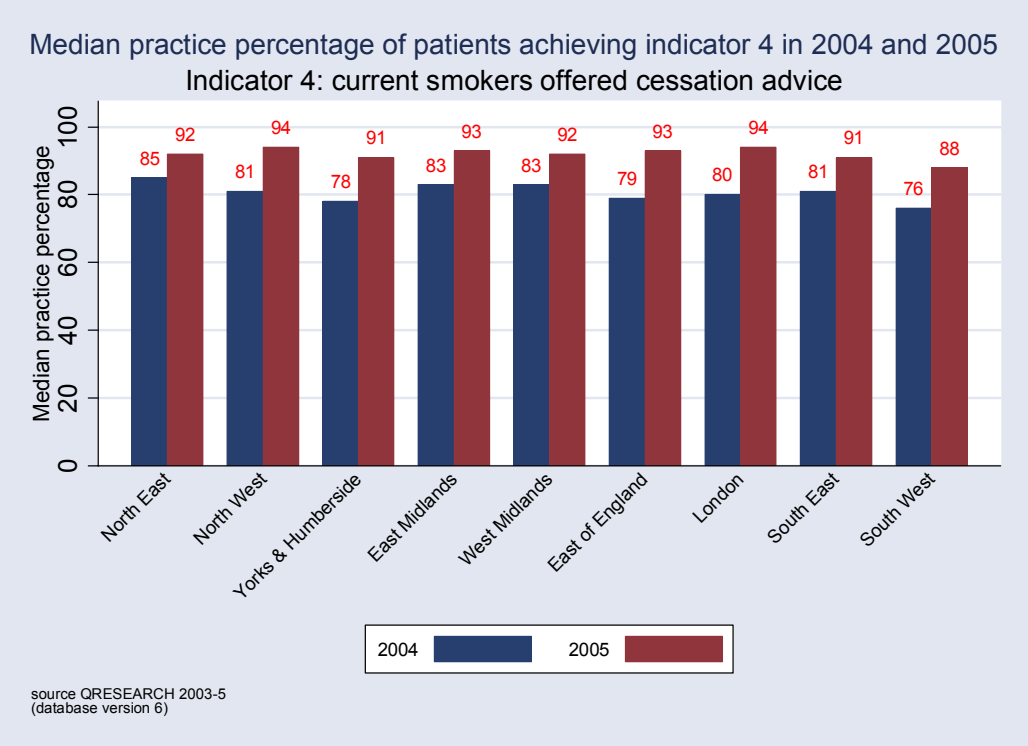
Indicator 3: stroke or TIA patients with smoking status recorded in the last 15 months



source QRESEARCH 2003-5
(database version 6)

9.12.3 Indicator 4: Stroke or TIA current smokers offered cessation advice by region

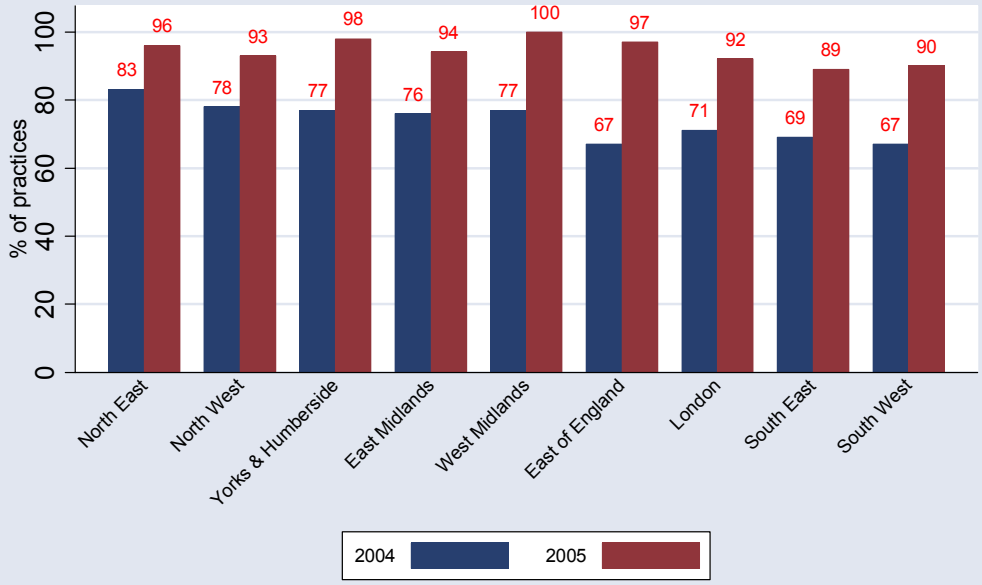
The maximum threshold for indicator 4 is 70%. The median practice percentage ranged from 76% (South West) to 85% (North East) in 2004, and from 88% (South West) to 94% (North West, London) in 2005. The increase in median practice percentage from 2004 to 2005 was similar across all regions.



The proportion of practices achieving the maximum threshold ranged from 67% (East of England, South West) to 83% (North East) in 2004, and from 89% (South East) to 100% (West Midlands) in 2005. The largest relative increase was in the East of England (67% to 97%), a relative increase of 45%.

Percentage of practices achieving the maximum threshold by government region

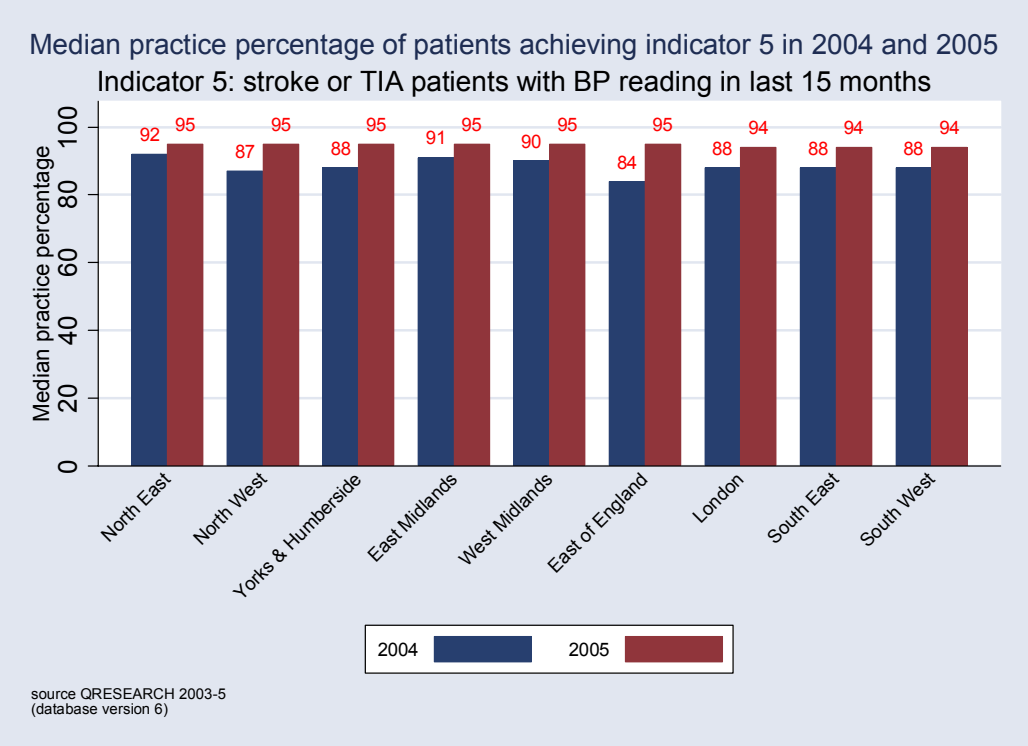
Indicator 4: current smokers offered cessation advice



source QRESEARCH 2003-5
(database version 6)

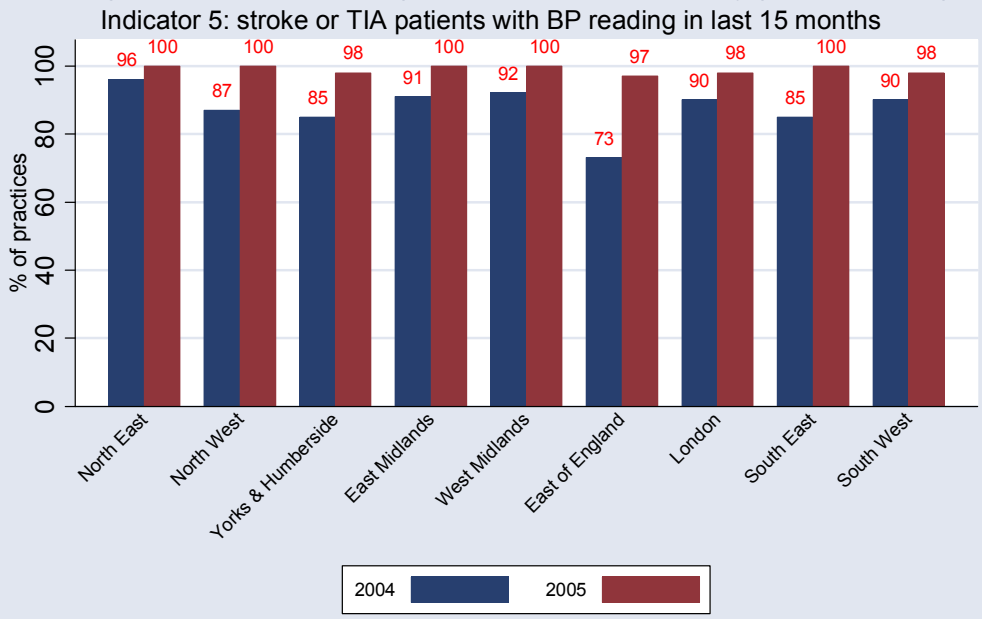
9.12.4 Indicator 5: Stroke or TIA patients with blood pressure recorded by region

The maximum threshold for indicator 5 is 80%. The median practice percentage ranged from 84% (East of England) to 92% (North East) in 2004. All regions had a median practice percentage of either 94% or 95% in 2005.



