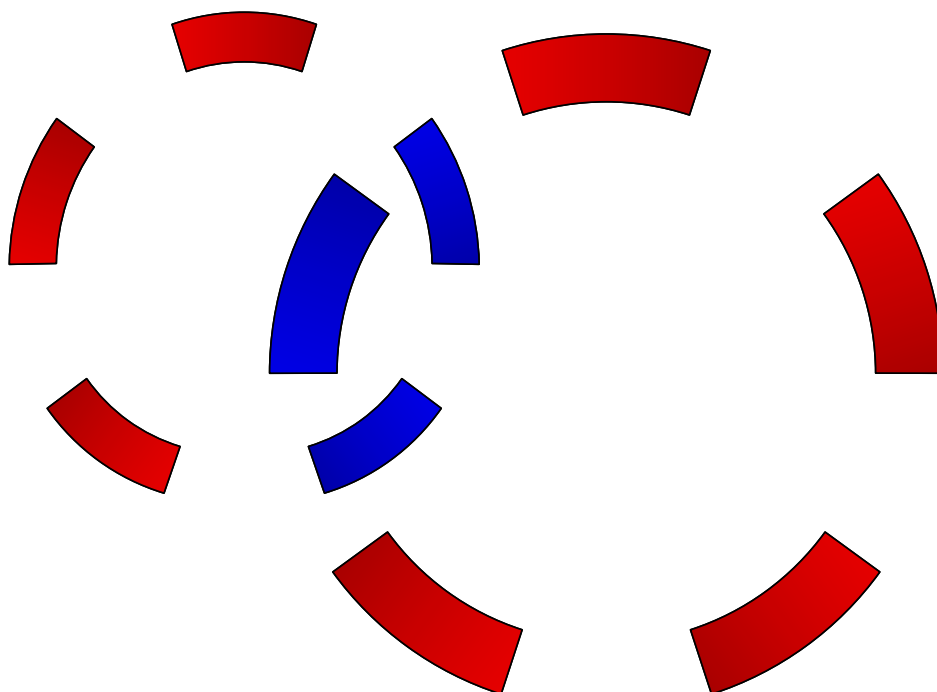


# UK Carotid Endarterectomy Audit

## Round 5

(Operation dates 1/10/2011 – 30/09/2012)



**October 2013**

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|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
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|   | <p><b>The Vascular Society of Great Britain and Ireland</b> is the specialist society that represents vascular surgeons. It is one of the key partners leading the audit.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|  | <p><b>The Healthcare Quality Improvement Partnership (HQIP)</b> is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices. Its aim is to promote quality improvement, and in particular to increase the impact that clinical audit has on healthcare quality in England and Wales. HQIP hosts the contract to manage and develop the National Clinical Audit and Patient Outcomes Programme (NCAPOP). Their purpose is to engage clinicians across England and Wales in systematic evaluation of their clinical practice against standards and to support and encourage improvement in the quality of treatment and care. The programme comprises more than 30 clinical audits that cover care provided to people with a wide range of medical, surgical and mental health conditions.</p> |

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We would also like to thank the Clinical Standards Department at the Royal College of Physicians for managing the Carotid Interventions Audit until 31 December 2012, during which time most of the data used in this report was collected. We particularly thank Mrs Alex Hoffman, Mr Michael Roughton, Dr Geoffrey Cloud and Professor Antony Rudd.

## Foreword

This fifth public report from the Carotid Interventions Audit demonstrates continuing improvement in the service that hospital teams provide to patients.

Levels of participation have again improved, with 97% of eligible NHS trusts in England, Northern Ireland, Scotland and Wales participating in the audit, and with 95% of cases in England compared with Hospital Episode Statistics included in the report. This makes it the most robust review of UK carotid surgical interventions ever.

The time between referral and treatment has continued to fall and indicates a commitment to improving the quality of service within the NHS. There is much to be pleased with, but there are also areas to examine. Our results show some variation in the time to intervention between hospitals in the UK. Some are very good, treating nearly all patients within the NICE target of 14 days from the onset of symptoms. Others need to improve their performance. The clinical teams and the executives of these organisations need to ask themselves how they can meet the NICE recommendations, and should consider moving the service to adjacent better performing Trusts.

Quality Improvement represents a challenge to organisations. Discussions with high performing centres indicate that a focus on a facilitated pathway of referral, seven day TIA clinic access and working in teams (as opposed to the traditional consultant firm approach) are the keys to improving access to treatment for patients. Lessons could be learnt from the re-organisation of stroke services in London. Fewer centres are seeing more patients, and patients are now treated quickly.

The audit results also show that stroke and other peri-operative complications of carotid surgery remain low. In this report, we have included comparative outcome information at an organisation-level for the first time. This complements the publication of surgeon level outcomes that the National Vascular Registry published in July 2013. Carotid surgery is being performed more effectively than ever before in the NHS. What is required now is for clinical teams to work hard on managing their pathways of care to treat all patients within the NICE target.

David Mitchell  
Chair, Audit & Quality Improvement committee,  
The Vascular society of Great Britain & Ireland

## Executive Summary

### Background

This report is based on Round 5 of the National Carotid Interventions Audit, which includes all carotid endarterectomies performed between 1 October 2011 and 30 September 2012. The initial data submission deadline was 31 December 2012 but the report was refined to include data submitted to the Audit as part of the initiative to publish surgeon-level outcomes. To show how clinical practice and outcomes have changed over time, the report also contains information from Rounds 3 (1 October 2009 – 30 September 2010) and 4 (1 October 2010 – 30 September 2011).

The objectives of the National Carotid Interventions Audit are:

1. To assess the current speed of delivery of carotid endarterectomy in the UK.
2. To assess variations in access and quality of care for patients needing carotid endarterectomy.
3. To assess 30-day mortality and complications rates following carotid endarterectomy.
4. To stimulate improvements over time in the quality of care provided to patients undergoing carotid endarterectomy.

### Methods

Data on carotid procedures are prospectively entered by vascular surgeons, other members of the vascular team and audit personnel into a secure webtool (National Vascular Database). The database captures patient demographic information as well as clinical information on symptoms, medication and treatments. Critical steps in the care pathway are recorded with dates (or within date bands where precise information is not available). This includes data on time from symptom to referral, and time to referral to the surgical service. Time from symptom to carotid intervention is also recorded. Finally, the NVD captures outcomes including complication rates for stroke and cranial nerve injury, as well as patient survival whilst an inpatient and at 30 days post-surgery.

### Participation

In Round 5, data were submitted by 440 (94%) of the 468 eligible surgeons, who were working at 117 (97%) of the 121 eligible NHS trusts and Health Boards in England, Wales, Scotland and Northern Ireland.

NHS organisations submitted a total of 5723 interventions to the Audit. Among these, there were:

- 4941 symptomatic patients
- 5571 cases with complete 30 day survival information
- 4836 cases for whom information was submitted on a follow-up appointment

Carotid endarterectomy is more common among men than women, with 67% of procedures performed in men. The mean age of patients having the surgery was 71 years. Nearly three-quarters of the patients had at least 70% stenosis in their ipsilateral artery at the time of operation, and 86% were symptomatic. Among the 4941 patients with symptomatic disease, TIA was the most common symptom (48%) followed by stroke (34%).

### Times along the care pathway

The current NICE guideline recommends two weeks as the target time from symptom to operation in order to minimise the chance of a high risk patient with TIA developing a stroke. In Round 5:

- The median time from symptom onset to carotid surgery was 13 days (IQR 7–28).
- The median time from symptom onset to referral was 4 days (IQR 2–10).
- The median time from referral to carotid surgery was 7 days (IQR 4–17).

The median times reported in Round 5 are lower than those reported in Round 3 and 4, and represent continuing improvement in access.

The median times along the care pathway were similar for patients with symptoms of stroke or TIA. However, patients with amaurosis fugax took comparatively longer to progress from symptom onset to surgery, with the median delay being 21 days (IQR 10-46).

When the delay between symptom and procedure was more than 14 days, the main causes of delay reported to the Audit were: delay in referral (38%), delay in patient presentation (27%), operation cancellation as patient was unfit or patient choice (18%), and lack of operating time (12%).

### Postoperative Surgical outcomes

Patients may experience various complications following carotid endarterectomy, including: bleeding, myocardial infarct, cranial nerve injury, or stroke. The risk of a complication remains low, with rates (and 95% confidence intervals (CI)) across Rounds 3 to 5 summarised below.

| Complication                       | Procedures in Rounds 3-5 | Complication rate (%) | 95% CI     |
|------------------------------------|--------------------------|-----------------------|------------|
| Myocardial Infarct                 | 16774                    | 0.6                   | 0.5 to 0.7 |
| Bleeding                           | 16774                    | 3.4                   | 3.1 to 3.7 |
| Death and/or stroke within 30 days | 16485                    | 2.4                   | 2.1 to 2.6 |
| Cranial Nerve Injury               | 16774                    | 3.8                   | 3.5 to 4.1 |

The data for Rounds 3 to 5 were used to calculate risk adjusted rates of death/stroke by NHS trust / Health Board. To assess whether there are systematic differences in outcomes between organisations, the figures were examined using a funnel plot.

All the NHS trusts had a risk adjusted rate of death/stroke within 30 days that fell within the expected range given the number of procedures performed at the organisation.



## Recommendations

1. All staff involved in organising and delivering care to patients who require carotid surgery need to examine their data and assess their performance against standards within NICE Guideline CG68.
2. Clinicians should ensure that data from patients having carotid surgery are included in national clinical audit. Appropriate time within job plans must be made available for consultants to validate and act upon their data.
3. Systems should be in place to ensure that coding of patients with carotid surgery is accurate. This requires close collaboration between hospital coding departments and clinicians and is likely to require regular (at least monthly) coding review meetings with the vascular team.
4. Services offering carotid surgery must have a clearly documented pathway of care. This should state how the patient accesses services and how they flow through to surgery if required.
5. Clinicians involved in providing care to patients with TIA and minor stroke should ensure that there are agreed referral protocols to minimise delays in the pathway.
6. Referrals to vascular surgery or interventional radiology should go to a central point within the department, rather than individual clinicians. There should be someone available to deal with referrals on a daily basis (during the working week and at the weekend).
7. Patients requiring carotid endarterectomy should be allocated to the next available operating list (ideally within 3 days of referral).
8. Carotid intervention should be prioritised as urgent/emergency in all symptomatic cases.
9. Clinical teams should seek feedback from patients to help improve the quality of care offered.
10. Stroke teams should publicise their services to primary care and the public. Attention should be given to highlighting the importance of amaurosis fugax because this diagnosis is associated with significantly greater delays in the pathway.



## Introduction

### Background

The Carotid Interventions Audit was initiated in 2005 as a collaboration between the Vascular Society of Great Britain & Ireland and the Royal College of Physicians. The purpose of the Audit was to gather information about the pathway of care for patients with carotid stenosis who undergo carotid interventions (either surgery or endovascular stenting). This report is on the fifth round of the Audit.

This report focuses on surgical carotid endarterectomy (CEA) and has four main aims:

1. To assess the current speed of delivery of carotid endarterectomy in the UK.
2. To assess variations in provision of imaging and CEA to encourage national and local action to improve quality and increase capacity.
3. To assess 30-day mortality and complications at follow-up against the available evidence base.
4. To stimulate improvements over time in the quality of care provided to patients undergoing carotid endarterectomy.

In January 2013, the National Vascular Registry was formed by the amalgamation of the National Vascular Database and the UK Carotid Interventions Audit projects. The Registry was commissioned by the Healthcare Quality Improvement Partnership (HQIP) as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP) and is based in the Clinical Effectiveness Unit of the Royal College of Surgeons of England. The aim of the Registry is to measure the quality and outcomes of care for patients who undergo vascular surgery in England and Wales.

Since Round 3, the reports on carotid endarterectomy procedures have been based on data collected over an annual period (see below). For each Round, the deadline for NHS trusts to submit data has been 31<sup>st</sup> December. However, the publication of this report was delayed so that it could include additional data submitted to the Audit as part of the initiative to publish surgeon-level outcomes.

### Audit periods

| Round               | Operations Performed Between                                     | Deadline for Submission of Cases | Report Date  |
|---------------------|------------------------------------------------------------------|----------------------------------|--------------|
| Round 1 (24 months) | 1 <sup>st</sup> December 2005 and 31 <sup>st</sup> December 2007 | 31 <sup>st</sup> March 2008      | August 2008  |
| Round 2 (21 months) | 1 <sup>st</sup> January 2008 and 30 <sup>th</sup> September 2009 | 31 <sup>st</sup> December 2009   | April 2010   |
| Round 3 (12 months) | 1 <sup>st</sup> October 2009 and 30 <sup>th</sup> September 2010 | 31 <sup>st</sup> December 2010   | March 2011   |
| Round 4 (12 months) | 1 <sup>st</sup> October 2010 and 30 <sup>th</sup> September 2011 | 31 <sup>st</sup> December 2011   | April 2012   |
| Round 5 (12 months) | 1 <sup>st</sup> October 2011 and 30 <sup>th</sup> September 2012 | 31 <sup>st</sup> December 2012   | October 2013 |

## Evidence base for carotid interventions

The evidence used for setting audit questions is derived from two main sources:

1. National Clinical Guidelines 2009 *Stroke: The diagnosis and acute management of stroke and transient ischaemic attacks by the National Institute for Health and Clinical Excellence*  
<http://www.nice.org.uk/Guidance/CG68>
2. National Stroke Strategy 2007 <http://www.dh.gov.uk> and the accompanying publication *Implementing the National Stroke Strategy – an imaging guide*

Patients with significant narrowing of their carotid arteries are at increased risk of stroke. Those with transient symptoms have the highest risk of stroke in the period immediately following the onset of symptoms. There is a large body of evidence showing that the greatest benefit from carotid intervention is seen if the procedure is carried out quickly following onset of symptoms. Both NICE and the National Stroke Strategy have set targets for the time from symptoms to intervention. For the symptom to surgery pathway to work well, it requires many stakeholders to co-ordinate care delivery. The general public and healthcare professionals need to be aware of the symptoms of stroke and TIA; and what to do when they recognise these symptoms. General practitioners need to refer promptly and NHS trusts need to have organised stroke services with rapid access to specialist clinicians, imaging and surgery. This audit provides data on the efficiency of the pathway of care and outcomes for patients who have had an endarterectomy.

## Methodology

Data are entered, by vascular surgeons, other members of the vascular team and audit personnel, prospectively into a secure webtool (National Vascular Database) that captures core demographic information as well as clinical data about symptoms, medication and treatment for each case. Critical steps in care are recorded with dates (or within date bands where precise information is not available). The data on time from symptom to referral, referral to imaging and time to referral to the surgical service are recorded. Time from symptom to carotid intervention is also captured. This enables all stakeholders to examine the components of care the pathway, involving general practitioners, physicians, radiologists, vascular technologists, surgeons and their surgical teams. Outcomes including complication rates for stroke and cranial nerve injury are captured as well as survival within hospital and at 30 days post surgery.

Data are analysed by a dedicated team, including statistical support, within the Clinical Effectiveness Unit of the Royal College of Surgeons of England to compare performance of individual trusts and regions with national averages, and in comparison with previous rounds of the audit.

## Limitations

The cohort in this audit includes only patients who received carotid endarterectomy. The findings, therefore, exclude patients that were referred for consideration but did not undergo CEA. This could occur because they declined the surgery, did not have appropriate symptoms, were clinically unfit for CEA, developed an inoperable stenosis (occluded) whilst waiting for CEA or had a disabling stroke whilst waiting for CEA.

## Carotid stents

The number of stents submitted to Round 5 was insufficient for inclusion within this report. There were a total of 37 stent cases on the NVD, with data locked for analysis at the deadline, from 11 NHS trusts, ranging between 1 and 14 per organisation. There were 273 stents identified in HES for England for the same time period (L31.4) from a total of 28 NHS trusts. The median number of cases per English NHS trust was 4 and the mean was 10. Only five trusts in England carried out more than 20 carotid stents within the Round 5 time period.

## Definitions

### Dataset

The Clinical Audit dataset used since 2009 is in **Appendix 2**. It includes the following key aspects of carotid endarterectomy delivery and outcomes:

**Inpatient:** Patient demographics, pre-operative investigations, surgical techniques, inpatient stay and condition at hospital discharge.

**Follow-up:** Patient mortality at 30 days post-operatively and post-operative assessment when the patient is seen at follow-up to assess surgical outcome.

### Key indicators for carotid endarterectomy

The key indicators included in this report are based on the NICE Acute Stroke and TIA guideline and the National Stroke Strategy which set optimal times for managing patients from symptom to surgery. The standards include:

- Patients referred to vascular surgery for CEA within 7 days of experiencing the index symptom that triggered referral.
- The median delay and inter-quartile range between the index symptom that that triggered referral and the date of referral.
- Patients receiving CEA within 7 days of referral to vascular surgery for CEA.
- The median delay and inter-quartile range between the date of referral and the date of CEA.
- Patients receiving CEA within 2 days of experiencing the index symptom that triggered referral (National Stroke Strategy Standard).
- Patients receiving CEA within 14 days of experiencing the index symptom that triggered referral (NICE Guideline).
- The median delay and inter-quartile range between the index symptom that triggered referral and the date of CEA.

## NHS trust / Health Board and surgeon participation

During the Round 5 period, data were submitted on a total of 440/468 (94%) surgeons (representing 117/121, (97%) of the eligible NHS trusts and Health Boards).

Since Round 1, participation in the Audit has improved:

- NHS trusts /Health Boards, from 76% (102/135) to 93% (122/131) to 97% (126/130) to 98% (125/128).
- Surgeons, from 61% (240/396) to 93% (352/390) to 87% (382/437) to 93% (425/457) to 94% (440/468).
- 26 surgeons submitted cases from more than one NHS trust within Round 5.

A full list of participants is shown in **Appendix 3**.

## Comparison of Audit data with national administrative health databases

The Hospital Episode Statistics (HES) database is the national statistical data collection for England of the care provided by NHS hospitals and for NHS hospital patients treated elsewhere. It provides data for a wide range of analyses on the healthcare delivered by the NHS, providing information for the NHS, Government and many other organisations. Similar databases are used in Wales (PEDW) and Scotland (SMR).

The number of carotid endarterectomy procedures (OPCS codes L29.4 and L29.5) that were performed over the equivalent audit period in HES was used to compare the completeness of cases contributed to the Audit by each NHS trust/Health Board.

- There were 5346 CEA cases recorded on HES for the Round 5 time period in England. Round 5 captured 5083/5346 (95%) of comparable cases in England.
- There were 319 CEA cases recorded on PEDW for the Round 5 time period in England. Round 5 captured 220/319 (69%) of comparable cases in Wales.
- There were 451 CEA cases recorded on SMR01 for the Round 5 time period in Scotland. Round 5 captured 354/451 (78%) of these cases.
- The data for Northern Ireland was not available.

From now on, in this report, the term *HES* is used generically to describe the hospital data that are routinely collected by these national agencies.

Please note that the HES data is based on the date of discharge from hospital, whereas this Audit collects data based on the date of operation. There were a number of operations that were performed in the latter half of September 2012, so were included in this Audit, but were discharged from hospital in October 2012 or later, so are not recorded in HES. The HES comparator figure also includes some cases from Round 4 that were discharged from hospital in October 2011.

The median number of cases per NHS trust in England was:

- 45 (IQR 30-68) reported in the Audit in Round 5.
- 47 (IQR 31-68) recorded on HES in Round 5.

## How to read this report

The report does not contain every carotid intervention that took place within the UK between 1<sup>st</sup> October 2011 and 30<sup>th</sup> September 2012. Only cases entered into the CIA and locked to at least phase 1 (discharge from hospital) were included in the analysis. The analysis of care in the follow up period after discharge requires records to be locked to phase 2 (post discharge clinic visit) and contains a smaller number of cases.

Patients suitable for intervention but not operated upon are not included in this Audit.

Results are presented as totals and/or percentages, medians and inter-quartile ranges (IQR).

Where the numerators and percentages do not add up exactly this is due to:

- Differences between the denominators within the table
- The ability to select more than one answer option
- The rounding up or down of the individual percentage values

The number of cases included in each analysis may vary depending on the level of information that has been provided by the contributors and the total number of cases that meet the inclusion criteria for each analysis. Details are given in **Appendix 4**.

Where individual NHS trust and Health Board results are given, the denominators are based on the number of cases for which the question was applicable and answered.

For clarity of presentation, the terms *Trust* or *Trusts* is used generically to describe NHS trusts and health boards.

## Results

### Carotid endarterectomy procedures reported to the Audit

The number of patients in the last three rounds of the Audit are summarised in the table below. From Rounds 1 to 4, there was an increase in the number of cases submitted to the Audit, year on year. The number of cases in Round 5 is similar to the numbers in Round 4, which reflects similar high-levels of participation and case-ascertainment.

| Type of denominator                                   | Round 3              | Round 4              | Round 5              |                               |
|-------------------------------------------------------|----------------------|----------------------|----------------------|-------------------------------|
|                                                       | National Denominator | National Denominator | National Denominator | Median number per trust (IQR) |
| All cases                                             | 5292                 | 5759                 | 5723                 | 44 (27-67)                    |
| All symptomatic cases                                 | 4475                 | 5014                 | 4941                 | 37 (24-56)                    |
| All cases with 30-day survival data                   | 5180                 | 5723                 | 5571                 | 43 (25-65)                    |
| All cases where a follow-up appointment was conducted | 4508                 | 4982                 | 4836                 | 39 (22-56)                    |

### Patient characteristics

Carotid endarterectomy procedures were more common among men than women, with 67% of patients undergoing these procedures in Round 5 being male. The mean age of patients was 72 years (see Table 1). Nearly three-quarters of the patients had at least 70% stenosis in their ipsilateral artery at the time of operation, and 86% were symptomatic. Among the 4941 patients with symptomatic disease, TIA was the most common symptom (48%) followed by stroke (34%).



**Table 1: Patient Demographics**

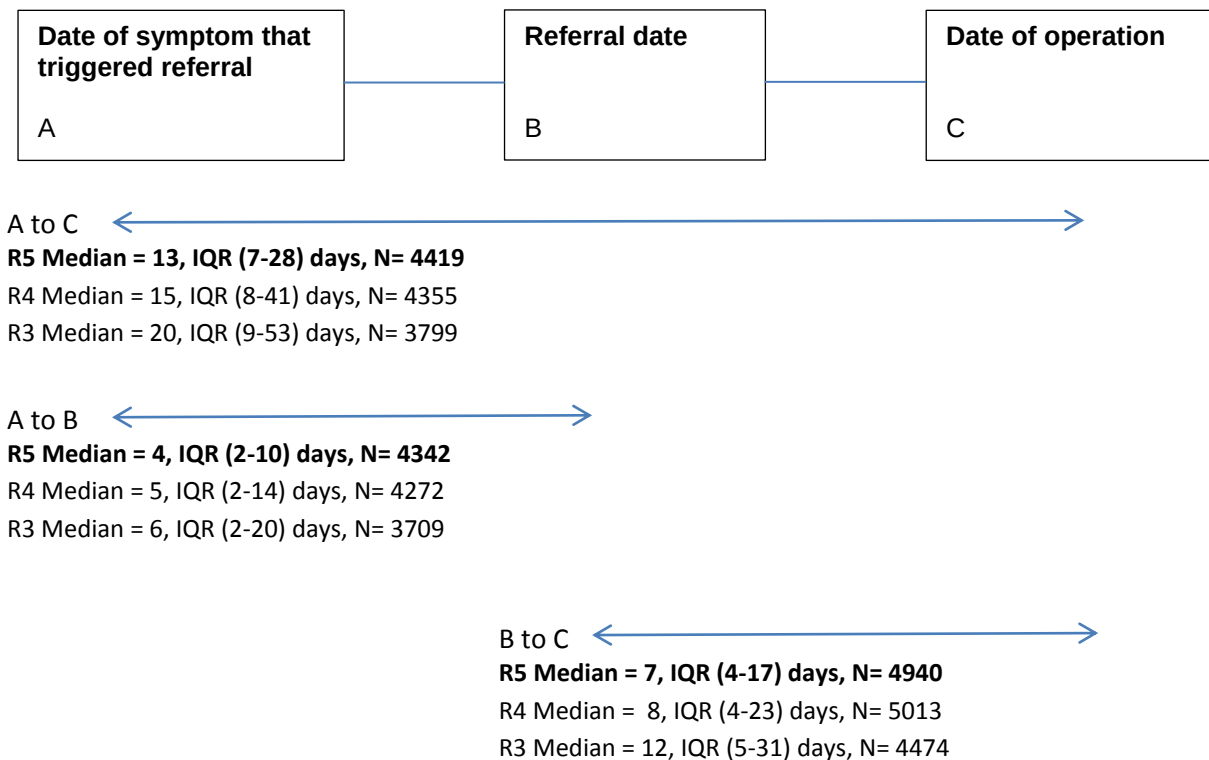
|                                                                 | National        | Denominator |
|-----------------------------------------------------------------|-----------------|-------------|
| <b>Q1.7</b> Male<br>N (%)                                       | 3829 (67%)      | 5723        |
| <b>Q1.5</b> Age<br>Mean (SD)                                    | 71.6 years (10) |             |
| Co-morbidities                                                  |                 |             |
| <b>Q2.1</b> Diagnosed diabetic                                  | 1175 (21%)      | 5723        |
| <b>Q2.2</b> Current symptoms/ treatment ischaemic heart disease | 1496 (26%)      |             |
| Pre-op drugs prior to surgery                                   |                 |             |
| <b>Q10.1</b> Antiplatelet/antithrombotic treatment              | 5491 (96%)      | 5723        |
| <b>Q10.3</b> Statin therapy                                     | 5010 (89%)      | 5619        |
| Stopped therapy                                                 |                 |             |
| <b>Q10.2a</b> Aspirin                                           | 348 (9%)        | 3799        |
| <b>Q10.2b</b> Stopped x days prior surgery                      | 1(1-3)          |             |
| <b>Q10.2c</b> Clopidogrel                                       | 526 (24%)       | 2211        |
| <b>Q10.2d</b> Stopped x days prior surgery                      | 5(2-7)          |             |
| <b>Q10.2e</b> Dipyridamole                                      | 75 (20%)        | 374         |
| <b>Q10.2f</b> Stopped x days prior surgery                      | 2(1-5)          |             |
| <b>Q10.2g</b> Warfarin                                          | 236 (93%)       | 255         |
| <b>Q10.2h</b> Stopped x days prior surgery                      | 5(3-5)          |             |
| <b>Q20.5</b> Drugs prescribed post-op                           |                 |             |
| Anti-thrombotic                                                 | 4595 (99%)      | 4630        |
| Statin                                                          | 4100 (89%)      |             |
| <b>Q7.2</b> Rankin score prior to surgery                       |                 |             |
| 0-2                                                             | 5255 (92%)      | 5722        |
| 3                                                               | 401 ( 7%)       |             |
| 4-5                                                             | 66 ( 1%)        |             |
| <b>Q4.1</b> Patients symptomatic for carotid disease            | 4941 (86%)      | 5723        |
| <b>Q4.1c</b> If symptomatic, index symptom:                     |                 |             |
| Amaurosis fugax                                                 | 840 (17%)       | 4941        |
| TIA                                                             | 2354 (48%)      |             |
| Stroke                                                          | 1680 (34%)      |             |
| None of the three above                                         | 67 ( 1%)        |             |
| <b>Q5.2a</b> Grade of ipsilateral carotid stenosis              |                 |             |
| <50%                                                            | 45 ( 0.8%)      | 5682        |
| 50-69%                                                          | 1405 (25%)      |             |
| 70-89%                                                          | 2603 (46%)      |             |
| 90-99%                                                          | 1593 (28%)      |             |
| Occluded                                                        | 36 ( 0.6%)      |             |
| <b>Q5.2b</b> Grade of contralateral carotid stenosis            |                 |             |
| <50%                                                            | 3418 (63%)      | 5438        |
| 50-69%                                                          | 906 (17%)       |             |
| 70-89%                                                          | 532 (10%)       |             |
| 90-99%                                                          | 241 ( 4%)       |             |
| Occluded                                                        | 341 ( 6%)       |             |

## Key dates in the care pathway from symptom to surgery

Several key dates for symptomatic patients were collected to calculate timescales across the pathway of care. Audit participants submitted these with varying degrees of completeness, and the denominators for measuring change between two specific dates varied (see N values)

The median provides the best estimate for the interval between each point of the care pathway. NB: It is not appropriate to add up the median delays of adjacent time periods.

**Figure 1: A summary of the key dates that were collected for symptomatic patients during the care pathway (symptom to surgery)**



## Summary of key delays

The ten year National Stroke Strategy, published in 2007, states a target of 48 hours from symptom to operation to minimise the risk of high risk patients with TIA developing a stroke and the current NICE guidelines recommend two weeks.

**Table 2: Summary of key delays**

|                                                                                                 |               | Round 3  | Round 4  | Round 5  |
|-------------------------------------------------------------------------------------------------|---------------|----------|----------|----------|
|                                                                                                 |               | National | National | National |
| Carotid imaging                                                                                 |               |          |          |          |
| Time from index symptom (Q4.1a) to initial diagnostic imaging (Q5.1)                            | N             | 3497     | 4057     | 4138     |
|                                                                                                 | Median (days) | 5        | 3        | 3        |
|                                                                                                 | IQR (days)    | 2-15     | 1-10     | 1-7      |
| Time from further pre-operative carotid imaging to confirm diagnosis (Q5.3) to operation (Q1.1) | N             | 2113     | 2321     | 2356     |
|                                                                                                 | Median (days) | 6        | 6        | 5        |
|                                                                                                 | IQR (days)    | 2-21     | 1-14     | 1-13     |
| Time from further pre-operative carotid imaging to confirm patency (Q6.1)to operation (Q1.1)    | N             | 1440     | 1486     | 1470     |
|                                                                                                 | Median (days) | 1        | 1        | 1        |
|                                                                                                 | IQR (days)    | 0-1      | 0-1      | 0-1      |
| Time from initial imaging (Q5.1) to first being seen by the surgical team (Q3.1a)               | N             | 4113     | 4641     | 4653     |
|                                                                                                 | Median (days) | 4        | 3        | 2        |
|                                                                                                 | IQR (days)    | 1-14     | 1-9      | 0-7      |
| Referral                                                                                        |               |          |          |          |
| Time from index symptom (Q4.1a) to referral (Q3.1) (A-B in Fig. 1)                              | N             | 3709     | 4272     | 4342     |
|                                                                                                 | Median (days) | 6        | 5        | 4        |
|                                                                                                 | IQR (days)    | 2-20     | 2-14     | 2-10     |
| Time from referral (Q3.1) to first being seen by the surgical team (Q3.1a)                      | N             | 4475     | 5014     | 4937     |
|                                                                                                 | Median (days) | 1        | 1        | 1        |
|                                                                                                 | IQR (days)    | 0-7      | 0-6      | 0-4      |
| Time from referral (Q3.1) to admission (Q1.11)                                                  | N             | 3913     | 4078     | 4036     |
|                                                                                                 | Median (days) | 13       | 11       | 8        |
|                                                                                                 | IQR (days)    | 5-34     | 5-28     | 3-20     |
| Surgery                                                                                         |               |          |          |          |
| Time from index symptom (Q4.1a) to operation (Q1.1) (A-C in Fig. 2.1)                           | N             | 3799     | 4355     | 4419     |
|                                                                                                 | Median (days) | 20       | 15       | 13       |
|                                                                                                 | IQR (days)    | 9-53     | 8-41     | 7-28     |
| Time from referral (Q3.1) to operation (Q1.1) (B-C in Fig. 1)                                   | N             | 4474     | 5013     | 4940     |
|                                                                                                 | Median (days) | 12       | 8        | 7        |
|                                                                                                 | IQR (days)    | 5-31     | 4-23     | 4-17     |
| Time from first being seen by the surgical team (Q3.1a) to operation (Q1.1)                     | N             | 4474     | 5013     | 4937     |
|                                                                                                 | Median (days) | 8        | 6        | 6        |
|                                                                                                 | IQR (days)    | 3-20     | 2-14     | 2-12     |
| Time from admission (Q1.11) to operation (Q1.1)                                                 | N             | 4475     | 5014     | 4941     |
|                                                                                                 | Median (days) | 1        | 1        | 1        |
|                                                                                                 | IQR (days)    | 1-2      | 0-2      | 0-2      |

In some NHS trusts, the median referral to admission time was longer than the median referral to operation time because some patients were admitted then referred. This was reported for 905 cases, which were not used to calculate the median referral to admission time. The majority of these cases were admitted following stroke (522/905, 58%).

We have compared timings for stroke, TIA, amaurosis fugax and other from Rounds 4 and 5. For this analysis, we grouped chronic cerebral hypoperfusion with the 'other' symptoms. There were significant differences for each symptom, and the breakdown is shown in the table below.

**Table 3: Key milestone timings (days) for different symptoms**

| Round 4                                                             |               | Symptom Type    |      |        |             |
|---------------------------------------------------------------------|---------------|-----------------|------|--------|-------------|
|                                                                     |               | Amaurosis Fugax | TIA  | Stroke | Other & CCH |
| Time from index symptom (Q4.1a) to referral (Q3.1) (A-B in Fig. 1)  | N             | 648             | 2018 | 1565   | 41          |
|                                                                     | Median (days) | 10              | 4    | 5      | 5           |
|                                                                     | IQR (days)    | 3-30            | 1-12 | 2-11   | 2-30        |
| Time from referral (Q3.1) to operation (Q1.1) (B-C in Fig. 1)       | N             | 880             | 2345 | 1719   | 69          |
|                                                                     | Median (days) | 13              | 8    | 7      | 36          |
|                                                                     | IQR (days)    | 6-32            | 4-21 | 4-19   | 10-97       |
| Time from index symptom (Q4.1a) to operation (Q1.1) (A-C in Fig. 1) | N             | 662             | 2062 | 1588   | 43          |
|                                                                     | Median (days) | 28              | 14   | 14     | 46          |
|                                                                     | IQR (days)    | 13-61           | 7-36 | 8-35   | 10-125      |
| Round 5                                                             |               | Symptom Type    |      |        |             |
| Time from index symptom (Q4.1a) to referral (Q3.1) (A-B in Fig. 1)  | N             | 650             | 2083 | 1570   | 39          |
|                                                                     | Median (days) | 7               | 3    | 4      | 8           |
|                                                                     | IQR (days)    | 3-20            | 1-8  | 2-9    | 1-24        |
| Time from referral (Q3.1) to operation (Q1.1) (B-C in Fig. 1)       | N             | 840             | 2353 | 1680   | 67          |
|                                                                     | Median (days) | 11              | 7    | 7      | 55          |
|                                                                     | IQR (days)    | 5-27            | 4-15 | 4-14   | 10-82       |
| Time from index symptom (Q4.1a) to operation (Q1.1) (A-C in Fig. 1) | N             | 661             | 2129 | 1589   | 40          |
|                                                                     | Median (days) | 21              | 11   | 12     | 60          |
|                                                                     | IQR (days)    | 10-46           | 6-24 | 7-26   | 16-107      |

### Cases where the time of the symptom that triggered referral is not known

In records that did not have the exact date on which the patient experienced the symptom that triggered referral, the timing of this symptom was recorded in time bands.

Data on exact time of symptom was not known for 676 cases in the 12 month time period for Round 3, 657 cases in the 12 month period for Round 4 and 520 cases in the 12 month period for Round 5.

## Reasons for delays of more than two weeks between index symptom and surgery

*There is evidence that greater benefit from carotid endarterectomy is achieved when surgery is performed early, ideally within two weeks of the initial symptom (Rothwell et al., 2004).*

86 per cent of cases (4941/5723) were reported as symptomatic. The date of the index symptom and the date of surgery were known for 89% of symptomatic cases (4419/4941). Among these, 53% of patients had a delay of more than two weeks (2331/4419). The reason for delay was reported for 1932 (83%) of these 2331 patients.

**Table 4: Self-reported reasons for delays of more than two weeks between index symptom and surgery**

| <b>Q11.1</b> If elapsed time between the symptom that triggered referral and surgery is >2 weeks, what was the reason? | <b>Round 3</b><br>(2243 cases) | <b>Round 4</b><br>(2191 cases) | <b>Round 5</b><br>(1932 cases) |
|------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------------------------|--------------------------------|
| <b>Reason cited *</b>                                                                                                  | <b>National<br/>N (%)</b>      | <b>National<br/>N (%)</b>      | <b>National<br/>N (%)</b>      |
| Delay in presentation                                                                                                  | 551 (25%)                      | 565 (26%)                      | 517 (27%)                      |
| Delay in referral                                                                                                      | 906 (40%)                      | 899 (41%)                      | 740 (38%)                      |
| Delay in carotid imaging                                                                                               | 280 (12%)                      | 243 (11%)                      | 191 (10%)                      |
| Patient cancellation/delay - unfit                                                                                     | 197 (9%)                       | 206 (9%)                       | 162 (8%)                       |
| Patient cancellation/delay - patient choice                                                                            | 213 (10%)                      | 210 (10%)                      | 192 (10%)                      |
| Limited availability of surgeon                                                                                        | 248 (11%)                      | 225 (10%)                      | 160 (8%)                       |
| Limited availability of anaesthetist                                                                                   | 24 (1%)                        | 13 (0.6%)                      | 9 (0.5%)                       |
| Limited availability of radiologist                                                                                    | 2 (0.1%)                       | 4 (0.2%)                       | 6 (0.3%)                       |
| Lack of operating time                                                                                                 | 301 (13%)                      | 220 (10%)                      | 237 (12%)                      |
| Other case took priority                                                                                               | 61 (3%)                        | 49 (2%)                        | 78 (4%)                        |
| Other                                                                                                                  | 316 (14%)                      | 339 (15%)                      | 277 (14%)                      |

\* Multiple reasons could be selected.