The proportion of practices achieving the maximum threshold ranged from 73% (East of England) to 96% (North East) in 2004, and from 97% (East of England) to 100% (North East, North West, East Midlands, West Midlands, South East) in 2005. There are few practices that did not achieve the maximum threshold in 2005.

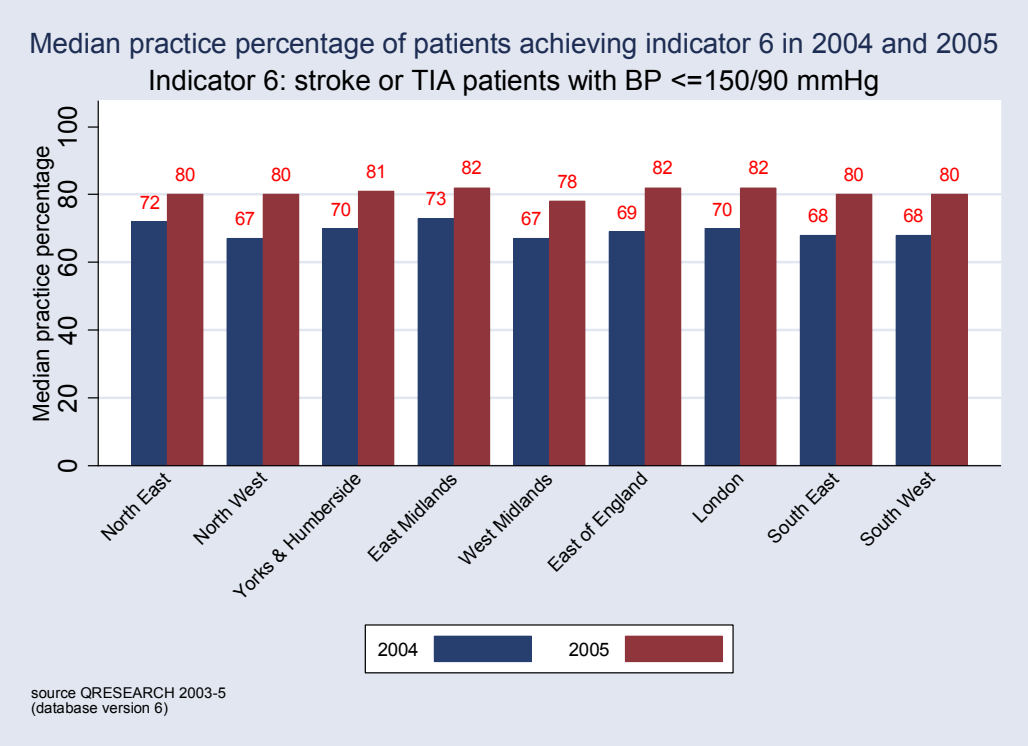
Percentage of practices achieving the maximum threshold by government region



source QRESEARCH 2003-5
(database version 6)

9.12.5 Indicator 6: Stroke or TIA patients with blood pressure <=150/90 mmHg by region

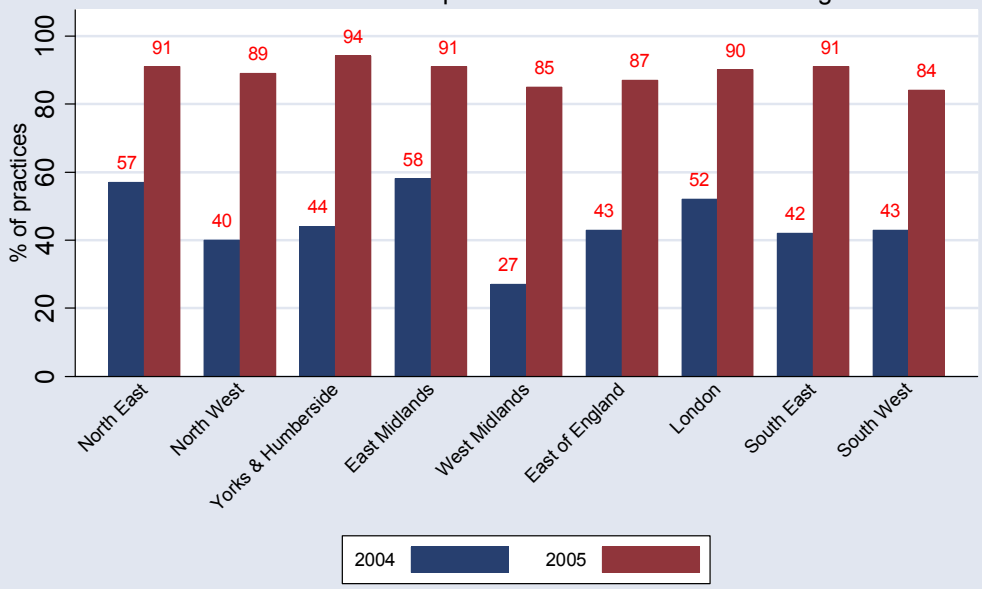
The maximum threshold for indicator 6 is 70%. The median practice percentage ranged from 67% (North West, West Midlands) to 73% (East Midlands) in 2004, and from 78% (West Midlands) to 82% (East Midlands, East of England, London) in 2005. The increase in median practice percentage from 2004 to 2005 was similar across all regions.



The proportion of practices achieving the maximum threshold ranged from 27% (West Midlands) to 58% (East Midlands) in 2004, and from 84% (South West) to 94% (Yorks. & Humberside) in 2005. The largest increase (both relative and absolute) was in the West Midlands where the proportion of practices achieving the threshold rose from 27% to 85%, a relative increase of 215%.

Percentage of practices achieving the maximum threshold by government region

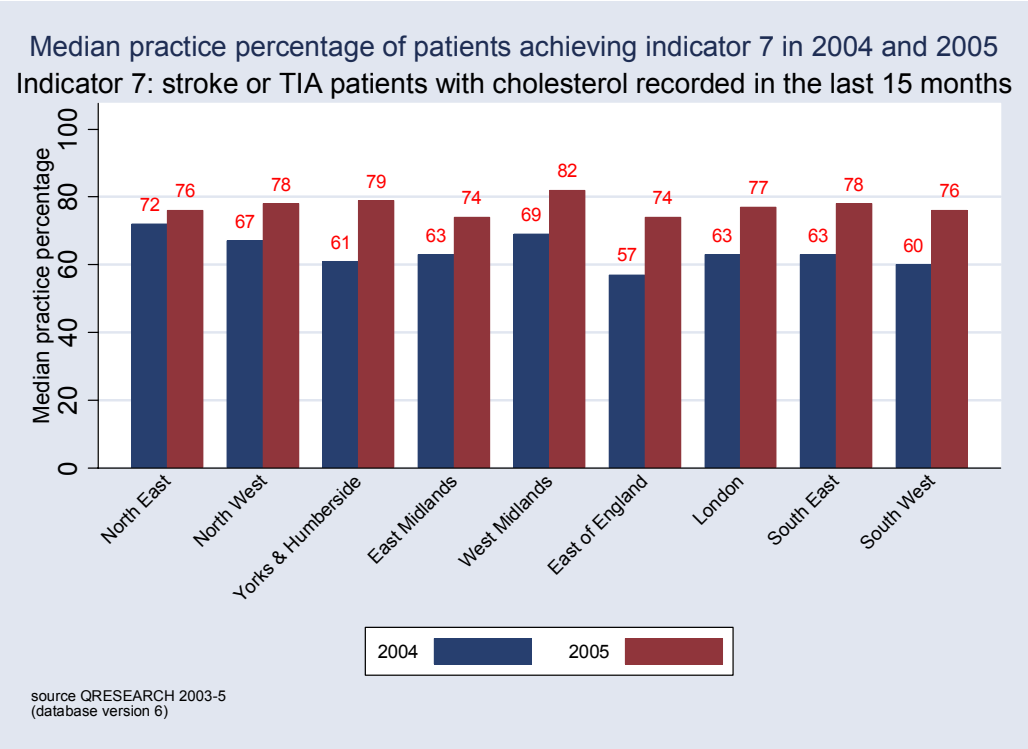
Indicator 6: stroke or TIA patients with BP <=150/90 mmHg



source QRESEARCH 2003-5
(database version 6)

9.12.6 Indicator 7: Stroke or TIA patients with cholesterol recorded by region

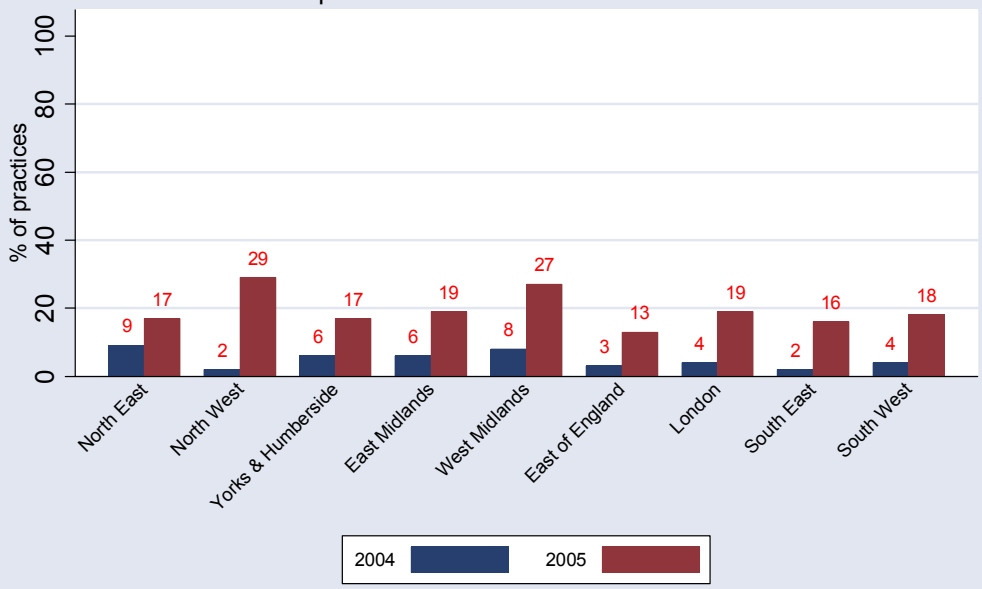
The maximum threshold for indicator 7 is 90%. The median practice percentage ranged from 57% (East of England) to 72% (North East) in 2004, and from 74% (East Midlands, East of England) to 82% (West Midlands) in 2005. The increase in median practice percentage from 2004 to 2005 was similar across all regions. The largest relative increases were in Yorks. & Humberside (61% in 2004 and 79% in 2005) and the East of England (57% in 2004 and 74% in 2005), both with relative increases of 29%. The smallest increase was in the North East where the median practice percentage rose from 72% to 76%, a relative increase of 6%.



The proportion of practices achieving the maximum threshold ranged from 2% (North West, South East) to 9% (North East) in 2004, and from 13% (East of England) to 29% (North West, West Midlands) in 2005. The largest increase (both relative and absolute) was in the North West where the proportion of practices achieving the threshold rose from 2% to 29%, a relative increase of 1350%.

Percentage of practices achieving the maximum threshold by government region

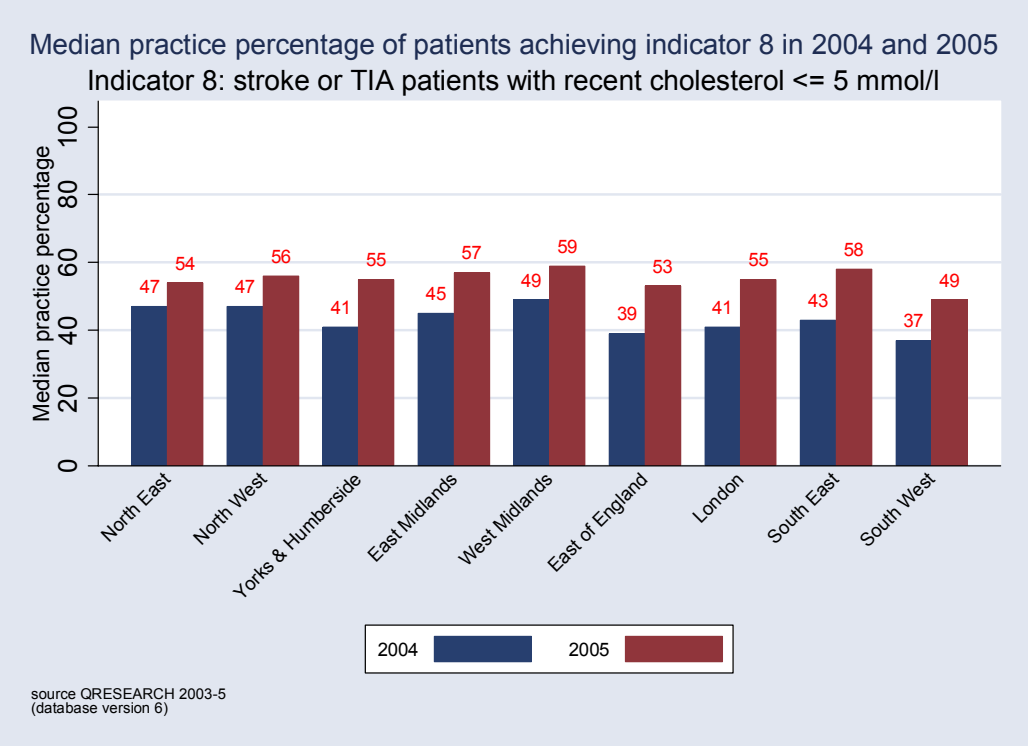
Indicator 7: stroke or TIA patients with cholesterol recorded in the last 15 months



source QRESEARCH 2003-5
(database version 6)

9.12.7 Indicator 8: Stroke or TIA patients with last cholesterol <= 5 mmol/l by region*

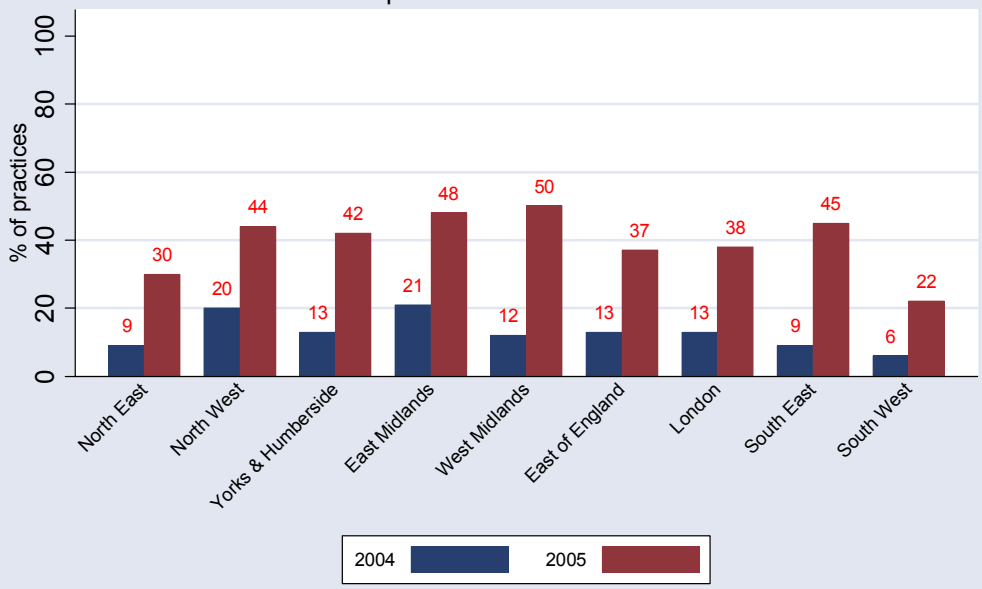
The maximum threshold for indicator 8 is 60%. The median practice percentage ranged from 37% (South West) to 49% (West Midlands) in 2004, and from 49% (South West) to 59% (West Midlands) in 2005. The largest relative increase was in the East of England where the median practice percentage rose from 39% to 53%, a relative increase of 36%.



The proportion of practices achieving the maximum threshold ranged from 6% (South West) to 21% (East Midlands) in 2004, and from 22% (South West) to 50% (West Midlands) in 2005. The largest increase (both relative and absolute) was in the South East where the proportion of practices achieving the threshold rose from 9% to 45%, a relative increase of 400%.

Percentage of practices achieving the maximum threshold by government region

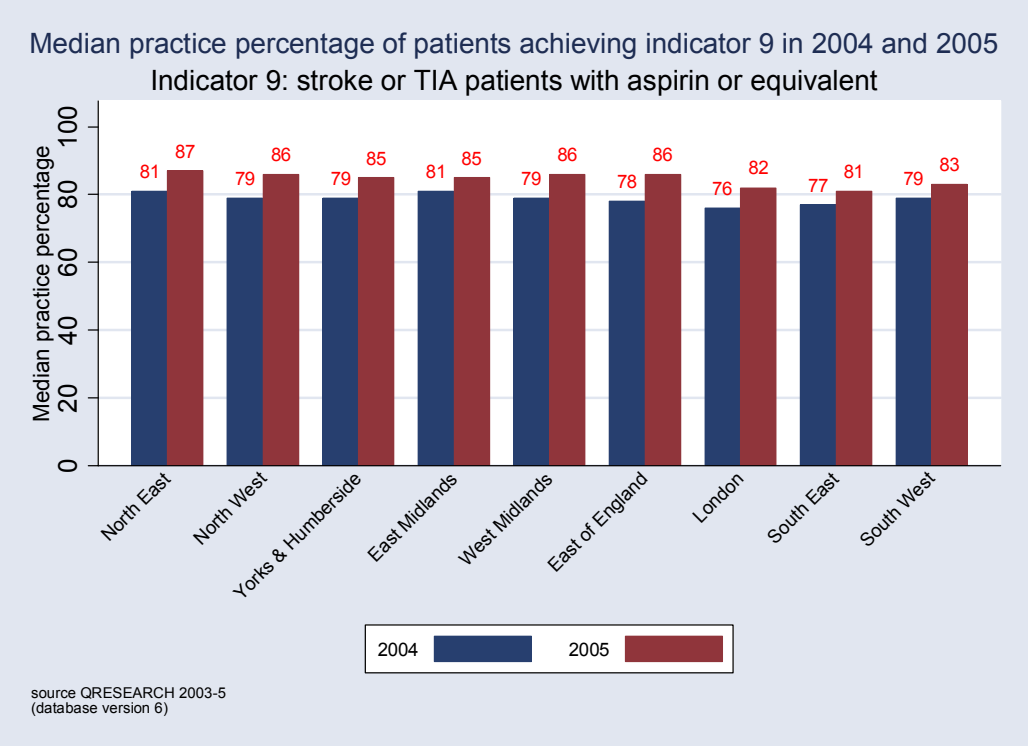
Indicator 8: stroke or TIA patients with recent cholesterol <= 5 mmol/l



source QRESEARCH 2003-5
(database version 6)

9.12.8 Indicator 9: Non-haemorrhagic stroke or TIA patients taking aspirin or equivalent by region

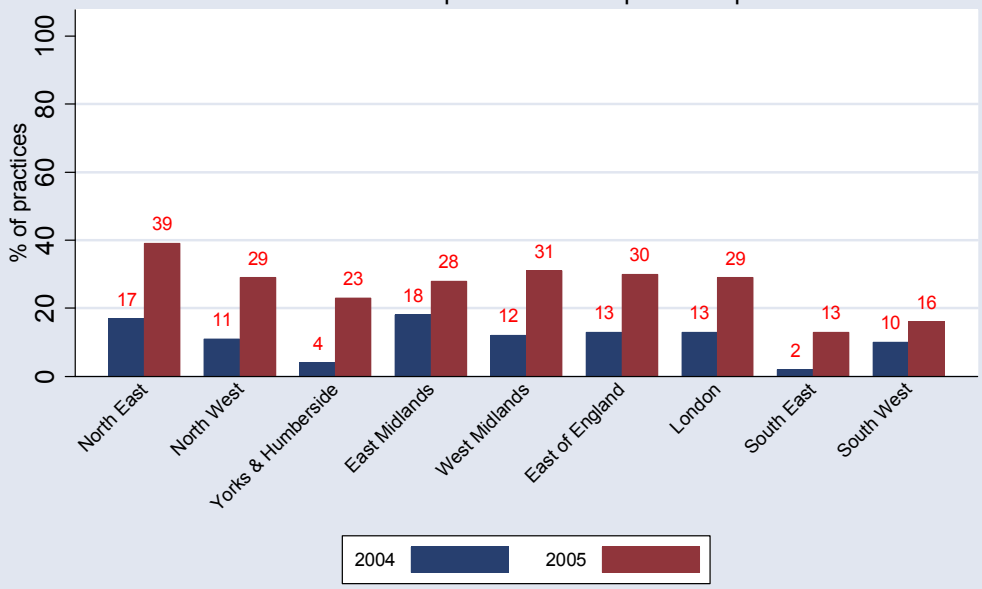
The maximum threshold for indicator 9 is 90%. The median practice percentage ranged from 76% (London) to 81% (North East, East Midlands) in 2004, and from 81% (South East) to 87% (North East) in 2005. The increase in median practice percentage from 2004 to 2005 was similar in all regions.