### Changes in delays during Rounds 3 to 5

To demonstrate reductions in delays, the symptomatic cases for Rounds 3 to 5 were divided into *six month periods*, and plotted on the same graph to show the median delays over the whole 36 month period. The six month intervals were defined as follows:

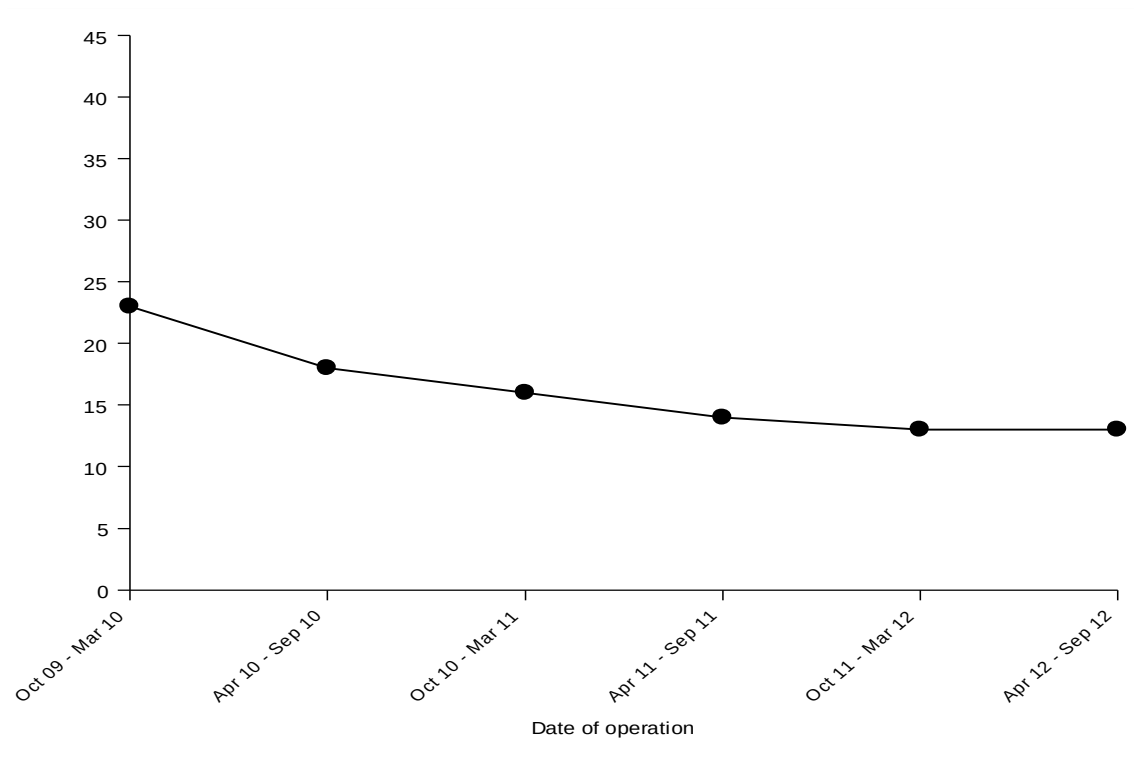
Round 3 : October 2009 to March 2010 and April 2010 to September 2010.

Round 4 : October 2010 to March 2011 and April 2011 to September 2011.

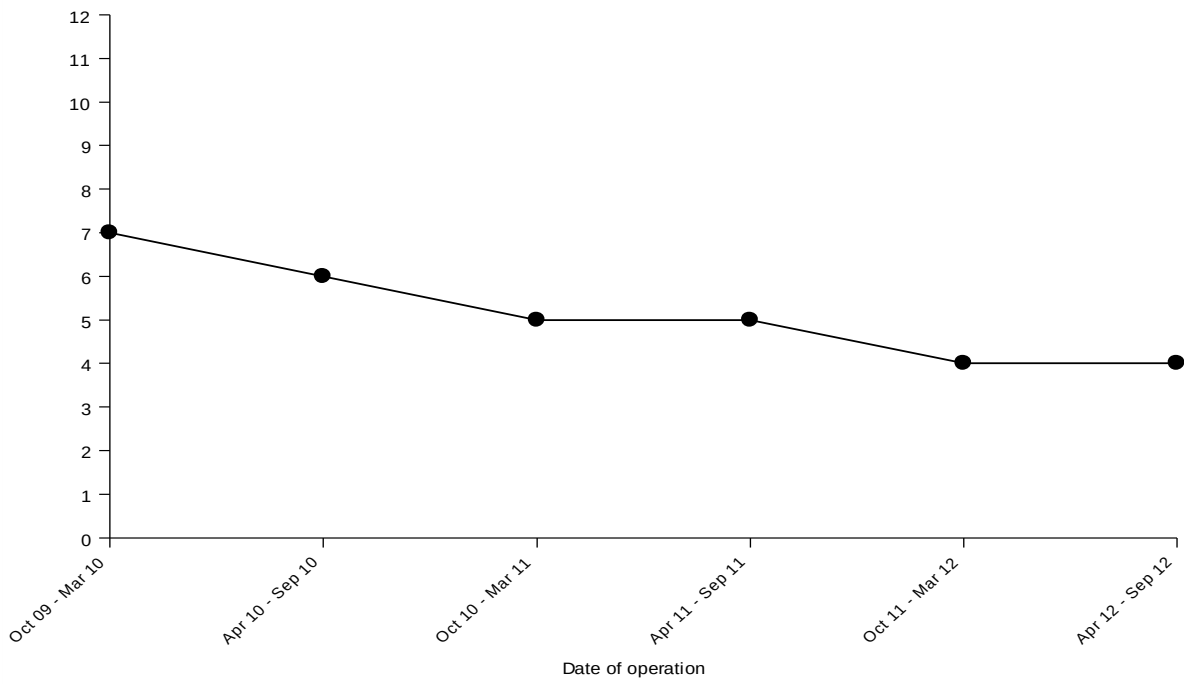
Round 5 : October 2011 to March 2012 and April 2012 to September 2012

Figures 2 to 4 show the reduction in median delays for the key parts of the pathway (see **Figure 1** on page 14 for the definition of key parts).

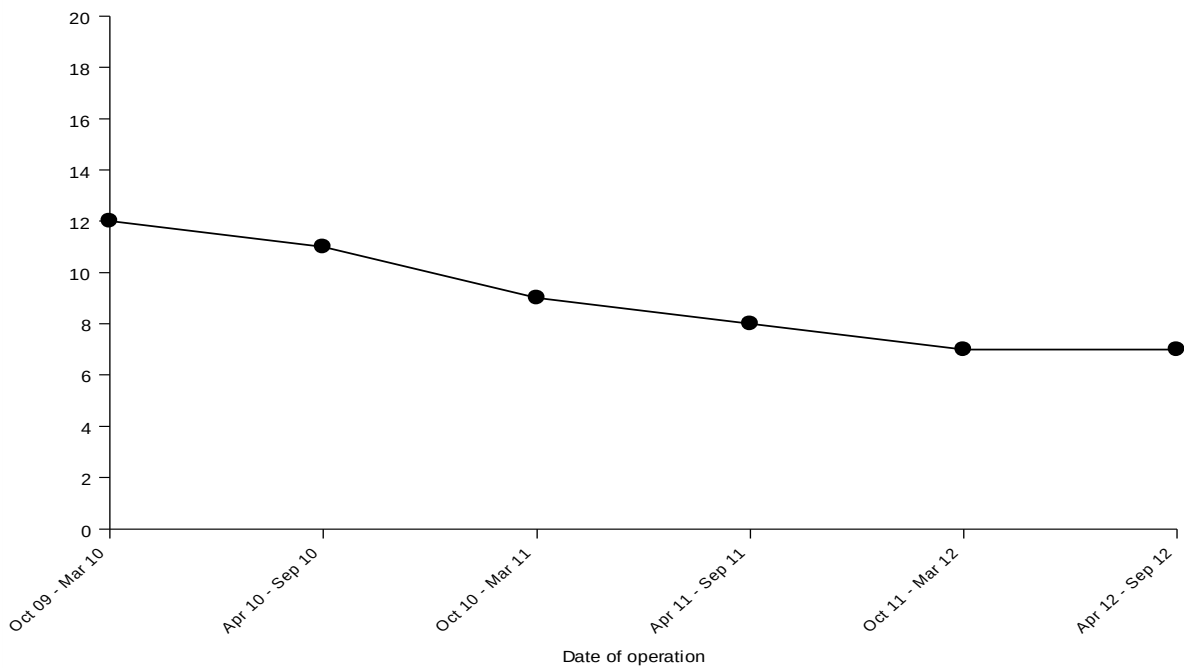
**Figure 2: Index symptom to operation (number of days) during Rounds 3 - 5 (A-C)**



**Figure 3: Index symptom to referral (number of days) during Rounds 3 - 5 (A-B)**



**Figure 4: Referral to operation (number of days) during Rounds 3 - 5 (B-C)**



## Referral for carotid endarterectomy

Patients may be referred for carotid endarterectomy from various medical practitioners. These different referral pathways have the potential to influence the speed of access to vascular services and ultimately surgery itself. The most common source of referral in Round 5 was the stroke physician, followed by the general practitioner (see Table 5a). The time spent travelling the care pathway was typically shortest for patients referred by stroke physicians.

**Table 5a: Specialist who referred the patient to the surgical team**

| Q3.2 Who referred the patient to the team under whose care the procedure was performed? | Round 3<br>(5292 cases) | Round 4<br>(5759 cases) | Round 5<br>(5723 cases) |
|-----------------------------------------------------------------------------------------|-------------------------|-------------------------|-------------------------|
|                                                                                         | National<br>N (%)       | National<br>N (%)       | National<br>N (%)       |
| General Practitioner                                                                    | 453 (9%)                | 397 (7%)                | 333 (6%)                |
| Neurologist                                                                             | 328 (6%)                | 357 (6%)                | 309 (5%)                |
| Stroke physician                                                                        | 3261 (62%)              | 3896 (68%)              | 4146 (72%)              |
| Radiologist                                                                             | 39 (1%)                 | 38 (1%)                 | 29 (1%)                 |
| Care of Elderly consultant                                                              | 413 (8%)                | 295 (5%)                | 265 (5%)                |
| Cardiologist/Cardiothoracic surgeon                                                     | 205 (4%)                | 162 (3%)                | 153 (3%)                |
| Vascular surgeon                                                                        | 139 (3%)                | 147 (3%)                | 109 (2%)                |
| Self-referral                                                                           | 29 (1%)                 | 27 (1%)                 | 16 (0%)                 |
| Other surgeon                                                                           | 41 (1%)                 | 48 (1%)                 | 52 (1%)                 |
| Ophthalmologist                                                                         | 198 (4%)                | 194 (3%)                | 146 (3%)                |
| Other                                                                                   | 186 (4%)                | 198 (3%)                | 165 (3%)                |

In Round 5, 20% of cases (1,086/5530) were referred from another NHS trust.



**Table 5b: Delays by referral source**

| Q3.2 Who referred the patient to the team under whose care the procedure was performed? | Round 5                           |                                                   |                                                     |
|-----------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------------------|-----------------------------------------------------|
|                                                                                         | All Round 5 cases<br>(5723 cases) | Round 5 SYMPTOMATIC patients                      |                                                     |
|                                                                                         |                                   | Median (IQR) time from symptom to referral (days) | Median (IQR) time from referral to operation (days) |
|                                                                                         | National<br>N (%)                 | National<br>N (IQR)                               | National<br>N (IQR)                                 |
| General Practitioner                                                                    | 333 (6%)                          | 8 (3-27)                                          | 24 (9-55)                                           |
| Neurologist                                                                             | 309 (5%)                          | 4 (2-11)                                          | 9 (4-22)                                            |
| Stroke physician                                                                        | 4146 (72%)                        | 4 (2-9)                                           | 7 (3-14)                                            |
| Radiologist                                                                             | 29 (1%)                           | 10 (1-21)                                         | 10 (6-17)                                           |
| Care of Elderly consultant                                                              | 265 (5%)                          | 5 (2-13)                                          | 11 (6-23)                                           |
| Cardiologist/Cardiothoracic surgeon                                                     | 153 (3%)                          | 1 (0-4)                                           | 26 (11-82)                                          |
| Vascular surgeon                                                                        | 109 (2%)                          | 5 (1-21)                                          | 8 (4-26)                                            |
| Self-referral                                                                           | 16 (0%)                           | 0 (0-1)                                           | 32 (7-63)                                           |
| Other surgeon                                                                           | 52 (1%)                           | 8 (4-13)                                          | 5 (2-18)                                            |
| Ophthalmologist                                                                         | 146 (3%)                          | 10 (2-38)                                         | 32 (11-59)                                          |
| Other                                                                                   | 165 (3%)                          | 6 (2-22)                                          | 9 (5-18)                                            |

## Operation characteristics

There are various aspects of the operative technique may influence outcome of a carotid endarterectomy. Shunts may be placed to ensure blood supply to the brain during the procedure but these are not always required. The need for shunting is reduced when local anaesthetic (LA) is used as the patient can be assessed for signs of cerebral ischaemia.

A review of the evidence on carotid patching following carotid endarterectomy has demonstrated that patching is associated with a reduction in the risk of stroke of any type or death during the perioperative period and long term follow-up (Bond et al., 2004). Tacking sutures at the distal end of the endarterectomy may help to prevent the intimal flap from occluding the artery when flow is restored.

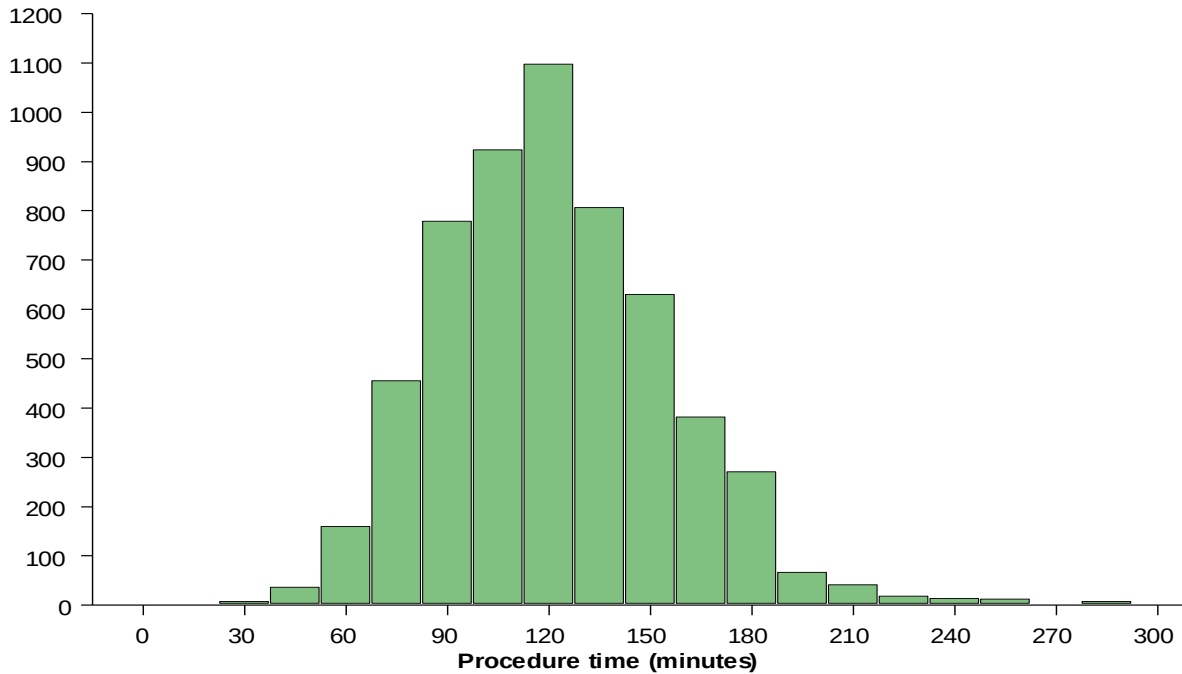
**Table 6: Characteristics of operations**

| Aspect of care                                                                              | Round 3           | Round 4           | Round 5           |
|---------------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|
|                                                                                             | National<br>N (%) | National<br>N (%) | National<br>N (%) |
| <b>Q12.6</b> Timing of surgery: elective                                                    | 4295/5267(82%)    | 4458/5723 (78%)   | 4270/5700 (75%)   |
| <b>Q12.7</b> Type of anaesthetic                                                            |                   |                   |                   |
| General (GA)                                                                                | 2837/5292 (54%)   | 3142/5759 (55%)   | 3199/5722 (56%)   |
| Local / Block (LA)                                                                          | 2359/5292 (45%)   | 2525/5759 (44%)   | 2445/5722 (43%)   |
| Started with LA, switched to GA                                                             | 96/5292 (2%)      | 92/5759 (2%)      | 78/5722 (1%)      |
| <b>Q13.4</b> Carotid shunt                                                                  |                   |                   |                   |
| Used                                                                                        | 2381/5185 (46%)   | 2503/5648 (44%)   | 2674/5610 (48%)   |
| Attempted and abandoned                                                                     | 30/5185 (1%)      | 45/5648 (1%)      | 51/5610 (1%)      |
| <b>Q13.5</b> Type of endarterectomy                                                         |                   |                   |                   |
| Standard                                                                                    | 4712/5134 (92%)   | 5133/5608 (92%)   | 5047/5532 (91%)   |
| Eversion                                                                                    | 422/5134 (8%)     | 475/5608 (8%)     | 485/5532 (9%)     |
| <b>Q13.6</b> Carotid patch                                                                  | 3769/5205 (72%)   | 4096/5688 (72%)   | 4269/5653 (76%)   |
| <b>Q13.7</b> Distal tacking sutures used                                                    | 2400/5086 (47%)   | 2756/5592 (49%)   | 3008/5499 (55%)   |
| Median (IQR) duration of operation in minutes                                               | 120 (95-145)      | 120 (95-145)      | 120 (95-145)      |
| <b>Q13.9</b> Completion assessment technique                                                |                   |                   |                   |
| At least one of the following:                                                              | 1834/4946 (37%)   | 2124/5510 (39%)   | 2048/5382 (38%)   |
| Angiography                                                                                 | 64/4946 (1%)      | 40/5510 (1%)      | 12/5382 (0%)      |
| Duplex carotid imaging                                                                      | 290/4946 (6%)     | 331/5510 (6%)     | 298/5382 (6%)     |
| Angioscopy                                                                                  | 186/4946 (4%)     | 132/5510 (2%)     | 134/5382 (2%)     |
| Hand-held Doppler                                                                           | 1345/4946 (27%)   | 1652/5510 (30%)   | 1658/5382 (31%)   |
| <b>Q14.1</b> Time spent in recovery                                                         |                   |                   |                   |
| None                                                                                        | 238/5030 (5%)     | 226/5629 (4%)     | 219/5482 (4%)     |
| Less than 4 hours                                                                           | 3744/5030 (74%)   | 4176/5629 (74%)   | 4102/5482 (75%)   |
| Between 4 and 12 hours                                                                      | 696/5030 (14%)    | 812/5629 (14%)    | 689/5482 (13%)    |
| More than 12 hours                                                                          | 352/5030 (7%)     | 415/5629 (7%)     | 472/5482 (9%)     |
| <b>Q14.2</b> Where was the patient admitted post-operatively (after any period in recovery) |                   |                   |                   |
| Intensive Care Unit (ICU)                                                                   | 147/5163 (3%)     | 202/5644 (4%)     | 126/5547 (2%)     |
| High Dependency Unit (HDU)                                                                  | 1840/5163 (36%)   | 2020/5644 (36%)   | 2060/5547 (37%)   |
| Ward                                                                                        | 2836/5163 (55%)   | 3035/5644 (54%)   | 2849/5547 (51%)   |
| Post Anaesthetic Care Unit (PACU)                                                           | 340/5163 (7%)     | 387/5644 (7%)     | 512/5547 (9%)     |
| <b>Length of Stay (days)</b>                                                                |                   |                   |                   |
| Median (IQR)                                                                                | 3 (2-5)           | 3 (2-6)           | 3 (2-6)           |

In this round, the median time to perform a carotid endarterectomy was 120 minutes (Figure 5). The average duration of an operation has remained consistent over the last three Rounds.

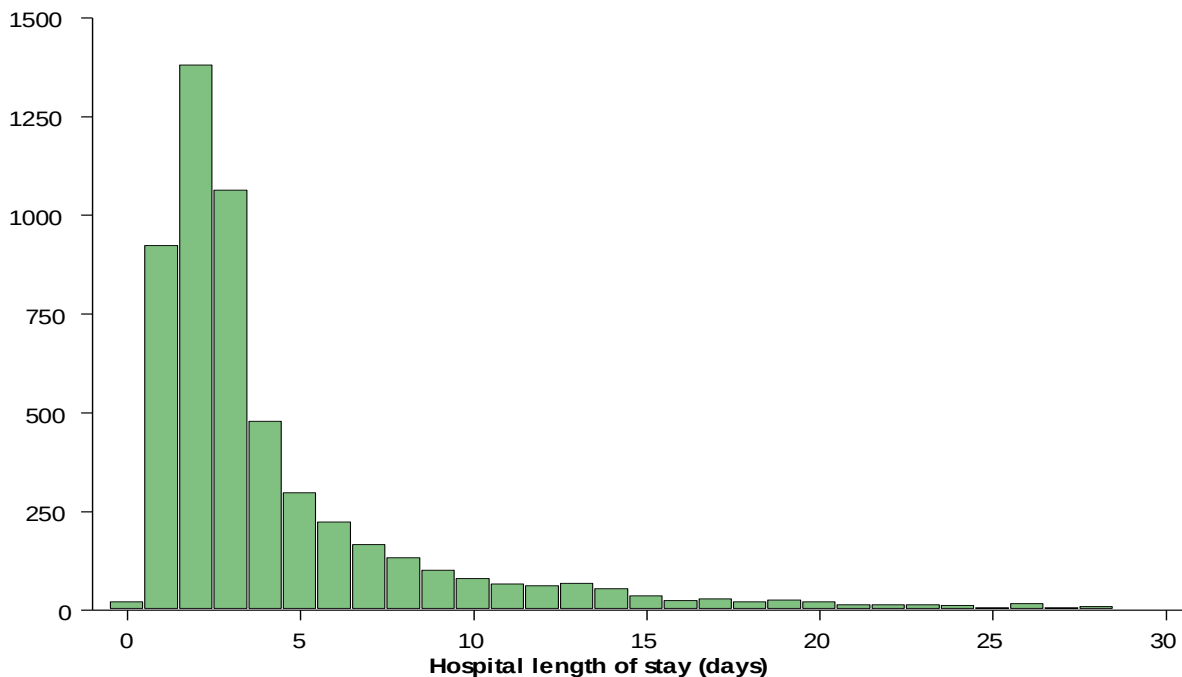
Patients remained in hospital typically between 2 and 6 days (Figure 6).

**Figure 5: Duration of operation**



This graph excludes four patients with times over 300 minutes for presentation purposes.

**Figure 6: Distribution of Hospital length of stay**



This graph excludes 199 patients with LOS greater than 28 days for presentation purposes.

## Follow-up care

In the sections that follow, the denominator of the total number of cases changes because follow-up data were not submitted for all patients. Of the 5723 Round 5 records that were complete to at least Phase 1, follow-up data were submitted for 5413 (95%) patients.

### Access to follow-up appointments

*Post-operative and post-discharge assessment of patients undergoing CEA is essential in order to:*

- *Assess the outcomes of surgery*
- *Inform the assessment of risk versus benefit of surgical intervention*

**Table 7: Follow-up appointments**

| Access to follow-up appointments                                                        | Round 3           | Round 4           | Round 5           |
|-----------------------------------------------------------------------------------------|-------------------|-------------------|-------------------|
|                                                                                         | National<br>N (%) | National<br>N (%) | National<br>N (%) |
| <b>Q19.1</b> Offered an appointment? (Yes)                                              | 4802/5058 (95%)   | 5340/5551 (96%)   | 5192/5373 (97%)   |
| <b>Q19.2</b> Attended the appointment (Yes)                                             | 4514/4802 (94%)   | 4988/5340 (93%)   | 4838/5192 (93%)   |
| Median time (IQR) from discharge ( <b>Q16.2</b> ) to follow-up ( <b>Q19.2</b> ) in days | 48 (39-67)        | 48 (39-64)        | 48 (39-63)        |
| <b>Q19.3</b> Specialist who assessed the patient at follow-up *                         |                   |                   |                   |
| Surgeon                                                                                 | 3825/4495 (85%)   | 4114/4960 (83%)   | 3915/4824 (81%)   |
| Neurologist                                                                             | 88/4495 (2%)      | 113/4960 (2%)     | 83/4824 (2%)      |
| Stroke Physician                                                                        | 290/4495 (6%)     | 380/4960 (8%)     | 508/4824 (11%)    |
| Surgeon and Stroke Physician                                                            | 62/4495 (1%)      | 69/4960 (1%)      | 111/4824 (2%)     |
| Other                                                                                   | 342/4495 (8%)     | 429/4960 (9%)     | 415/4824 (9%)     |

\*multiple specialists could be selected

## Postoperative surgical outcomes

Patients may experience various complications following carotid endarterectomy. These can be one of the following:

- Bleeding.
- Myocardial Infarct: otherwise known as a heart attack, this involves the interruption of blood supply to part of the heart.
- Cranial Nerve Injury: abbreviated to CNI, this is damage to one of the nerves to the face and neck.
- Transient Ischaemic Attack: a “mini-stroke” or TIA occurs when the blood supply to the brain is briefly interrupted.

The likelihood of a complication following carotid endarterectomy is low, and has remained at similar levels throughout Rounds 3 to 5.

**Table 8a: Summary of reported complications following carotid endarterectomy by Audit Round**

|                    |                                                   | Round 3         | Round 4         | Round 5         |
|--------------------|---------------------------------------------------|-----------------|-----------------|-----------------|
| Complication       | Stage complication experienced                    | National N (%)  | National N (%)  | National N (%)  |
| Myocardial Infarct | Inpatient                                         | 40/5292 (0.8%)  | 38/5759 (0.7%)  | 22/5723 (0.4%)  |
| Bleeding           | Inpatient                                         | 182/5292 (3.4%) | 194/5759 (3.4%) | 193/5723 (3.4%) |
|                    | of which returned to theatre                      | 112/5292 (2.1%) | 134/5759 (2.3%) | 145/5723 (2.5%) |
| CNI                | Inpatient CNI                                     | 106/5292 (2.0%) | 115/5759 (2.0%) | 93/5723 (1.6%)  |
|                    | CNI (found at follow-up)                          | 106/4508 (2.4%) | 111/4982 (2.2%) | 134/4836 (2.8%) |
|                    | Overall CNI                                       | 197/5292 (3.7%) | 222/5759 (3.9%) | 211/5723 (3.7%) |
| TIA                | Inpatient                                         | 29/5292 (0.5%)  | 27/5759 (0.5%)  | 32/5723 (0.6%)  |
| Stroke             | Inpatient stroke                                  | 105/5292 (2.0%) | 83/5759 (1.4%)  | 75/5723 (1.3%)  |
|                    | Stroke at any point by follow-up                  | 136/5185 (2.6%) | 115/5728 (2.0%) | 111/5572 (2.0%) |
|                    | Stroke within 30 days of operation                | 118/5185 (2.3%) | 102/5728 (1.8%) | 103/5572 (1.8%) |
| Death              | Inpatient death                                   | 34/5292 (0.6%)  | 29/5759 (0.5%)  | 27/5723 (0.5%)  |
|                    | Death within 30 days of operation                 | 42/5180 (0.8%)  | 48/5723 (0.8%)  | 44/5571 (0.8%)  |
| Stroke/Death       | Death within 30 days and/or stroke within 30 days | 139/5185 (2.7%) | 125/5728 (2.2%) | 124/5572 (2.2%) |
| MI/Stroke/Death    | Inpatient                                         | 153/5275 (2.9%) | 123/5759 (2.1%) | 104/5721 (1.8%) |

**Table 8b: Summary of reported complications following carotid endarterectomy for Round 3-5**

| Complication        | Stage complication experienced                    | Procedures<br>N | Complication<br>rate (%) | 95% CI      |
|---------------------|---------------------------------------------------|-----------------|--------------------------|-------------|
| Myocardial Infarct  | Inpatient                                         | 16774           | 0.6                      | 0.5 to 0.7  |
| Bleeding            | Inpatient                                         | 16774           | 3.4                      | 3.1. to 3.7 |
|                     | of which returned to theatre                      | 16774           | 2.3                      | 2.1 to 2.6  |
| CNI                 | Inpatient CNI                                     | 16774           | 1.9                      | 1.7 to 2.1  |
|                     | CNI (found at follow-up)                          | 14326           | 2.5                      | 2.2 to 2.7  |
|                     | Overall CNI                                       | 16774           | 3.8                      | 3.5 to 4.1  |
| TIA                 | Inpatient                                         | 16774           | 0.5                      | 0.4 to 0.6  |
| Stroke              | Inpatient stroke                                  | 16774           | 1.6                      | 1.4 to 1.8  |
|                     | Stroke at any point by follow-up                  | 16485           | 2.2                      | 2.0 to 2.4  |
|                     | Stroke within 30 days of operation                | 16485           | 2.0                      | 1.8 to 2.2  |
| Death               | Inpatient death                                   | 16774           | 0.5                      | 0.4 to 0.7  |
|                     | Death within 30 days of the operation             | 16474           | 0.8                      | 0.7 to 1.0  |
| Stroke/<br>Death    | Death within 30 days and/or stroke within 30 days | 16485           | 2.4                      | 2.1 to 2.6  |
| MI/Stroke/<br>Death | Inpatient                                         | 16755           | 2.3                      | 2.0 to 2.5  |

## Rates of stroke/death within 30 days among NHS trusts

Data for Rounds 3 to 5 were used to calculate risk-adjusted rates of death/stroke by NHS trust / Health Board. A logistic regression model was used to adjust the rates for differences between patients treated at the various organisations and took into account the following characteristics: age, diabetes, symptoms/treatment for ischaemic heart disease/congestive heart failure, peripheral vascular disease and the Rankin Scale.

A funnel plot was used to assess whether there are systematic differences between outcomes between NHS organisations. This is a widely used graphical method for comparing the outcomes of surgeons or hospitals [Spiegelhalter, 2005].

In these plots, each dot represents an NHS organisation. The solid horizontal line is the national average. The vertical axis indicates the outcome with dots higher up the axis showing trusts with a higher stroke and/or death rate. The horizontal axis shows NHS trust activity with dots further to the right showing the organisations that perform more operations. The benefit of funnel plot is that it shows whether the outcomes of NHS trusts differ from the national average by more than would be expected from random fluctuations. Random variation will always affect outcome information like mortality rates, and its influence is greater among small samples. This is shown by the two funnel-shaped dotted lines. These lines define the region within which we would expect the outcomes of NHS trusts to fall if their outcomes only differed from the national rate because of random variation.

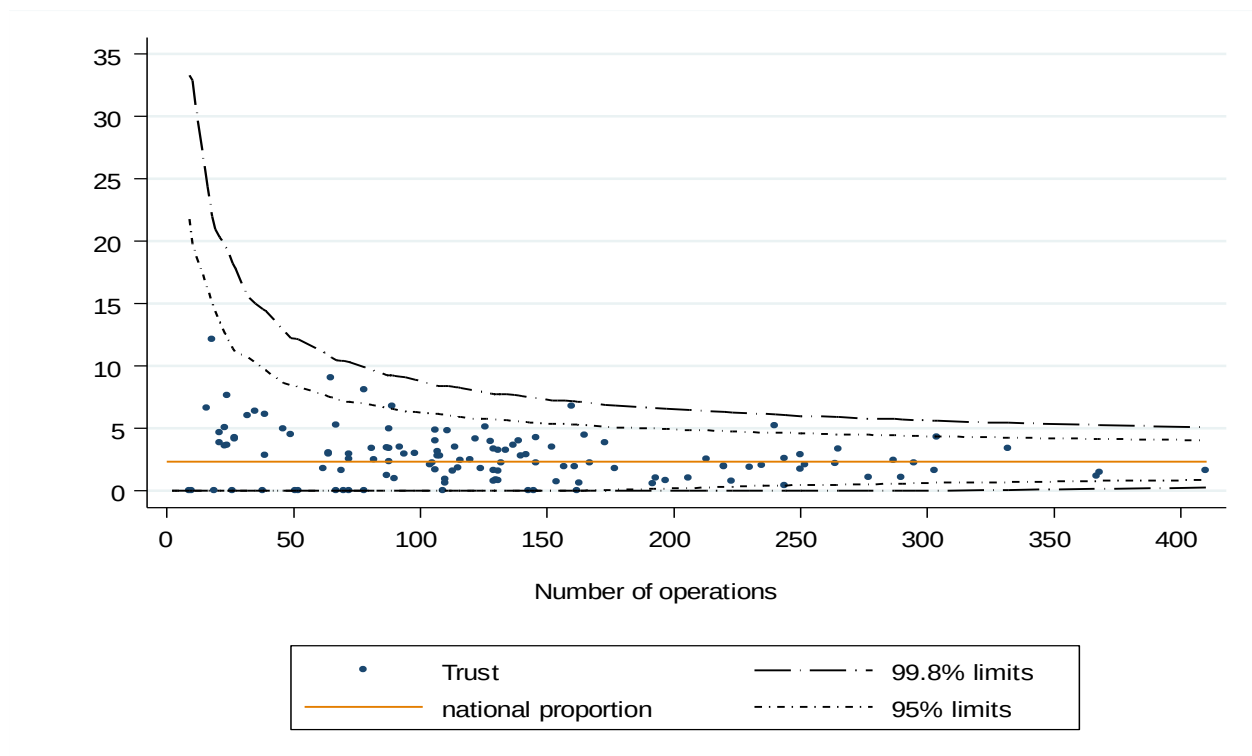
If the outcomes of an NHS trust fell outside the outer limits, there could be a systematic reason for the higher or lower rate, and they would be flagged as an outlier for further investigation. In this report, outliers are managed according to the outlier policy of the Vascular Society, drawn up using guidance from the Department of Health. It can be found at

<http://www.vsqip.org.uk/wp/wp-content/uploads/2013/07/National-Vascular-Registry-Outlier-Policy.pdf>.

All the NHS trusts had a risk adjusted rate of death/stroke within 30 days that fell within the expected range given the number of procedures performed. They all fell within the outer 99.8% control limits.

The data related to the funnel plot can be found in the table that starts on page 43.

**Figure 7: Funnel plot of risk-adjusted rate of stroke/death within 30 days of a carotid endarterectomy, with NHS trusts/ Health Boards shown in comparison to the national average**



**Cause of death during the inpatient stay and within 30-days of surgery**

In Round 5, 28 (0.5%) of 5723 patients were reported to have died during their hospital stay. The primary cause of death was recorded for all 28 these. Among these patients, 27 died within 30-days of the operation.

Overall, there were 44 patients who died within 30 days of the procedure, the causes of which are presented in Table 10 below.

**Table 9: Cause of inpatient death**

| <b>Q15.7 and Q15.7b</b> Cause of death | <b>Round 3</b><br>(40/5292 cases) | <b>Round 4</b><br>(31/5759 cases) | <b>Round 5</b><br>(28/5723 cases) |
|----------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| MI                                     | 7 (0.1%)                          | 7 (0.1%)                          | 5 (0.1%)                          |
| Bleeding                               | 2 (0.04%)                         | 0 (0%)                            | 0 (0%)                            |
| Stroke                                 | 13 (0.2%)                         | 16 (0.3%)                         | 14 (0.2%)                         |
| Other                                  | 18 (0.3%)                         | 8 (0.1%)                          | 9 (0.2%)                          |

**Table 10: Cause of death up to 30 days post surgery**

| <b>Q15.7b and Q18.1b</b> Cause of death | <b>Round 3</b><br>(42/5180 cases) | <b>Round 4</b><br>(48/5723 cases) | <b>Round 5</b><br>(44/5571 cases) |
|-----------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Myocardial infarct                      | 6 (0.1%)                          | 9 (0.2%)                          | 8 (0.1%)                          |
| Bleeding                                | 3 (0.1%)                          | 0 (0%)                            | 0 (0%)                            |
| Stroke                                  | 15 (0.3%)                         | 23 (0.4%)                         | 21 (0.4%)                         |
| Other                                   | 17 (0.3%)                         | 10 (0.2%)                         | 10 (0.2%)                         |
| Not known                               | 1 (0.02%)                         | 6 (0.1%)                          | 5 (0.1%)                          |



## Stroke during the inpatient stay and post-discharge

A stroke during a patient's inpatient stay was reported for 75/5723 (1.3%) cases. Among the 62 patients in whom the side of the stroke was reported, 46 (74%) patients experienced an ipsilateral stroke.