The proportion of practices achieving the maximum threshold ranged from 2% (South East) to 18% (East Midlands) in 2004, and from 13% (South East) to 39% (North East) in 2005. The largest relative increase was in the South East where the proportion of practices achieving the threshold rose from 2% to 13%, a relative increase of 550%.

Percentage of practices achieving the maximum threshold by government region

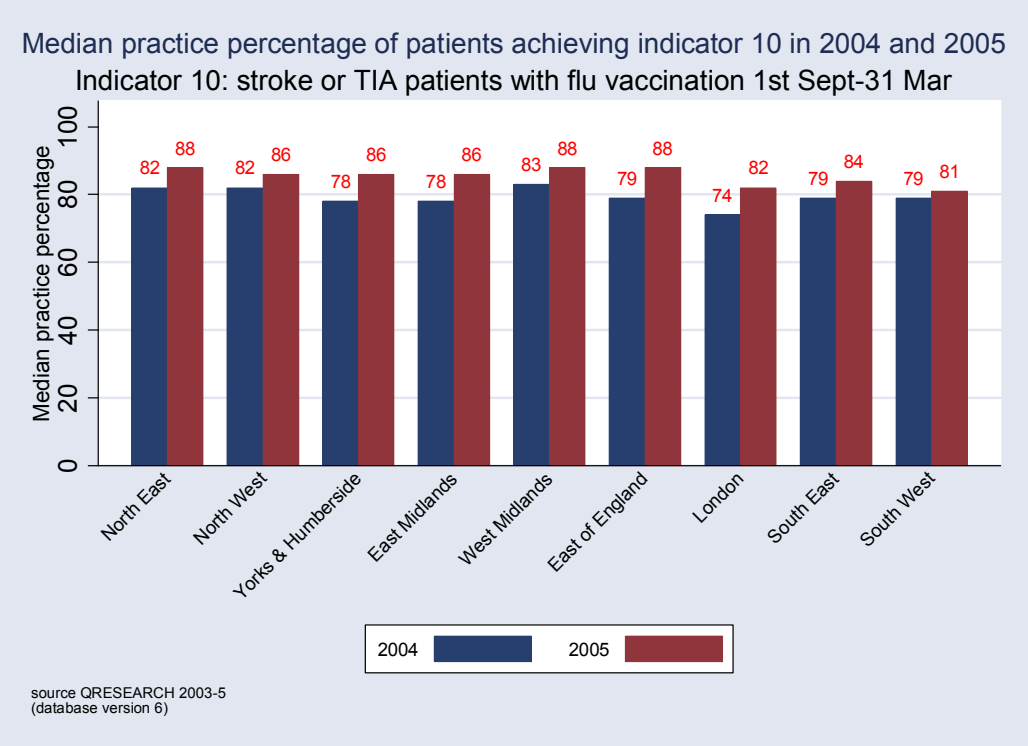
Indicator 9: stroke or TIA patients with aspirin or equivalent



source QRESEARCH 2003-5
(database version 6)

9.12.9 Indicator 10: Flu vaccination in the preceding 1st Sept - 31st March by region

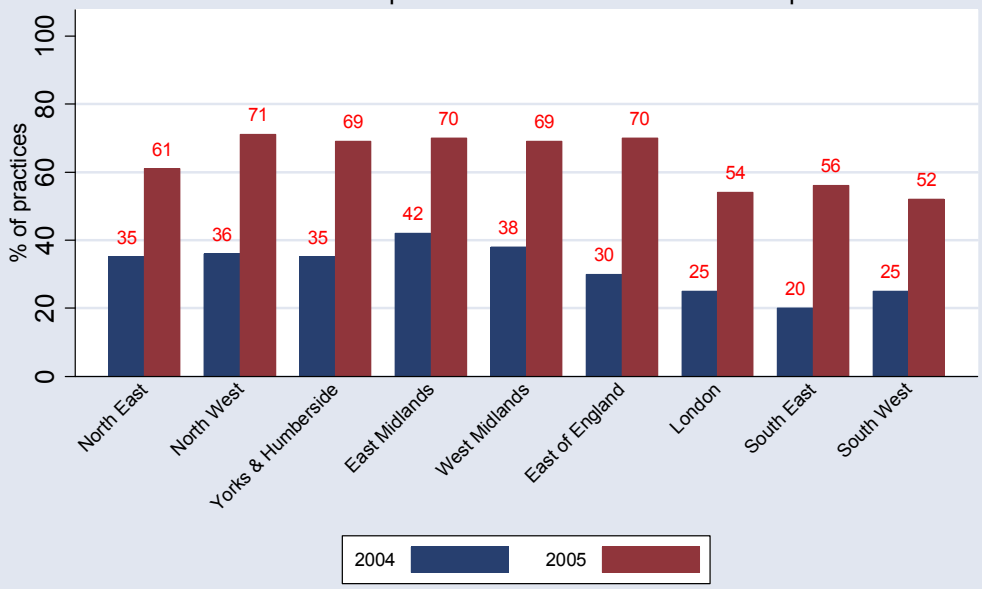
The maximum threshold for indicator 10 is 85%. The median practice percentage ranged from 74% (London) to 83% (West Midlands) in 2004, and from 81% (South West) to 88% (North East, West Midlands, East of England) in 2005. The largest increase (both relative and absolute) was in the East of England (79% to 88%), a relative increase of 10%.



The proportion of practices achieving the maximum threshold ranged from 20% (South East) to 42% (East Midlands) in 2004, and from 52% (South West) to 71% (North West) in 2005. The largest relative increase was in the South East where the proportion of practices achieving the threshold rose from 20% to 56%, a relative increase of 180%.

Percentage of practices achieving the maximum threshold by government region

Indicator 10: stroke or TIA patients with flu vaccination 1st Sept-31 Mar



source QRESEARCH 2003-5
(database version 6)

10 Discussion

10.1 Discussion of data source and methods

This report was commissioned by the National Audit Office from the QRESEARCH team in Nottingham. The database used for this report is the sixth version of QRESEARCH uploaded in April 2005. The version numbering is important since different practices contribute to the various versions uploaded over time. In this sixth version, there are contributing 488 practice of which 413 practices had complete data up to 1st April 2005 (the remaining practices were still uploading at 1st April 05). However, 398 of these practices are in England (with at least 23 in each region), nine in Wales, five in Scotland and only one in Northern Ireland. This latter is because of technical issues in linking practices in the province to the NHS Net in England.

The QRESEARCH database is extracted only from practices using the EMIS clinical system LV. We know that these practices tend to be larger (fewer single handed practices) and are more likely to be teaching practices compared to practices overall in the United Kingdom. However in other respects they are representative of practice characteristics. There are no differences in patient characteristics (age, gender, deprivation, morbidity etc) compared to the population of England and Wales.

The interpretation of the results in this report depends crucially on the credibility that can be placed on the data in the QRESEARCH database. In a range of studies undertaken for the Department of Health (source), the validity of the data have been established. There are practices in this database which have used the clinical computer for routine care to a greater extent that others, and there are ranges in incidence, prevalence, values and rates (for example prescription and consultation rates) between practices. However these variations are in line with those expected from other studies, some of which have directly validated the data against paper records including hospital diagnoses. Furthermore, the data have been proven to be of sufficient quality for use in high grade research publications[3 4 7-10].

Overall, the QRESEARCH team has confidence that the completeness and accuracy of the QRESEARCH data is sufficient to undertake the task set by the National Audit Office. And this was to look at primary and secondary prevention of stroke (for the purposes of this report, stroke and/or transient ischaemic attack) as recorded in primary care. To do this, two census points – 1st April 2004 and 1st April 2005 – were chosen to look for changes over time and the Quality and Outcomes Framework indicators were used as the key measures of prevention.

10.2 Discussion of overall results

This report starts by looking at primary prevention using measures from the Quality and Outcomes Framework. Primary prevention is the prevention of a first stroke in people who have never had a stroke or TIA. In terms of primary prevention, then of the 1.2 million patients aged 45 years and over in the QRESEARCH database for this study, smoking status had been recorded at least once in 83% by April 2004. Of these patients, 22% were recorded as smokers and **38% of these patients had smoking cessation advice** recorded on the computer within the preceding 15 months.

By 2005, smoking status was recorded in 87% of patients aged 45 years and older. Of those patients, 20% were recorded as smokers. Of those known to be smokers, **52% had smoking cessation advice** recorded on the computer within the preceding 15 months.

In 2004, 77% of patients aged 45 and over had a recorded blood pressure rising to 81% by 2005.

Of patients aged 45 years and over with blood pressure recorded in the last 5 years, 77% had a blood pressure of less than or equal to 150/90 mmHg in 2004. By 2005 this had risen to 82%.

These changes in recording may be influenced by improved use of smoking habit and blood pressure in codes (as opposed to free text which cannot be analysed in this report). However there has been a long-term trend towards coding these data and our findings are much more likely to be due to increased activity leading to the recording of that activity. Obviously in terms of primary prevention it is not the recording of smoking and blood pressure that really matters, but the level of control. Between 2004 and 2005 there was an absolute decrease of 2% in the number of smokers and an absolute decrease of 5% in patients with blood pressure greater than 150/90 mmHg.

The recorded prevalence of stroke/TIA did not change over the 12 month study period. In 2004, the age-standardised prevalence of stroke or TIA overall was 14.5 per 1000 and varied between regions with highest rates in the North East (18.9 per 1000 registered patients) and lowest rates in the South East and London (12.5 and 12.6 per 1000 registered patients respectively). Variations in prevalence may represent differences in diagnostic practice, computer recording (i.e. patients have stroke or TIA but this is not recorded on the practice computer) or true variations in population prevalence.

In terms of secondary prevention, this study has shown that for all indicators except one (referral for CT or MRI scan) there was improvement in recorded performance between April 2004 and April 2005.

The indicator that bucked the trend was Indicator 2 – referral for a MRI or CT scanning early after an incident stroke. In order to achieve this scan the GP needs to refer the patients for a scan. This may be due to a delay in recording - scans are generally undertaken under the direction of a specialist whilst a patient is admitted to, or has an outpatient appointment at, hospital. The hospital would then notify the general practitioner to inform them whether or not the patient had been scanned. If the discharge

letter didn't make it clear whether a scan had been done or not, then the GP would then consider a referral. Absence of evidence for having referred a patient for an MRI or CT scan could therefore be because the patient had not been referred. Alternatively the patient was referred (or had a scan organised by the hospital during admission) but the general practice didn't enter it into the patients' electronic record after being informed. Lastly the patient may not have been referred because of an absence of a local clinic or suitable scanning facilities.

Particularly gratifying is the improvement in the indicators reflecting the achievement of clinical control in biological risk factors for further stroke in those who have already experienced a stroke. Indicator 6 measures the proportion of these patients who have a last blood pressure reading of 150/90 or less (both systolic and diastolic levels to be achieved). In April 2005 80.3% of patients had achieved this standard in their last blood pressure measurement, and this was a substantial improvement on the 68.9% of a year earlier.

Similarly, the percentage of patients achieving indicator 8 (last total cholesterol reading of 5 mmol/l or less) was 54.9% in April 2005, up from 41% of a year earlier. Taken together with the improvement in the prescribing of anti-platelet therapy (up from 78.9% to 84.3%) **these improvements should have led, and should continue to lead, to significant reductions in recurrent strokes in this vulnerable group.**

The positive changes over the year suggest that most of the new General Medical Services Contract Quality and Outcomes Framework stroke indicators (for secondary prevention) will be met soon. The major concern must be around the use of scans early after incident strokes and this may need systematic action if it is to be achieved overall.

There was no correspondence between the relative increase in achievement of indicators and the points allocated for each indicator although the allocation of points varied between indicators with seven points for hypertension management (indicator 5 and 6) and only two for scans (indicator 2). The justification for the different weightings is not entirely clear and may need further consideration.

Obviously the success against the maximum thresholds for this whole population disguises some inter-practice variation, and the thresholds are of course applied in the contract at practice level. Continuing surveillance of outlying practices will be required.

10.3 Variations in quality indicators by age, sex, deprivation and region

In this report, the QRESEARCH team were also asked to look at inequalities in the secondary prevention of stroke. *Our Healthier Nation* aims to improve the health of the worst off in society and to narrow the health gap[11]. Whilst some National Policies such as the National Service Framework (NSF) for elderly and the NSF for Diabetes[12] have reduction of inequalities as key objectives, others have curious incentives which could

inadvertently make things worse. The NSF for Coronary Heart Disease, for example, specifically mentions targets for patients under 75 years[13] and it is possible that this could lead to a focus on younger patients at the expense of the more elderly. The new GMS contract, does not distinguish patients on the basis of age and hopefully this will encourage similar levels of care in the elderly as in their younger counter parts.

There was a complex relationship between age and achievement of indicators. We found some important differences in quality indicators between the patients aged under 75 and those aged 75 or over. This is consistent with age inequalities reported elsewhere for coronary heart disease in primary care[6] and also in secondary care (where older people are less likely to undergo angiography, angioplasty and bypass grafting[14]). In this analysis of stroke patients, the level of achievement of indicators 7 (cholesterol screening) and 8 (cholesterol control) was lower among patients aged 85 and over in both years. However, for indicators 9 (use of aspirin or equivalent in patients with non-haemorrhagic stroke) and 10 (flu vaccination) patients under 65 years had lower levels of achievement than patients aged 65 and over.

There was evidence of gender inequalities for two indicators – both concerned with screening and treatment of cholesterol levels. These differences persisted despite adjustments for age and deprivation suggesting a genuine discrepancy based on gender. This is consistent with other studies which have found gender inequalities and for patients with coronary heart disease[5 15-20] (who are less likely to have appropriate prevention, referral, investigation and treatment than men in primary and secondary care) and for patients with diabetes (where both the quality of care and patient reported access differs between men and women)[3 4].

However, there is no real evidence of deprivation or rurality having a major effect on whether patients achieve the indicators. This was a surprising finding since there have been a number of earlier studies showing differential access to care for patients from deprived areas with coronary heart disease[21] or diabetes[4].

When an intervention first occurs, it could increase baseline inequalities[22] if those who need the intervention least take it up first with those at greatest risk being late in adopting the change. Eventually, however, as the overall levels rise, then there is a catch phase tending to level differences out. So, there may have been deprivation inequalities in the past which have now disappeared – an analysis of trends over the last ten or so years would help answer this question since the current analysis only covered 2004 and 2005.

Although the prevalence of stroke shows wide regional variation the achievement of thresholds for the indicators of good care in secondary prevention of stroke do not.

Overall, this study has demonstrated evidence of improving primary and secondary prevention of stroke. These improvements coincide with the introduction of the new General Medical Services contract and are likely to have been spurred by it and by preceding National Service Frameworks. Whatever the driver, the improvement in quality

of care should result in a reduction in the incidence of stroke and potential mortality due to stroke.

11 Appendix

11.1 Validation of QRESEARCH

QRESEARCH is a new clinical database containing the clinical records of over 7 million patients ever registered with 468 practices over the last 16 years. The information recorded on the database includes patient demographics (year of birth, sex, socio-economic data associated with postcode area), characteristics (height, weight, smoking status), symptoms, clinical diagnosis, consultations, referrals, prescribed medication and results of investigations. The database has been validated by comparing birth rates, death rates, consultation rates, prevalence and mortality rates with other data sources including the General Household Survey and the General Practice Research Database[23]. The age-sex structure of the population has been compared with that reported in the 2001 census. We found a good correspondence for all of these measures (results available on request) although in some instances our prevalence figures[9] are marginally higher than less recent data. We have also compared practices taking part in regional research networks on these and other measures and found a good correspondence[24]. Detailed analyses have shown good levels of completeness and consistency[25]. Similar databases have been used for studies investigating risk factors for coronary heart disease[26-29] or effects of conventional NSAIDs[27]. In previous studies, the diagnosis of acute myocardial infarction has been confirmed by reviewing hospital discharge notes [28 29] or comparing with the paper based records[30] and found to be correct in over 90% of cases.

11.2 Rurality

The QRESARCH database has a measure for rurality. This is the Countryside Agency's Ward Level Definition of Rural Areas. The simple binary classification enables each of 8,414 specified wards in England to be categorised as either rural or non-rural (this classification does not apply to the Devolved administrations).

This classification of rural wards was developed for the Countryside Agency by the Social Disadvantage Research Centre of the Department of Social Policy and Social Work at Oxford University in 2000. Further information about the rurality score can be found at the following website:

http://neighbourhood.statistics.gov.uk/downloads.asp?nsid=false&CE=True&SE=True&dsid=488

11.3 Deprivation scores

The QRESEARCH database has a range of measures which can be used as a proxy for deprivation including the Townsend Score[31].

The Townsend Score is a composite score made up of four variables: unemployment (lack of material resources and insecurity), overcrowding (material living conditions), lack of owner occupied accommodation (a proxy indicator of wealth) and lack or car ownership (a proxy indicator of income). The Townsend Score is a summation of the standardised scores (z scores) for each variable (scores greater than zero indicate greater levels of material deprivation). The Townsend Score[31] is a validated measure of material deprivation[32] and is a composite score based on unemployment, overcrowding, lack of a car and non-owner occupation. It is strongly related to morbidity[33 34], use of routine and emergency services [35 36] and mortality[37]. Higher scores indicated greater levels of deprivation. The Townsend score is considered the best indicator of material deprivation currently available.

For this analysis, we used the Townsend Score for each patient as determined by the score associated with the output area of the patients' postcode. Output areas consist of approximately 125 households and are nested within larger administrative areas known as electoral wards. This information was linked to the patients medical practice on the GP clinical computer system enabling the extraction of the score but leaving the postcode behind (no strong identifiers are held on the QRESEARCH database as the data are anonymised at practice and patient level)

11.4 Computer Read Codes

The computer codes used to record clinical diagnoses in UK general practices are known as Read codes – this hierarchical clinical coding system is analogous to the ICD10 coding system which is used in secondary care in the UK. The following lists the diagnostic codes used for the searches for stroke or TIA. These were taken form the GMS contract definitions.