The time the stroke occurred was known for 67/75 (89%) of cases.

**Table 11: Stroke experienced during inpatient stay**

| Q15.3 Stroke experienced during inpatient stay following CEA           | Round 3        | Round 4        | Round 5        |
|------------------------------------------------------------------------|----------------|----------------|----------------|
|                                                                        | National N (%) | National N (%) | National N (%) |
| Stroke during procedure (woke up with Stroke)                          | 33 (0.6%)      | 24 (0.4%)      | 24 (0.4%)      |
| Stroke experienced ≤ 24 hours of undergoing CEA                        | 41 (0.8%)      | 35 (0.6%)      | 27 (0.5%)      |
| Stroke experienced > 24 hours of undergoing CEA and prior to discharge | 16 (0.3%)      | 18 (0.3%)      | 16 (0.3%)      |
| Stroke experienced after CEA, but with no date given.                  | 15 (0.3%)      | 6 (0.1%)       | 8(0.1%)        |

The severity of the stroke (Rankin score) was known for 61 (82%) of the 75 patient strokes. Among these, the distribution of severity was:

- 28/61 (46%) had scores of 0-2
- 11/61 (18%) had a score of 3
- 22/61 (36%) had scores of 4-5

Strokes were reported after discharge in three ways:

- Where stroke was the primary cause of death
- Where the patient was re-admitted for stroke
- Where stroke was reported at post-hospital discharge follow-up assessment

When only those cases for which discharge follow-up data were available are considered, the stroke rate for the duration of the follow up period was 2.0% (111/5572). The 30-day stroke rate was 1.8% (103/5572).

## Other postoperative outcomes

**Table 12: Other specified post-operative complications**

|                                                       | <b>Round 3</b><br>(5292 cases) | <b>Round 4</b><br>(5759 cases) | <b>Round 5</b><br>(5723 cases) |
|-------------------------------------------------------|--------------------------------|--------------------------------|--------------------------------|
| <b>Complication specified</b>                         | <b>National<br/>N (%)</b>      | <b>National<br/>N (%)</b>      | <b>National<br/>N (%)</b>      |
| Amaurosis fugax                                       | 1 (0.0%)                       | 1 (0.0%)                       | 4 (0.1%)                       |
| Heart failure                                         | 38 (0.7%)                      | 25 (0.4%)                      | 9 (0.2%)                       |
| Urinary complications                                 | 37 (0.7%)                      | 51 (0.9%)                      | 43 (0.8%)                      |
| Cardiac arrest                                        | 9 (0.2%)                       | 3 (0.1%)                       | 6 (0.1%)                       |
| Fitting                                               | 10 (0.2%)                      | 9 (0.2%)                       | 9 (0.2%)                       |
| Occlusion of the operated carotid                     | 4 (0.1%)                       | 3 (0.1%)                       | 3 (0.1%)                       |
| Respiratory complications                             | 50 (0.9%)                      | 53 (0.9%)                      | 45 (0.8%)                      |
| Thromboembolism related to the treated carotid artery | 8 (0.2%)                       | 13 (0.2%)                      | 11 (0.2%)                      |
| Post-operative hypertension                           | 67 (1.3%)                      | 51 (0.9%)                      | 81 (1.4%)                      |

There were 133/5409 (2%) patients (394 missing) who were reported as being re-admitted within 30-days of their carotid endarterectomy. The complications reported as leading to these readmissions were:

- 18/133 (14%) stroke
- 14/133 (11%) cardiac-related
- 11/133 (8%) respiratory
- 94/133 (71%) other

NB: The percentages may not add up to 100 as multiple reasons could be selected.

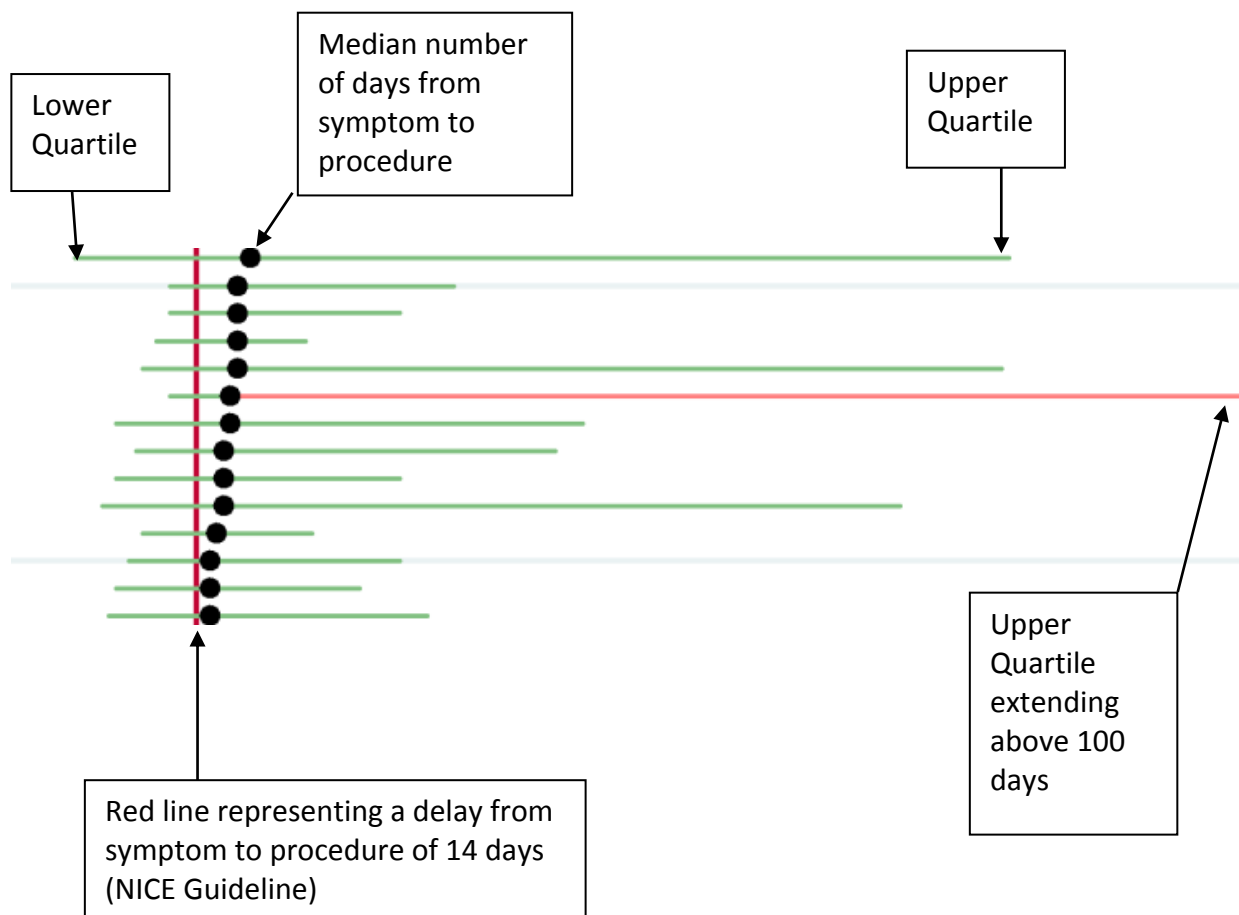
The following section presents NHS trust level information on the overall speed of symptom to surgery. The time is described using the median value for the group of patients within a single NHS trust.

The plot on the following page (Figure 8) shows the summary symptom to procedure time measures for all NHS trusts within Round 5 that had 10 or more symptomatic cases with exact symptom and procedure dates. The median time is represented by a black dot. The inter-quartile ranges (IQRs) are shown by horizontal green lines. Any upper quartile line that is red indicates that the upper quartile value is above 100 days. This typically occurs when the number of patients with exact symptom and procedure dates for the NHS trust was relatively small.

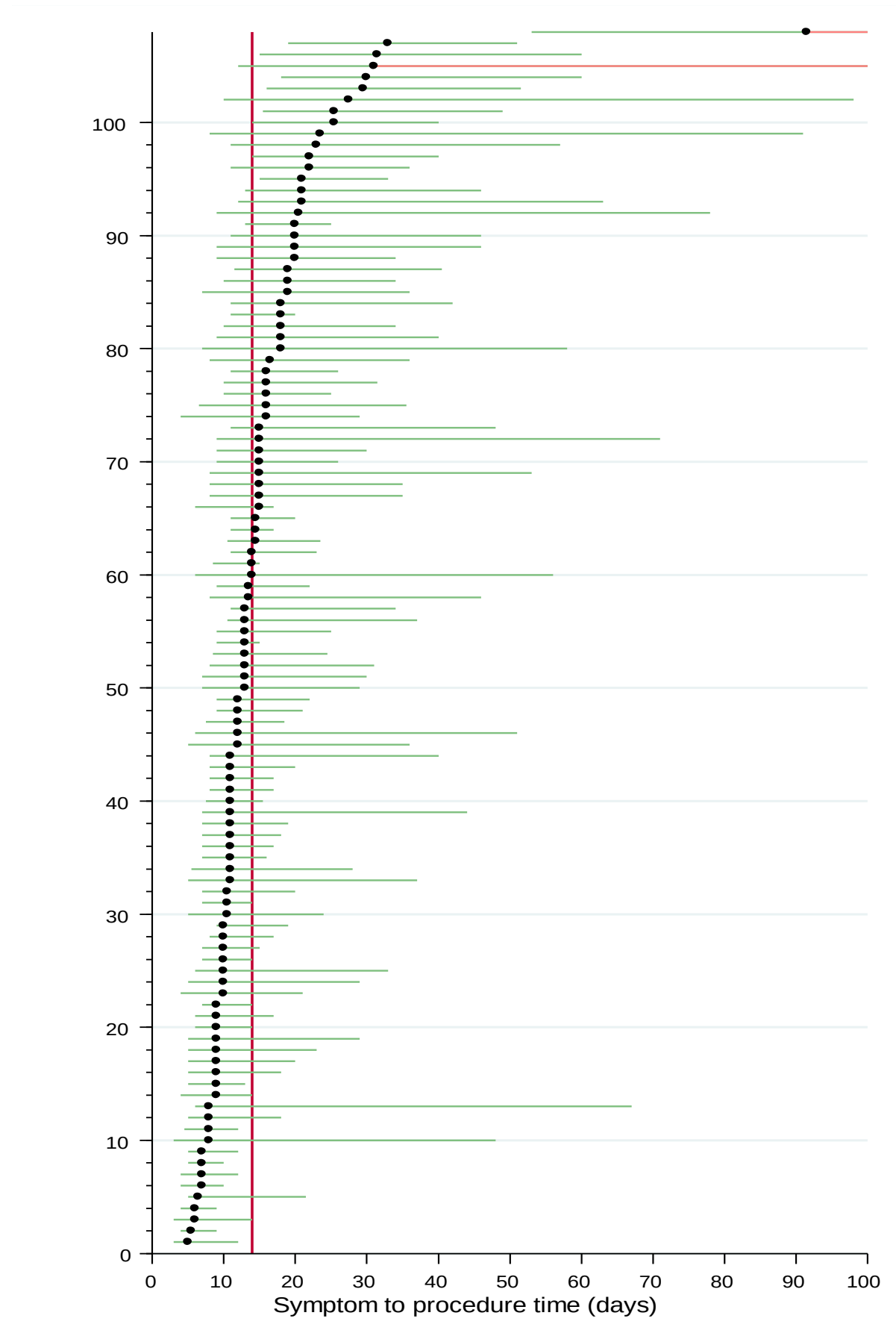
The vertical red line in the graph represents the current NICE Guideline of 14 days from symptom to procedure.

Please note that the graph needs to be studied in conjunction with the table on page 32, which includes how many patients this median and IQR is based upon, and how many cases were identified in HES within Round 5 for each trust.

Figure 8 shows that there is considerable variation among NHS trusts in the median time to surgery. The median was 14 days for 62 organisations, but for a few NHS trusts the median exceeded 20 days.



**Figure 8: Median time (and inter-quartile range) from symptom to procedure by NHS trust**



## Participation in the audit

### NHS trust case-ascertainment

There is concern amongst many healthcare professionals regarding the accuracy of HES data, and this was examined further in an Organisational Audit of Vascular Surgical Services in 2009. We asked trusts to self-report the number of CEAs they had performed in that year, and a reasonable association was found between the self-reported data and that obtained from HES. However, HES is the only national data available with which to compare.

From Round 3 onwards a traffic light system has been used to illustrate trust's contribution of cases compared to HES. Red indicates that the trust has submitted 75% or fewer of their cases compared to HES. Amber indicates that the trust has submitted between 76% and 90%. Green indicates that the trust has submitted 91% or more of their cases compared to HES. We have capped the green category at 110% as this probably indicates a HES coding issue within the trust.

The ,  or  in the final column is included to aid those who find it difficult to differentiate between red and green.

As the HES data are given by discharge date from hospital, the numbers in the HES comparison may differ slightly from the total number of cases included in analysis for Round 5.

A number of NHS trusts have stopped performing carotid endarterectomies since this data was collected, due to the on-going reconfiguration of vascular surgical services. Those trusts who have now stopped performing carotid endarterectomies are denoted with an asterisk (\*) and are in a grey font.

**Table 13: Case contribution to this audit compared to HES reported caseload by Trust**

| Trust Name                                                     | Total Number of Cases in Round 5 | Number in R5 for HES Comparison | Number of Cases in HES | % case ascertainment |                                                                                       |
|----------------------------------------------------------------|----------------------------------|---------------------------------|------------------------|----------------------|---------------------------------------------------------------------------------------|
| <b>East Midlands</b>                                           |                                  |                                 |                        |                      |                                                                                       |
| Derby Hospitals NHS Foundation Trust                           | 41                               | 41                              | 41                     | 100%                 |  |
| Kettering General Hospital NHS Foundation Trust*               | 4                                | 4                               | 6                      | 67%                  |  |
| Northampton General Hospital NHS Trust                         | 51                               | 53                              | 51                     | 104%                 |  |
| Nottingham University Hospitals NHS Trust                      | 91                               | 91                              | 94                     | 97%                  |  |
| Sherwood Forest Hospitals NHS Foundation Trust*                | 44                               | 44                              | 45                     | 98%                  |  |
| United Lincolnshire Hospitals NHS Trust                        | 45                               | 45                              | 50                     | 90%                  |  |
| University Hospitals of Leicester NHS Trust                    | 107                              | 111                             | 114                    | 97%                  |  |
| <b>East of England</b>                                         |                                  |                                 |                        |                      |                                                                                       |
| Basildon and Thurrock University Hospital NHS Foundation Trust | 30                               | 32                              | 32                     | 100%                 |  |
| Bedford Hospital NHS Trust                                     | 50                               | 50                              | 45                     | 111%                 |  |
| Cambridge University Hospitals NHS Foundation Trust            | 102                              | 105                             | 105                    | 100%                 |  |
| Colchester Hospital University NHS Foundation Trust            | 51                               | 52                              | 51                     | 102%                 |  |
| East and North Hertfordshire NHS Trust                         | 46                               | 46                              | 47                     | 98%                  |  |
| Ipswich Hospital NHS Trust*                                    | 23                               | 23                              | 21                     | 110%                 |  |
| Mid Essex Hospital Services NHS Trust                          | 43                               | 43                              | 44                     | 98%                  |  |
| Norfolk and Norwich University Hospitals NHS Foundation Trust  | 91                               | 92                              | 92                     | 100%                 |  |
| Peterborough and Stamford Hospitals NHS Foundation Trust       | 16                               | 16                              | 25                     | 64%                  |  |
| Princess Alexandra Hospital NHS Trust                          | 22                               | 23                              | 24                     | 96%                  |  |
| Southend University Hospital NHS Foundation Trust              | 51                               | 52                              | 52                     | 100%                 |  |
| West Hertfordshire Hospitals NHS Trust                         | 36                               | 36                              | 50                     | 72%                  |  |

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| Trust Name                                                                | Total Number of Cases in Round 5 | Number in R5 for HES Comparison | Number of Cases in HES | % case ascertainment |   |
|---------------------------------------------------------------------------|----------------------------------|---------------------------------|------------------------|----------------------|---|
| <b>London</b>                                                             |                                  |                                 |                        |                      |   |
| Barking, Havering And Redbridge University Hospitals NHS Foundation Trust | 42                               | 43                              | 45                     | 96%                  | ✓ |
| Barnet and Chase Farm Hospitals NHS Trust*                                | 5                                | 5                               | 10                     | 50%                  | ✗ |
| Barts Health NHS Trust                                                    | 54                               | 55                              | 48                     | 115%                 | ⬢ |
| Guy's and St Thomas' Hospital NHS Foundation Trust                        | 18                               | 19                              | 19                     | 100%                 | ✓ |
| Imperial College Healthcare NHS Trust                                     | 89                               | 90                              | 92                     | 98%                  | ✓ |
| King's College Hospital NHS Foundation Trust                              | 137                              | 139                             | 132                    | 105%                 | ✓ |
| Lewisham Healthcare NHS Trust*                                            | 3                                | 3                               | 3                      | 100%                 | ✓ |
| North West London Hospitals NHS Trust                                     | 36                               | 36                              | 40                     | 90%                  | ⬢ |
| Royal Free London NHS Foundation Trust                                    | 16                               | 16                              | 16                     | 100%                 | ✓ |
| St George's Healthcare NHS Trust                                          | 77                               | 78                              | 75                     | 104%                 | ✓ |
| University College London Hospitals NHS Foundation Trust                  | 46                               | 48                              | 50                     | 96%                  | ✓ |
| <b>North East</b>                                                         |                                  |                                 |                        |                      |   |
| City Hospitals Sunderland NHS Foundation Trust                            | 48                               | 48                              | 51                     | 94%                  | ✓ |
| County Durham and Darlington NHS Foundation Trust                         | 56                               | 57                              | 57                     | 100%                 | ✓ |
| Gateshead Health NHS Foundation Trust                                     | 43                               | 43                              | 42                     | 102%                 | ✓ |
| Newcastle upon Tyne Hospitals NHS Foundation Trust                        | 70                               | 72                              | 76                     | 95%                  | ✓ |
| South Tees Hospitals NHS Foundation Trust                                 | 67                               | 67                              | 66                     | 102%                 | ✓ |
| <b>North West</b>                                                         |                                  |                                 |                        |                      |   |
| Aintree University Hospitals NHS Foundation Trust*                        | 40                               | 41                              | 45                     | 91%                  | ✓ |
| Blackpool Teaching Hospitals NHS Foundation Trust                         | 0                                | 0                               | 66                     | 0%                   | ✗ |
| Bolton NHS Foundation Trust                                               | 37                               | 39                              | 37                     | 105%                 | ✓ |
| Central Manchester University Hospitals NHS Foundation Trust              | 75                               | 77                              | 78                     | 99%                  | ✓ |
| Countess of Chester Hospital NHS Foundation Trust                         | 45                               | 46                              | 49                     | 94%                  | ✓ |
| East Lancashire Hospitals NHS Trust                                       | 84                               | 84                              | 88                     | 95%                  | ✓ |
| Lancashire Teaching Hospitals NHS Foundation Trust                        | 50                               | 50                              | 52                     | 96%                  | ✓ |
| Mid Cheshire Hospitals NHS Foundation Trust*                              | 17                               | 17                              | 30                     | 57%                  | ✗ |
| North Cumbria University Hospitals NHS Trust                              | 21                               | 21                              | 24                     | 88%                  | ⬢ |
| Pennine Acute Hospitals NHS Trust                                         | 114                              | 117                             | 120                    | 98%                  | ✓ |
| Royal Liverpool and Broadgreen University Hospitals NHS Trust             | 64                               | 65                              | 64                     | 102%                 | ✓ |
| Southport and Ormskirk Hospital NHS Trust*                                | 25                               | 25                              | 25                     | 100%                 | ✓ |
| Tameside Hospital NHS Foundation Trust                                    | 18                               | 18                              | 47                     | 38%                  | ✗ |
| University Hospital of South Manchester NHS Foundation Trust              | 89                               | 89                              | 89                     | 100%                 | ✓ |
| University Hospitals Of Morecambe Bay NHS Foundation Trust                | 42                               | 42                              | 40                     | 105%                 | ✓ |
| Warrington and Halton Hospitals NHS Foundation Trust                      | 46                               | 47                              | 47                     | 100%                 | ✓ |
| Wirral University Teaching Hospital NHS Foundation Trust                  | 61                               | 61                              | 63                     | 97%                  | ✓ |
| Wrightington, Wigan And Leigh NHS Foundation Trust                        | 47                               | 48                              | 52                     | 92%                  | ✓ |
| <b>South Central</b>                                                      |                                  |                                 |                        |                      |   |
| Buckinghamshire Healthcare NHS Trust                                      | 75                               | 77                              | 74                     | 104%                 | ✓ |
| Milton Keynes Hospital NHS Foundation Trust*                              | 8                                | 8                               | 9                      | 89%                  | ⬢ |
| Oxford University Hospitals NHS Trust                                     | 97                               | 97                              | 104                    | 93%                  | ✓ |
| Portsmouth Hospitals NHS Trust                                            | 69                               | 70                              | 71                     | 99%                  | ✓ |
| Royal Berkshire NHS Foundation Trust*                                     | 0                                | 0                               | 7                      | 0%                   | ✗ |
| University Hospital Southampton NHS Foundation Trust                      | 110                              | 115                             | 115                    | 100%                 | ✓ |
| <b>South East Coast</b>                                                   |                                  |                                 |                        |                      |   |
| Ashford And St Peter's Hospitals NHS Foundation Trust                     | 70                               | 72                              | 70                     | 103%                 | ✓ |
| Brighton and Sussex University Hospitals NHS Trust                        | 57                               | 58                              | 59                     | 98%                  | ✓ |
| Dartford and Gravesham NHS Trust                                          | 9                                | 9                               | 9                      | 100%                 | ✓ |
| East Kent Hospitals University NHS Foundation Trust                       | 73                               | 73                              | 73                     | 100%                 | ✓ |
| East Sussex Healthcare NHS Trust                                          | 5                                | 5                               | 25                     | 20%                  | ✗ |
| Frimley Park Hospital NHS Foundation Trust                                | 92                               | 93                              | 91                     | 102%                 | ✓ |
| Maidstone and Tunbridge Wells NHS Trust                                   | 8                                | 8                               | 18                     | 44%                  | ✗ |
| Medway NHS Foundation Trust                                               | 27                               | 27                              | 29                     | 93%                  | ✓ |
| Surrey and Sussex Healthcare NHS Trust*                                   | 24                               | 24                              | 25                     | 96%                  | ✓ |
| Western Sussex Hospitals NHS Trust                                        | 17                               | 18                              | 26                     | 69%                  | ✗ |

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| Trust Name                                                        | Total Number of Cases in Round 5 | Number in R5 for HES Comparison | Number of Cases in HES | % case ascertainment |   |
|-------------------------------------------------------------------|----------------------------------|---------------------------------|------------------------|----------------------|---|
| <b>South West</b>                                                 |                                  |                                 |                        |                      |   |
| Dorset County Hospital NHS Foundation Trust                       | 30                               | 31                              | 32                     | 97%                  | ✓ |
| Gloucestershire Hospitals NHS Foundation Trust                    | 68                               | 68                              | 71                     | 96%                  | ✓ |
| Great Western Hospitals NHS Foundation Trust                      | 21                               | 22                              | 19                     | 116%                 | ✖ |
| North Bristol NHS Trust                                           | 52                               | 54                              | 50                     | 108%                 | ✓ |
| Northern Devon Healthcare NHS Trust                               | 29                               | 29                              | 29                     | 100%                 | ✓ |
| Plymouth Hospitals NHS Trust                                      | 36                               | 36                              | 36                     | 100%                 | ✓ |
| Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust | 45                               | 46                              | 49                     | 94%                  | ✓ |
| Royal Cornwall Hospitals NHS Trust                                | 45                               | 46                              | 46                     | 100%                 | ✓ |
| Royal Devon and Exeter NHS Foundation Trust                       | 35                               | 36                              | 38                     | 95%                  | ✓ |
| Royal United Hospital Bath NHS Trust                              | 72                               | 73                              | 64                     | 114%                 | ✖ |
| Salisbury NHS Foundation Trust                                    | 24                               | 24                              | 25                     | 96%                  | ✓ |
| South Devon Healthcare NHS Foundation Trust                       | 31                               | 31                              | 31                     | 100%                 | ✓ |
| Taunton and Somerset NHS Foundation Trust                         | 52                               | 53                              | 52                     | 102%                 | ✓ |
| University Hospitals Bristol NHS Foundation Trust                 | 43                               | 45                              | 45                     | 100%                 | ✓ |
| <b>West Midlands</b>                                              |                                  |                                 |                        |                      |   |
| Dudley Group of Hospitals NHS Trust                               | 83                               | 83                              | 84                     | 99%                  | ✓ |
| Heart of England NHS Foundation Trust                             | 47                               | 48                              | 46                     | 104%                 | ✓ |
| Mid Staffordshire NHS Foundation Trust*                           | 3                                | 3                               | 4                      | 75%                  | ✖ |
| Royal Wolverhampton Hospitals NHS Trust*                          | 40                               | 40                              | 39                     | 103%                 | ✓ |
| Sandwell and West Birmingham Hospitals NHS Trust*                 | 30                               | 30                              | 31                     | 97%                  | ✓ |
| Shrewsbury and Telford Hospital NHS Trust                         | 42                               | 43                              | 49                     | 88%                  | ✖ |
| University Hospital Of North Staffordshire NHS Trust              | 44                               | 50                              | 46                     | 109%                 | ✓ |
| University Hospitals Birmingham NHS Foundation Trust              | 59                               | 60                              | 57                     | 105%                 | ✓ |
| University Hospitals Coventry and Warwickshire NHS Trust          | 77                               | 79                              | 79                     | 100%                 | ✓ |
| Walsall Healthcare NHS Trust*                                     | 26                               | 27                              | 29                     | 93%                  | ✓ |
| Worcestershire Acute Hospitals NHS Trust                          | 42                               | 43                              | 63                     | 68%                  | ✖ |
| <b>Yorkshire and The Humber</b>                                   |                                  |                                 |                        |                      |   |
| Bradford Teaching Hospitals NHS Foundation Trust                  | 37                               | 38                              | 37                     | 103%                 | ✓ |
| Calderdale and Huddersfield NHS Foundation Trust                  | 37                               | 37                              | 38                     | 97%                  | ✓ |
| Doncaster and Bassetlaw Hospitals NHS Foundation Trust            | 67                               | 67                              | 69                     | 97%                  | ✓ |
| Hull and East Yorkshire Hospitals NHS Trust                       | 105                              | 106                             | 107                    | 99%                  | ✓ |
| Leeds Teaching Hospitals NHS Trust                                | 32                               | 33                              | 61                     | 54%                  | ✖ |
| Mid Yorkshire Hospitals NHS Trust                                 | 38                               | 39                              | 45                     | 87%                  | ✖ |
| Scarborough and North East Yorkshire Healthcare NHS Trust*        | 0                                | 0                               | 4                      | 0%                   | ✖ |
| Sheffield Teaching Hospitals NHS Foundation Trust                 | 83                               | 83                              | 85                     | 98%                  | ✓ |
| York Teaching Hospital NHS Foundation Trust                       | 156                              | 161                             | 153                    | 105%                 | ✓ |
| <b>ENGLAND TOTAL</b>                                              | <b>4998</b>                      | <b>5083</b>                     | <b>5346</b>            | <b>95%</b>           |   |
| <b>Northern Ireland</b>                                           |                                  |                                 |                        |                      |   |
| Belfast Health and Social Care Trust                              | 143                              | 144                             | 140                    | 103%                 | ✓ |
| Southern Health and Social Care Trust                             | 4                                | 4                               |                        |                      |   |
| Western Health and Social Care Trust*                             | 17                               | 17                              | 17                     | 100%                 | ✓ |
| <b>NORTHERN IRELAND TOTAL</b>                                     | <b>164</b>                       | <b>165</b>                      |                        |                      |   |
| <b>Scotland</b>                                                   |                                  |                                 |                        |                      |   |
| NHS Ayrshire & Arran                                              | 30                               | 30                              | 41                     | 73%                  | ✖ |
| NHS Dumfries and Galloway                                         | 33                               | 34                              | 33                     | 103%                 | ✓ |
| NHS Fife                                                          | 13                               | 13                              | 13                     | 100%                 | ✓ |
| NHS Forth Valley                                                  | 39                               | 40                              | 41                     | 98%                  | ✓ |
| NHS Grampian                                                      | 16                               | 16                              | 16                     | 100%                 | ✓ |
| NHS Greater Glasgow and Clyde                                     | 55                               | 57                              | 102                    | 56%                  | ✖ |
| NHS Highland                                                      | 46                               | 47                              | 46                     | 102%                 | ✓ |
| NHS Lanarkshire                                                   | 19                               | 19                              | 55                     | 35%                  | ✖ |
| NHS Lothian                                                       | 75                               | 77                              | 78                     | 99%                  | ✓ |
| NHS Tayside                                                       | 21                               | 21                              | 26                     | 81%                  | ✖ |
| <b>SCOTLAND TOTAL</b>                                             | <b>347</b>                       | <b>354</b>                      | <b>451</b>             | <b>78%</b>           |   |
| <b>Wales</b>                                                      |                                  |                                 |                        |                      |   |

| Trust Name                                     | Total Number of Cases in Round 5 | Number in R5 for HES Comparison | Number of Cases in HES | % case ascertainment |          |
|------------------------------------------------|----------------------------------|---------------------------------|------------------------|----------------------|----------|
| Abertawe Bro Morgannwg University Health Board | 103                              | 105                             | 142                    | 74%                  | ✗        |
| Aneurin Bevan Health Board                     | 55                               | 55                              | 71                     | 77%                  | ⬢        |
| Betsi Cadwaladr University Health Board        | 34                               | 36                              | 43                     | 84%                  | ⬢        |
| Cardiff and Vale University Health Board       | 0                                | 0                               | 37                     | 0%                   | ✗        |
| Cwm Taf University Health Board                | 22                               | 24                              | 26                     | 92%                  | ✓        |
| <b>WALES TOTAL</b>                             | <b>214</b>                       | <b>220</b>                      | <b>319</b>             | <b>69%</b>           | <b>✗</b> |
| <b>UK TOTAL</b>                                | <b>5723</b>                      | <b>5822</b>                     |                        |                      |          |

\* Please see note regarding trusts that have stopped performing CEA on page 27..

## Regional participation and results

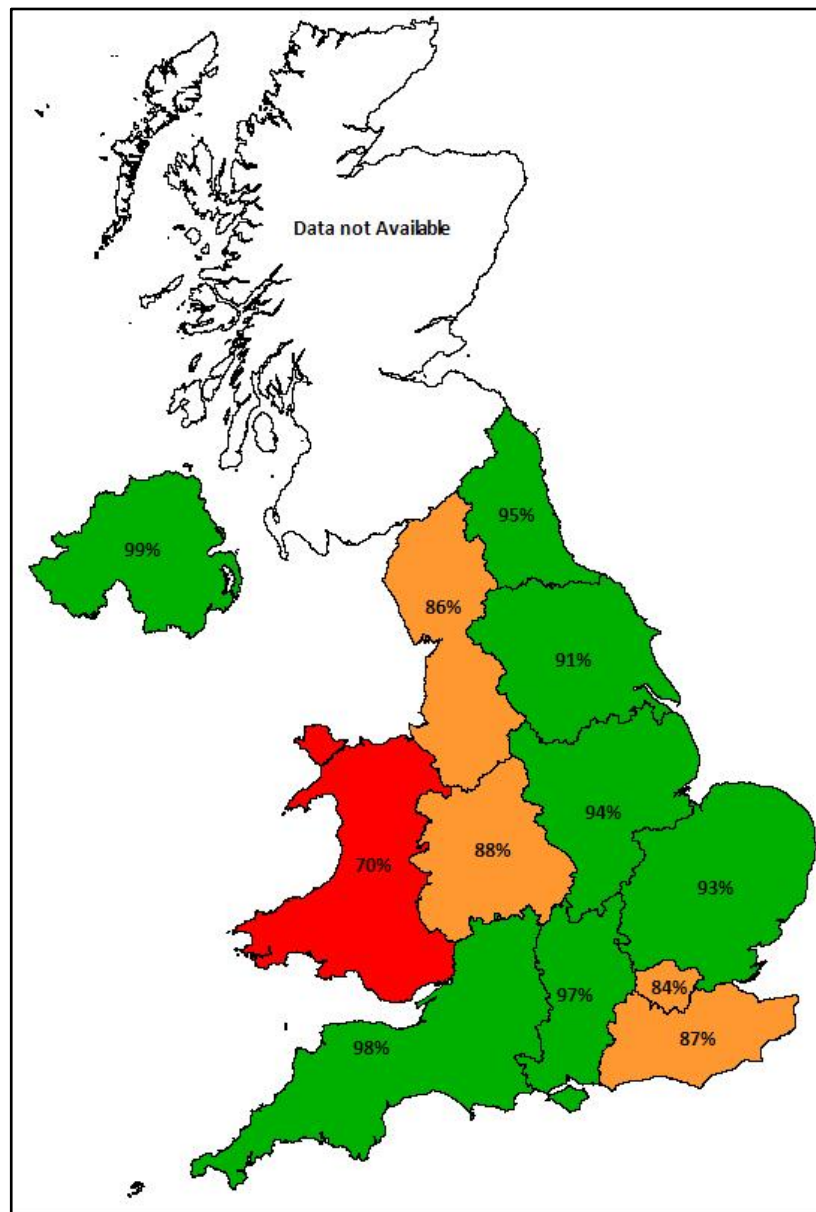
**Table 14: Case contribution to this audit compared to HES reported caseload by SHA**

| Region                   | ROUND 1<br>(Operations 1 <sup>st</sup> Dec 2005 to 31 <sup>st</sup> Dec 2007) | ROUND 2<br>(Operation dates: 1 <sup>st</sup> Jan 2008 to 30 <sup>th</sup> Sept 2009) | Round 3<br>(Operation dates: 1 <sup>st</sup> Oct 2009 to 30 <sup>th</sup> Sept 2010) | Round 4<br>(Operation dates: 1 <sup>st</sup> Oct 2010 to 30 <sup>th</sup> Sept 2011) | Round 5<br>(Operation dates: 1 <sup>st</sup> Oct 2011 to 30 <sup>th</sup> Sept 2012) |                                                          |
|--------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|----------------------------------------------------------|
|                          | Total Round 1 cases as recorded by HES<br>(based on contributing trusts only) | Round 2 cases as recorded by HES<br>(based on contributing trusts only)              | Round 3 cases as recorded by HES<br>(based on contributing trusts only)              | Round 4 cases as recorded by HES                                                     | Round 5 cases as recorded by HES                                                     | Round 5 cases contributed to this audit (% of HES cases) |
| East Midlands            | 404                                                                           | 477                                                                                  | 382                                                                                  | 405                                                                                  | 401                                                                                  | 389 (97%)                                                |
| East of England          | 641                                                                           | 477                                                                                  | 586                                                                                  | 556                                                                                  | 588                                                                                  | 570 (97%)                                                |
| London                   | 918                                                                           | 1017                                                                                 | 584                                                                                  | 597                                                                                  | 531                                                                                  | 532 (100.2%)                                             |
| North East               | 545                                                                           | 483                                                                                  | 265                                                                                  | 283                                                                                  | 292                                                                                  | 287 (98%)                                                |
| North West               | 1079                                                                          | 1421                                                                                 | 1008                                                                                 | 1077                                                                                 | 1016                                                                                 | 887 (87%)                                                |
| South Central            | 163                                                                           | 649                                                                                  | 370                                                                                  | 392                                                                                  | 380                                                                                  | 367 (97%)                                                |
| South East Coast         | 373                                                                           | 579                                                                                  | 321                                                                                  | 358                                                                                  | 425                                                                                  | 387 (91%)                                                |
| South West               | 1047                                                                          | 972                                                                                  | 584                                                                                  | 577                                                                                  | 587                                                                                  | 594 (101%)                                               |
| W Midlands               | 985                                                                           | 1032                                                                                 | 619                                                                                  | 602                                                                                  | 527                                                                                  | 506 (96%)                                                |
| Yorkshire and The Humber | 901                                                                           | 923                                                                                  | 538                                                                                  | 519                                                                                  | 599                                                                                  | 564 (94%)                                                |
| <b>ENGLAND TOTAL</b>     | <b>7056</b>                                                                   | <b>8345</b>                                                                          | <b>5257</b>                                                                          | <b>5366</b>                                                                          | <b>5346</b>                                                                          | <b>5083 (95%)</b>                                        |
| Northern Ireland         | 324                                                                           | 252                                                                                  | 182                                                                                  | 154                                                                                  |                                                                                      |                                                          |
| Scotland                 | 793                                                                           | 822                                                                                  | 494                                                                                  | 395                                                                                  | 451                                                                                  | 354 (78%)                                                |
| Wales                    | 530                                                                           | 601                                                                                  | 328                                                                                  | 362                                                                                  | 319                                                                                  | 220 (69%)                                                |
| <b>UK TOTAL</b>          | <b>8703</b>                                                                   | <b>10,020</b>                                                                        | <b>6261</b>                                                                          | <b>6277</b>                                                                          |                                                                                      |                                                          |