11.4.1 Transient Ischaemic Attacks Read codes

READCODE	DESCRIPTION
G65..	Transient cerebral ischaemia
G65..	Drop attack
G65..	Transient ischaemic attack
G65..	Vertebro-basilar insufficiency
G650.	Basilar artery syndrome
G650.	Insufficiency - basilar artery
G651.	Vertebral artery syndrome
G6510	Vertebro-basilar artery syndrome
G652.	Subclavian steal syndrome
G653.	Carotid artery syndrome hemispheric
G654.	Multiple and bilateral precerebral artery syndromes

G65y.	Other transient cerebral ischaemia
G65z.	Transient cerebral ischaemia NOS
G65z.	Transient ischaemic attacks
G65z0	Impending cerebral ischaemia
G65z1	Intermittent cerebral ischaemia
G65zz	Transient cerebral ischaemia NOS

11.4.2 Stroke read codes

READCODE	DESCRIPTION
G61..	Intracerebral haemorrhage
G61..	CVA - cerebrovascular accid due to intracerebral haemorrhage
G61..	Stroke due to intracerebral haemorrhage
G610.	Cortical haemorrhage
G611.	Internal capsule haemorrhage
G612.	Basal nucleus haemorrhage
G613.	Cerebellar haemorrhage
G614.	Pontine haemorrhage
G615.	Bulbar haemorrhage
G616.	External capsule haemorrhage
G617.	Intracerebral haemorrhage
G618.	Intracerebral haemorrhage
G61X.	Intracerebral haemorrhage in hemisphere
G61X0	Left sided intracerebral haemorrhage
G61X1	Right sided intracerebral haemorrhage
G61z.	Intracerebral haemorrhage NOS
G63y0	Cerebral infarction due to thrombosis of precerebral arteries
G63y1	Cerebral infarction due to embolism of precerebral arteries
G64..	Cerebral arterial occlusion
G64..	CVA - cerebral artery occlusion
G64..	Infarction – cerebral
G64..	Stroke due to cerebral arterial occlusion
G640.	Cerebral thrombosis
G6400	Cerebral infarction due to thrombosis of cerebral arteries
G641.	Cerebral embolism
G641.	Cerebral embolus
G6410	Cerebral infarction due to embolism of cerebral arteries
G64z.	Cerebral infarction NOS
G64z.	Brainstem infarction NOS
G64z.	Cerebellar infarction
G64z.	Cerebral A. occlusion NOS
G64z0	Brainstem infarction
G64z1	Wallenberg syndrome
G64z1	Lateral medullary syndrome
G64z2	Left sided cerebral infarction
G64z3	Right sided cerebral infarction
G66..	Stroke and cerebrovascular accident unspecified
G66..	CVA unspecified
G66..	Stroke unspecified

G66..	CVA - Cerebrovascular accident unspecified
G66..	Stroke/CVA - undefined
G66..	Stroke
G660.	Middle cerebral artery syndrome
G661.	Anterior cerebral artery syndrome
G662.	Posterior cerebral artery syndrome
G663.	Brain stem stroke syndrome
G664.	Cerebellar stroke syndrome
G665.	Pure motor lacunar syndrome
G666.	Pure sensory lacunar syndrome
G667.	Left sided CVA
G668.	Right sided CVA
G669.	Cerebral palsy
G6760.	Cereb infarct due cerebral venous thrombosis
G6W.	Cereb infarct due unsp occlus/stenos precerebr arteries
G6X.	Cerebrl infarctn due/unspcf occlusn or sten/cerebrl artrs

11.5 Statistical notes

11.5.1 Median values and inter-quartile ranges

For each indicator we calculated the percentage of patients achieving that indicator for each individual practice. These percentages were ranked in ascending order, separately for each indicator, and the median practice percentages for each of the indicators are the middle values. A median practice percentage of, say, 80%, means that half of the practices had less than 80% of patients achieving the indicator and half of the practices had more than 80% of patients achieving the indicator. We also determined the 25^{th} and 75^{th} percentile such that 25% of practices came below the 25^{th} percentile and 75% of practices came below the 75^{th} percentile once they had been ranked in order of patient achievement. The difference between the 25^{th} percentile and the 75^{th} percentile is termed the inter-quartile range. A large inter-quartile range indicates that practices vary considerably and a small inter-quartile range indicates a small degree of variation.

11.5.2 Statistical adjustment

Sometimes an apparent difference between groups (such as males and females) may be due to differences in another factor such as age. This could happen if women tended to be older than men, for example. The process of statistical adjustment corrects for the effect of age (for example) so that any remaining variation is due to differences between males and females rather than differences in age. We used multivariate analyses to adjust for year, age band, sex, deprivation and rurality simultaneously.

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Table 1 Regional distribution of practices, registered patients and the crude and directly age-standardised prevalence of stroke per 1000 registered patients. (Only practices with complete data up to 1st April 2005 have been included in this analysis)

	1st April 2004					1st April 2005			
Government office region	**Number of practices**	**Number of registered patients**	**Crude prevalence of stroke or TIA per 1000**	**Age-standardised prevalence rate per 1000**	**(95% CI)**	**Number of registered patients**	**Crude prevalence of stroke or TIA per 1000**	**Age-standardised prevalence rate per 1000**	**(9**
North East	23	162,891	21.0	18.9	(18.3-19.5)	165,078	20.4	18.3	(1
North West	46	255,148	18.5	18.1	(17.6-18.6)	258,118	18.1	17.7	(1
Yorks & Humberside	48	360,539	18.0	15.5	(15.2-15.9)	367,326	17.7	15.1	(1
East Midlands	67	452,865	15.6	14.0	(13.7-14.3)	450,630	15.5	13.8	(1
West Midlands	26	173,434	18.8	16.3	(15.7-16.8)	175,670	18.2	15.6	(1
East of England	30	221,599	12.7	11.6	(11.2-12.0)	223,642	12.5	11.3	(1
London	52	373,825	9.3	12.6	(12.2-13.0)	382,337	9.1	12.7	(1
South East	55	422,368	13.7	12.5	(12.1-12.8)	426,735	13.7	12.3	(1
South West	51	365,937	17.7	14.2	(13.9-14.6)	372,071	17.1	13.8	(1
Wales	9	70,284	18.0	15.2	(14.4-16.0)	70,654	18.1	15.1	(1
Scotland	5	32,172	18.6	15.5	(14.3-16.7)	32,091	18.9	15.5	(1
Northern Ireland*	1	8,000	16.0	16.3	(13.6-19.0)	8,000	16.9	16.5	(1
Total	413	2,899,062	15.7	14.5	(14.4-14.7)	2,932,352	15.4	14.2	(1

*No. of registered patients has been rounded to protect confidentiality

Table 2 Smoking and blood pressure measurements in the general population aged 45 and over
(in 413 QRESEARCH practices on 1st April 2004 and 1st April 2005)

		1st April 2004			1st April 2005		
Ageband	**Sex**	**No. patients with smoking recorded ever**	**Number of registered patients**	**Percentage of total**	**No. patients with smoking recorded ever**	**Number of registered patients**	**Percentage of total**
45 to 74	females	419,433	482,378	87.0	441,430	489,525	90.2
45 to 74	males	390,295	489,139	79.8	415,424	496,769	83.6
75 plus	females	117,739	146,807	80.2	127,306	147,641	86.2
75 plus	males	77,194	93,181	82.8	83,290	95,040	87.6
total 45 plus		**1,004,661**	**1,211,505**	**82.9**	**1,067,450**	**1,228,975**	**86.9**

Ageband	**Sex**	**No. patients with blood pressure recorded in last 5 years**	**Number of registered patients**	**Percentage of total**	**No. patients with blood pressure recorded in last 5 years**	**Number of registered patients**	**Percentage of total**
45 to 74	females	391,989	482,378	81.3	412,750	489,525	84.3
45 to 74	males	338,710	489,139	69.2	364,974	496,769	73.5
75 plus	females	126,218	146,807	86.0	131,056	147,641	88.8
75 plus	males	79,417	93,181	85.2	83,858	95,040	88.2
total 45 plus		**936,334**	**1,211,505**	**77.3**	**992,638**	**1,228,975**	**80.8**

Table 3 Geographical distribution of patients with stroke or TIA on 1st April 2004 and 1st April 2005

	1st April 2004		1st April 2005	
Government office region	**Number of patients with stroke or TIA**	**% of all patients with stroke or TIA**	**Number of patients with stroke or TIA**	**% of all patients with stroke or TIA**
North East	3,416	7.5	3,365	7.4
North West	4,713	10.3	4,672	10.3
Yorks & Humberside	6,507	14.3	6,500	14.4
East Midlands	7,064	15.5	6,998	15.5
West Midlands	3,264	7.2	3,199	7.1
East of England	2,821	6.2	2,795	6.2
London	3,480	7.6	3,472	7.7
South East	5,805	12.7	5,837	12.9
South West	6,474	14.2	6,352	14.1
Wales	1,266	2.8	1,277	2.8
Scotland	600	1.3	606	1.3
Northern Ireland	128	0.3	135	0.3
Total	45,538	100.0	45,208	100.0

Table 4 Demographic characteristics of patients with stroke or TIA on 1st April 2004 & 1st April 2005

	1st April 2004		1st April 2005	
	Number stroke or TIA patients	**Column % of 45,538**	**Number stroke or TIA patients**	**Column % of 45,208**
Type				
Patients with pure stroke	19,124	42.0	19,038	42.1
Patients with pure TIA	21,497	47.2	21,222	46.9
Patients with both TIA and stroke recorded	4903	10.8	4931	10.9
Sex				
Females	23,192	50.9	22,937	50.7
Males	22,346	49.1	22,271	49.3
Ageband				
<65 years	8,772	19.3	8,844	19.6
65-74 years	11,367	25.0	11,147	24.7
75-84 years	16,561	36.4	15,986	35.4
85 plus	8,838	19.4	9,231	20.4
Deprivation				
Townsend quintile 1 (affluent)	9,470	20.8	9,574	21.2
Townsend quintile 2	9,224	20.3	9,148	20.2
Townsend quintile 3	8,913	19.6	8,736	19.3
Townsend quintile 4	8,083	17.8	7,981	17.7
Townsend quintile 5(deprived)	8,051	17.7	7,929	17.5
Missing Townsend score	1,797	3.9	1,840	4.1

Table 5 Overall change in quality indicators between 1st April 2004 & 1st April 2005

		1st April 2004			1st April 2005			
Description	**Indicator**	**Number of patients with indicator**	**Number of eligible patients**	**% of patients achieving indicator**	**Number of patients with indicator**	**Number of eligible patients**	**% of patients achieving indicator**	**Relative % change over 12 months**
Newly diagnosed stroke patients referred for MRI or CT	2	1,184	2,495	47.5	2,105	4,626	45.5	-4
Stroke or TIA patients with smoking status*	3	31,296	44,117	70.9	39,799	43,696	91.1	+29
Stroke or TIA current smokers offered cessation advice*	4	4,199	5,270	79.7	5,626	6,128	91.8	+15
Stroke or TIA patients with BP recorded*	5	39,732	44,888	88.5	41,838	44,172	94.7	+7
Stroke or TIA patients with BP <=150/90 mmHg*	6	29,515	42,808	68.9	33,696	41,984	80.3	+17
Stroke or TIA patients with cholesterol recorded*	7	26,997	43,439	62.1	32,343	41,633	77.7	+25
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	16,346	39,823	41	20,443	37,224	54.9	+34
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant	9	23,234	29,451	78.9	23,862	28,297	84.3	+7
Flu vaccination in the preceding 1st Sept - 31st Mar	10	30,593	38,514	79.4	29,830	34,652	86.1	+8