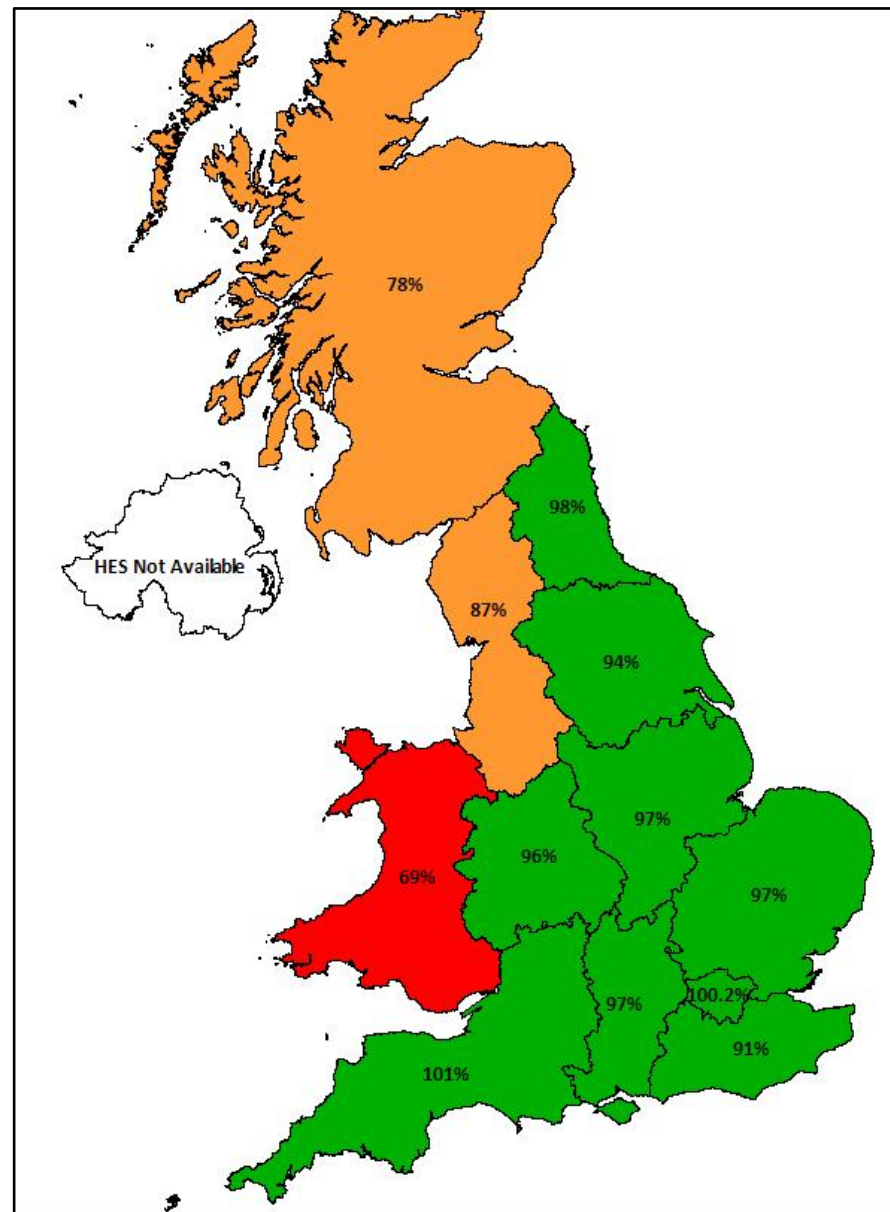


# Map of the Percentage of Cases Submitted to the Audit in Rounds 4 and 5 compared to HES

## Round 4



## Round 5



## UK Carotid Endarterectomy Clinical Audit Round 5 report

| Trust name                                                     | All cases in the audit | HES Comparator | Cases in HES | Symptomatic cases | Time from index symptom to referral<br>(A to B on Figure 1) |                                            |                                               | Time from referral to surgery<br>(B to C on Figure 1) |                                                      |                                               | Time from symptom to surgery<br>(A to C on Figure 1) |                                                                             |                                                                              |                                                    | Number in symptom to procedure plot |
|----------------------------------------------------------------|------------------------|----------------|--------------|-------------------|-------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|-------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------|
|                                                                |                        |                |              |                   | Patients with exact symptom and referral dates              | Patients referred within 7 days of symptom | Median delay and IQR from symptom to referral | Patients with exact referral and operation dates      | Patients receiving surgery within 7 days of referral | Median delay and IQR from referral to surgery | Patients with exact symptom and operation dates      | Patients receiving surgery within 2 days of symptom that triggered referral | Patients receiving surgery within 14 days of symptom that triggered referral | Median delay and IQR from index symptom to surgery |                                     |
|                                                                | N                      | N              | N            | N                 | N                                                           | N (%)                                      | Med (IQR)                                     | N                                                     | N (%)                                                | Med (IQR)                                     | N                                                    | N (%)                                                                       | N (%)                                                                        | Med (IQR)                                          |                                     |
| National<br><i>Median per Trust</i>                            | 5723<br>44             | 5822           |              | 4941<br>37        | 4342<br>33                                                  | 3018<br>(70%)                              | 4(2, 10)                                      | 4940<br>37                                            | 2502<br>(51%)                                        | 7(4, 17)                                      | 4419<br>34                                           | 154<br>(3%)                                                                 | 2471<br>(56%)                                                                | 13(7, 28)                                          |                                     |
| EAST MIDLANDS                                                  |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| Derby Hospitals NHS Foundation Trust                           | 41                     | 41             | 41           | 41                | 30                                                          | 26(87%)                                    | 2(2, 6)                                       | 41                                                    | 18(44%)                                              | 8(2, 28)                                      | 31                                                   | 2(6%)                                                                       | 25(8%1)                                                                      | 9(4, 14)                                           | 15                                  |
| Kettering General Hospital NHS Foundation Trust*               | 4                      | 4              | 6            | 3                 | 2                                                           | 0(0)                                       | 60(31, 89)                                    | 3                                                     | 1(33%)                                               | 29(7, 139)                                    | 2                                                    | 0(0%)                                                                       | 0(0%)                                                                        | 78(60, 96)                                         | **                                  |
| Northampton General Hospital NHS Trust                         | 51                     | 53             | 51           | 45                | 37                                                          | 28(76%)                                    | 2(1, 7)                                       | 45                                                    | 27(60%)                                              | 6(4, 21)                                      | 41                                                   | 1(2%)                                                                       | 25(61%)                                                                      | 10(4, 21)                                          | 23                                  |
| Nottingham University Hospitals NHS Trust                      | 91                     | 91             | 94           | 83                | 76                                                          | 66(87%)                                    | 3(2, 5)                                       | 83                                                    | 76(92%)                                              | 3(1, 5)                                       | 76                                                   | 4(5%)                                                                       | 68(89%)                                                                      | 7(4, 10)                                           | 7                                   |
| Sherwood Forest Hospitals NHS Foundation Trust*                | 44                     | 44             | 45           | 35                | 33                                                          | 29(88%)                                    | 2(1, 4)                                       | 35                                                    | 16(46%)                                              | 9(6, 15)                                      | 35                                                   | 0(0%)                                                                       | 24(69%)                                                                      | 11(7, 19)                                          | 38                                  |
| United Lincolnshire Hospitals NHS Trust                        | 45                     | 45             | 50           | 40                | 32                                                          | 15(47%)                                    | 8(3, 19)                                      | 40                                                    | 26(65%)                                              | 4(2, 9)                                       | 32                                                   | 4(13%)                                                                      | 15(47%)                                                                      | 16(7, 36)                                          | 75                                  |
| University Hospitals of Leicester NHS Trust                    | 107                    | 111            | 114          | 102               | 95                                                          | 67(71%)                                    | 3(1, 10)                                      | 102                                                   | 65(64%)                                              | 5(3, 11)                                      | 97                                                   | 0(0%)                                                                       | 69(71%)                                                                      | 9(6, 17)                                           | 21                                  |
| EAST OF ENGLAND                                                |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| Basildon and Thurrock University Hospital NHS Foundation Trust | 30                     | 32             | 32           | 27                | 25                                                          | 19(76%)                                    | 4(1, 7)                                       | 27                                                    | 13(48%)                                              | 8(5, 13)                                      | 25                                                   | 0(0%)                                                                       | 17(68%)                                                                      | 13(9, 15)                                          | 54                                  |
| Bedford Hospital NHS Trust                                     | 50                     | 50             | 45           | 36                | 35                                                          | 22(63%)                                    | 5(3, 15)                                      | 36                                                    | 10(28%)                                              | 16(7, 33)                                     | 35                                                   | 1(3%)                                                                       | 11(31%)                                                                      | 23(11, 57)                                         | 98                                  |
| Cambridge University Hospitals NHS Foundation Trust            | 102                    | 105            | 105          | 84                | 80                                                          | 55(69%)                                    | 4(2, 10)                                      | 84                                                    | 21(25%)                                              | 14(8, 33)                                     | 82                                                   | 1(1%)                                                                       | 22(27%)                                                                      | 21(13, 46)                                         | 94                                  |
| Colchester Hospital University NHS Foundation Trust            | 51                     | 52             | 51           | 46                | 41                                                          | 31(76%)                                    | 3(1, 6)                                       | 46                                                    | 16(35%)                                              | 15(6, 40)                                     | 43                                                   | 1(2%)                                                                       | 18(42%)                                                                      | 18(7, 58)                                          | 81                                  |
| East and North Hertfordshire NHS Trust                         | 46                     | 46             | 47           | 39                | 39                                                          | 29(74%)                                    | 4(2, 8)                                       | 39                                                    | 26(67%)                                              | 4(2, 9)                                       | 39                                                   | 2(5%)                                                                       | 24(62%)                                                                      | 9(5, 29)                                           | 19                                  |
| Ipswich Hospital NHS Trust*                                    | 23                     | 23             | 21           | 19                | 18                                                          | 11(61%)                                    | 6(0, 9)                                       | 19                                                    | 2(11%)                                               | 28(14, 60)                                    | 18                                                   | 0(0%)                                                                       | 2(11%)                                                                       | 30(18, 60)                                         | 104                                 |
| Mid Essex Hospital Services NHS Trust                          | 43                     | 43             | 44           | 19                | 18                                                          | 16(89%)                                    | 3(2, 6)                                       | 19                                                    | 9(47%)                                               | 11(5, 23)                                     | 18                                                   | 0(0%)                                                                       | 9(50%)                                                                       | 16(10, 25)                                         | 76                                  |
| Norfolk and Norwich University Hospitals NHS Foundation Trust  | 91                     | 92             | 92           | 77                | 67                                                          | 51(76%)                                    | 4(2, 7)                                       | 77                                                    | 50(65%)                                              | 6(4, 13)                                      | 69                                                   | 0(0%)                                                                       | 45(65%)                                                                      | 11(7, 17)                                          | 36                                  |

## UK Carotid Endarterectomy Clinical Audit Round 5 report

| Trust name                                                                | All cases in the audit | HES Comparator | Cases in HES | Symptomatic cases | Time from index symptom to referral<br>(A to B on Figure 1) |                                            |                                               | Time from referral to surgery<br>(B to C on Figure 1) |                                                      |                                               | Time from symptom to surgery<br>(A to C on Figure 1) |                                                                             |                                                                              |                                                    | Number in symptom to procedure plot |
|---------------------------------------------------------------------------|------------------------|----------------|--------------|-------------------|-------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|-------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------|
|                                                                           |                        |                |              |                   | Patients with exact symptom and referral dates              | Patients referred within 7 days of symptom | Median delay and IQR from symptom to referral | Patients with exact referral and operation dates      | Patients receiving surgery within 7 days of referral | Median delay and IQR from referral to surgery | Patients with exact symptom and operation dates      | Patients receiving surgery within 2 days of symptom that triggered referral | Patients receiving surgery within 14 days of symptom that triggered referral | Median delay and IQR from index symptom to surgery |                                     |
|                                                                           |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| N                                                                         | N                      | N              | N            | N                 | N                                                           | N (%)                                      | Med (IQR)                                     | N                                                     | N (%)                                                | Med (IQR)                                     | N                                                    | N (%)                                                                       | N (%)                                                                        | Med (IQR)                                          |                                     |
| National<br>Median per Trust                                              | 5723<br>44             | 5822           |              | 4941<br>37        | 4342<br>33                                                  | 3018<br>(70%)                              | 4(2, 10)                                      | 4940<br>37                                            | 2502<br>(51%)                                        | 7(4, 17)                                      | 4419<br>34                                           | 154<br>(3%)                                                                 | 2471<br>(56%)                                                                | 13(7, 28)                                          |                                     |
| Peterborough and Stamford Hospitals NHS Foundation Trust                  | 16                     | 16             | 25           | 15                | 10                                                          | 8(80%)                                     | 3(1, 7)                                       | 15                                                    | 6(40%)                                               | 24(3, 71)                                     | 10                                                   | 2(20%)                                                                      | 5(50%)                                                                       | 16(4, 29)                                          | 74                                  |
| Princess Alexandra Hospital NHS Trust                                     | 22                     | 23             | 24           | 18                | 14                                                          | 10(71%)                                    | 4(2, 8)                                       | 18                                                    | 8(44%)                                               | 11(3, 23)                                     | 15                                                   | 0(0%)                                                                       | 7(47%)                                                                       | 15(6, 17)                                          | 66                                  |
| Southend University Hospital NHS Foundation Trust                         | 51                     | 52             | 52           | 44                | 42                                                          | 38(90%)                                    | 3(1, 5)                                       | 44                                                    | 40(91%)                                              | 4(3, 6)                                       | 44                                                   | 2(5%)                                                                       | 39(89%)                                                                      | 7(5, 10)                                           | 9                                   |
| West Hertfordshire Hospitals NHS Trust                                    | 36                     | 36             | 50           | 26                | 22                                                          | 16(73%)                                    | 4(2, 9)                                       | 26                                                    | 11(42%)                                              | 9(3, 11)                                      | 22                                                   | 0(0%)                                                                       | 14(64%)                                                                      | 12(9, 21)                                          | 48                                  |
| LONDON                                                                    |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| Barking, Havering and Redbridge University Hospitals NHS Foundation Trust | 42                     | 43             | 45           | 39                | 31                                                          | 18(58%)                                    | 7(5, 11)                                      | 39                                                    | 22(56%)                                              | 6(4, 12)                                      | 32                                                   | 0(0%)                                                                       | 16(50%)                                                                      | 15(11, 20)                                         | 65                                  |
| Barnet and Chase Farm Hospitals NHS Trust*                                | 5                      | 5              | 10           | 4                 | 4                                                           | 1(25%)                                     | 17(9, 25)                                     | 4                                                     | 2(50%)                                               | 7(5, 8)                                       | 4                                                    | 0(0%)                                                                       | 1(25%)                                                                       | 22(15, 32)                                         | **                                  |
| Barts Health NHS Trust                                                    | 54                     | 55             | 48           | 35                | 27                                                          | 22(81%)                                    | 2(1, 5)                                       | 35                                                    | 29(83%)                                              | 3(1, 7)                                       | 27                                                   | 3(11%)                                                                      | 22(81%)                                                                      | 5(3, 12)                                           | 1                                   |
| Guy's and St Thomas' Hospital NHS Foundation Trust                        | 18                     | 19             | 19           | 14                | 11                                                          | 7(64%)                                     | 7(4, 10)                                      | 14                                                    | 8(57%)                                               | 7(4, 11)                                      | 12                                                   | 0(0%)                                                                       | 6(50%)                                                                       | 14(9, 15)                                          | 61                                  |
| Imperial College Healthcare NHS Trust                                     | 89                     | 90             | 92           | 78                | 58                                                          | 41(71%)                                    | 3(0, 8)                                       | 78                                                    | 47(60%)                                              | 6(3, 15)                                      | 61                                                   | 2(3%)                                                                       | 40(66%)                                                                      | 9(5, 23)                                           | 18                                  |
| King's College Hospital NHS Foundation Trust                              | 137                    | 139            | 132          | 113               | 94                                                          | 66(70%)                                    | 4(1, 11)                                      | 113                                                   | 79(70%)                                              | 4(2, 10)                                      | 95                                                   | 7(7%)                                                                       | 65(68%)                                                                      | 8(5, 18)                                           | 12                                  |
| Lewisham Healthcare NHS Trust*                                            | 3                      | 3              | 3            | 1                 | 1                                                           | 0(0%)                                      | 42(42, 42)                                    | 1                                                     | 1(100%)                                              | 7(7, 7)                                       | 1                                                    | 0(0%)                                                                       | 0(0%)                                                                        | 49(49, 49)                                         | **                                  |
| North West London Hospitals NHS Trust                                     | 36                     | 36             | 40           | 23                | 23                                                          | 20(87%)                                    | 2(1, 3)                                       | 23                                                    | 15(65%)                                              | 5(3, 22)                                      | 23                                                   | 1(4%)                                                                       | 15(65%)                                                                      | 8(6, 67)                                           | 13                                  |
| Royal Free London NHS Foundation Trust                                    | 16                     | 16             | 16           | 14                | 11                                                          | 10(91%)                                    | 2(1, 4)                                       | 14                                                    | 10(71%)                                              | 5(3, 8)                                       | 11                                                   | 0(0%)                                                                       | 10(91%)                                                                      | 9(5, 13)                                           | 14                                  |
| St George's Healthcare NHS Trust                                          | 77                     | 78             | 75           | 75                | 62                                                          | 54(87%)                                    | 3(1, 6)                                       | 75                                                    | 59(79%)                                              | 5(3, 7)                                       | 63                                                   | 1(2)                                                                        | 54(86%)                                                                      | 7(5, 12)                                           | 10                                  |
| University College London Hospitals NHS Foundation Trust                  | 46                     | 48             | 50           | 43                | 42                                                          | 40(95%)                                    | 2(1, 3)                                       | 43                                                    | 35(81%)                                              | 2(1, 6)                                       | 42                                                   | 5(12%)                                                                      | 37(88%)                                                                      | 6(4, 9)                                            | 2                                   |

## UK Carotid Endarterectomy Clinical Audit Round 5 report

| Trust name                                                   | All cases in the audit | HES Comparator | Cases in HES | Symptomatic cases | Time from index symptom to referral<br>(A to B on Figure 1) |                                            |                                               | Time from referral to surgery<br>(B to C on Figure 1) |                                                      |                                               | Time from symptom to surgery<br>(A to C on Figure 1) |                                                                             |                                                                              |                                                    | Number in symptom to procedure plot |
|--------------------------------------------------------------|------------------------|----------------|--------------|-------------------|-------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|-------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------|
|                                                              |                        |                |              |                   | Patients with exact symptom and referral dates              | Patients referred within 7 days of symptom | Median delay and IQR from symptom to referral | Patients with exact referral and operation dates      | Patients receiving surgery within 7 days of referral | Median delay and IQR from referral to surgery | Patients with exact symptom and operation dates      | Patients receiving surgery within 2 days of symptom that triggered referral | Patients receiving surgery within 14 days of symptom that triggered referral | Median delay and IQR from index symptom to surgery |                                     |
|                                                              | N                      | N              | N            | N                 | N                                                           | N (%)                                      | Med (IQR)                                     | N                                                     | N (%)                                                | Med (IQR)                                     | N                                                    | N (%)                                                                       | N (%)                                                                        | Med (IQR)                                          |                                     |
| National<br><i>Median per Trust</i>                          | 5723<br>44             | 5822           |              | 4941<br>37        | 4342<br>33                                                  | 3018<br>(70%)                              | 4(2, 10)                                      | 4940<br>37                                            | 2502<br>(51%)                                        | 7(4, 17)                                      | 4419<br>34                                           | 154<br>(3%)                                                                 | 2471<br>(56%)                                                                | 13(7, 28)                                          |                                     |
| NORTH EAST                                                   |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| City Hospitals Sunderland NHS Foundation Trust               | 48                     | 48             | 51           | 44                | 43                                                          | 22(51%)                                    | 7(2, 20)                                      | 44                                                    | 19(43%)                                              | 10(6, 23)                                     | 43                                                   | 1(2%)                                                                       | 21(49%)                                                                      | 15(11, 48)                                         | 73                                  |
| County Durham and Darlington NHS Foundation Trust            | 56                     | 57             | 57           | 53                | 48                                                          | 33(69%)                                    | 5(2, 11)                                      | 53                                                    | 23(43%)                                              | 9(6, 14)                                      | 48                                                   | 1(2%)                                                                       | 28(58%)                                                                      | 13(9, 25)                                          | 53                                  |
| Gateshead Health NHS Foundation Trust                        | 43                     | 43             | 42           | 43                | 42                                                          | 26(62%)                                    | 6(3, 14)                                      | 43                                                    | 25(58%)                                              | 7(6, 9)                                       | 42                                                   | 0(0%)                                                                       | 22(52%)                                                                      | 14(11, 23)                                         | 62                                  |
| Newcastle upon Tyne Hospitals NHS Foundation Trust           | 70                     | 72             | 76           | 57                | 52                                                          | 31(60%)                                    | 5(2, 13)                                      | 57                                                    | 23(40%)                                              | 10(6, 21)                                     | 52                                                   | 2(4%)                                                                       | 21(40%)                                                                      | 16(10, 32)                                         | 77                                  |
| South Tees Hospitals NHS Foundation Trust                    | 67                     | 67             | 66           | 67                | 61                                                          | 55(90%)                                    | 3(2, 5)                                       | 67                                                    | 34(51%)                                              | 7(6, 13)                                      | 64                                                   | 0(0%)                                                                       | 44(69%)                                                                      | 10(8, 17)                                          | 29                                  |
| NORTH WEST                                                   |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| Aintree University Hospitals NHS Foundation Trust*           | 40                     | 41             | 45           | 36                | 27                                                          | 21(78%)                                    | 1(0, 5)                                       | 36                                                    | 23(64%)                                              | 5(3, 10)                                      | 27                                                   | 4(15%)                                                                      | 22(81%)                                                                      | 6(3, 14)                                           | 3                                   |
| Blackpool Teaching Hospitals NHS Foundation Trust            | 0                      | 0              | 66           | No data           |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| Bolton NHS Foundation Trust                                  | 37                     | 39             | 37           | 32                | 26                                                          | 18(69%)                                    | 5(4, 18)                                      | 32                                                    | 15(47%)                                              | 10(6, 48)                                     | 27                                                   | 0(0%)                                                                       | 13(48%)                                                                      | 15(9, 71)                                          | 72                                  |
| Central Manchester University Hospitals NHS Foundation Trust | 75                     | 77             | 78           | 65                | 38                                                          | 24(63%)                                    | 3(0, 21)                                      | 65                                                    | 18(28%)                                              | 19(6, 57)                                     | 38                                                   | 1(3%)                                                                       | 15(39%)                                                                      | 21(9, 78)                                          | 92                                  |
| Countess of Chester Hospital NHS Foundation Trust            | 45                     | 46             | 49           | 34                | 25                                                          | 18(72%)                                    | 2(1, 12)                                      | 34                                                    | 12(35%)                                              | 10(6, 20)                                     | 29                                                   | 2(7%)                                                                       | 18(62%)                                                                      | 10(6, 33)                                          | 26                                  |
| East Lancashire Hospitals NHS Trust                          | 84                     | 84             | 88           | 60                | 57                                                          | 52(91%)                                    | 0(0, 3)                                       | 60                                                    | 17(28%)                                              | 18(7, 28)                                     | 57                                                   | 5(9%)                                                                       | 23(40%)                                                                      | 20(9, 34)                                          | 88                                  |
| Lancashire Teaching Hospitals NHS Foundation Trust           | 50                     | 50             | 52           | 45                | 42                                                          | 22(52%)                                    | 7(2, 18)                                      | 45                                                    | 11(24%)                                              | 13(8, 17)                                     | 42                                                   | 0(0%)                                                                       | 11(26%)                                                                      | 22(14, 40)                                         | 97                                  |
| Mid Cheshire Hospitals NHS Foundation Trust*                 | 17                     | 17             | 30           | 17                | 16                                                          | 7(44%)                                     | 10(3, 13)                                     | 17                                                    | 5(29%)                                               | 23(7, 42)                                     | 17                                                   | 0(0%)                                                                       | 3(18%)                                                                       | 33(19, 51)                                         | 107                                 |

## UK Carotid Endarterectomy Clinical Audit Round 5 report

| Trust name                                                    | All cases in the audit | HES Comparator | Cases in HES | Symptomatic cases | Time from index symptom to referral<br>(A to B on Figure 1) |                                            |                                               | Time from referral to surgery<br>(B to C on Figure 1) |                                                      |                                               | Time from symptom to surgery<br>(A to C on Figure 1) |                                                                             |                                                                              |                                                    | Number in symptom to procedure plot |
|---------------------------------------------------------------|------------------------|----------------|--------------|-------------------|-------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|-------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------|
|                                                               |                        |                |              |                   | Patients with exact symptom and referral dates              | Patients referred within 7 days of symptom | Median delay and IQR from symptom to referral | Patients with exact referral and operation dates      | Patients receiving surgery within 7 days of referral | Median delay and IQR from referral to surgery | Patients with exact symptom and operation dates      | Patients receiving surgery within 2 days of symptom that triggered referral | Patients receiving surgery within 14 days of symptom that triggered referral | Median delay and IQR from index symptom to surgery |                                     |
|                                                               | N                      | N              | N            | N                 | N                                                           | N (%)                                      | Med (IQR)                                     | N                                                     | N (%)                                                | Med (IQR)                                     | N                                                    | N (%)                                                                       | N (%)                                                                        | Med (IQR)                                          |                                     |
| National<br><i>Median per Trust</i>                           | 5723<br>44             | 5822           |              | 4941<br>37        | 4342<br>33                                                  | 3018<br>(70%)                              | 4(2, 10)                                      | 4940<br>37                                            | 2502<br>(51%)                                        | 7(4, 17)                                      | 4419<br>34                                           | 154<br>(3%)                                                                 | 2471<br>(56%)                                                                | 13(7, 28)                                          |                                     |
| North Cumbria University Hospitals NHS Trust                  | 21                     | 21             | 24           | 15                | 15                                                          | 8(53%)                                     | 5(3, 24)                                      | 15                                                    | 11(73%)                                              | 6(2, 13)                                      | 15                                                   | 0(0%)                                                                       | 10(67%)                                                                      | 11(7, 44)                                          | 39                                  |
| Pennine Acute Hospitals NHS Trust                             | 114                    | 117            | 120          | 95                | 91                                                          | 58(64%)                                    | 4(2, 14)                                      | 94                                                    | 48(51%)                                              | 7(2, 38)                                      | 91                                                   | 4(4%)                                                                       | 49(54%)                                                                      | 14(6, 56)                                          | 60                                  |
| Royal Liverpool and Broadgreen University Hospitals NHS Trust | 64                     | 65             | 64           | 56                | 48                                                          | 33(69%)                                    | 4(2, 9)                                       | 56                                                    | 42(75%)                                              | 6(4, 8)                                       | 48                                                   | 0(0%)                                                                       | 35(73%)                                                                      | 10(7, 15)                                          | 28                                  |
| Southport and Ormskirk Hospital NHS Trust*                    | 25                     | 25             | 25           | 25                | 24                                                          | 14(58%)                                    | 6(4, 12)                                      | 25                                                    | 13(52%)                                              | 7(4, 14)                                      | 24                                                   | 0(0%)                                                                       | 13(54%)                                                                      | 13(11, 37)                                         | 56                                  |
| Tameside Hospital NHS Foundation Trust                        | 18                     | 18             | 47           | 16                | 10                                                          | 9(90%)                                     | 4(2, 5)                                       | 16                                                    | 5(31%)                                               | 16(7, 30)                                     | 11                                                   | 0(0%)                                                                       | 4(36%)                                                                       | 18(11, 20)                                         | 84                                  |
| University Hospital of South Manchester NHS Foundation Trust  | 89                     | 89             | 89           | 72                | 39                                                          | 25(64%)                                    | 6(2, 16)                                      | 72                                                    | 33(46%)                                              | 11(4, 29)                                     | 42                                                   | 4(10%)                                                                      | 23(55%)                                                                      | 13(7, 29)                                          | 50                                  |
| University Hospitals Of Morecambe Bay NHS Foundation Trust    | 42                     | 42             | 40           | 37                | 33                                                          | 28(85%)                                    | 1(0, 3)                                       | 37                                                    | 19(51%)                                              | 7(2, 53)                                      | 33                                                   | 6(18%)                                                                      | 21(64%)                                                                      | 8(3, 48)                                           | 6                                   |
| Warrington and Halton Hospitals NHS Foundation Trust          | 46                     | 47             | 47           | 39                | 34                                                          | 21(62%)                                    | 6(3, 13)                                      | 39                                                    | 20(51%)                                              | 7(4, 14)                                      | 37                                                   | 1(3%)                                                                       | 18(49%)                                                                      | 15(8, 35)                                          | 67                                  |
| Wirral University Teaching Hospital NHS Foundation Trust      | 61                     | 61             | 63           | 57                | 52                                                          | 42(81%)                                    | 3(1, 6)                                       | 57                                                    | 16(28%)                                              | 18(5, 33)                                     | 53                                                   | 2(4%)                                                                       | 23(43%)                                                                      | 19(7, 36)                                          | 86                                  |
| Wrightington, Wigan And Leigh NHS Foundation Trust            | 47                     | 48             | 52           | 39                | 34                                                          | 18(53%)                                    | 5(0, 27)                                      | 39                                                    | 0(0%)                                                | 90(40, 126)                                   | 34                                                   | 0(0%)                                                                       | 0(0%)                                                                        | 92(53, 140)                                        | 108                                 |
| SOUTH CENTRAL                                                 |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| Buckinghamshire Healthcare NHS Trust                          | 75                     | 77             | 74           | 55                | 48                                                          | 38(79%)                                    | 4(2, 6)                                       | 55                                                    | 27(49%)                                              | 8(5, 13)                                      | 48                                                   | 3(6%)                                                                       | 34(71%)                                                                      | 11(8, 16)                                          | 40                                  |
| Milton Keynes Hospital NHS Foundation Trust*                  | 8                      | 8              | 9            | 8                 | 8                                                           | 3(38%)                                     | 14(5, 18)                                     | 8                                                     | 4(50%)                                               | 12(7, 33)                                     | 8                                                    | 0(0%)                                                                       | 3(38%)                                                                       | 26(11, 50)                                         | *                                   |
| Oxford University Hospitals NHS Trust                         | 97                     | 97             | 104          | 75                | 62                                                          | 32(52%)                                    | 7(1, 14)                                      | 75                                                    | 31(41%)                                              | 9(5, 22)                                      | 64                                                   | 1(2%)                                                                       | 27(42%)                                                                      | 18(9, 40)                                          | 82                                  |
| Portsmouth Hospitals NHS Trust                                | 69                     | 70             | 71           | 56                | 52                                                          | 40(77%)                                    | 3(1, 7)                                       | 56                                                    | 15(27%)                                              | 15(7, 53)                                     | 52                                                   | 1(2%)                                                                       | 18(35%)                                                                      | 21(12, 63)                                         | 93                                  |

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| Trust name                                            | All cases in the audit | HES Comparator | Cases in HES | Symptomatic cases | Time from index symptom to referral<br>(A to B on Figure 1) |                                            |                                               | Time from referral to surgery<br>(B to C on Figure 1) |                                                      |                                               | Time from symptom to surgery<br>(A to C on Figure 1) |                                                                             |                                                                              |                                                    | Number in symptom to procedure plot |
|-------------------------------------------------------|------------------------|----------------|--------------|-------------------|-------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|-------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------|
|                                                       |                        |                |              |                   | Patients with exact symptom and referral dates              | Patients referred within 7 days of symptom | Median delay and IQR from symptom to referral | Patients with exact referral and operation dates      | Patients receiving surgery within 7 days of referral | Median delay and IQR from referral to surgery | Patients with exact symptom and operation dates      | Patients receiving surgery within 2 days of symptom that triggered referral | Patients receiving surgery within 14 days of symptom that triggered referral | Median delay and IQR from index symptom to surgery |                                     |
|                                                       |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| N                                                     | N                      | N              | N            | N                 | N (%)                                                       | Med (IQR)                                  | N                                             | N (%)                                                 | Med (IQR)                                            | N                                             | N (%)                                                | N (%)                                                                       | Med (IQR)                                                                    |                                                    |                                     |
| National<br>Median per Trust                          | 5723<br>44             | 5822           |              | 4941<br>37        | 4342<br>33                                                  | 3018<br>(70%)                              | 4(2, 10)                                      | 4940<br>37                                            | 2502<br>(51%)                                        | 7(4, 17)                                      | 4419<br>34                                           | 154<br>(3%)                                                                 | 2471<br>(56%)                                                                | 13(7, 28)                                          |                                     |
| Royal Berkshire NHS Foundation Trust*                 | 0                      | 0              | 7            | No data           |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| University Hospital Southampton NHS Foundation Trust  | 110                    | 115            | 115          | 82                | 79                                                          | 55(70%)                                    | 3(2, 8)                                       | 82                                                    | 20(24%)                                              | 12(8, 16)                                     | 79                                                   | 0(0%)                                                                       | 33(42%)                                                                      | 16(11, 26)                                         | 78                                  |
| SOUTH EAST COAST                                      |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| Ashford and St Peter's Hospitals NHS Foundation Trust | 70                     | 72             | 70           | 65                | 57                                                          | 40(70%)                                    | 3(1, 10)                                      | 65                                                    | 34(52%)                                              | 7(3, 15)                                      | 59                                                   | 6(10%)                                                                      | 34(58%)                                                                      | 11(5, 37)                                          | 34                                  |
| Brighton and Sussex University Hospitals NHS Trust    | 57                     | 58             | 59           | 54                | 39                                                          | 36(92%)                                    | 3(1, 4)                                       | 54                                                    | 31(57%)                                              | 7(5, 11)                                      | 39                                                   | 1(3%)                                                                       | 30(77%)                                                                      | 9(7, 14)                                           | 22                                  |
| Dartford and Gravesham NHS Trust                      | 9                      | 9              | 9            | 8                 | 8                                                           | 4(50%)                                     | 9(3, 17)                                      | 8                                                     | 3(38%)                                               | 12(7, 18)                                     | 8                                                    | 0(0%)                                                                       | 2(25%)                                                                       | 25(13, 29)                                         | **                                  |
| East Kent Hospitals University NHS Foundation Trust   | 73                     | 73             | 73           | 58                | 48                                                          | 40(83%)                                    | 3(1, 5)                                       | 58                                                    | 51(88%)                                              | 2(1, 4)                                       | 49                                                   | 9(18%)                                                                      | 45(92%)                                                                      | 6(4, 9)                                            | 4                                   |
| East Sussex Healthcare NHS Trust                      | 5                      | 5              | 25           | 5                 | 5                                                           | 2(40%)                                     | 8(5, 10)                                      | 5                                                     | 1(20%)                                               | 24(17, 36)                                    | 5                                                    | 0(0)                                                                        | 1(20%)                                                                       | 27(24, 44)                                         | **                                  |
| Frimley Park Hospital NHS Foundation Trust            | 92                     | 93             | 91           | 74                | 59                                                          | 43(73%)                                    | 3(2, 11)                                      | 74                                                    | 50(68%)                                              | 5(1, 12)                                      | 60                                                   | 5(8%)                                                                       | 43(72%)                                                                      | 9(5, 20)                                           | 17                                  |
| Maidstone and Tunbridge Wells NHS Trust               | 8                      | 8              | 18           | 5                 | 4                                                           | 1(25%)                                     | 22(10, 153)                                   | 5                                                     | 2(40%)                                               | 8(3, 10)                                      | 4                                                    | 0(0%)                                                                       | 1(25%)                                                                       | 24(14, 189)                                        | **                                  |
| Medway NHS Foundation Trust                           | 27                     | 27             | 29           | 25                | 23                                                          | 17(74%)                                    | 4(2, 8)                                       | 25                                                    | 11(44%)                                              | 8(4, 21)                                      | 23                                                   | 1(4%)                                                                       | 13(57%)                                                                      | 13(7, 30)                                          | 51                                  |
| Surrey and Sussex Healthcare NHS Trust*               | 24                     | 24             | 25           | 23                | 21                                                          | 18(86%)                                    | 3(1, 4)                                       | 23                                                    | 16(70%)                                              | 6(4, 12)                                      | 22                                                   | 0(0%)                                                                       | 18(82%)                                                                      | 11(7, 14)                                          | 32                                  |
| Western Sussex Hospitals NHS Trust                    | 17                     | 18             | 26           | 13                | 12                                                          | 6(50%)                                     | 9(5, 17)                                      | 13                                                    | 2(15%)                                               | 10(8, 14)                                     | 12                                                   | 0(0%)                                                                       | 5(42%)                                                                       | 19(12, 41)                                         | 79                                  |
| SOUTH WEST                                            |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| Dorset County Hospital NHS Foundation Trust           | 30                     | 31             | 32           | 30                | 29                                                          | 24(83%)                                    | 2(1, 5)                                       | 30                                                    | 18(60%)                                              | 7(2, 29)                                      | 29                                                   | 3(10%)                                                                      | 15(52%)                                                                      | 10(5, 29)                                          | 24                                  |
| Gloucestershire Hospitals NHS Foundation Trust        | 68                     | 68             | 71           | 64                | 59                                                          | 44(75%)                                    | 3(2, 8)                                       | 64                                                    | 35(55%)                                              | 7(4, 12)                                      | 60                                                   | 0(0%)                                                                       | 41(68%)                                                                      | 11(7, 18)                                          | 37                                  |



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|-------------------------------------------------------------------|------------------------|----------------|--------------|-------------------|-------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|-------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------|
|                                                                   |                        |                |              |                   | Patients with exact symptom and referral dates              | Patients referred within 7 days of symptom | Median delay and IQR from symptom to referral | Patients with exact referral and operation dates      | Patients receiving surgery within 7 days of referral | Median delay and IQR from referral to surgery | Patients with exact symptom and operation dates      | Patients receiving surgery within 2 days of symptom that triggered referral | Patients receiving surgery within 14 days of symptom that triggered referral | Median delay and IQR from index symptom to surgery |                                     |
|                                                                   |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| N                                                                 | N                      | N              | N            | N                 | N                                                           | N (%)                                      | Med (IQR)                                     | N                                                     | N (%)                                                | Med (IQR)                                     | N                                                    | N (%)                                                                       | N (%)                                                                        | Med (IQR)                                          |                                     |
| National<br>Median per Trust                                      | 5723<br>44             | 5822           |              | 4941<br>37        | 4342<br>33                                                  | 3018<br>(70%)                              | 4(2, 10)                                      | 4940<br>37                                            | 2502<br>(51%)                                        | 7(4, 17)                                      | 4419<br>34                                           | 154<br>(3%)                                                                 | 2471<br>(56%)                                                                | 13(7, 28)                                          |                                     |
| Great Western Hospitals NHS Foundation Trust                      | 21                     | 22             | 19           | 20                | 18                                                          | 15(83%)                                    | 2(1, 6)                                       | 20                                                    | 9(45%)                                               | 8(5, 11)                                      | 19                                                   | 0(0%)                                                                       | 15(79%)                                                                      | 10(7, 14)                                          | 27                                  |
| North Bristol NHS Trust                                           | 52                     | 54             | 50           | 50                | 49                                                          | 30(61%)                                    | 6(4, 13)                                      | 50                                                    | 43(86%)                                              | 5(2, 6)                                       | 49                                                   | 1(2%)                                                                       | 31(63%)                                                                      | 11(8, 17)                                          | 41                                  |
| Northern Devon Healthcare NHS Trust                               | 29                     | 29             | 29           | 28                | 22                                                          | 15(68%)                                    | 5(3, 14)                                      | 28                                                    | 18(64%)                                              | 6(5, 10)                                      | 22                                                   | 0(0%)                                                                       | 15(68%)                                                                      | 11(8, 20)                                          | 43                                  |
| Plymouth Hospitals NHS Trust                                      | 36                     | 36             | 36           | 32                | 32                                                          | 31(97%)                                    | 3(1, 6)                                       | 32                                                    | 14(44%)                                              | 8(4, 14)                                      | 32                                                   | 1(3%)                                                                       | 19(59%)                                                                      | 12(8, 19)                                          | 47                                  |
| Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust | 45                     | 46             | 49           | 42                | 35                                                          | 23(66%)                                    | 4(2, 10)                                      | 42                                                    | 17(40%)                                              | 12(5, 27)                                     | 36                                                   | 1(3%)                                                                       | 17(47%)                                                                      | 17(8, 36)                                          | 80                                  |
| Royal Cornwall Hospitals NHS Trust                                | 45                     | 46             | 46           | 44                | 41                                                          | 31(76%)                                    | 4(2, 7)                                       | 44                                                    | 35(80%)                                              | 4(3, 7)                                       | 41                                                   | 1(2%)                                                                       | 31(76%)                                                                      | 9(6, 14)                                           | 20                                  |
| Royal Devon and Exeter NHS Foundation Trust                       | 35                     | 36             | 38           | 34                | 32                                                          | 23(72%)                                    | 2(0, 9)                                       | 34                                                    | 15(44%)                                              | 9(2, 33)                                      | 34                                                   | 2(6%)                                                                       | 19(56%)                                                                      | 12(5, 36)                                          | 45                                  |
| Royal United Hospital Bath NHS Trust                              | 72                     | 73             | 64           | 53                | 48                                                          | 39(81%)                                    | 3(1, 7)                                       | 53                                                    | 37(70%)                                              | 4(2, 8)                                       | 48                                                   | 3(6%)                                                                       | 40(83%)                                                                      | 8(5, 12)                                           | 11                                  |
| Salisbury NHS Foundation Trust                                    | 24                     | 24             | 25           | 19                | 16                                                          | 11(69%)                                    | 5(1, 9)                                       | 19                                                    | 9(47%)                                               | 8(3, 14)                                      | 16                                                   | 1(6%)                                                                       | 10(63%)                                                                      | 11(6, 28)                                          | 25                                  |
| South Devon Healthcare NHS Foundation Trust                       | 31                     | 31             | 31           | 29                | 27                                                          | 15(56%)                                    | 6(2, 24)                                      | 29                                                    | 9(31%)                                               | 14(6, 20)                                     | 27                                                   | 2(7%)                                                                       | 11(41%)                                                                      | 22(11, 36)                                         | 96                                  |
| Taunton and Somerset NHS Foundation Trust                         | 52                     | 53             | 52           | 49                | 43                                                          | 34(79%)                                    | 4(2, 7)                                       | 49                                                    | 30(61%)                                              | 6(3, 10)                                      | 43                                                   | 0(0%)                                                                       | 31(72%)                                                                      | 11(8, 17)                                          | 42                                  |
| University Hospitals Bristol NHS Foundation Trust                 | 43                     | 45             | 45           | 37                | 33                                                          | 26(79%)                                    | 4(1, 7)                                       | 37                                                    | 15(41%)                                              | 10(6, 20)                                     | 33                                                   | 2(6%)                                                                       | 19(58%)                                                                      | 13(9, 25)                                          | 55                                  |
| WEST MIDLANDS                                                     |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| Dudley Group of Hospitals NHS Trust                               | 83                     | 83             | 84           | 59                | 56                                                          | 39(70%)                                    | 5(3, 11)                                      | 59                                                    | 30(51%)                                              | 7(4, 23)                                      | 57                                                   | 0(0%)                                                                       | 27(47%)                                                                      | 15(8, 53)                                          | 69                                  |
| Heart of England NHS Foundation Trust                             | 47                     | 48             | 46           | 40                | 38                                                          | 27(71%)                                    | 1(0, 8)                                       | 40                                                    | 16(40%)                                              | 9(5, 34)                                      | 38                                                   | 1(3%)                                                                       | 24(63%)                                                                      | 11(8, 40)                                          | 44                                  |
| Mid Staffordshire NHS Foundation Trust*                           | 3                      | 3              | 4            | 2                 | 2                                                           | 1(50%)                                     | 8(2, 13)                                      | 2                                                     | 1(50%)                                               | 12(7, 16)                                     | 2                                                    | 0(0%)                                                                       | 1(50%)                                                                       | 19(9, 29)                                          | **                                  |
| Royal Wolverhampton Hospitals NHS Trust*                          | 40                     | 40             | 39           | 30                | 29                                                          | 23(79%)                                    | 3(2, 6)                                       | 30                                                    | 16(53%)                                              | 7(5, 8)                                       | 30                                                   | 0(0%)                                                                       | 21(70%)                                                                      | 11(7, 20)                                          | 33                                  |

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| Trust name                                                 | All cases in the audit | HES Comparator | Cases in HES | Symptomatic cases | Time from index symptom to referral<br>(A to B on Figure 1) |                                            |                                               | Time from referral to surgery<br>(B to C on Figure 1) |                                                      |                                               | Time from symptom to surgery<br>(A to C on Figure 1) |                                                                             |                                                                              |                                                    | Number in symptom to procedure plot |
|------------------------------------------------------------|------------------------|----------------|--------------|-------------------|-------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|-------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------|
|                                                            |                        |                |              |                   | Patients with exact symptom and referral dates              | Patients referred within 7 days of symptom | Median delay and IQR from symptom to referral | Patients with exact referral and operation dates      | Patients receiving surgery within 7 days of referral | Median delay and IQR from referral to surgery | Patients with exact symptom and operation dates      | Patients receiving surgery within 2 days of symptom that triggered referral | Patients receiving surgery within 14 days of symptom that triggered referral | Median delay and IQR from index symptom to surgery |                                     |
|                                                            |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| N                                                          | N                      | N              | N            | N                 | N                                                           | N (%)                                      | Med (IQR)                                     | N                                                     | N (%)                                                | Med (IQR)                                     | N                                                    | N (%)                                                                       | N (%)                                                                        | Med (IQR)                                          |                                     |
| National<br>Median per Trust                               | 5723<br>44             | 5822           |              | 4941<br>37        | 4342<br>33                                                  | 3018<br>(70%)                              | 4(2, 10)                                      | 4940<br>37                                            | 2502<br>(51%)                                        | 7(4, 17)                                      | 4419<br>34                                           | 154<br>(3%)                                                                 | 2471<br>(56%)                                                                | 13(7, 28)                                          |                                     |
| Sandwell and West Birmingham Hospitals NHS Trust*          | 30                     | 30             | 31           | 29                | 27                                                          | 14(52%)                                    | 7(3, 10)                                      | 29                                                    | 8(28%)                                               | 10(7, 35)                                     | 29                                                   | 0(0%)                                                                       | 13(45%)                                                                      | 18(11, 42)                                         | 85                                  |
| Shrewsbury and Telford Hospital NHS Trust                  | 42                     | 43             | 49           | 38                | 34                                                          | 24(71%)                                    | 3(2, 8)                                       | 38                                                    | 21(55%)                                              | 7(2, 12)                                      | 34                                                   | 2(6%)                                                                       | 21(62%)                                                                      | 11(5, 24)                                          | 31                                  |
| University Hospital Of North Staffordshire NHS Trust       | 44                     | 50             | 46           | 43                | 37                                                          | 22(59%)                                    | 3(0, 32)                                      | 43                                                    | 11(26%)                                              | 20(6, 42)                                     | 38                                                   | 1(3%)                                                                       | 13(34%)                                                                      | 24(8, 91)                                          | 99                                  |
| University Hospitals Birmingham NHS Foundation Trust       | 59                     | 60             | 57           | 29                | 21                                                          | 16(76%)                                    | 4(2, 7)                                       | 29                                                    | 4(14%)                                               | 16(12, 26)                                    | 21                                                   | 0(0%)                                                                       | 5(24%)                                                                       | 21(15, 33)                                         | 95                                  |
| University Hospitals Coventry and Warwickshire NHS Trust   | 77                     | 79             | 79           | 71                | 60                                                          | 42(70%)                                    | 5(2, 11)                                      | 71                                                    | 32(45%)                                              | 9(5, 29)                                      | 62                                                   | 3(5%)                                                                       | 35(56%)                                                                      | 14(8, 46)                                          | 58                                  |
| Walsall Healthcare NHS Trust*                              | 26                     | 27             | 29           | 24                | 22                                                          | 9(41%)                                     | 16(3, 68)                                     | 24                                                    | 7(29%)                                               | 15(6, 57)                                     | 23                                                   | 1(4%)                                                                       | 7(30%)                                                                       | 31(12, 109)                                        | 105                                 |
| Worcestershire Acute Hospitals NHS Trust                   | 42                     | 43             | 63           | 41                | 37                                                          | 24(65%)                                    | 6(2, 9)                                       | 41                                                    | 27(66%)                                              | 6(3, 9)                                       | 37                                                   | 0(0%)                                                                       | 23(62%)                                                                      | 10(9, 19)                                          | 30                                  |
| YORKSHIRE AND THE HUMBER                                   |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| Bradford Teaching Hospitals NHS Foundation Trust           | 37                     | 38             | 37           | 33                | 31                                                          | 23(74%)                                    | 4(1, 12)                                      | 33                                                    | 22(67%)                                              | 6(4, 10)                                      | 31                                                   | 1(3%)                                                                       | 23(74%)                                                                      | 9(5, 18)                                           | 16                                  |
| Calderdale and Huddersfield NHS Foundation Trust           | 37                     | 37             | 38           | 36                | 35                                                          | 28(80%)                                    | 4(2, 6)                                       | 36                                                    | 16(44%)                                              | 8(6, 11)                                      | 35                                                   | 0(0%)                                                                       | 21(60%)                                                                      | 12(9, 22)                                          | 49                                  |
| Doncaster and Bassetlaw Hospitals NHS Foundation Trust     | 67                     | 67             | 69           | 61                | 54                                                          | 34(63%)                                    | 4(2, 10)                                      | 61                                                    | 31(51%)                                              | 7(6, 10)                                      | 54                                                   | 0(0%)                                                                       | 33(61%)                                                                      | 14(9, 22)                                          | 59                                  |
| Hull and East Yorkshire Hospitals NHS Trust                | 105                    | 106            | 107          | 100               | 97                                                          | 42(43%)                                    | 13(3, 42)                                     | 100                                                   | 39(39%)                                              | 13(6, 36)                                     | 98                                                   | 4(4%)                                                                       | 32(33%)                                                                      | 28(10, 98)                                         | 102                                 |
| Leeds Teaching Hospitals NHS Trust                         | 32                     | 33             | 61           | 28                | 24                                                          | 16(67%)                                    | 5(1, 14)                                      | 28                                                    | 22(79%)                                              | 4(3, 7)                                       | 24                                                   | 0(0%)                                                                       | 17(71%)                                                                      | 7(5, 22)                                           | 5                                   |
| Mid Yorkshire Hospitals NHS Trust                          | 38                     | 39             | 45           | 35                | 35                                                          | 22(63%)                                    | 5(2, 12)                                      | 35                                                    | 15(43%)                                              | 9(7, 18)                                      | 35                                                   | 0(0%)                                                                       | 15(43%)                                                                      | 18(10, 34)                                         | 83                                  |
| Scarborough and North East Yorkshire Healthcare NHS Trust* | 0                      | 0              | 4            | No data           |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |



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|---------------------------------------------------|------------------------|----------------|--------------|-------------------|-------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|-------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------|
|                                                   |                        |                |              |                   | Patients with exact symptom and referral dates              | Patients referred within 7 days of symptom | Median delay and IQR from symptom to referral | Patients with exact referral and operation dates      | Patients receiving surgery within 7 days of referral | Median delay and IQR from referral to surgery | Patients with exact symptom and operation dates      | Patients receiving surgery within 2 days of symptom that triggered referral | Patients receiving surgery within 14 days of symptom that triggered referral | Median delay and IQR from index symptom to surgery |                                     |
|                                                   |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| N                                                 | N                      | N              | N            | N                 | N                                                           | N (%)                                      | Med (IQR)                                     | N                                                     | N (%)                                                | Med (IQR)                                     | N                                                    | N (%)                                                                       | N (%)                                                                        | Med (IQR)                                          |                                     |
| National<br><i>Median per Trust</i>               | 5723<br>44             | 5822           |              | 4941<br>37        | 4342<br>33                                                  | 3018<br>(70%)                              | 4(2, 10)                                      | 4940<br>37                                            | 2502<br>(51%)                                        | 7(4, 17)                                      | 4419<br>34                                           | 154<br>(3%)                                                                 | 2471<br>(56%)                                                                | 13(7, 28)                                          |                                     |
| Sheffield Teaching Hospitals NHS Foundation Trust | 83                     | 83             | 85           | 76                | 68                                                          | 38(56%)                                    | 6(3, 15)                                      | 76                                                    | 14(18%)                                              | 17(9, 35)                                     | 68                                                   | 0(0%)                                                                       | 15(22%)                                                                      | 26(16, 49)                                         | 101                                 |
| York Teaching Hospital NHS Foundation Trust       | 156                    | 161            | 153          | 130               | 112                                                         | 85(76%)                                    | 4(2, 7)                                       | 130                                                   | 114(88%)                                             | 3(2, 4)                                       | 113                                                  | 8(7%)                                                                       | 88(78%)                                                                      | 7(4, 12)                                           | 8                                   |
| NORTHERN IRELAND                                  |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| Belfast Health and Social Care Trust              | 143                    | 144            | 140          | 122               | 113                                                         | 67(59%)                                    | 6(3, 16)                                      | 122                                                   | 66(54%)                                              | 7(4, 20)                                      | 114                                                  | 2(2%)                                                                       | 56(49%)                                                                      | 15(8, 35)                                          | 68                                  |
| Southern Health and Social Care Trust             | 4                      | 4              |              | 4                 | 3                                                           | 3(100%)                                    | 2(0, 6)                                       | 4                                                     | 3(75%)                                               | 6(5, 10)                                      | 3                                                    | 0(0%)                                                                       | 3(100%)                                                                      | 8(5, 11)                                           | **                                  |
| Western Health and Social Care Trust*             | 17                     | 17             | 17           | 14                | 14                                                          | 8(57%)                                     | 7(2, 13)                                      | 14                                                    | 6(43%)                                               | 11(6, 24)                                     | 14                                                   | 0(0%)                                                                       | 5(36%)                                                                       | 19(10, 34)                                         | 87                                  |
| WALES                                             |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| Abertawe Bro Morgannwg University Health Board    | 103                    | 105            | 142          | 91                | 83                                                          | 52 (63%)                                   | 5(2, 11)                                      | 91                                                    | 48 (53%)                                             | 7(3, 23)                                      | 85                                                   | 6 (7%)                                                                      | 47 (55%)                                                                     | 12(6, 51)                                          | 46                                  |
| Aneurin Bevan Health Board                        | 55                     | 55             | 71           | 50                | 41                                                          | 32 (78%)                                   | 3(0, 7)                                       | 50                                                    | 8 (16%)                                              | 16(9, 37)                                     | 42                                                   | 0 (0%)                                                                      | 17 (40%)                                                                     | 20(11, 46)                                         | 90                                  |
| Betsi Cadwaladr University Health Board           | 34                     | 36             | 43           | 33                | 30                                                          | 12 (40%)                                   | 15(2, 28)                                     | 33                                                    | 10 (30%)                                             | 14(7, 41)                                     | 32                                                   | 0 (0%)                                                                      | 6 (19%)                                                                      | 32(15, 60)                                         | 106                                 |
| Cardiff and Vale University Health Board          | 0                      | 0              | 37           | No Data           |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| Cwm Taf University Health Board                   | 22                     | 24             | 26           | 20                | 19                                                          | 11 (58%)                                   | 6(3, 14)                                      | 20                                                    | 9 (45%)                                              | 9(4, 13)                                      | 19                                                   | 0 (0%)                                                                      | 9 (47%)                                                                      | 15(9, 26)                                          | 70                                  |
| SCOTLAND                                          |                        |                |              |                   |                                                             |                                            |                                               |                                                       |                                                      |                                               |                                                      |                                                                             |                                                                              |                                                    |                                     |
| NHS Ayrshire & Arran                              | 30                     | 30             | 41           | 27                | 25                                                          | 13(52%)                                    | 7(3, 18)                                      | 27                                                    | 14(52%)                                              | 7(5, 15)                                      | 25                                                   | 0(0%)                                                                       | 15(60%)                                                                      | 13(11, 34)                                         | 57                                  |
| NHS Dumfries and Galloway                         | 33                     | 34             | 33           | 31                | 20                                                          | 12(60%)                                    | 6(4, 13)                                      | 31                                                    | 6(19%)                                               | 15(8, 26)                                     | 20                                                   | 0(0%)                                                                       | 5(25%)                                                                       | 26(14, 40)                                         | 100                                 |
| NHS Fife                                          | 13                     | 13             | 13           | 13                | 12                                                          | 8(67%)                                     | 6(3, 16)                                      | 13                                                    | 3(23%)                                               | 17(8, 27)                                     | 13                                                   | 0(0%)                                                                       | 6(46%)                                                                       | 20(9, 46)                                          | 89                                  |
| NHS Forth Valley                                  | 39                     | 40             | 41           | 31                | 27                                                          | 22(81%)                                    | 5(1, 7)                                       | 31                                                    | 12(39%)                                              | 9(3, 30)                                      | 27                                                   | 3(11%)                                                                      | 15(56%)                                                                      | 13(8, 31)                                          | 52                                  |
| NHS Grampian                                      | 16                     | 16             | 16           | 16                | 15                                                          | 8(53%)                                     | 6(3, 16)                                      | 16                                                    | 13(81%)                                              | 6(2, 7)                                       | 16                                                   | 0(0%)                                                                       | 12(75%)                                                                      | 11(7, 16)                                          | 35                                  |
| NHS Greater Glasgow and Clyde                     | 55                     | 57             | 102          | 54                | 46                                                          | 24(52%)                                    | 7(3, 17)                                      | 54                                                    | 28(52%)                                              | 7(5, 10)                                      | 49                                                   | 4(8%)                                                                       | 24(49%)                                                                      | 15(9, 30)                                          | 71                                  |
| NHS Highland                                      | 46                     | 47             | 46           | 37                | 31                                                          | 11(35%)                                    | 14(6, 29)                                     | 37                                                    | 6(16%)                                               | 13(9, 19)                                     | 32                                                   | 0(0%)                                                                       | 7(22%)                                                                       | 30(16, 52)                                         | 103                                 |

## UK Carotid Endarterectomy Clinical Audit Round 5 report

| Trust name                                 | All cases in the audit | HES Comparator | Cases in HES | Symptomatic cases | Time from index symptom to referral<br>(A to B on Figure 1) |                                            |                                               | Time from referral to surgery<br>(B to C on Figure 1) |                                                      |                                               | Time from symptom to surgery<br>(A to C on Figure 1) |                                                                             |                                                                              |                                                    | Number in symptom to procedure plot |
|--------------------------------------------|------------------------|----------------|--------------|-------------------|-------------------------------------------------------------|--------------------------------------------|-----------------------------------------------|-------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------|------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------|
|                                            |                        |                |              |                   | Patients with exact symptom and referral dates              | Patients referred within 7 days of symptom | Median delay and IQR from symptom to referral | Patients with exact referral and operation dates      | Patients receiving surgery within 7 days of referral | Median delay and IQR from referral to surgery | Patients with exact symptom and operation dates      | Patients receiving surgery within 2 days of symptom that triggered referral | Patients receiving surgery within 14 days of symptom that triggered referral | Median delay and IQR from index symptom to surgery |                                     |
|                                            | N                      | N              | N            | N                 | N                                                           | N (%)                                      | Med (IQR)                                     | N                                                     | N (%)                                                | Med (IQR)                                     | N                                                    | N (%)                                                                       | N (%)                                                                        | Med (IQR)                                          |                                     |
| <b>National</b><br><i>Median per Trust</i> | <b>5723</b><br>44      | <b>5822</b>    |              | <b>4941</b><br>37 | <b>4342</b><br>33                                           | <b>3018</b><br>(70%)                       | <b>4(2, 10)</b>                               | <b>4940</b><br>37                                     | <b>2502</b><br>(51%)                                 | <b>7(4, 17)</b>                               | <b>4419</b><br>34                                    | <b>154</b><br>(3%)                                                          | <b>2471</b><br>(56%)                                                         | <b>13(7, 28)</b>                                   |                                     |
| NHS Lanarkshire                            | 19                     | 19             | 55           | 18                | 15                                                          | 8(53%)                                     | 7(6, 14)                                      | 18                                                    | 6(33%)                                               | 11(7, 16)                                     | 15                                                   | 0(0%)                                                                       | 5(33%)                                                                       | 20(13, 25)                                         | 91                                  |
| NHS Lothian                                | 75                     | 77             | 78           | 75                | 67                                                          | 49(73%)                                    | 4(3, 10)                                      | 75                                                    | 26(35%)                                              | 10(6, 15)                                     | 68                                                   | 2(3%)                                                                       | 34(50%)                                                                      | 15(11, 24)                                         | 63                                  |
| NHS Tayside                                | 21                     | 21             | 26           | 21                | 16                                                          | 12(75%)                                    | 5(3, 7)                                       | 21                                                    | 10(48%)                                              | 8(7, 10)                                      | 16                                                   | 0(0%)                                                                       | 8(50%)                                                                       | 15(11, 17)                                         | 64                                  |

\* Please see note regarding NHS trusts that have stopped performing carotid endarterectomy on page 27.

## UK Carotid Endarterectomy Clinical Audit Round 5 report

| Region                   | Total number of cases reported in Round 5 | HES Comparator | Cases in HES | Symptomatic cases | Time from index symptom to referral ( <b>A</b> to <b>B</b> on Figure 1) |                                                      |                                               | Time from referral to surgery ( <b>B</b> to <b>C</b> on Figure 1) |                                                                |                                               | Time from symptom to surgery ( <b>A</b> to <b>C</b> on Figure 1) |                                                                                       |                                                                                        |                                                    |
|--------------------------|-------------------------------------------|----------------|--------------|-------------------|-------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------|
|                          |                                           |                |              |                   | Total cases with exact symptom and referral dates                       | Total cases referred within <b>7 days</b> of symptom | Median delay and IQR from symptom to referral | Total cases with exact referral and operation dates               | Total cases receiving surgery within <b>7 days</b> of referral | Median delay and IQR from referral to surgery | Total cases with exact symptom and operation dates               | Total cases receiving surgery within <b>2 days</b> of symptom that triggered referral | Total cases receiving surgery within <b>14 days</b> of symptom that triggered referral | Median delay and IQR from index symptom to surgery |
|                          | N                                         | N              | N            | N                 | N                                                                       | N (%)                                                | Med (IQR)                                     | N                                                                 | N (%)                                                          | Med (IQR)                                     | N                                                                | N (%)                                                                                 | N (%)                                                                                  | Med (IQR)                                          |
| National                 | 5723                                      | 5781           |              | 4941              | 4342                                                                    | 3018(70%)                                            | 4(2,10)                                       | 4940                                                              | 2502(51%)                                                      | 7(4,17)                                       | 4419                                                             | 154(3%)                                                                               | 2471(56%)                                                                              | 13(7,28)                                           |
| East Midlands            | 383                                       | 389            | 401          | 349               | 305                                                                     | 231(76%)                                             | 3(1, 7)                                       | 349                                                               | 229(66%)                                                       | 5(2, 11)                                      | 314                                                              | 11(4%)                                                                                | 226(72%)                                                                               | 9(5, 17)                                           |
| East of England          | 561                                       | 570            | 588          | 450               | 411                                                                     | 306(74%)                                             | 4(2, 8)                                       | 450                                                               | 212(47%)                                                       | 8(4, 21)                                      | 420                                                              | 9 (2%)                                                                                | 213(51%)                                                                               | 14(7, 29)                                          |
| London                   | 523                                       | 532            | 531          | 439               | 364                                                                     | 279(77%)                                             | 3(1, 7)                                       | 439                                                               | 307(70%)                                                       | 5(2, 9)                                       | 371                                                              | 19 (5%)                                                                               | 266(72%)                                                                               | 8(5, 15)                                           |
| North East               | 284                                       | 287            | 292          | 264               | 246                                                                     | 167(68%)                                             | 5(2, 9)                                       | 264                                                               | 124(47%)                                                       | 8(6, 14)                                      | 249                                                              | 4 (2%)                                                                                | 136(55%)                                                                               | 13(9, 24)                                          |
| North West               | 875                                       | 887            | 1016         | 740               | 611                                                                     | 418(68%)                                             | 4(1, 11)                                      | 739                                                               | 308(42%)                                                       | 11(5, 29)                                     | 625                                                              | 29 (5%)                                                                               | 301(48%)                                                                               | 15(8, 41)                                          |
| South Central            | 359                                       | 367            | 380          | 276               | 249                                                                     | 168(67%)                                             | 4(2, 10)                                      | 276                                                               | 97(35%)                                                        | 11(6, 20)                                     | 251                                                              | 5(2%)                                                                                 | 115(46%)                                                                               | 16(10, 33)                                         |
| South East Coast         | 382                                       | 387            | 425          | 330               | 276                                                                     | 207(75%)                                             | 3(1, 8)                                       | 330                                                               | 201(61%)                                                       | 6(2, 12)                                      | 281                                                              | 22 (8%)                                                                               | 192(68%)                                                                               | 10(6, 20)                                          |
| South West               | 583                                       | 594            | 587          | 531               | 484                                                                     | 361(75%)                                             | 4(2, 8)                                       | 531                                                               | 304(57%)                                                       | 7(4, 13)                                      | 489                                                              | 17 (3%)                                                                               | 314(64%)                                                                               | 11(7, 22)                                          |
| West Midlands            | 493                                       | 506            | 527          | 406               | 363                                                                     | 241(66%)                                             | 4(2, 11)                                      | 406                                                               | 173(43%)                                                       | 9(5, 25)                                      | 371                                                              | 8 (2%)                                                                                | 190(51%)                                                                               | 14(8, 40)                                          |
| Yorkshire and The Humber | 555                                       | 564            | 599          | 499               | 456                                                                     | 288(63%)                                             | 5(2, 13)                                      | 499                                                               | 273(55%)                                                       | 7(3, 16)                                      | 458                                                              | 13 (3%)                                                                               | 244(53%)                                                                               | 14(7, 33)                                          |

## UK Carotid Endarterectomy Clinical Audit Round 5 report

| Region           | Total number of cases reported in Round 5 | HES Comparator | Cases in HES | Symptomatic cases | Time from index symptom to referral ( <b>A</b> to <b>B</b> on Figure 1) |                                                      |                                               | Time from referral to surgery ( <b>B</b> to <b>C</b> on Figure 1) |                                                                |                                               | Time from symptom to surgery ( <b>A</b> to <b>C</b> on Figure 1) |                                                                                       |                                                                                        |                                                    |
|------------------|-------------------------------------------|----------------|--------------|-------------------|-------------------------------------------------------------------------|------------------------------------------------------|-----------------------------------------------|-------------------------------------------------------------------|----------------------------------------------------------------|-----------------------------------------------|------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------|
|                  |                                           |                |              |                   | Total cases with exact symptom and referral dates                       | Total cases referred within <b>7 days</b> of symptom | Median delay and IQR from symptom to referral | Total cases with exact referral and operation dates               | Total cases receiving surgery within <b>7 days</b> of referral | Median delay and IQR from referral to surgery | Total cases with exact symptom and operation dates               | Total cases receiving surgery within <b>2 days</b> of symptom that triggered referral | Total cases receiving surgery within <b>14 days</b> of symptom that triggered referral | Median delay and IQR from index symptom to surgery |
|                  | N                                         | N              | N            | N                 | N                                                                       | N (%)                                                | Med (IQR)                                     | N                                                                 | N (%)                                                          | Med (IQR)                                     | N                                                                | N (%)                                                                                 | N (%)                                                                                  | Med (IQR)                                          |
| National         | 5723                                      | 5781           |              | 4941              | 4342                                                                    | 3018(70%)                                            | 4(2,10)                                       | 4940                                                              | 2502(51%)                                                      | 7(4,17)                                       | 4419                                                             | 154(3%)                                                                               | 2471(56%)                                                                              | 13(7,28)                                           |
| ENGLAND          | 4998                                      | 5083           | 5346         | 4284              | 3765                                                                    | 2666(71%)                                            | 4(2, 9)                                       | 4283                                                              | 2228(52%)                                                      | 7(4,17)                                       | 3829                                                             | 137 (4%)                                                                              | 2197(57%)                                                                              | 12(7, 27)                                          |
| NORTHERN IRELAND | 164                                       | 165            |              | 140               | 130                                                                     | 78(60%)                                              | 6(3, 16)                                      | 140                                                               | 75(54%)                                                        | 7(4, 20)                                      | 131                                                              | 2 (2%)                                                                                | 64(49%)                                                                                | 15(8, 34)                                          |
| SCOTLAND         | 347                                       | 354            | 451          | 323               | 274                                                                     | 167(61%)                                             | 6(3, 13)                                      | 323                                                               | 124(38%)                                                       | 9(6, 16)                                      | 281                                                              | 9 (3%)                                                                                | 131(47%)                                                                               | 16(11, 30)                                         |
| WALES            | 214                                       | 220            | 319          | 194               | 173                                                                     | 107(62%)                                             | 5(1, 14)                                      | 194                                                               | 75(39%)                                                        | 10(5, 32)                                     | 178                                                              | 6 (3%)                                                                                | 79(44%)                                                                                | 18(9, 46)                                          |

# UK Carotid Endarterectomy Clinical Audit Round 5 Report

| Trust Name                                                                       | Total CEAs | Total CEAs with outcomes | % Stroke and/or death <i>unadjusted</i> | % Stroke and/or death <i>Adjusted</i> | Status |
|----------------------------------------------------------------------------------|------------|--------------------------|-----------------------------------------|---------------------------------------|--------|
| <b>EAST MIDLANDS</b>                                                             |            |                          |                                         |                                       |        |
| Derby Hospitals NHS Foundation Trust                                             | 110        | 110                      | 0.9%                                    | 0.6%                                  | ▲      |
| Kettering General Hospital NHS Foundation Trust*                                 | 73         | 72                       | 2.8%                                    | 2.9%                                  | ▲      |
| Northampton General Hospital NHS Trust                                           | 128        | 128                      | 3.9%                                    | 3.9%                                  | ▲      |
| Nottingham University Hospitals NHS Trust                                        | 265        | 265                      | 3.4%                                    | 3.3%                                  | ▲      |
| Sherwood Forest Hospitals NHS Foundation Trust*                                  | 108        | 107                      | 2.8%                                    | 2.8%                                  | ▲      |
| United Lincolnshire Hospitals NHS Trust                                          | 91         | 88                       | 2.3%                                    | 2.3%                                  | ▲      |
| University Hospitals of Leicester NHS Trust                                      | 368        | 368                      | 1.4%                                    | 1.5%                                  | ▲      |
| <b>EAST OF ENGLAND</b>                                                           |            |                          |                                         |                                       |        |
| Basildon and Thurrock University Hospital NHS Foundation Trust                   | 65         | 62                       | 1.6%                                    | 1.7%                                  | ▲      |
| Bedford Hospital NHS Trust                                                       | 131        | 129                      | 1.6%                                    | 1.6%                                  | ▲      |
| Cambridge University Hospitals NHS Foundation Trust                              | 293        | 290                      | 1.0%                                    | 1.0%                                  | ▲      |
| Colchester Hospital University NHS Foundation Trust                              | 131        | 131                      | 0.8%                                    | 0.8%                                  | ▲      |
| East and North Hertfordshire NHS Trust                                           | 90         | 90                       | 1.1%                                    | 1.0%                                  | ▲      |
| Ipswich Hospital NHS Trust*                                                      | 83         | 78                       | 0.0%                                    | 0.0%                                  | ▲      |
| Mid Essex Hospital Services NHS Trust                                            | 106        | 106                      | 3.8%                                    | 4.0%                                  | ▲      |
| Norfolk and Norwich University Hospitals NHS Foundation Trust                    | 288        | 287                      | 2.4%                                    | 2.4%                                  | ▲      |
| Peterborough and Stamford Hospitals NHS Foundation Trust                         | 39         | 39                       | 2.6%                                    | 2.8%                                  | ▲      |
| Princess Alexandra Hospital NHS Trust                                            | 88         | 88                       | 3.4%                                    | 3.4%                                  | ▲      |
| Southend University Hospital NHS Foundation Trust                                | 157        | 157                      | 1.9%                                    | 1.9%                                  | ▲      |
| West Hertfordshire Hospitals NHS Trust                                           | 109        | 108                      | 2.8%                                    | 2.8%                                  | ▲      |
| <b>LONDON</b>                                                                    |            |                          |                                         |                                       |        |
| Barking, Havering And Redbridge University Hospitals NHS Trust                   | 119        | 113                      | 1.8%                                    | 1.6%                                  | ▲      |
| Barnet and Chase Farm Hospitals NHS Trust*                                       | 66         | 64                       | 3.1%                                    | 2.9%                                  | ▲      |
| Barts Health NHS Trust                                                           | 140        | 140                      | 2.9%                                    | 2.8%                                  | ▲      |
| Ealing Hospital NHS Trust*                                                       | 6          | 0                        | 0.0%                                    | 0.0%                                  | ▲      |
| Epsom and St Helier University Hospitals NHS Trust*                              | 3          | 3                        | 0.0%                                    | 0.0%                                  | ▲      |
| Guy's and St Thomas' Hospital NHS Foundation Trust                               | 65         | 65                       | 9.2%                                    | 9.0%                                  | ▲      |
| Hillingdon Hospitals NHS Foundation Trust*                                       | 23         | 23                       | 4.3%                                    | 3.6%                                  | ▲      |
| Imperial College Healthcare NHS Trust                                            | 307        | 304                      | 4.3%                                    | 4.3%                                  | ▲      |
| King's College Hospital NHS Foundation Trust                                     | 283        | 277                      | 1.1%                                    | 1.1%                                  | ▲      |
| Lewisham Healthcare NHS Trust*                                                   | 24         | 24                       | 4.2%                                    | 3.6%                                  | ▲      |
| North West London Hospitals NHS Trust                                            | 89         | 89                       | 6.7%                                    | 6.8%                                  | ▲      |
| Royal Free London NHS Trust                                                      | 43         | 38                       | 0.0%                                    | 0.0%                                  | ▲      |
| St George's Healthcare NHS Trust                                                 | 198        | 197                      | 1.0%                                    | 0.8%                                  | ▲      |
| University College London Hospitals NHS Foundation Trust                         | 137        | 137                      | 3.6%                                    | 3.6%                                  | ▲      |
| Whipps Cross University Hospital NHS Trust* (now part of Barts Health NHS Trust) | 4          | 4                        | 0.0%                                    | 0.0%                                  | ▲      |
| Whittington Hospital NHS Trust*                                                  | 2          | 2                        | 0.0%                                    | 0.0%                                  | ▲      |