*recorded in last the 15 months

** excluding patients with side effects or contraindications

Table 6 Variation between practices in achievement of stroke indicators between 1st April 2004 & 1st April 2005

		1st April 2004				1st April 2005			
Description	**Indicator**	**Median practice percentage**	**25th percentile**	**75th percentilie**	**Interquartile range**	**Median practice percentage**	**25th percentile**	**75th percentilie**	**Interquartile range**
Newly diagnosed stroke patients referred for MRI or CT	2	44	0	80	80	45	25	65	40
Stroke or TIA patients with smoking status*	3	73	59	86	27	93	88	96	8
Stroke or TIA current smokers offered cessation advice*	4	83	69	100	31	96	87	100	13
Stroke or TIA patients with BP recorded*	5	90	84	94	10	96	93	98	5
Stroke or TIA patients with BP <=150/90 mmHg*	6	69	62	77	15	81	76	87	11
Stroke or TIA patients with cholesterol recorded*	7	64	52	76	24	79	69	88	19
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	41	32	52	20	55	45	66	21
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	79	73	85	11	85	80	90	11
Flu vaccination in the preceding 1st Sept - 31st Mar	10	80.8	75	88	12	88	82	92	10

*recorded in last the 15 months

** excluding patients with side effects or contraindications

Table 7 Overall change in indicators for males and females 1st April 2004 & 1st April 2005

		1st April 2004			1st April 2005		
Description	**Indicator**	**% of females achieving indicator**	**% of males achieving indicator**	**Difference in % between males & females**	**% of females achieving indicator**	**% of males achieving indicator**	**Difference in % between males and females**
Newly diagnosed stroke patients referred for MRI or CT	2	45	50	4.8	45	46	1.1
Stroke or TIA patients with smoking status*	3	70	72	2.9	91	91	0.6
Stroke or TIA current smokers offered cessation advice*	4	79	80	1.2	91	93	2.0
Stroke or TIA patients with BP recorded*	5	88	89	1.2	94	95	0.7
Stroke or TIA patients with BP <=150/90 mmHg*	6	67	71	4.0	79	82	2.7
Stroke or TIA patients with cholesterol recorded*	7	57	67	10.1	76	79	3.6
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	32	50	17.4	47	62	14.9
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	77	80	3.0	83	86	2.3
Flu vaccination in the preceding 1st Sept - 31st Mar	10	80	79	-1.6	87	85	-1.2

*recorded in last the 15 months

** excluding patients with side effects or contraindications

Table 8: Overall change in indicators for patients under 75 and those over 75 years at 1st April 2004 & 1st April 2005

		1st April 2004		1st April 2005	
Description	**Indicator**	**% of patients under 75 years achieving indicator**	**% of patients 75 plus achieving indicator**	**% of patients under 75 years achieving indicator**	**% of patients 75 plus achieving indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	49.1	46.0	45.8	45.2
Stroke or TIA patients with smoking status*	3	74.4	68.2	91.1	91.0
Stroke or TIA current smokers offered cessation advice*	4	80.1	78.7	91.9	91.6
Stroke or TIA patients with BP recorded*	5	87.7	89.1	93.7	95.5
Stroke or TIA patients with BP <=150/90 mmHg*	6	71.0	67.3	81.1	79.6
Stroke or TIA patients with cholesterol recorded*	7	70.4	55.4	79.2	76.4
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	47.7	35.6	57.0	53.1
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	73.3	83.1	78.5	88.7
Flu vaccination in the preceding 1st Sept - 31st Mar	10	66.9	89.3	76.7	93.7

*recorded in last the 15 months
** excluding patients with side effects or contraindications

Table 9 Overall change in indicators for patients from deprived and affluent areas from 1st April 2004 & 1st April 2005

		1st April 2004		1st April 2005	
Description	**Indicator**	**% of patients from affluent area meeting indicator**	**% of patients from deprived area meeting indicator**	**% of patients from affluent area meeting indicator**	**% of patients from deprived area meeting indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	47.6	39.2	44.6	39.9
Stroke or TIA patients with smoking status*	3	70.2	72.3	91.4	91.2
Stroke or TIA current smokers offered cessation advice*	4	77.2	81.2	91.3	92.3
Stroke or TIA patients with BP recorded*	5	88.6	88.5	94.9	94.4
Stroke or TIA patients with BP <=150/90 mmHg*	6	69.2	68.0	81.3	79.1
Stroke or TIA patients with cholesterol recorded*	7	62.8	63.3	79.2	76.4
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	42.1	41.0	56.1	53.5
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	77.6	80.1	83.0	86.3
Flu vaccination in the preceding 1st Sept - 31st Mar	10	79.9	78.5	87.3	84.9

*recorded in last the 15 months
** excluding patients with side effects or contraindications

Table 10: Overall change in indicators for patients from urban and rural areas from 1st April 2004 & 1st April 2005

		1st April 2004		1st April 2005	
Description	**Indicator**	**% of patients from urban area meeting indicator**	**% of patients from rural area meeting indicator**	**% of patients from urban area meeting indicator**	**% of patients from rural area meeting indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	43.0	51.9	41.6	49.8
Stroke or TIA patients with smoking status*	3	70.8	70.8	91.5	90.5
Stroke or TIA current smokers offered cessation advice*	4	79.8	80.4	92.5	91.0
Stroke or TIA patients with BP recorded*	5	88.2	89.0	94.7	94.9
Stroke or TIA patients with BP <=150/90 mmHg*	6	68.8	68.8	79.8	80.5
Stroke or TIA patients with cholesterol recorded*	7	62.7	61.1	76.9	78.5
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	41.6	39.8	54.7	54.5
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	79.0	78.2	84.6	83.5
Flu vaccination in the preceding 1st Sept - 31st Mar	10	79.2	79.6	86.4	86.1

*recorded in last the 15 months

** excluding patients with side effects or contraindications

Table 11: Summary of multivariate analysis to determine differences between patient groups for each of the indicators. All the results are simultaneously adjusted for year, sex, age (4 agebands), deprivation category and rurality.

	Description	Year	Sex	Age	Deprivation	Rurality	Change in gender inequality over time	Comments
2	New stroke patients referred for MRI or CT	No increase	No difference	85 plus less likely	No difference	Urban less likely	n/a	No change over time; oldest older less likely to get scans and those from urban areas
3	Stroke or TIA patients with smoking status	Increase over 12 months	No difference	Less likely for those under 65 and over 85	No difference	No difference	n/a	Age important
4	Stroke or TIA current smokers offered cessation advice.	Increase over 12 months	No difference	No difference	No difference	No difference	n/a	
5	Stroke or TIA patients with BP recorded	Increase over 12 months	Females less likely	Under 65 less likely	No difference	No difference	No change over 12 months	Age and sex important
6	Stroke or TIA patients with BP <=150/90mmHg	Increase over 12 months	Females less likely	Less likely for those under 65 and over 85	No difference	No difference	No change over 12 months	Age and sex important
7	Stroke or TIA patients with cholesterol recorded	Increase over 12 months	Females less likely in 2004	Less likely for those under 65 and over 85	No difference	No difference	Inequality disappears over 12 months	Age and sex important
8	Stroke or TIA patients with recent cholesterol <=5 mmol/l	Increase over 12 months	Females less likely	Less likely for those under 65 and over 85	No difference	No difference	Inequality slightly decreased over 12 months	Age and sex important
9	Non-haemorrhagic stroke or TIA patients taking aspirin or equivalent	Increase over 12 months	Females less likely	Lower in under 65 years	No difference	No difference	No change over 12 months	Age and sex important
10	Flu vaccination in the preceding 1st Sept – 31st Mar	Increase over 12 months	No difference	Lower in under 65 years	No difference	No difference	n/a	Age important

Table 12 Overall change in indicators for patients from the North East Region from 1st April 2004 & 1st April 2005

		1st April 2004			1st April 2005		
Description		**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	93	210	44.3	161	369	43.6
Stroke or TIA patients with smoking status*	3	2,487	3,371	73.8	3,035	3,297	92.1
Stroke or TIA current smokers offered cessation advice*	4	446	501	89.0	582	615	94.6
Stroke or TIA patients with BP recorded*	5	3,102	3,388	91.6	3,172	3,323	95.5
Stroke or TIA patients with BP <=150/90 mmHg*	6	2,357	3,281	71.8	2,572	3,209	80.1
Stroke or TIA patients with cholesterol recorded*	7	2,417	3,340	72.4	2,454	3,193	76.9
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	1,491	3,123	47.7	1,635	2,938	55.7
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	1,755	2,159	81.3	1,800	2,075	86.7
Flu vaccination in the preceding 1st Sept - 31st Mar	10	2,416	2,905	83.2	2,389	2,710	88.2

*recorded in last the 15 months
** excluding patients with side effects or contraindications

Table 13 Overall change in indicators for patients from the North West Region from 1st April 2004 & 1st April 2005

		1st April 2004			1st April 2005		
Description	**Indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	106	259	40.9	202	478	42.3
Stroke or TIA patients with smoking status*	3	3,219	4,562	70.6	4,115	4,528	90.9
Stroke or TIA current smokers offered cessation advice*	4	550	683	80.5	752	796	94.5
Stroke or TIA patients with BP recorded*	5	4,090	4,660	87.8	4,326	4,563	94.8
Stroke or TIA patients with BP <=150/90 mmHg*	6	2,972	4,420	67.2	3,458	4,323	80.0
Stroke or TIA patients with cholesterol recorded*	7	2,979	4,517	66.0	3,340	4,305	77.6
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	1,798	4,175	43.1	2,132	3,877	55.0
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	2,322	2,965	78.3	2,425	2,855	84.9
Flu vaccination in the preceding 1st Sept - 31st Mar	10	3,256	4,018	81.0	3,101	3,592	86.3

*recorded in last the 15 months

** excluding patients with side effects or contraindications

Table 14 : Overall change in indicators for patients from Yorks & Humberside from 1st April 2004 & 1st April 2005

		1st April 2004			1st April 2005		
Description	**Indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	127	327	38.8	243	622	39.1
Stroke or TIA patients with smoking status*	3	4,543	6,339	71.7	5,719	6,297	90.8
Stroke or TIA current smokers offered cessation advice*	4	602	778	77.4	852	944	90.3
Stroke or TIA patients with BP recorded*	5	5,701	6,436	88.6	6,056	6,365	95.1
Stroke or TIA patients with BP <=150/90 mmHg*	6	4,311	6,177	69.8	4,882	6,072	80.4
Stroke or TIA patients with cholesterol recorded*	7	3,689	6,272	58.8	4,758	5,998	79.3
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	2,288	5,724	40.0	2,935	5,306	55.3
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	3,568	4,521	78.9	3,689	4,374	84.3
Flu vaccination in the preceding 1st Sept - 31st Mar	10	4,069	5,343	76.2	4,565	5,282	86.4

*recorded in last the 15 months

** excluding patients with side effects or contraindications

Table 15: Overall change in indicators for patients from East Midlands from 1st April 2004 & 1st April 2005

		1st April 2004			1st April 2005		
Description	**Indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	230	390	59.0	354	721	49.1
Stroke or TIA patients with smoking status*	3	4,949	6,719	73.7	6,111	6,688	91.4
Stroke or TIA current smokers offered cessation advice*	4	607	722	84.1	759	821	92.4
Stroke or TIA patients with BP recorded*	5	6,214	6,899	90.1	6,399	6,750	94.8
Stroke or TIA patients with BP <=150/90 mmHg*	6	4,691	6,504	72.1	5,180	6,339	81.7
Stroke or TIA patients with cholesterol recorded*	7	3,947	6,494	60.8	4,785	6,253	76.5
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	2,455	5,874	41.8	3,138	5,482	57.2
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	3,591	4,440	80.9	3,594	4,239	84.8
Flu vaccination in the preceding 1st Sept - 31st Mar	10	4,726	5,862	80.6	4,811	5,508	87.3

*recorded in last the 15 months

** excluding patients with side effects or contraindications

Table 16: Overall change in indicators for patients from the West Midlands from 1st April 2004 & 1st April 2005

		1st April 2004			1st April 2005		
Description	**Indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	88	151	58.3	160	290	55.2
Stroke or TIA patients with smoking status*	3	2,440	3,158	77.3	2,867	3,112	92.1
Stroke or TIA current smokers offered cessation advice*	4	332	407	81.6	403	442	91.2
Stroke or TIA patients with BP recorded*	5	2,887	3,214	89.8	2,969	3,140	94.6
Stroke or TIA patients with BP <=150/90 mmHg*	6	2,013	3,039	66.2	2,300	2,971	77.4
Stroke or TIA patients with cholesterol recorded*	7	2,194	3,112	70.5	2,424	3,003	80.7
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	1,422	2,885	49.3	1,612	2,746	58.7
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	1,661	2,091	79.4	1,709	2,018	84.7
Flu vaccination in the preceding 1st Sept - 31st Mar	10	2,311	2,807	82.3	2,266	2,585	87.7

*recorded in last the 15 months

** excluding patients with side effects or contraindications

Table 17: Overall change in indicators for patients from the East of England from 1st April 2004 & 1st April 2005

		1st April 2004			1st April 2005		
Description	**Indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	74	147	50.3	126	254	49.6
Stroke or TIA patients with smoking status*	3	1,849	2,728	67.8	2,396	2,683	89.3
Stroke or TIA current smokers offered cessation advice*	4	207	278	74.5	314	341	92.1
Stroke or TIA patients with BP recorded*	5	2,397	2,782	86.2	2,590	2,728	94.9
Stroke or TIA patients with BP <=150/90 mmHg*	6	1,873	2,660	70.4	2,143	2,614	82.0
Stroke or TIA patients with cholesterol recorded*	7	1,542	2,704	57.0	1,911	2,562	74.6
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	954	2,478	38.5	1,257	2,349	53.5
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	1,423	1,846	77.1	1,492	1,751	85.2
Flu vaccination in the preceding 1st Sept - 31st Mar	10	1,882	2,416	77.9	1,820	2,066	88.1

*recorded in last the 15 months

** excluding patients with side effects or contraindications

Table 18: Overall change in indicators for patients from London from 1st April 2004 & 1st April 2005

		1st April 2004			1st April 2005		
Description	**Indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	85	215	39.5	173	407	42.5
Stroke or TIA patients with smoking status*	3	2,220	3,341	66.4	3,087	3,358	91.9
Stroke or TIA current smokers offered cessation advice*	4	398	504	79.0	542	587	92.3
Stroke or TIA patients with BP recorded*	5	2,971	3,422	86.8	3,193	3,385	94.3
Stroke or TIA patients with BP <=150/90 mmHg*	6	2,227	3,275	68.0	2,591	3,208	80.8
Stroke or TIA patients with cholesterol recorded*	7	2,038	3,329	61.2	2,483	3,165	78.5
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	1,122	3,023	37.1	1,499	2,795	53.6
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	1,522	1,997	76.2	1,601	1,920	83.4
Flu vaccination in the preceding 1st Sept - 31st Mar	10	2,165	2,890	74.9	2,213	2,662	83.1

*recorded in last the 15 months

** excluding patients with side effects or contraindications

Table 19: Overall change in indicators for patients from the South East from 1st April 2004 & 1st April 2005

		1st April 2004			1st April 2005		
Description	**Indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	141	333	42.3	282	637	44.3
Stroke or TIA patients with smoking status*	3	3,885	5,666	68.6	5,162	5,641	91.5
Stroke or TIA current smokers offered cessation advice*	4	454	570	79.6	621	673	92.3
Stroke or TIA patients with BP recorded*	5	5,028	5,737	87.6	5,390	5,717	94.3
Stroke or TIA patients with BP <=150/90 mmHg*	6	3,651	5,493	66.5	4,385	5,460	80.3
Stroke or TIA patients with cholesterol recorded*	7	3,472	5,592	62.1	4,247	5,367	79.1
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	2,102	5,153	40.8	2,774	4,828	57.5
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	2,972	3,817	77.9	3,015	3,656	82.5
Flu vaccination in the preceding 1st Sept - 31st Mar	10	4,014	5,008	80.2	3,734	4,351	85.8

*recorded in last the 15 months

** excluding patients with side effects or contraindications

Table 20: Overall change in indicators for patients from the South West from 1st April 2004 & 1st April 2005

		1st April 2004			1st April 2005		
Description	**Indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	173	348	49.7	296	628	47.1
Stroke or TIA patients with smoking status*	3	4,312	6,330	68.1	5,504	6,152	89.5
Stroke or TIA current smokers offered cessation advice*	4	413	564	73.2	535	611	87.6
Stroke or TIA patients with BP recorded*	5	5,608	6,401	87.6	5,844	6,232	93.8
Stroke or TIA patients with BP <=150/90 mmHg*	6	4,135	6,127	67.5	4,654	5,939	78.4
Stroke or TIA patients with cholesterol recorded*	7	3,532	6,254	56.5	4,495	5,948	75.6
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	1,982	5,729	34.6	2,547	5,289	48.2
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	3,339	4,325	77.2	3,406	4,136	82.4
Flu vaccination in the preceding 1st Sept - 31st Mar	10	4,458	5,653	78.9	3,924	4,680	83.8

*recorded in last the 15 months

** excluding patients with side effects or contraindications

Table 21: Overall change in indicators for patients from Wales from 1st April 2004 & 1st April 2005

		1st April 2004			1st April 2005		
Description	**Indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	34	69	49.3	68	153	44.4
Stroke or TIA patients with smoking status*	3	882	1,233	71.5	1,134	1,228	92.3
Stroke or TIA current smokers offered cessation advice*	4	113	164	68.9	155	176	88.1
Stroke or TIA patients with BP recorded*	5	1,096	1,247	87.9	1,196	1,243	96.2
Stroke or TIA patients with BP <=150/90 mmHg*	6	794	1,194	66.5	951	1,179	80.7
Stroke or TIA patients with cholesterol recorded*	7	753	1,204	62.5	886	1,159	76.4
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	437	1,119	39.1	539	1,048	51.4
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	681	844	80.7	708	814	87.0
Flu vaccination in the preceding 1st Sept - 31st Mar	10	801	1,049	76.4	621	781	79.5

*recorded in last the 15 months

** excluding patients with side effects or contraindications

Table 22: Overall change in indicators for patients from Scotland from 1st April 2004 & 1st April 2005

		1st April 2004			1st April 2005		
Description	**Indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**	**Number of patients achieving indicator**	**Number of patients eligible for indicator**	**% of patients achieving indicator**
Newly diagnosed stroke patients referred for MRI or CT	2	31	41	75.6	36	57	63.2
Stroke or TIA patients with smoking status*	3	431	546	78.9	565	584	96.7
Stroke or TIA current smokers offered cessation advice*	4	67	83	80.7	97	105	92.4
Stroke or TIA patients with BP recorded*	5	538	576	93.4	584	594	98.3
Stroke or TIA patients with BP <=150/90 mmHg*	6	422	521	81.0	488	546	89.4
Stroke or TIA patients with cholesterol recorded*	7	368	500	73.6	472	555	85.0
Stroke or TIA patients with last cholesterol <= 5 mmol/l*	8	247	432	57.2	315	453	69.5
Non-haemorrhagic stroke or TIA patients taking aspirin or antiplatelet or anticoagulant**	9	336	368	91.3	353	379	93.1
Flu vaccination in the preceding 1st Sept - 31st Mar	10	415	451	92.0	365	382	95.5

*recorded in last the 15 months

** excluding patients with side effects or contraindications