## UK Carotid Endarterectomy Clinical Audit Round 5 report

| Trust Name                                                    | Total CEAs | Total CEAs with outcomes | % Stroke and/or death <i>unadjusted</i> | % Stroke and/or death <i>Adjusted</i> | Status |
|---------------------------------------------------------------|------------|--------------------------|-----------------------------------------|---------------------------------------|--------|
| <b>NORTH EAST</b>                                             |            |                          |                                         |                                       |        |
| City Hospitals Sunderland NHS Foundation Trust                | 139        | 139                      | 3.6%                                    | 4.0%                                  | ▲      |
| County Durham and Darlington NHS Foundation Trust             | 157        | 145                      | 0.0%                                    | 0.0%                                  | ▲      |
| Gateshead Health NHS Foundation Trust                         | 81         | 81                       | 3.7%                                    | 3.4%                                  | ▲      |
| Newcastle upon Tyne Hospitals NHS Foundation Trust            | 230        | 230                      | 1.7%                                    | 1.8%                                  | ▲      |
| South Tees Hospitals NHS Foundation Trust                     | 192        | 192                      | 0.5%                                    | 0.5%                                  | ▲      |
| <b>NORTH WEST</b>                                             |            |                          |                                         |                                       |        |
| Aintree University Hospitals NHS Foundation Trust*            | 123        | 122                      | 4.1%                                    | 4.2%                                  | ▲      |
| Blackpool Teaching Hospitals NHS Foundation Trust             | 9          | 9                        | 0.0%                                    | 0.0%                                  | ▲      |
| Bolton NHS Foundation Trust                                   | 109        | 109                      | 0.0%                                    | 0.0%                                  | ▲      |
| Central Manchester University Hospitals NHS Foundation Trust  | 223        | 223                      | 0.9%                                    | 0.8%                                  | ▲      |
| Countess of Chester Hospital NHS Foundation Trust             | 143        | 143                      | 0.0%                                    | 0.0%                                  | ▲      |
| East Lancashire Hospitals NHS Trust                           | 252        | 252                      | 2.0%                                    | 2.1%                                  | ▲      |
| Lancashire Teaching Hospitals NHS Foundation Trust            | 152        | 152                      | 3.3%                                    | 3.5%                                  | ▲      |
| Mid Cheshire Hospitals NHS Foundation Trust*                  | 69         | 69                       | 1.4%                                    | 1.6%                                  | ▲      |
| North Cumbria University Hospitals NHS Trust                  | 68         | 67                       | 0.0%                                    | 0.0%                                  | ▲      |
| Pennine Acute Hospitals NHS Trust                             | 367        | 367                      | 1.1%                                    | 1.1%                                  | ▲      |
| Royal Liverpool and Broadgreen University Hospitals NHS Trust | 142        | 142                      | 2.8%                                    | 2.9%                                  | ▲      |
| Southport and Ormskirk Hospital NHS Trust*                    | 67         | 67                       | 6.0%                                    | 5.2%                                  | ▲      |
| Tameside Hospital NHS Foundation Trust                        | 71         | 70                       | 0.0%                                    | 0.0%                                  | ▲      |
| The Walton Centre NHS Foundation Trust*                       | 21         | 21                       | 4.8%                                    | 4.6%                                  | ▲      |
| University Hospital of South Manchester NHS Foundation Trust  | 295        | 295                      | 2.0%                                    | 2.2%                                  | ▲      |
| University Hospitals Of Morecambe Bay NHS Foundation Trust    | 131        | 131                      | 3.1%                                    | 3.2%                                  | ▲      |
| Warrington and Halton Hospitals NHS Foundation Trust          | 146        | 146                      | 2.1%                                    | 2.2%                                  | ▲      |
| Wirral University Teaching Hospital NHS Foundation Trust      | 172        | 167                      | 2.4%                                    | 2.2%                                  | ▲      |
| Wrightington, Wigan And Leigh NHS Foundation Trust            | 114        | 114                      | 3.5%                                    | 3.5%                                  | ▲      |
| <b>SOUTH CENTRAL</b>                                          |            |                          |                                         |                                       |        |
| Buckinghamshire Healthcare NHS Trust                          | 247        | 244                      | 2.9%                                    | 2.6%                                  | ▲      |
| Hampshire Hospitals NHS Foundation Trust*                     | 10         | 10                       | 0.0%                                    | 0.0%                                  | ▲      |
| Milton Keynes Hospital NHS Foundation Trust*                  | 23         | 23                       | 4.3%                                    | 5.1%                                  | ▲      |
| Oxford University Hospitals NHS Trust                         | 253        | 250                      | 2.8%                                    | 2.9%                                  | ▲      |
| Portsmouth Hospitals NHS Trust                                | 235        | 235                      | 2.1%                                    | 2.0%                                  | ▲      |
| Royal Berkshire NHS Foundation Trust*                         | 26         | 26                       | 0.0%                                    | 0.0%                                  | ▲      |
| University Hospital Southampton NHS Foundation Trust          | 303        | 303                      | 1.7%                                    | 1.6%                                  | ▲      |
| <b>SOUTH EAST COAST</b>                                       |            |                          |                                         |                                       |        |
| Ashford And St Peter's Hospitals NHS Foundation Trust         | 132        | 132                      | 2.3%                                    | 2.2%                                  | ▲      |
| Brighton and Sussex University Hospitals NHS Trust            | 124        | 124                      | 1.6%                                    | 1.7%                                  | ▲      |
| Dartford and Gravesham NHS Trust                              | 19         | 19                       | 0.0%                                    | 0.0%                                  | ▲      |
| East Kent Hospitals University NHS Foundation Trust           | 220        | 220                      | 1.8%                                    | 2.0%                                  | ▲      |

## UK Carotid Endarterectomy Clinical Audit Round 5 report

| Trust Name                                                        | Total CEAs | Total CEAs with outcomes | % Stroke and/or death <i>unadjusted</i> | % Stroke and/or death <i>Adjusted</i> | Status |
|-------------------------------------------------------------------|------------|--------------------------|-----------------------------------------|---------------------------------------|--------|
| East Sussex Healthcare NHS Trust                                  | 22         | 18                       | 11.1%                                   | 12.1%                                 | ▲      |
| Frimley Park Hospital NHS Foundation Trust                        | 213        | 213                      | 2.3%                                    | 2.5%                                  | ▲      |
| Maidstone and Tunbridge Wells NHS Trust                           | 32         | 32                       | 6.3%                                    | 6.0%                                  | ▲      |
| Medway NHS Foundation Trust                                       | 92         | 92                       | 3.3%                                    | 3.5%                                  | ▲      |
| Surrey and Sussex Healthcare NHS Trust*                           | 88         | 87                       | 1.1%                                    | 1.2%                                  | ▲      |
| Western Sussex Hospitals NHS Trust                                | 89         | 87                       | 3.4%                                    | 3.4%                                  | ▲      |
| <b>SOUTH WEST</b>                                                 |            |                          |                                         |                                       |        |
| Dorset County Hospital NHS Foundation Trust                       | 88         | 88                       | 5.7%                                    | 5.0%                                  | ▲      |
| Gloucestershire Hospitals NHS Foundation Trust                    | 193        | 193                      | 1.0%                                    | 1.0%                                  | ▲      |
| Great Western Hospitals NHS Foundation Trust                      | 54         | 52                       | 0.0%                                    | 0.0%                                  | ▲      |
| North Bristol NHS Trust                                           | 112        | 110                      | 0.9%                                    | 0.9%                                  | ▲      |
| Northern Devon Healthcare NHS Trust                               | 79         | 78                       | 7.7%                                    | 8.1%                                  | ▲      |
| Plymouth Hospitals NHS Trust                                      | 124        | 120                      | 2.5%                                    | 2.5%                                  | ▲      |
| Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust | 176        | 160                      | 6.9%                                    | 6.8%                                  | ▲      |
| Royal Cornwall Hospitals NHS Trust                                | 161        | 161                      | 1.9%                                    | 1.9%                                  | ▲      |
| Royal Devon and Exeter NHS Foundation Trust                       | 126        | 126                      | 4.8%                                    | 5.1%                                  | ▲      |
| Royal United Hospital Bath NHS Trust                              | 176        | 165                      | 4.2%                                    | 4.4%                                  | ▲      |
| Salisbury NHS Foundation Trust                                    | 72         | 72                       | 0.0%                                    | 0.0%                                  | ▲      |
| South Devon Healthcare NHS Foundation Trust                       | 82         | 82                       | 2.4%                                    | 2.5%                                  | ▲      |
| Taunton and Somerset NHS Foundation Trust                         | 153        | 146                      | 4.1%                                    | 4.2%                                  | ▲      |
| University Hospitals Bristol NHS Foundation Trust                 | 134        | 134                      | 3.0%                                    | 3.2%                                  | ▲      |
| <b>WEST MIDLANDS</b>                                              |            |                          |                                         |                                       |        |
| Dudley Group of Hospitals NHS Foundation Trust                    | 244        | 244                      | 0.4%                                    | 0.4%                                  | ▲      |
| Heart of England NHS Foundation Trust                             | 154        | 154                      | 0.6%                                    | 0.7%                                  | ▲      |
| Mid Staffordshire NHS Foundation Trust*                           | 27         | 27                       | 3.7%                                    | 4.1%                                  | ▲      |
| Royal Wolverhampton Hospitals NHS Trust*                          | 111        | 111                      | 4.5%                                    | 4.8%                                  | ▲      |
| Sandwell and West Birmingham Hospitals NHS Trust*                 | 106        | 106                      | 4.7%                                    | 4.8%                                  | ▲      |
| Shrewsbury and Telford Hospital NHS Trust                         | 130        | 129                      | 3.1%                                    | 3.3%                                  | ▲      |
| University Hospital of North Staffordshire NHS Trust              | 106        | 106                      | 1.9%                                    | 1.7%                                  | ▲      |
| University Hospitals Birmingham NHS Foundation Trust              | 173        | 173                      | 4.0%                                    | 3.8%                                  | ▲      |
| University Hospitals Coventry and Warwickshire NHS Trust          | 210        | 206                      | 1.0%                                    | 1.0%                                  | ▲      |
| Walsall Healthcare NHS Trust*                                     | 93         | 64                       | 3.1%                                    | 3.1%                                  | ▲      |
| Worcestershire Acute Hospitals NHS Trust                          | 162        | 162                      | 0.0%                                    | 0.0%                                  | ▲      |
| <b>YORKSHIRE AND THE HUMBER</b>                                   |            |                          |                                         |                                       |        |
| Bradford Teaching Hospitals NHS Foundation Trust                  | 129        | 129                      | 0.8%                                    | 0.7%                                  | ▲      |
| Calderdale and Huddersfield NHS Foundation Trust                  | 115        | 115                      | 1.7%                                    | 1.8%                                  | ▲      |
| Doncaster and Bassetlaw Hospitals NHS Foundation Trust            | 180        | 177                      | 1.7%                                    | 1.8%                                  | ▲      |
| Hull and East Yorkshire Hospitals NHS Trust                       | 240        | 240                      | 5.0%                                    | 5.2%                                  | ▲      |
| Leeds Teaching Hospitals NHS Trust                                | 113        | 107                      | 2.8%                                    | 3.1%                                  | ▲      |

## UK Carotid Endarterectomy Clinical Audit Round 5 report

| Trust Name                                                      | Total CEAs | Total CEAs with outcomes | % Stroke and/or death <i>unadjusted</i> | % Stroke and/or death <i>Adjusted</i> | Status |
|-----------------------------------------------------------------|------------|--------------------------|-----------------------------------------|---------------------------------------|--------|
| Mid Yorkshire Hospitals NHS Trust                               | 110        | 105                      | 1.9%                                    | 2.2%                                  | ▲      |
| Northern Lincolnshire and Goole Hospitals NHS Foundation Trust* | 27         | 27                       | 3.7%                                    | 4.3%                                  | ▲      |
| Scarborough and North East Yorkshire Healthcare NHS Trust*      | 21         | 21                       | 4.8%                                    | 3.8%                                  | ▲      |
| Sheffield Teaching Hospitals NHS Foundation Trust               | 223        | 220                      | 1.8%                                    | 1.9%                                  | ▲      |
| York Teaching Hospital NHS Foundation Trust                     | 345        | 332                      | 3.6%                                    | 3.4%                                  | ▲      |
| <b>NORTHERN IRELAND</b>                                         |            |                          |                                         |                                       |        |
| Belfast Health and Social Care Trust                            | 411        | 410                      | 1.7%                                    | 1.6%                                  | ▲      |
| Southern Health and Social Care Trust                           | 25         | 16                       | 6.3%                                    | 6.6%                                  | ▲      |
| Western Health and Social Care Trust*                           | 50         | 49                       | 4.1%                                    | 4.5%                                  | ▲      |
| <b>SCOTLAND</b>                                                 |            |                          |                                         |                                       |        |
| NHS Ayrshire & Arran                                            | 72         | 72                       | 2.8%                                    | 2.5%                                  | ▲      |
| NHS Dumfries and Galloway                                       | 98         | 98                       | 3.1%                                    | 3.0%                                  | ▲      |
| NHS Fife                                                        | 40         | 39                       | 5.1%                                    | 6.1%                                  | ▲      |
| NHS Forth Valley                                                | 107        | 104                      | 1.9%                                    | 2.1%                                  | ▲      |
| NHS Grampian                                                    | 52         | 35                       | 5.7%                                    | 6.4%                                  | ▲      |
| NHS Greater Glasgow and Clyde                                   | 130        | 130                      | 0.8%                                    | 0.8%                                  | ▲      |
| NHS Highland                                                    | 159        | 116                      | 2.6%                                    | 2.4%                                  | ▲      |
| NHS Lanarkshire                                                 | 46         | 46                       | 4.3%                                    | 4.9%                                  | ▲      |
| NHS Lothian                                                     | 250        | 250                      | 1.6%                                    | 1.7%                                  | ▲      |
| NHS Tayside                                                     | 66         | 51                       | 0.0%                                    | 0.0%                                  | ▲      |
| <b>WALES</b>                                                    |            |                          |                                         |                                       |        |
| Abertawe Bro Morgannwg University Health Board                  | 267        | 264                      | 2.3%                                    | 2.2%                                  | ▲      |
| Aneurin Bevan Health Board                                      | 170        | 163                      | 0.6%                                    | 0.6%                                  | ▲      |
| Betsi Cadwaladr University Health Board                         | 131        | 131                      | 1.5%                                    | 1.6%                                  | ▲      |
| Cardiff and Vale University Health Board                        | 24         | 24                       | 8.3%                                    | 7.6%                                  | ▲      |
| Cwm Taf University Health Board                                 | 94         | 94                       | 3.2%                                    | 2.9%                                  | ▲      |

\* Please see note regarding trusts that have stopped performing CEA on page 27.



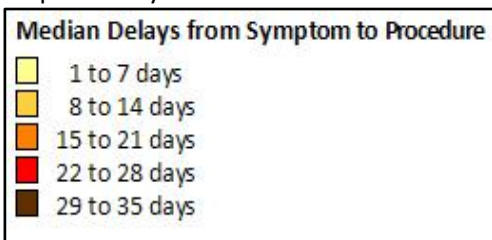
## Comparison of delays in the pathway by region

The maps on the following pages illustrate improvements in waiting times for CEA between Round 4 and Round 5. These maps are colour coded and show the variation across the ten English Strategic Health Authorities, Northern Ireland, Scotland and Wales.

The first set of maps show the median delay by region of the three main time points in the pathway from symptom to procedure:

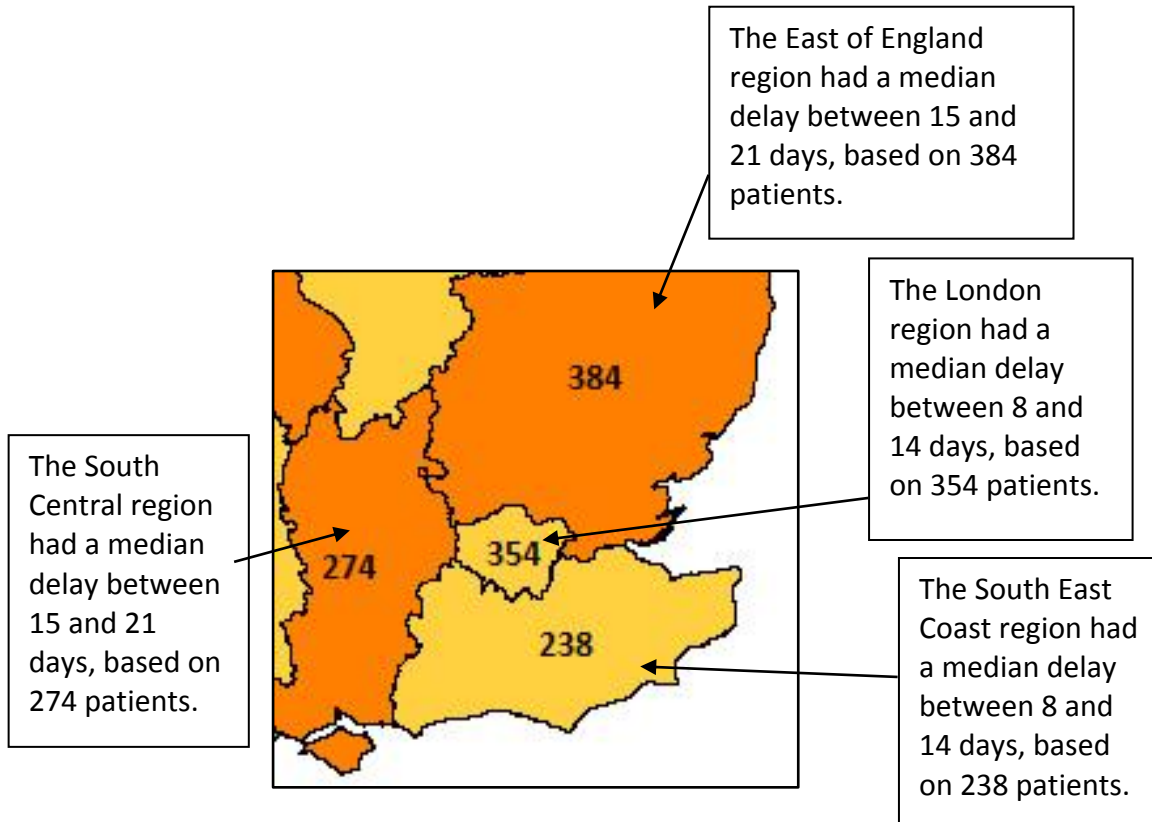
- The median number of days from symptom to referral.
- The median number of days from referral to procedure.
- The median number of days from symptom to procedure.

The maps are colour coded in colours ranging from a light yellow (optimum time) to a dark brown (least optimal time). These colours represent the category the region is in. The same colours are used in each map. The key is shown below:



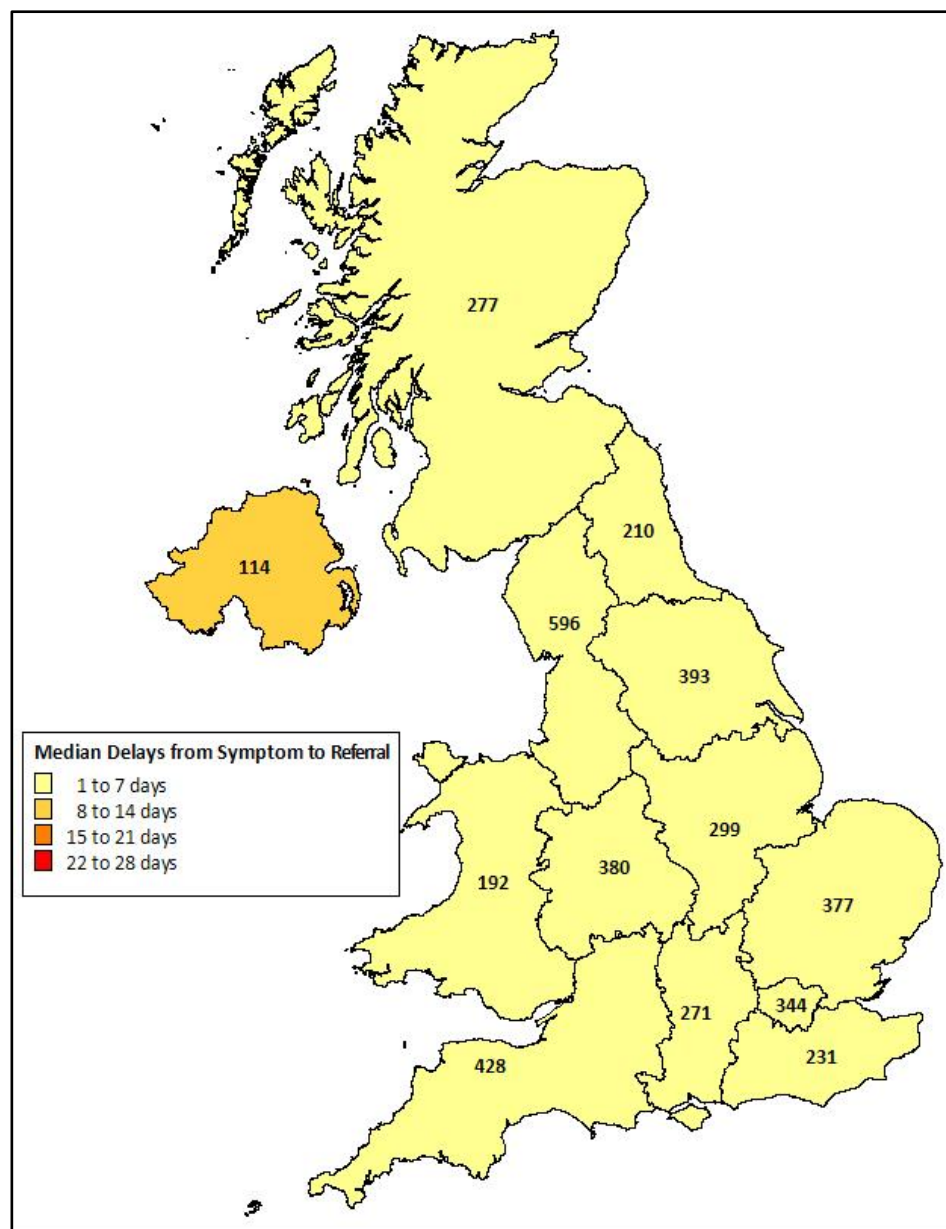
In each set of maps the Round 4 map is shown on the left and Round 5 on the right, to see improvements over time.

The number inside each region is the number of patients this median is based upon. For example, in the image below it is possible to see that:

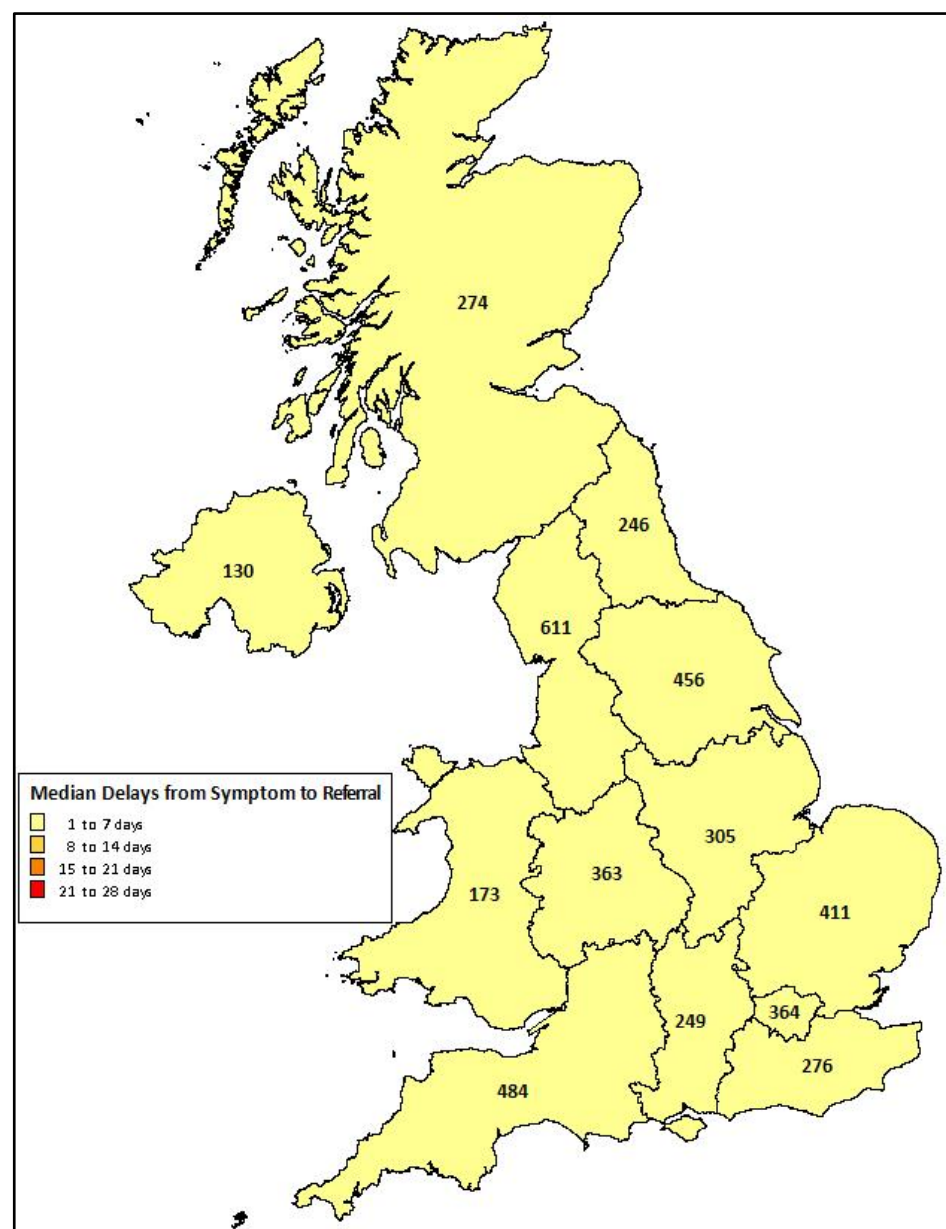


## Median Delays from Symptom to Referral

Round 4

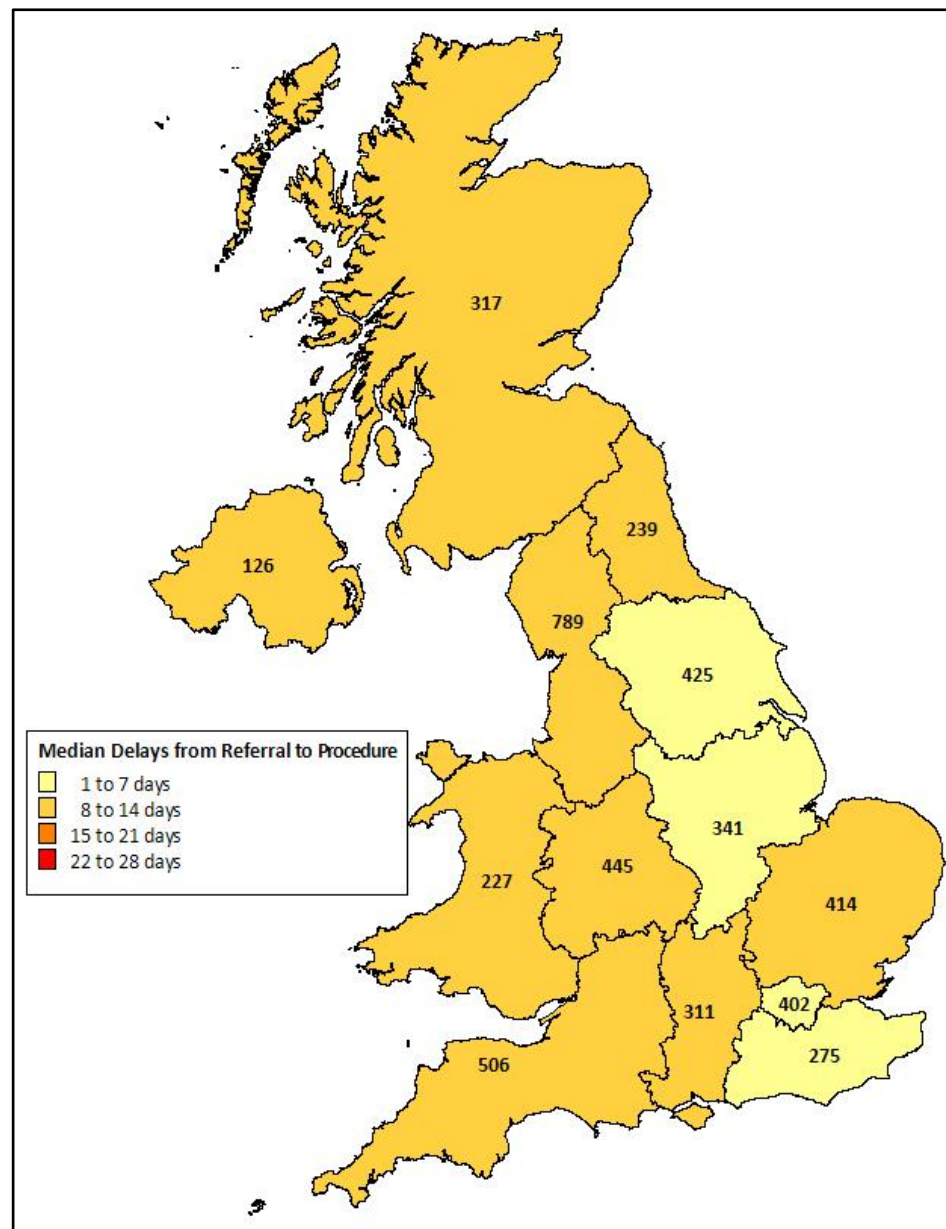


Round 5

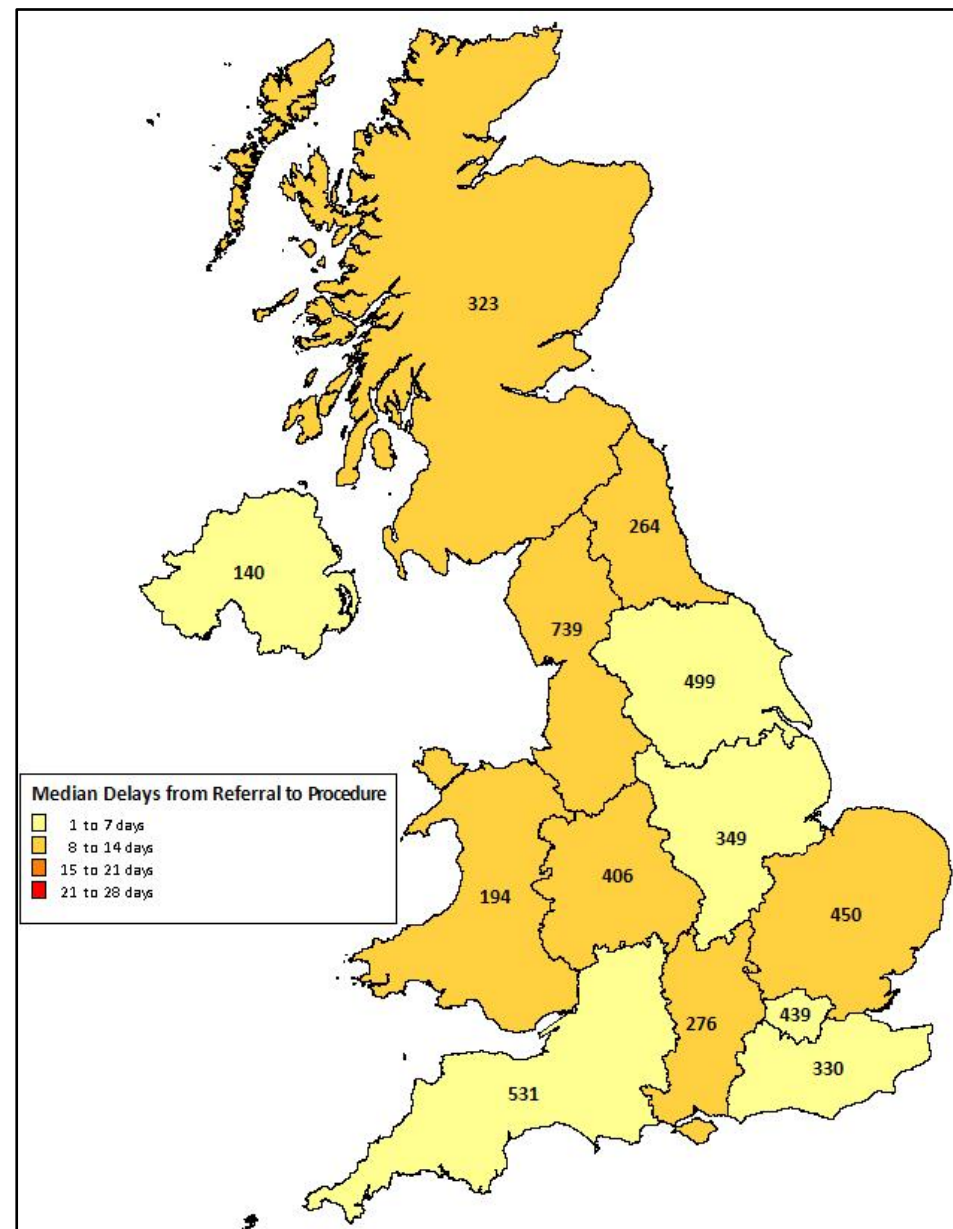


## Median Delays from Referral to Procedure

Round 4

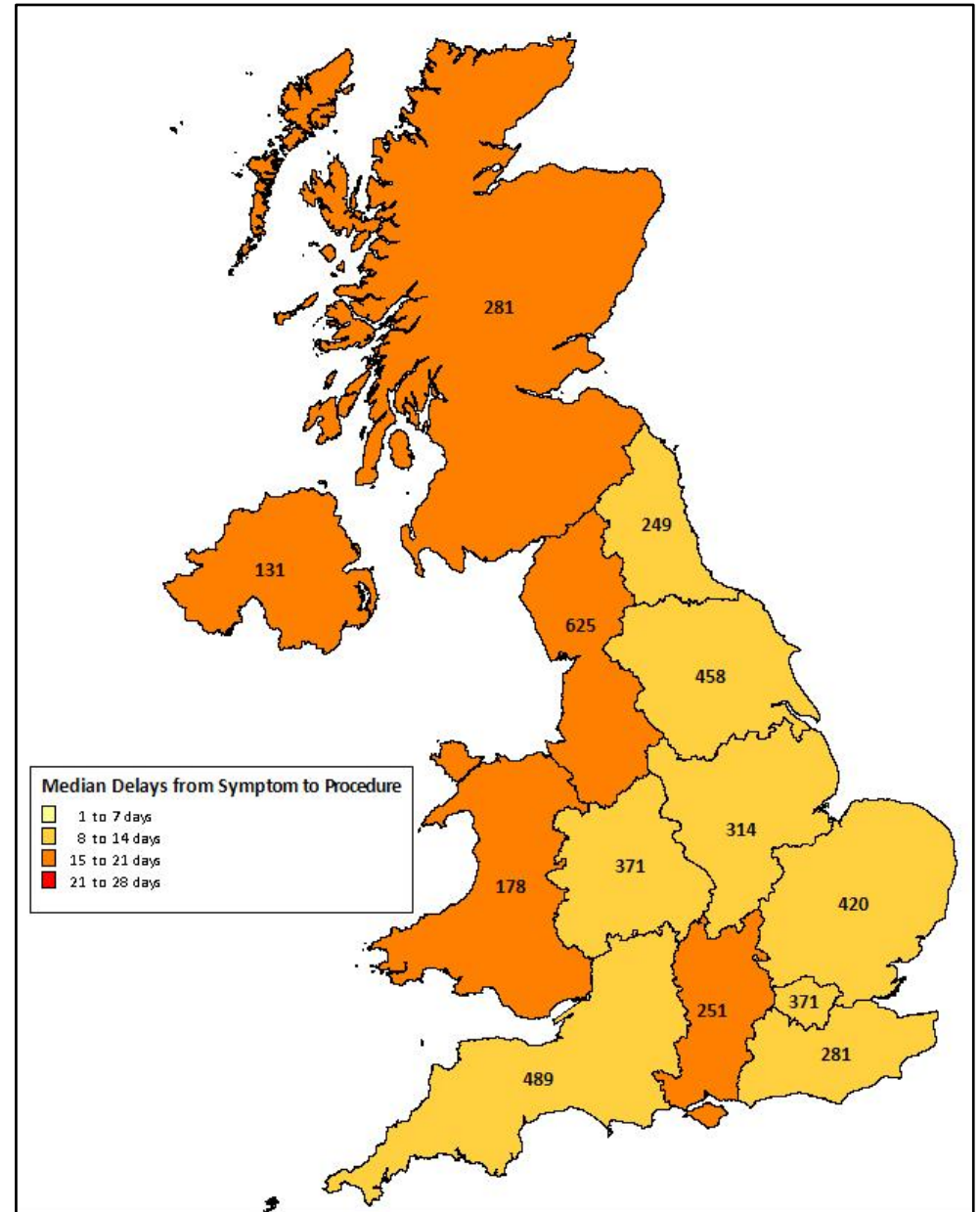
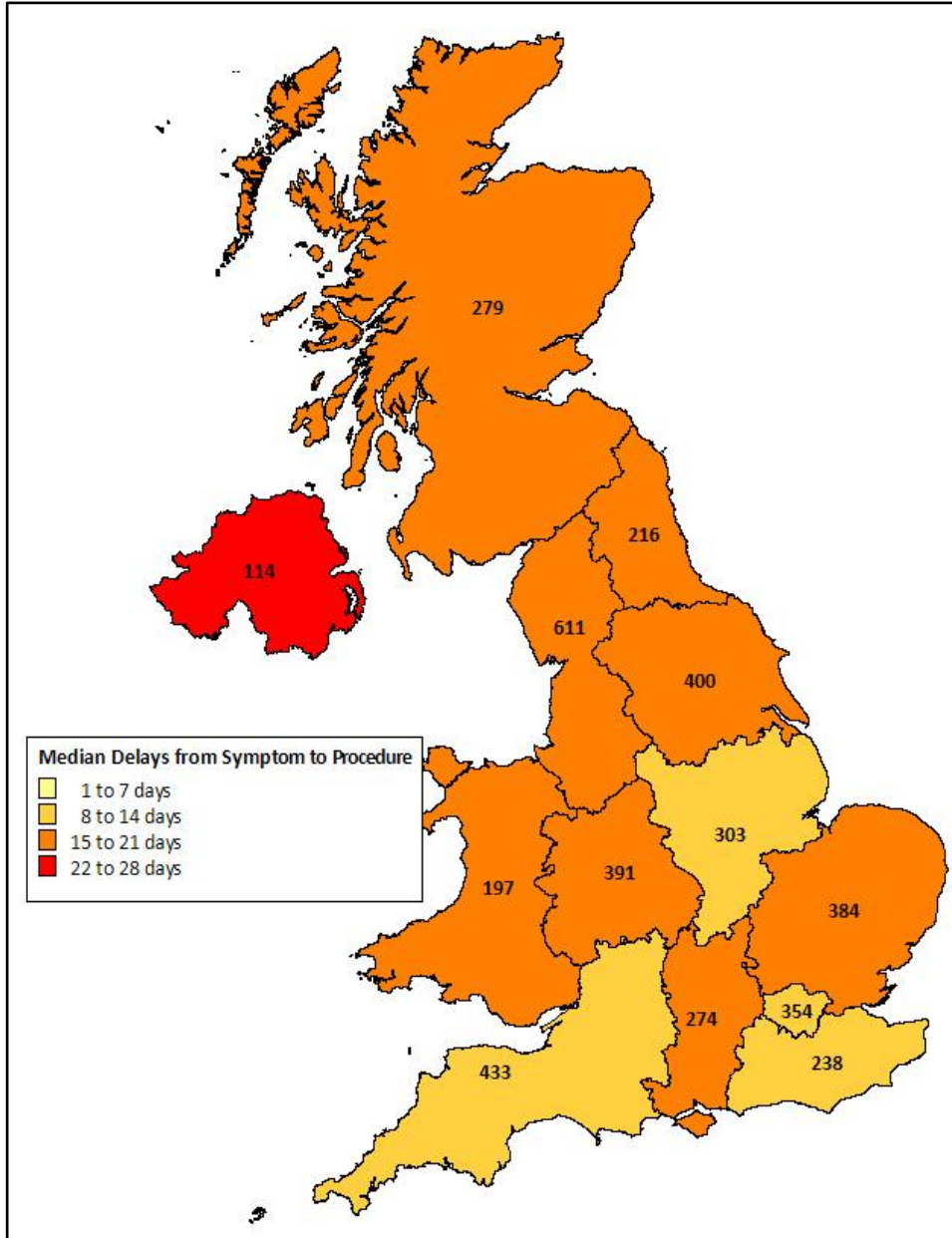


Round 5





## Round 4

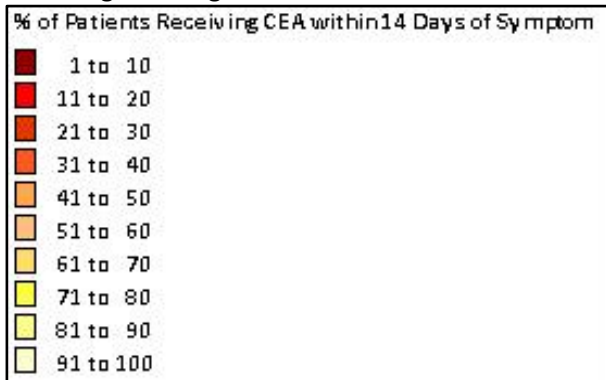


## Comparison of patients reaching standards in the pathway by region

The following set of maps show the percentage of patients per region that reached the following standards:

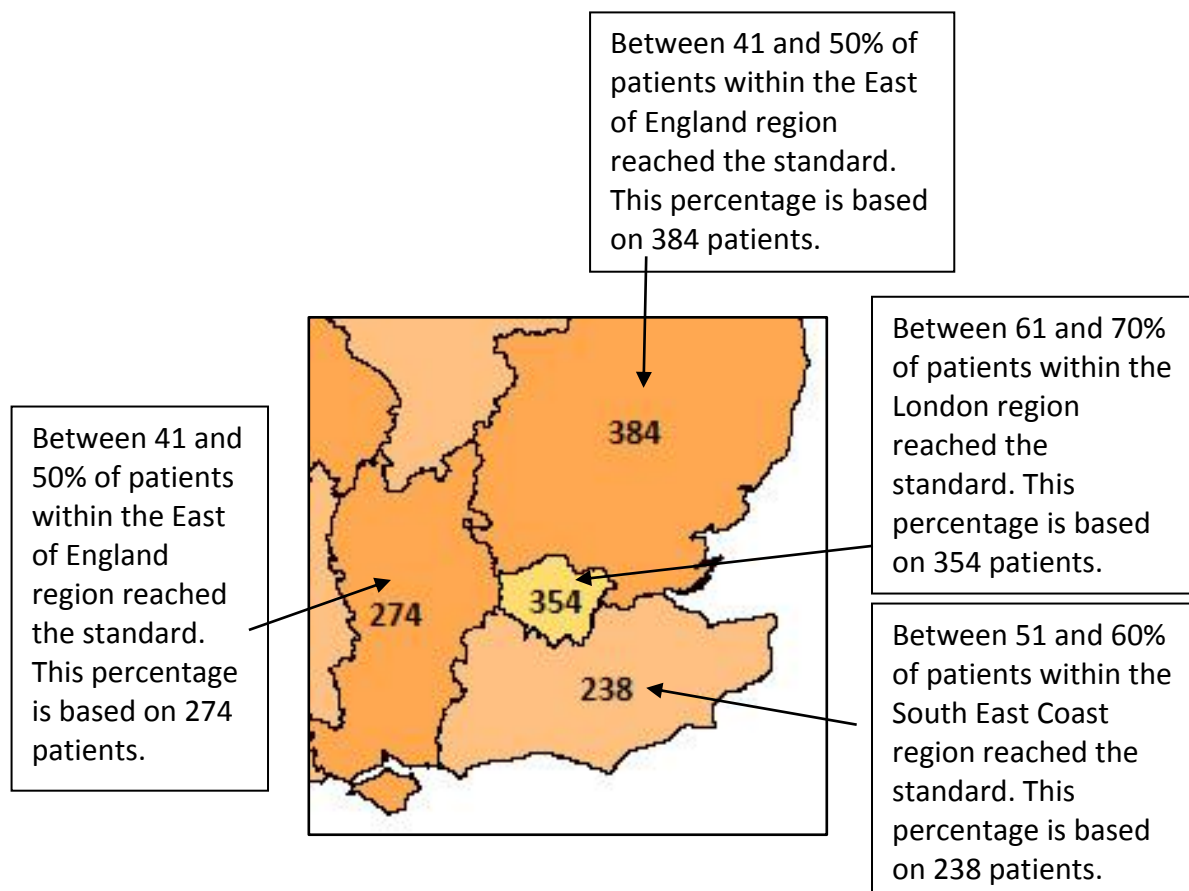
- Symptom to referral within 7 days.
- Referral to procedure within 7 days.
- Overall symptom to procedure within 14 days.

The maps are also colour coded, but this time from white to dark brown, and are broken down into the following 10 categories:



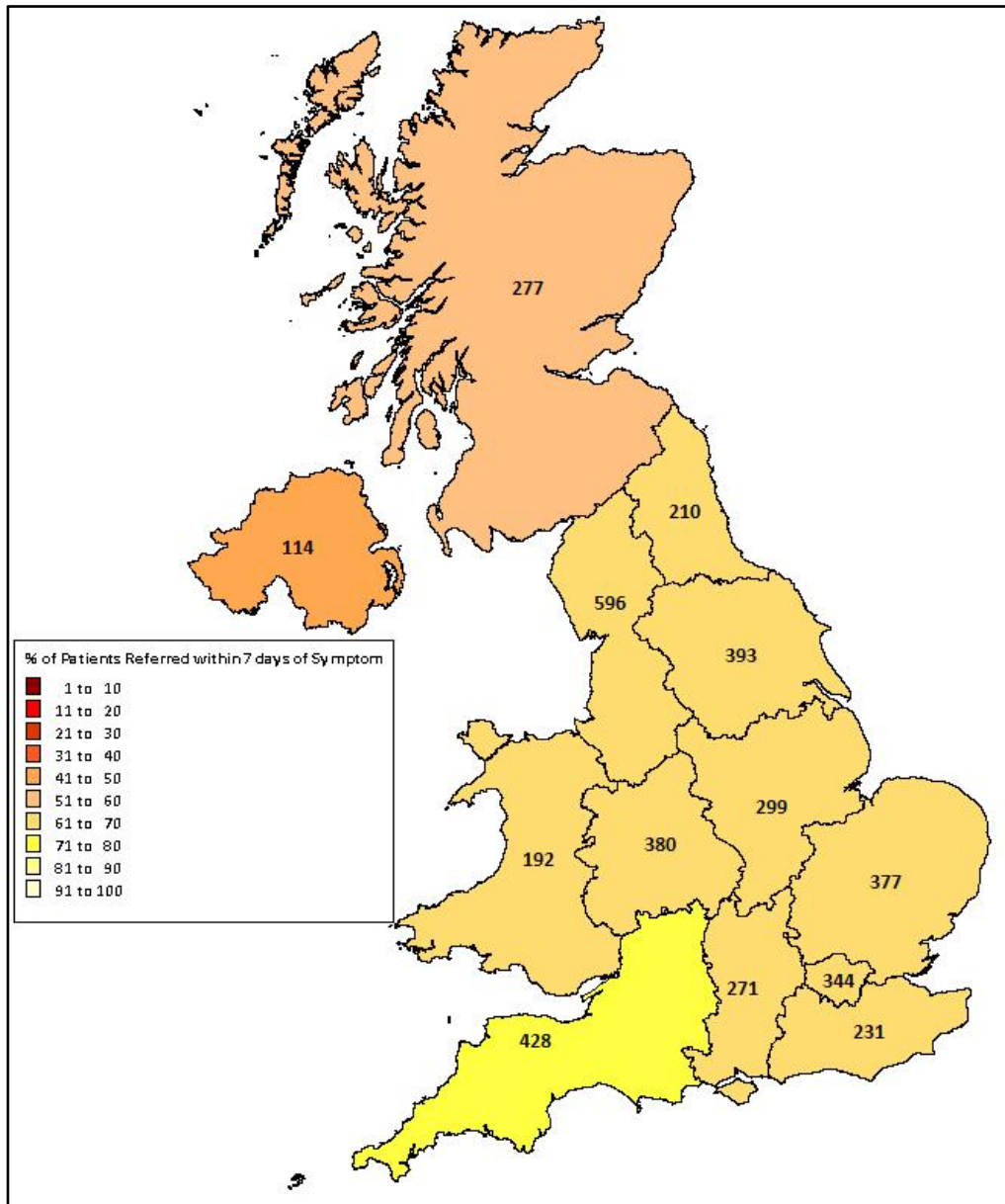
The same colours are used for each map. In each set of maps the Round 4 map is shown on the left and Round 5 on the right, to see improvements over time.

Again, the number inside each region is the number of patients this median is based upon. For example, in the image below it is possible to see that:

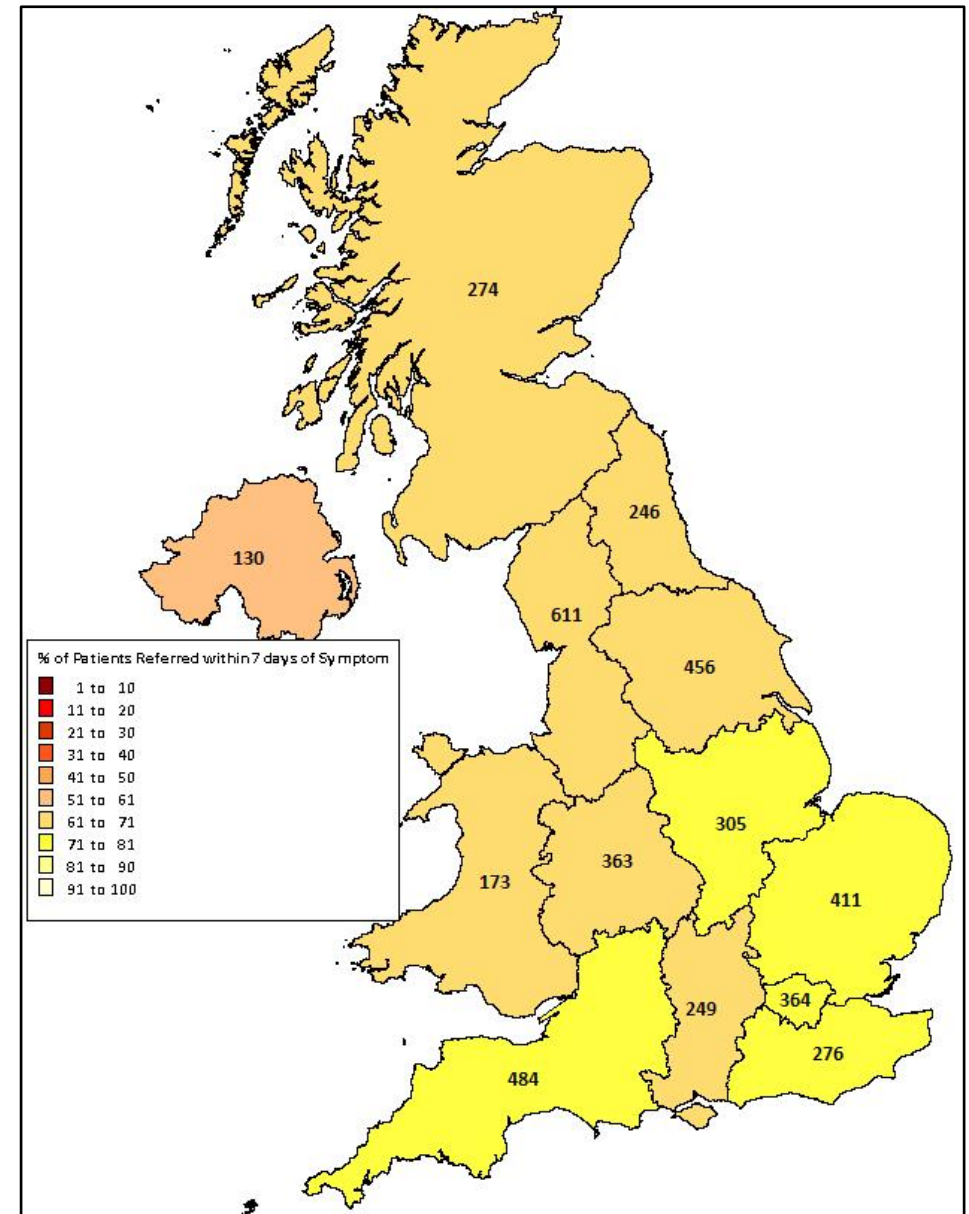


## Delays from Symptom to Referral

Round 4



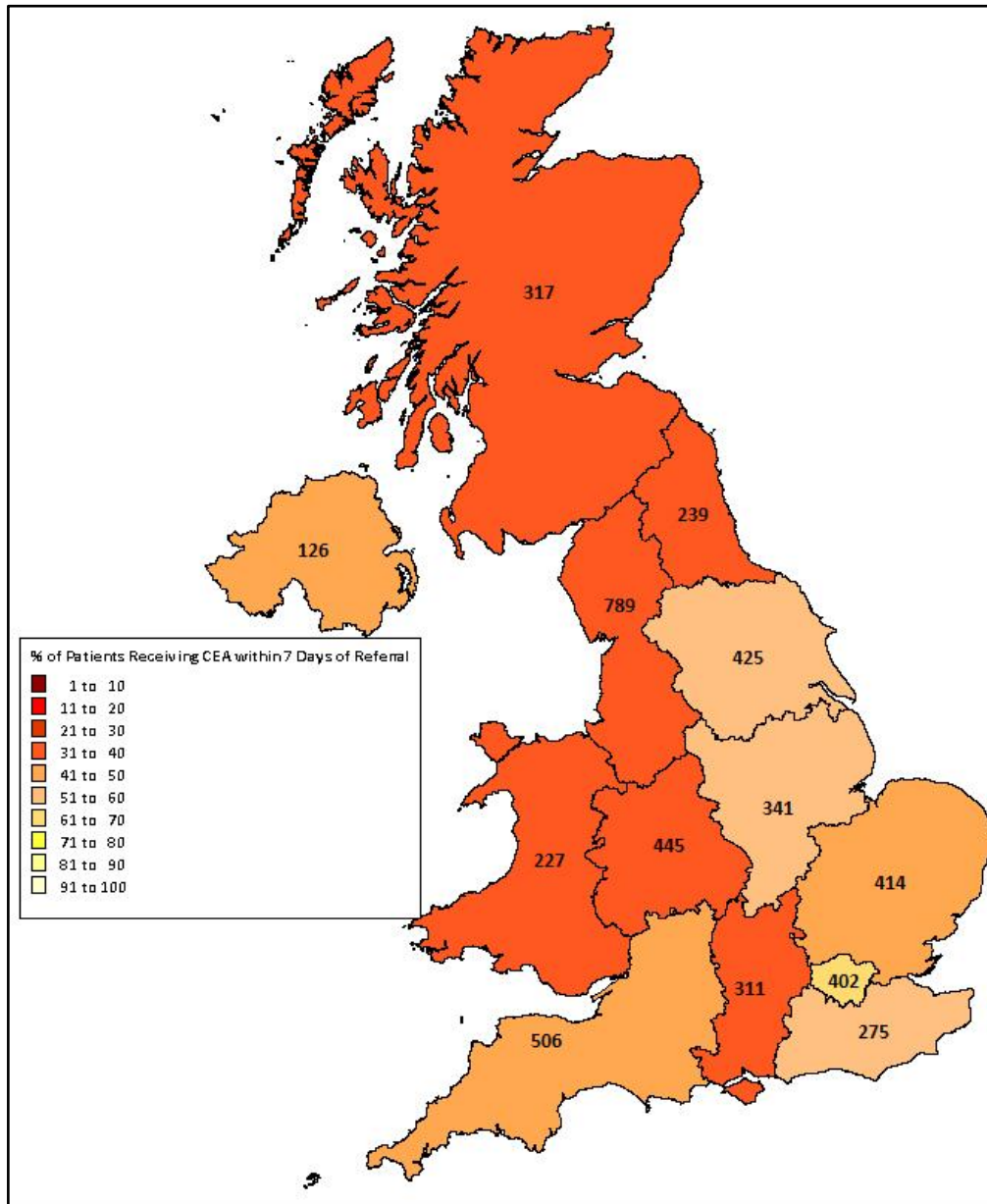
Round 5



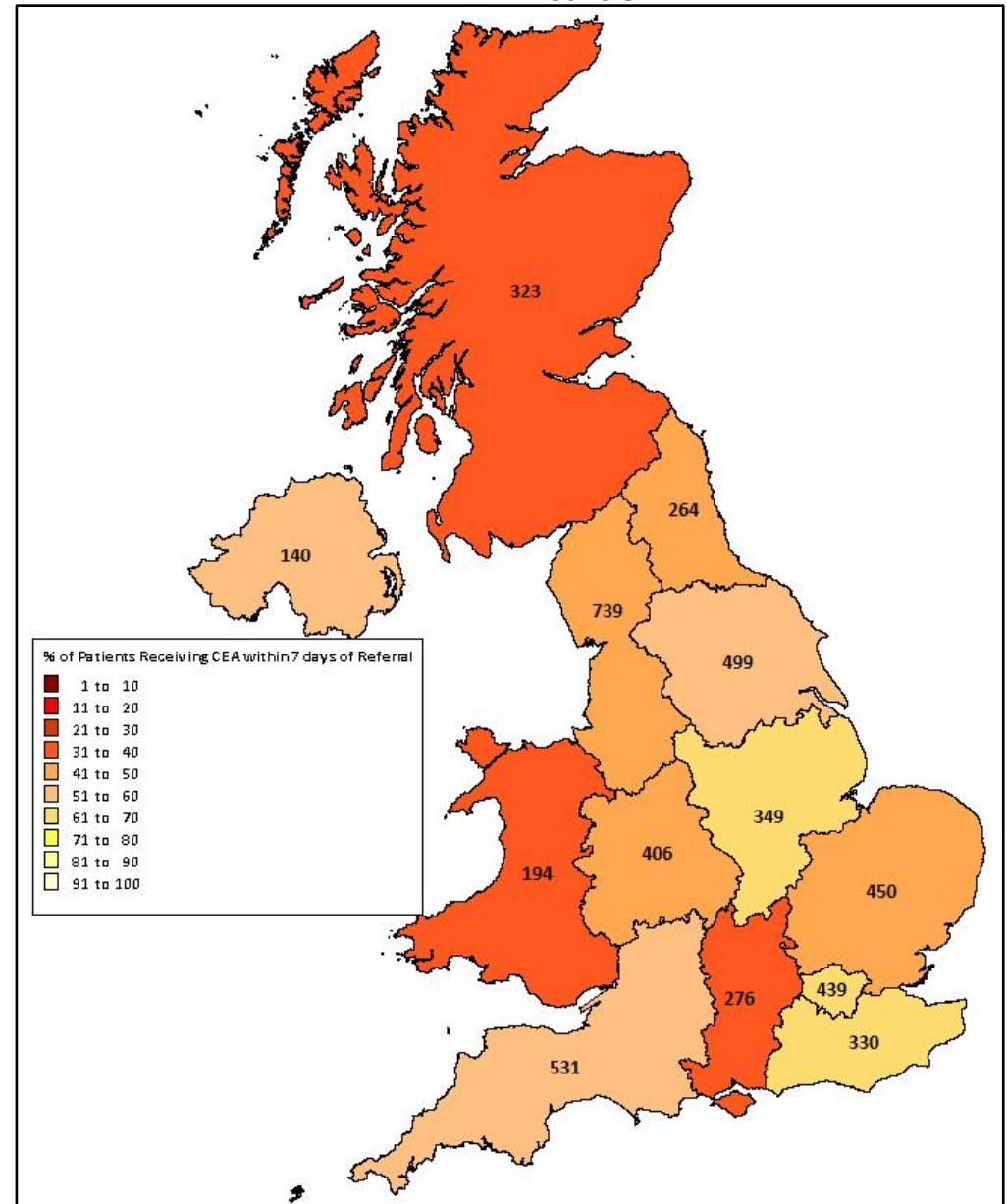


## Delays from Referral to Procedure

Round 4



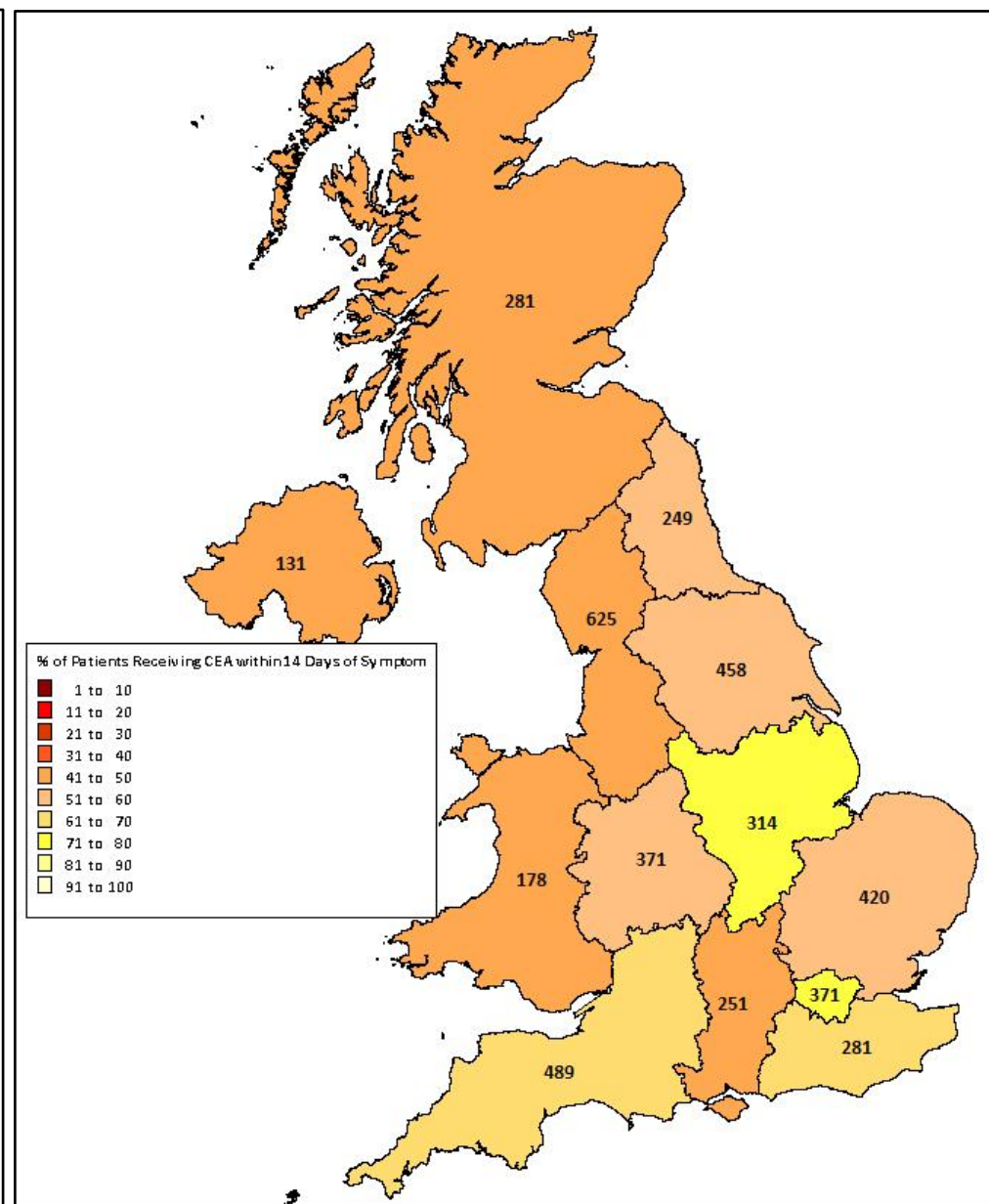
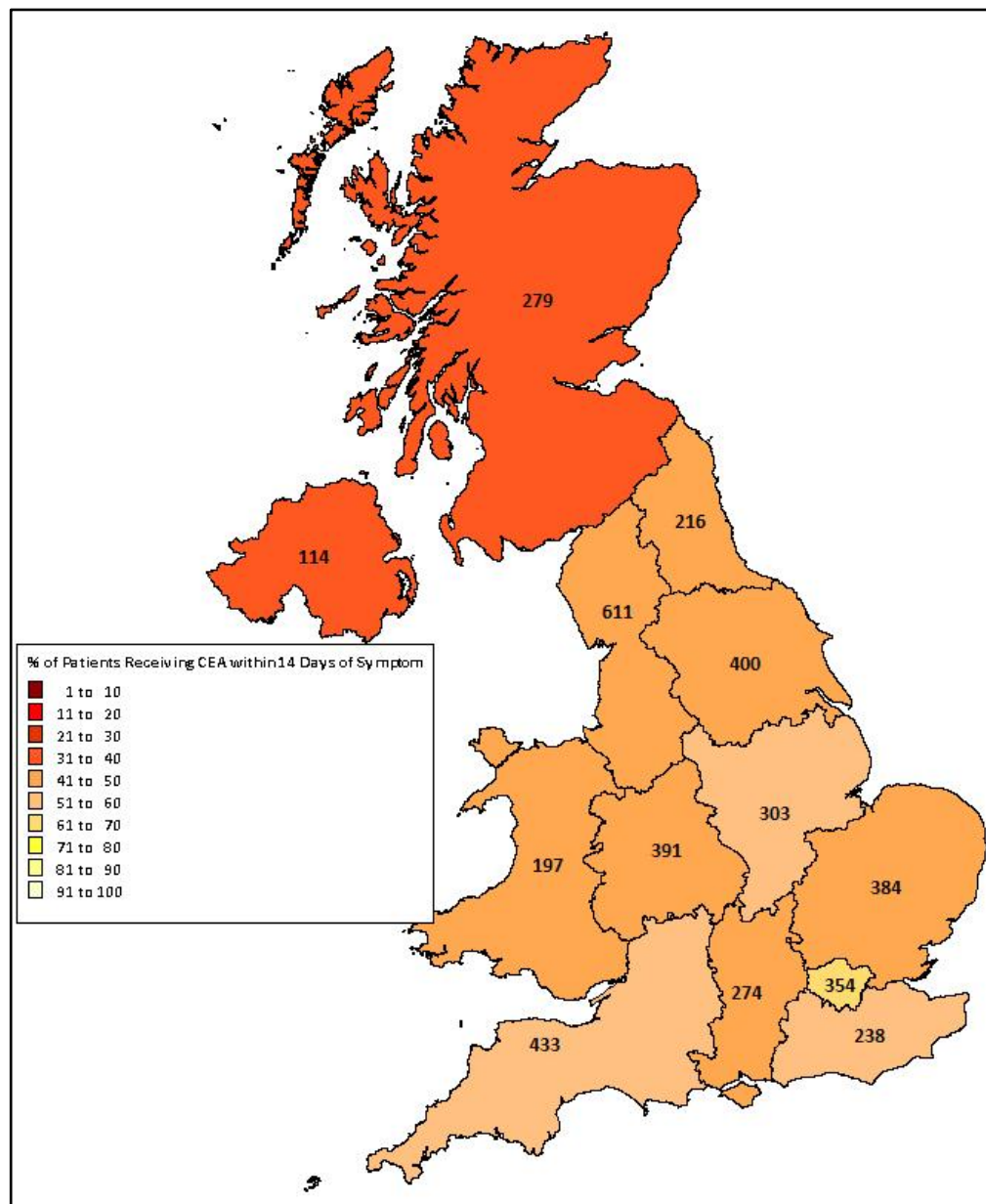
Round 5



Round 4

## Delays from Symptom to Procedure

Round 5





## References

- Bond R., Rerkasem K., AbuRahma A.F., Naylor A.R. and Rothwell P.M. (2004) Patch angioplasty versus primary closure for carotid endarterectomy. *Cochrane Database of Systematic Reviews*. 6(2):1814.
- DH Stroke Policy Team. Implementing the National Stroke Strategy - an imaging guide (2008). [http://www.dh.gov.uk/prod\\_consum\\_dh/groups/dh\\_digitalassets/@dh/@en/documents/digitalasset/dh\\_085145.pdf](http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_085145.pdf)
- National Stroke Strategy (December 2007) [http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_081062](http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_081062)
- Rothwell P.M., Eliasziw M., Gutnikov S.A., Warlow C.P. and Barnett H.J.M. (2004) Endarterectomy for symptomatic carotid stenosis in relation to clinical subgroups and timing of surgery for the Carotid Endarterectomy Trialists Collaboration. *The Lancet*, 363: 915-924.
- Stroke: The diagnosis and acute management of stroke and transient ischaemic attacks by the National Institute for Health and Clinical Excellence (NICE) (July 2008) <http://www.nice.org.uk/Guidance/CG68>
- Spiegelhalter D.J. (2005) Funnel plots for comparing institutional performance. *Stat Med*, 24(8): 1185-202.

## Appendices

### Appendix 1: Glossary

|                                                       |                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Amaurosis fugax                                       | Transient loss of vision in one eye due to an interruption of blood flow to the retina.                                                                                                                                                                                                                                                                    |
| Asymptomatic Patient                                  | A patient who does not yet show any outward signs or symptoms of plaque.                                                                                                                                                                                                                                                                                   |
| Carotid Endarterectomy (CEA)                          | Carotid Endarterectomy is a surgical procedure in which build-up is removed from the carotid artery.                                                                                                                                                                                                                                                       |
| Carotid Stenosis                                      | Abnormal narrowing of the neck artery to the brain.                                                                                                                                                                                                                                                                                                        |
| Cranial Nerve Injury (CNI)                            | Damage to one of the 12 nerves supplying the head and neck.                                                                                                                                                                                                                                                                                                |
| Electrocardiogram (ECG)                               | An ECG records the electrical activity of the heart, and can be used to detect abnormal heart rhythms and is sometimes carried out before operations.                                                                                                                                                                                                      |
| Hospital Episode Statistics (HES)                     | HES is the national statistical data warehouse for England regarding the care provided by NHS hospitals and for NHS hospital patients treated elsewhere. There are equivalent agencies in Northern Ireland, Scotland and Wales but in this report, the term HES is used generically to describe data that are collected by any of these national agencies. |
| Inter-quartile range (IQR)                            | Once the data are arranged in ascending order, this is the central 50% of all values and is otherwise known as the 'middle fifty' or IQR.                                                                                                                                                                                                                  |
| Median                                                | The median is the middle value in the data set; 50% of the values are below this point and 50% are above this point.                                                                                                                                                                                                                                       |
| Myocardial Infarct (MI)                               | Otherwise known as a Heart Attack, MI involves the interruption of the blood supply to part of the heart muscle.                                                                                                                                                                                                                                           |
| Occluded artery                                       | An artery that has become blocked and stops blood flow.                                                                                                                                                                                                                                                                                                    |
| Plaque                                                | Scale in an artery made of fat, cholesterol and other substances. This hard material builds up on the artery wall and can cause narrowing or blockage of an artery or a piece may break off causing a blockage in another part of the arterial circulation.                                                                                                |
| Strategic Health Authority (SHA)                      | An organisation, accountable to government, that assesses the health needs of local people and ensures that local health services are commissioned and provided to meet those needs.                                                                                                                                                                       |
| Stroke                                                | A brain injury caused by a sudden interruption of blood flow with symptoms that last for more than 24 hours.                                                                                                                                                                                                                                               |
| Symptomatic                                           | A patient showing symptoms is known to be symptomatic.                                                                                                                                                                                                                                                                                                     |
| Transient ischaemic attack (TIA)                      | A "mini-stroke" where the blood supply to the brain is briefly interrupted and recovers within 24 hours.                                                                                                                                                                                                                                                   |
| Trust or Health Board                                 | A public sector corporation that contains a number of hospitals, clinics and health provisions. For example, there were 4 hospitals in the trust and 3 trusts in the SHA.                                                                                                                                                                                  |
| Vascular Society of Great Britain and Ireland (VSGBI) | The VSGBI is a registered charity founded to relieve sickness and to preserve, promote and protect the health of the public by advancing excellence and innovation in vascular health, through education, audit and research. The VSGBI represents and provides professional support for over 600 members and focuses on non-cardiac vascular disease.     |

## Appendix 2: Proforma

### APPENDIX 1: Proforma

#### Phase 1 [Symptom to hospital discharge]

##### Section 1: Demographics

- 1.1 Date procedure was undertaken: \_\_\_\_\_ [DD/MM/YYYY]  
[Date entered should be from 1<sup>st</sup> Dec 2005 onwards]
- 1.1a Was this procedure successfully completed? Yes ☐ Abandoned ☐ [Tick 1 option only]  
[If Yes, go to 1.2] [If Abandoned, 1.1b **must be completed**]  
[NB This form still needs to be completed even if the procedure was abandoned]
- 1.1b If procedure was Abandoned, give reason: \_\_\_\_\_
- 1.2 RCP surgeon code: \_\_\_\_\_ [On the web tool, this field is filled automatically if an individual login was used to access the web tool. If a 'unit admin' login was used, the relevant code must be selected from a drop down menu] [3 digits]
- 1.2a GMC Number: \_\_\_\_\_ [On the web tool, this field is filled automatically once Q1.2 is filled] [7 digits]
- 1.3 Hospital name: \_\_\_\_\_ [On the web tool, this field is filled automatically if the surgeon or radiologists performs carotid procedures at 1 hospital only, otherwise the relevant hospital name must be selected manually from a drop down menu] [Describes hospital where the procedure was performed]
- 1.4 RCP Hospital code: \_\_\_\_\_ [On the web tool, this field is filled automatically] once Q1.3 [3 digits]
- 1.5 Date of birth: \_\_\_\_\_ [DD/MM/YYYY]
- 1.6a Patient code: \_\_\_\_\_ [Describes a random number (up to 3 digits) that you give to the patient for anonymity]
- 1.6b Patient hospital number: \_\_\_\_\_  
[On the web tool, this field is visible to hospital staff only] [Describes the identifier that is on the patient's local hospital records]
- 1.7 Gender: Male ☐ Female ☐ [Tick 1 option only]
- 1.9 Ethnicity: [Tick 1 option only]
- |                               |                       |                                                                                                 |
|-------------------------------|-----------------------|-------------------------------------------------------------------------------------------------|
| White                         | <input type="radio"/> | British, Irish, Any other white background                                                      |
| Mixed                         | <input type="radio"/> | White and Black Caribbean, White and Black African, White and Asian, Any other Mixed background |
| Asian or Asian British        | <input type="radio"/> | Indian, Pakistani, Bangladeshi, Any other Asian background                                      |
| Black or Black British        | <input type="radio"/> | Caribbean, African, Any other Black background                                                  |
| Chinese or other ethnic group | <input type="radio"/> | Chinese, Any other                                                                              |
- 1.10 Which of the following procedures was performed? [Tick 1 option only]
- Surgical carotid endarterectomy ☐ Angioplasty/stent ☐ Combined CEA and angioplasty/stent ☐  
[If Surgical carotid endarterectomy is selected, ignore 13.1 to 13.1b and 13.10 to 13.12]  
[If Angioplasty/stent is selected, ignore 12.3a and 13.4 to 13.9]  
[If Combined CEA & angioplasty/stent is selected, ignore 13.1 to 13.2a]
- 1.11 Date patient was admitted to this Hospital in **this episode** of care: \_\_\_\_\_  
[DD/MM/YYYY] [Date entered CANNOT be after date of procedure (1.1) but can be EQUAL to date of procedure (1.1)]

##### Section 2: Risk Factors

- 2.1 Diagnosed Diabetic: Yes ☐ No ☐ [Tick 1 option only]
- 2.2 Any current symptoms of or treatment for ischaemic heart disease or congestive heart failure?  
Yes ☐ No ☐ [Tick 1 option only]

- 2.3 Known peripheral arterial vascular disease (symptoms or previous intervention) Yes ☐ No ☐
- 2.4 Pre-operative blood pressure (e.g. taken on day or prior to surgery or in clinic):
- Systolic BP (mmHg): [            ] *[Min= 20, Max=350]*  
 Diastolic BP (mmHg): [            ] *[Min= 20, Max=350]*

### Section 3: Referral to surgeons

- 3.1 Date of referral to team under whose care surgery or angioplasty/stenting was undertaken: \_\_\_\_\_  
*[DD/MM/YYYY] [Date entered can be from 1<sup>st</sup> Dec 2003 onwards but CANNOT be after date of procedure (1.1)]*
- 3.1a Date patient was first seen by team under whose care surgery or angioplasty/stenting was undertaken:  
*[DD/MM/YYYY] [Date entered can be from 1<sup>st</sup> Dec 2003 onwards but CANNOT be after date of procedure (1.1)]*
- 3.2 Who referred the patient to the team under whose care surgery or angioplasty/stenting was undertaken?  
*[Tick 1 option only]*
- General Practitioner ☐ Neurologist ☐ Stroke Physician ☐ Radiologist ☐  
 Care of the Elderly Consultant ☐ Vascular Surgeon ☐ Cardiologist/Cardiothoracic surgeon ☐  
 Ophthalmology ☐ Self referral ☐ Other Surgeon ☐ Other ☐  
*[If NOT Other, go to 3.3] [If Other, 3.2a must be completed]*
- 3.2a If answered *Other* to 3.2, specify: \_\_\_\_\_
- 3.3 Was the patient referred from another Trust? Yes ☐ No ☐ *[Tick 1 option only]*

### Section 4: Indications that triggered referral

- 4.1 Was the patient symptomatic for carotid disease? Yes ☐ No ☐ *[Tick 1 option only]*  
*[If 'No', ignore 4.1a to 4.1d and 7.1.]*  
*[If 'Yes', ignore 4.1e and 4.1a or 4.1b and 4.1c must be completed]*
- 4.1a If 'Yes', give the **date** the patient experienced the symptom that triggered referral for surgery or angioplasty/stent:  
 \_\_\_\_\_ *[DD/MM/YYYY] [If date is given, go to 4.1c]*  
*[Date entered can be from 1<sup>st</sup> Dec 2000 onwards but CANNOT be after date of procedure (1.1)]*  
 Date not known ☐ *[If this option is selected 4.1b must be completed]*
- 4.1b If *Date Not known*, estimate the time between the date the patient experienced the symptom and the date that the initial referral for surgery or angioplasty/stent was made: *[Tick 1 option only]*
- 1-2 days ☐ 3-7 days ☐ 8-14 days ☐ 15-21 days ☐ 22-28 days ☐ >28 days ☐
- 4.1c What was the symptom that triggered referral for surgery or angioplasty/stent? *[Tick 1 option only]*  
*[NB only the INDEX symptom is required even if the patient had other symptoms]*
- Amaurosis fugax ☐ Transient ischaemic attack ☐ Stroke ☐  
 Chronic cerebral hypoperfusion ☐ Other ☐  
*[If Other is selected, 4.1d must be completed]*
- 4.1d If answered *Other* to 4.1c, specify: \_\_\_\_\_
- 4.1e If 'No' to 4.1, is CEA or angioplasty/stent being undertaken prior to major surgery (e.g. CABG) or as part of randomised trial? *[Tick 1 option only]*
- Major surgery (e.g. CABG) ☐ Randomised trial ☐ Neither of these ☐

**Section 5: DIAGNOSTIC carotid imaging** [i.e. Imaging that identified ICA stenosis requiring treatment]

- 5.1 Date of the initial DIAGNOSTIC carotid imaging that identified ICA stenosis requiring treatment: \_\_\_\_\_ [DD/MM/YYYY]  
[Date entered can be from 1<sup>st</sup> Dec 2003 onwards but CANNOT be after date of procedure (1.1)]
- 5.2 Specify imaging modalities used on date given in 5.1: [Select at least 1 option]  
Duplex ☐ MR angiogram ☐ Catheter angiogram ☐ CT angiogram ☐ Other or Not documented ☐
- 5.2a Grade of ipsilateral carotid stenosis (based on **NASCET** criteria): [Tick 1 option only]  
[Describes measurement used to identify suitability for intervention]  
<50% ☐ 50%-69% ☐ 70%-89% ☐ 90%-99% ☐ Occluded ☐
- 5.2b Grade of contralateral carotid stenosis (based on **NASCET** criteria): [Tick 1 option only]  
Not done ☐ <50% ☐ 50%-69% ☐ 70%-89% ☐ 90%-99% ☐ Occluded ☐
- 5.3 Has the patient had further pre-operative carotid imaging after initial scan, to confirm diagnosis? [Tick 1 option only]  
Yes ☐ No ☐ [If No, go to 6.1] [If Yes, 5.3a must be completed]
- 5.3a Date patient had further pre-operative carotid imaging after initial scan, to confirm diagnosis: \_\_\_\_\_ [DD/MM/YYYY] [Date entered MUST be BEFORE date of procedure (1.1)]
- 5.3b Specify imaging modalities used on date given in 5.3a: [Select at least 1 option]  
Duplex ☐ MR angiogram ☐ Catheter angiogram ☐ CT angiogram ☐ Other or Not documented ☐
- 5.3c If answered Yes to 5.3, specify grade of ipsilateral carotid stenosis (based on **NASCET** criteria):  
<50% ☐ 50%-69% ☐ 70%-89% ☐ 90%-99% ☐ Occluded ☐
- 5.3d If answered Yes to 5.3, did the patient have a string sign (with a collapsed ICA)? Yes ☐ No ☐
- 5.3e If answered Yes to 5.3, specify grade of contralateral carotid stenosis (based on **NASCET** criteria): [Tick 1 option only]  
Not done ☐ <50% ☐ 50%-69% ☐ 70%-89% ☐ 90%-99% ☐ Occluded ☐

**Section 6: Most recent carotid imaging prior to undergoing this surgery or angioplasty/stent**

- 6.1 Has the patient had further pre-operative carotid imaging to confirm patency immediately prior to surgery or angioplasty/stent?  
Yes ☐ No ☐ [If No, go to 7.1] [If Yes, 6.1a must be completed]
- 6.1a If answered Yes to 6.1, give date of pre-operative imaging to confirm patency prior to surgery or angioplasty/stent:  
\_\_\_\_\_ [DD/MM/YYYY] [Date entered MUST be ON or BEFORE date of procedure (1.1)]

**Section 7: Function prior to undergoing this surgery or angioplasty/stent**

- 7.1 Give date of the most recent ISCHAEMIC event prior to surgery or angioplasty/stent: \_\_\_\_\_  
[DD/MM/YYYY]  
[Date entered can be from 1<sup>st</sup> Dec 2003]
- 7.2 Rankin score immediately pre-operatively or prior to angioplasty/stent: [Tick 1 option only]  
0 ☐ Asymptomatic  
1 ☐ Non-disabling symptoms no interference with lifestyle  
2 ☐ Minor disability some restriction in lifestyle but does not interfere with patient's capacity to look after self  
3 ☐ Moderate disability symptoms significantly interfere with lifestyle or prevent totally independent existence  
4 ☐ Moderately severe symptoms prevent independent existence but patient does not need attention 24hrs  
5 ☐ Severely disabled totally dependent day and night

## Section 8: Previous carotid interventional procedures

- 8.1 Previous ipsilateral carotid surgery: Yes ☐ No ☐ *[Tick 1 option only]*
- 8.2 Previous ipsilateral carotid angioplasty or stent: Yes ☐ No ☐ *[Tick 1 option only]*

## Section 9: Tests prior to undergoing this surgery or angioplasty/stent

- 9.1 Creatinine: [ ] (mmol/L) *[Min=5 Max=1000]*

## Section 10: Drug therapy prior to undergoing this surgery or angioplasty/stent

- 10.1 Was the patient on anti-platelet/thrombotic treatment prior to surgery or angioplasty/stent? Yes ☐ No ☐ *[If No, go to 10.3] [If Yes, 10.2 must be completed]*
- 10.2 Which of the following drugs was the patient taking prior to surgery or angioplasty/stent: *[Select at least 1 option]*  
 Aspirin ☐ Clopidogrel ☐ Dipyridamole ☐ Warfarin ☐ Other ☐  
*[If Aspirin is NOT selected, ignore 10.2a & 10.2b] [If Clopidogrel is NOT selected, ignore 10.2c & 10.2d] [If Dipyridamole is NOT selected, ignore 10.2e & 10.2f] [If Warfarin is NOT selected, ignore 10.2g & 10.2h]*
- 10.2a Was ASPIRIN stopped prior to surgery or angioplasty/stent? Yes ☐ No ☐ *[If No, ignore 10.2b]*
- 10.2b If ASPIRIN was stopped, specify the number of days it was stopped prior to surgery or angioplasty/stent: [ ] *[Days]*
- 10.2c Was CLOPIDOGREL stopped prior to surgery or angioplasty/stent? Yes ☐ No ☐ *[If No, ignore 10.2d]*
- 10.2d If CLOPIDOGREL was stopped, specify the number of days it was stopped prior to surgery or angioplasty/stent: [ ] *[Days]*
- 10.2e Was DIPYRIDAMOLE stopped prior to surgery or angioplasty/stent? Yes ☐ No ☐ *[If No, ignore 10.2f]*
- 10.2f If DIPYRIDAMOLE was stopped, specify the number of days it was stopped prior to surgery or angioplasty/stent: [ ] *[Days]*
- 10.2g Was WARFARIN stopped prior to surgery or angioplasty/stent? Yes ☐ No ☐ *[If No, ignore 10.2h]*
- 10.2h If WARFARIN was stopped, specify the number of days it was stopped prior to surgery or angioplasty/stent: [ ] *[Days]*
- 10.3 Was the patient on statin therapy prior to surgery or angioplasty/stent? Yes ☐ No ☐ *[Tick 1 option only]*
- 10.4 Was the patient on beta-blockers therapy prior to surgery or angioplasty/stent? Yes ☐ No ☐ *[Tick 1 option only]*

## Section 11: Delay to surgery or angioplasty/stent

- 11.1 If elapsed time between the symptom that triggered referral and surgery or angioplasty/stent is **greater than 2 weeks**, specify reason(s):  
*[Select at least 1 option] [If Other is NOT selected, ignore 11.1a]*

|                                             |                          |                                      |                          |       |                          |
|---------------------------------------------|--------------------------|--------------------------------------|--------------------------|-------|--------------------------|
| Delay in presentation                       | <input type="checkbox"/> | Limited availability of surgeon      | <input type="checkbox"/> | Other | <input type="checkbox"/> |
| Delay in referral                           | <input type="checkbox"/> | Limited availability of anaesthetist | <input type="checkbox"/> |       |                          |
| Delay in carotid imaging                    | <input type="checkbox"/> | Limited availability of radiologist  | <input type="checkbox"/> |       |                          |
| Patient cancellation/delay - unfit          | <input type="checkbox"/> | Lack of operating time               | <input type="checkbox"/> |       |                          |
| Patient cancellation/delay – patient choice | <input type="checkbox"/> | Other case took priority             | <input type="checkbox"/> |       |                          |

11.1a If answered *Other* in 11.1, specify:

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## Section 12: Procedure details

12.1 Which carotid artery was treated? Left ☐ Right ☐ *[Tick 1 option only]*

12.2 Start time: [ : ] *[Hours:Minutes]*

12.3 Finish time: [ : ] *[Hours:Minutes]*

12.3a If length of procedure is <1hour or >3hours, give reason: \_\_\_\_\_

12.4 Grade of most senior surgeon in theatre: *[Tick 1 option only]* *[If NOT Specialist registrar, go to 12.5]*

Consultant ☐ Non consultant career grade ☐ Specialist registrar ☐

12.4a If most senior surgeon in theatre was *Specialist registrar*, specify year of training: *[Tick 1 option only]*

Year 1 ☐ Year 2 ☐ Year 3 ☐ Year 4 ☐ Year 5 ☐

12.5 Was this a joint consultant operation with two consultant surgeons operating together? Yes ☐ No ☐

12.6 Type of surgery: Elective ☐ Unplanned/Emergency ☐ *[Tick 1 option only]*

12.7 Type of anaesthetic used during surgery? General ☐ Local/Blocks ☐  
Started with LA, switched to GA ☐

12.8 Grade of most senior anaesthetist in theatre: *[Tick 1 option only]* *[If NOT Specialist registrar, go to 13.1]*

Consultant ☐ Non consultant career grade ☐ Specialist registrar ☐

12.8a If most senior anaesthetist in theatre was *Specialist registrar*, specify year of training: *[Tick 1 option only]*

Year 1 ☐ Year 2 ☐ Year 3 ☐ Year 4 ☐ Year 5 ☐



| Section 13: Specific procedure data |                                                                                                                                                 | [Complete Q13.1 to Q13.1b and 13.10 to 13.12 ONLY if the patient had angioplasty/stent] |                                                                                                                                 |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| 13.1                                | If angioplasty/stent only performed was conventional was surgery an option? Yes <input type="radio"/> No <input type="radio"/>                  |                                                                                         |                                                                                                                                 |
|                                     | [Tick 1 option only]                                                                                                                            |                                                                                         |                                                                                                                                 |
| 13.1a                               | Whose care was the patient under when they underwent angioplasty/stent? [If NOT Other, go to 13.2]                                              |                                                                                         |                                                                                                                                 |
|                                     | Vascular surgeon <input type="radio"/>                                                                                                          | Neurosurgeon <input type="radio"/>                                                      | Radiologist <input type="radio"/> Stroke Physician <input type="radio"/> Other <input type="radio"/>                            |
| 13.1b                               | If answered Other to 13.1a, specify: _____                                                                                                      |                                                                                         |                                                                                                                                 |
| 13.2                                | Was this patient in a stenting versus surgery clinical trial? Yes <input type="radio"/> No <input type="radio"/>                                |                                                                                         |                                                                                                                                 |
| 13.2                                | If the patient was in a stenting versus surgery trial were they in ICSS or ACST-2? ICSS <input type="radio"/> ACST-2 <input type="radio"/>      |                                                                                         |                                                                                                                                 |
| 13.3                                | Pathology: [Select at least 1 option] [If NOT Other, ignore 13.3a]                                                                              |                                                                                         |                                                                                                                                 |
|                                     | Atherosclerosis <input type="checkbox"/>                                                                                                        | Post endarterectomy restenosis <input type="checkbox"/>                                 | Post radiotherapy <input type="checkbox"/> Other <input type="checkbox"/>                                                       |
| 13.3a                               | If answered Other to 13.3, specify: _____                                                                                                       |                                                                                         |                                                                                                                                 |
| 13.4                                | Was a carotid shunt used? Yes <input type="radio"/> No <input type="radio"/> Attempted and abandoned <input type="radio"/> [Tick 1 option only] |                                                                                         |                                                                                                                                 |
| 13.5                                | Type of endarterectomy: Standard <input type="radio"/> Eversion <input type="radio"/> [Tick 1 option only]                                      |                                                                                         |                                                                                                                                 |
| 13.6                                | Was a carotid patch used? Yes <input type="radio"/> No <input type="radio"/> [Tick 1 option only]                                               |                                                                                         |                                                                                                                                 |
| 13.7                                | Were distal tacking sutures used? Yes <input type="radio"/> No <input type="radio"/> [Tick 1 option only]                                       |                                                                                         |                                                                                                                                 |
| 13.8                                | Was heart surgery undertaken synchronously? Yes <input type="radio"/> No <input type="radio"/> [Tick 1 option only]                             |                                                                                         |                                                                                                                                 |
| 13.9                                | Which of the following completion assessment techniques were used? [Select at least 1 option]                                                   |                                                                                         |                                                                                                                                 |
|                                     | [If 'None', go to 14.1] [If NOT 'None', select at least 1 option]                                                                               |                                                                                         |                                                                                                                                 |
|                                     | None <input type="radio"/>                                                                                                                      | Angiography <input type="checkbox"/>                                                    | Duplex scan <input type="checkbox"/> Angioscopy <input type="checkbox"/> Hand-held Doppler <input type="checkbox"/>             |
| 13.10                               | Site of angioplasty/stenting: [Select at least 1 option]                                                                                        |                                                                                         |                                                                                                                                 |
|                                     | Carotid bifurcation (including proximal ICA) <input type="checkbox"/>                                                                           | Distal ICA (below base of skull) <input type="checkbox"/>                               |                                                                                                                                 |
|                                     | Common Carotid artery <input type="checkbox"/>                                                                                                  | External Carotid artery <input type="checkbox"/>                                        |                                                                                                                                 |
| 13.11                               | Procedure details: Angioplasty alone <input type="checkbox"/> Stent Cerebral protection device <input type="checkbox"/>                         |                                                                                         |                                                                                                                                 |
|                                     | [Select at least 1 option] [If Stent is NOT selected, ignore 13.11a & 13.11b]                                                                   |                                                                                         |                                                                                                                                 |
|                                     | [If Cerebral protection device is NOT selected, ignore 13.11c & 13.11d]                                                                         |                                                                                         |                                                                                                                                 |
| 13.11a                              | If answered Stent to 13.11, specify type: [Select at least 1 option] [If NOT Other, ignore 13.11b]                                              |                                                                                         |                                                                                                                                 |
|                                     | Abbott XAct <input type="radio"/>                                                                                                               | Abbott Acculink <input type="radio"/>                                                   | Bard Vivax <input type="radio"/> Boston Scientific Wallstent <input type="radio"/>                                              |
|                                     | Boston Scientific NEX stent <input type="radio"/>                                                                                               | Cordis Precise <input type="radio"/>                                                    | Invatec Cristallo <input type="radio"/> Medtronic Exponent <input type="radio"/>                                                |
| Other                               | <input type="radio"/>                                                                                                                           |                                                                                         |                                                                                                                                 |
| 13.11b                              | If answered Other to 13.11a, specify: _____                                                                                                     |                                                                                         |                                                                                                                                 |
| 13.11c                              | If answered Cerebral protection device to 13.11, specify type: [Tick 1 option only] [If NO Other, ignore 13.11d]                                |                                                                                         |                                                                                                                                 |
|                                     | Filter <input type="radio"/>                                                                                                                    | Flow reversal <input type="radio"/>                                                     | Proximal occlusion (MoMa) <input type="radio"/> Distal occlusion (PercuSurge) <input type="radio"/> Other <input type="radio"/> |
| 13.11d                              | If answered Other to 13.11c, specify: _____                                                                                                     |                                                                                         |                                                                                                                                 |
| 13.12                               | Grade of most senior radiologist performing intervention: [Tick 1 option only]                                                                  |                                                                                         |                                                                                                                                 |
|                                     | Consultant <input type="radio"/>                                                                                                                | Non consultant career grade <input type="radio"/>                                       | Specialist registrar <input type="radio"/>                                                                                      |



## Section 14: Destination post-operatively or post angioplasty/stent

- 14.1 Time spent in recovery area: *[Tick 1 option only]*  
 None ☐ <4 hours ☐ >4 ≤ 12 hours ☐ >12 hours ☐
- 14.2 Where was the patient admitted post-operatively or post angioplasty/stent (after any period in recovery)?  
 Intensive care unit ☐ High dependency unit ☐ Ward ☐ PACU ☐  
*[Tick 1 option only]*

## Section 15: Complications during inpatient stay

- 15.1 Did the patient suffer any complications during inpatient stay? Yes ☐ No ☐ *[If No, go to 15.6]*

- 15.1a If answered 'Yes to 15.1', which of the following complications did the patient experience?

*[Select at least 1 option]*

|                    |                          |                                             |                          |                                                       |                          |
|--------------------|--------------------------|---------------------------------------------|--------------------------|-------------------------------------------------------|--------------------------|
| Myocardial Infarct | <input type="checkbox"/> | Cranial nerve injury (includes neuropraxia) | <input type="checkbox"/> | Occlusion of treated carotid artery                   | <input type="checkbox"/> |
| Stroke             | <input type="checkbox"/> | Heart Failure (includes cardiac arrhythmia) | <input type="checkbox"/> | Respiratory                                           | <input type="checkbox"/> |
| TIA                | <input type="checkbox"/> | Urinary                                     | <input type="checkbox"/> | Thromboembolism related to the treated carotid artery | <input type="checkbox"/> |
| Amaurosis fugax    | <input type="checkbox"/> | Cardiac arrest                              | <input type="checkbox"/> | Post-intervention hypertension                        | <input type="checkbox"/> |
| Bleeding           | <input type="checkbox"/> | Fit                                         | <input type="checkbox"/> | Other                                                 | <input type="checkbox"/> |

*[If Myocardial infarct is NOT selected, ignore 15.2][If Stroke is NOT selected, ignore 15.3, 15.3a, 15.3b, 15.3c & 15.3d]*

*[If TIA is NOT selected, ignore 15.4]*

*[If Cranial nerve injury is NOT selected, ignore 15.5 & 15.5a]*

*[If Other is NOT selected, ignore 15.1b]*

- 15.1b If answered 'Other' to 15.1a, specify: \_\_\_\_\_

- 15.2 If the patient experienced a *myocardial infarct*, specify timing: *[Tick 1 option only]*

≤24hrs of undergoing procedure ☐  
 >24hrs after undergoing procedure and prior to discharge ☐

- 15.3 If the patient experienced a *stroke*, specify timing: *[Tick 1 option only]*

During procedure (woke up with a stroke) ☐  
 ≤24hrs of undergoing procedure ☐  
 >24hrs after undergoing procedure and prior to discharge ☐

*[If During procedure (woke up with stroke) OR ≤24hrs of undergoing procedure ignore 15.3a]*

*[If >24hrs of undergoing procedure and prior to discharge 15.3a must be completed]*

- 15.3a If patient experienced a stroke >24hrs after undergoing procedure and prior to discharge, give date patient of stroke: \_\_\_\_\_ *[DD/MM/YYYY]* *[Date entered MUST be AFTER date of procedure (1.1)]*

- 15.3b Side of stroke: Side on which this procedure was done ☐ Contralateral side ☐ *[Tick 1 option only]*

- 15.3c Severity of stroke: *[Tick 1 option only]*

- 0 ☐ Asymptomatic  
 1 ☐ Non-disabling symptoms no interference with lifestyle  
 2 ☐ Minor disability some restriction in lifestyle but does not interfere with patient's capacity to look after self  
 3 ☐ Moderate disability symptoms significantly interfere with lifestyle or prevent totally independent existence  
 4 ☐ Moderately severe symptoms prevent independent existence but patient does not need attention 24hrs  
 5 ☐ Severely disabled totally dependent day and night

- 15.3d Give date the assessment in 15.3c was made: \_\_\_\_\_  
*[DD/MM/YYYY]* *[Date entered must be on or after date procedure was undertaken (1.1)]*

- 15.4 If patient experienced *TIA*, specify timing:  
 ≤24hrs of undergoing procedure ☐ >24hrs after undergoing procedure and prior to discharge ☐

- 15.5 If patient experienced *cranial nerve injury*, specify date injury was found: \_\_\_\_\_ *[DD/MM/YYYY]*

*[Date entered must be on or after date procedure was undertaken (1.1)]*

15.5a Affected cranial nerve (or branch): *[Select at least 1 option]*

Hypoglossal ☐ Facial ☐ Glossopharyngeal ☐ Vagus ☐ Recurrent laryngeal ☐

15.6 Did the patient return to theatre for ANY reason during hospital stay? Yes ☐ No ☒ *'No', go to 15.7]*

15.6a If answered Yes to 15.6, specify reason patient returned to theatre: *[Select at least 1 option]* *[If NOT Other, go to 15.7]*

Bleeding ☐ Stroke ☐ Thromboembolism related to the treated carotid artery ☐ Other ☐

15.6b If answered *Other* to 15.6a, specify: \_\_\_\_\_

15.7 Did the patient die during inpatient stay? Yes ☐ No ☐ *[Tick 1 option only]* *[If No, go to 16.1]*

15.7a If answered Yes to 15.7, give the date that the patient died: \_\_\_\_\_ *[DD/MM/YYYY]*  
*[Date entered must be equal to or greater than 1.1 (date of procedure)]*

15.7b Specify PRIMARY cause of death: Myocardial Infarct ☐ Bleeding ☐ Stroke ☐ Other ☐  
*[If NOT Other, complete 17.1. Then 18.1 to 21.1a DO NOT need to be completed]*  
*[If Other, 15.7c must be completed]*

15.7c If answered *Other* to 15.7b, specify: \_\_\_\_\_

## Section 16: Discharge data

16.1 Date patient was discharged by team under whose care surgery or angioplasty/stent was performed: \_\_\_\_\_ *[DD/MM/YYYY]* *[MUST be on or after date of procedure (1.1)]*

16.2 Date patient was discharged from hospital: \_\_\_\_\_ *[DD/MM/YYYY]*  
*[MUST be on or after date of procedure (1.1)]*

16.3 Discharge Destination: Home ☐ Care Home ☐ Other Hospital ☐ Other ☐  
*[If NOT 'Other' go to 16.4]*

16.3a If answered *Other* to 16.3, specify: \_\_\_\_\_

16.4 What was the Rankin score at hospital discharge? *[Tick 1 option only]*

- 0 ☐ Asymptomatic
- 1 ☐ Non-disabling symptoms no interference with lifestyle
- 2 ☐ Minor disability some restriction in lifestyle but does not interfere with patient's capacity to look after self
- 3 ☐ Moderate disability symptoms significantly interfere with lifestyle or prevent totally independent existence
- 4 ☐ Moderately severe symptoms prevent independent existence but patient does not need attention 24hrs
- 5 ☐ Severely disabled totally dependent day and night

## Section 17: Phase 1 Data entry

17.1 Who completed Phase 1? *[Tick 1 option only]*

Surgeon ☐ Specialist Registrar (Surgical) ☐ Basic surgical trainee ☐ Nurse ☐  
Audit personnel ☐ Radiologist ☐ Specialist Registrar (Radiological) ☐ Other ☐  
*[If Other, 17.1a must be completed]*  
*[If NOT Other, go to 18.1]*

17.1a If answered *Other* to 17.1, specify: \_\_\_\_\_

## Phase 2 [30-day survival/Follow-up assessment]

### Section 18: Patient status at 30days after undergoing procedure

- 18.1 Did the patient die following discharge (up to 30 days after undergoing this procedure)? Yes ☐ No ☐  
*[If No, go to 19.1]*
- 18.1a If answered Yes to 18.1, give date patient died: \_\_\_\_\_ *[DD/MM/YYYY]*  
*[Date entered must be equal to or greater than 16.2 (date patient was discharged from hospital)]*
- 18.1b Cause of death: Myocardial infarct ☐ Bleeding ☐ Stroke ☐ Other ☐ Unknown ☐  
*[Tick 1 option only] [If NOT Other, go to 21.1]*
- 18.1c If answered Other to 18.1b, specify: \_\_\_\_\_ *[Go to 21.1]*

### Section 19: Follow-up attendance

- 19.1 Was the patient offered a post-discharge follow-up appointment? Yes ☐ No ☐ *[If No, go to 21.1]*
- 19.2 If answered Yes to 19.1, did the patient attend post-operative follow-up appointment?  
 Yes ☐ No ☐ *[Tick 1 option only] [If No, go to 21.1]*
- 19.2a If answered Yes to 19.2, give date of post-discharge follow-up assessment: \_\_\_\_\_ *[DD/MM/YYYY]*  
*[Date entered must be ON or AFTER date of procedure (1.1)]*
- 19.2b Form of follow-up: *[Tick 1 option only]*  
 Patient seen in OPD (own Trust) ☐ Patient seen in OPD (other Trust) ☐ Telephone follow-up ☐  
 Postal follow-up ☐
- 19.3 Specify specialty of professional that assessed the patient: *[Select at least 1 option]*  
 Surgeon ☐ Neurologist ☐ Stroke Physician ☐ Care of the Elderly Consultant ☐  
 Cardiologist/Cardiothoracic surgeon ☐ Other ☐ *[If NOT Other, go to 20.1]*
- 19.3a If answered Other to 19.3, specify specialty: *[e.g. Vascular SpR]* \_\_\_\_\_

## Section 20: Post-operative follow-up data

- 20.1 Was the patient re-admitted for a complication <30days after operation and after hospital discharge?  
Yes ☐ No ☐ *[If No, go to 20.2]*
- 20.1a If answered Yes to 20.1, give date patient was re-admitted: \_\_\_\_\_ *[DD/MM/YYYY]*  
*[Date entered must be equal to or greater than 16.2 (date patient was discharged from hospital)]*
- 20.1b Specify reason for re-admission: Stroke ☐ Cardiac ☐ Respiratory ☐ Other ☐ *[Select at least 1 option] [If 'No', go to 20.2]*
- 20.1 c If answered *Other* to 20.1b, specify: \_\_\_\_\_
- 20.2 Was evidence of cranial nerve injury found at follow-up (that was NOT identified prior to discharge)? Yes ☐ No ☐  
*[If 'No', go to 20.3]*
- 20.2a If answered Yes to 20.2, which nerve (or branch) was affected? *[Select at least 1 option]*  
Hypoglossal ☐ Facial ☐ Glossal pharyngeal ☐ Vagus ☐ Recurrent laryngeal ☐
- 20.3 Has the patient had a stroke **since discharge**? Yes ☐ No ☐ *[If No, go to 20.4]*
- 20.3a If answered Yes to 20.3 give date patient experienced stroke (if exact date is not known, give best estimate):  
*[Date entered must be EQUAL to or GREATER than 16.2 (date patient was discharged from hospital)]*
- 20.4 Rankin score at this visit (follow-up): *[Tick 1 option only]*  
0 ☐ Asymptomatic  
1 ☐ Non-disabling symptoms no interference with lifestyle  
2 ☐ Minor disability some restriction in lifestyle but does not interfere with patient's capacity to look after self  
3 ☐ Moderate disability symptoms significantly interfere with lifestyle or prevent totally independent existence  
4 ☐ Moderately severe symptoms prevent independent existence but patient does not need attention 24hrs  
5 ☐ Severely disabled totally dependent day and night
- 20.5 What drug therapy is the patient on post-operatively? *[Select at least 1 option]*  
Anti-platelet/thrombotic ☐ Statin ☐ Beta-blockers ☐ *[If NOT Anti-platelet/thrombotic, go to 21.1]*
- 20.5a If answered *Anti-platelet/thrombotic* to 20.5, specify drug(s): *[Select at least 1 option] [If NOT Other, go to 21.1]*  
Aspirin ☐ Clopidogrel ☐ Dipyridamole ☐ Warfarin ☐ Other ☐
- 20.5b If answered *Other* to 20.5a, specify: \_\_\_\_\_

## Section 21: Phase 2 Data entry

- 21.1 Who completed Phase 2? *[Tick 1 option only]*  
Surgeon ☐ Specialist Registrar (surgical) ☐ Basic surgical trainee ☐ Nurse ☐  
Audit personnel ☐ Radiologist ☐ Specialist Registrar (radiological) ☐ Other ☐  
*[If NOT Other, ignore 21.1a]*
- 21.1a If answered *Other* to 21.1, please specify: \_\_\_\_\_

### Appendix 3: Table of Participation

| Country | Region          | Trust name                                                     | Consultant Name          |
|---------|-----------------|----------------------------------------------------------------|--------------------------|
| England | East Midlands   | Derby Hospitals NHS Foundation Trust                           | Mr Kumar Abayasekara     |
|         |                 |                                                                | Mr Amir El-Tahir         |
|         |                 |                                                                | Mr Sreevalsan Kappadath  |
|         |                 |                                                                | Mr Muthu Lingam          |
|         |                 |                                                                | Mr John Quarmby          |
|         |                 |                                                                | Mr Timothy Rowlands      |
|         |                 | Kettering General Hospital NHS Foundation Trust                | Mr Salem Al-Hamali       |
|         |                 |                                                                | Mr Avtar Brar            |
|         |                 | Northampton General Hospital NHS Trust                         | Mr Vijay Bahal           |
|         |                 |                                                                | Mr Avtar Brar            |
|         |                 |                                                                | Mr Robert Hicks          |
|         |                 |                                                                | Mr Sreevalsan Kappadath  |
|         |                 |                                                                | Mr Gabor Libertiny       |
|         |                 |                                                                | Mr David Ratliff         |
|         |                 | Nottingham University Hospitals NHS Trust                      | Mr Bruce Braithwaite     |
|         |                 |                                                                | Mrs Sadhana Chandrasekar |
|         |                 |                                                                | Mr Shane MacSweeney      |
|         |                 |                                                                | Mr Akin Oluwole          |
|         |                 |                                                                | Mr William Tennant       |
|         |                 | Sherwood Forest Hospitals NHS Foundation Trust                 | Mr Irfan Akhtar          |
|         |                 |                                                                | Mr Rakesh Kapur          |
|         |                 |                                                                | Mr Khalid Makhdoomi      |
|         |                 | United Lincolnshire Hospitals NHS Trust                        | Mr Nityanand Arya        |
|         |                 |                                                                | Mr Paul Dunning          |
|         |                 |                                                                | Mr Peter Lee Chong       |
|         |                 |                                                                | Mr Jayarama Mohan        |
|         |                 | University Hospitals of Leicester NHS Trust                    | Mr Matthew Bown          |
|         |                 |                                                                | Professor Nick London    |
|         |                 |                                                                | Mr Mark McCarthy         |
|         |                 |                                                                | Mr Akhtar Nasim          |
|         |                 |                                                                | Professor Ross Naylor    |
|         |                 |                                                                | Mr Robert Sayers         |
|         | East of England | Basildon and Thurrock University Hospital NHS Foundation Trust | Mr Vijay Gadhvi          |
|         |                 |                                                                | Mr Taleb Jeddy           |
|         |                 |                                                                | Mr Jay Menon             |
|         |                 | Bedford Hospital NHS Trust                                     | Mr Arindam Chaudhuri     |
|         |                 |                                                                | Mr Tapan Mehta           |
|         |                 |                                                                | Mr Nadim Noor            |
|         |                 |                                                                | Mr Paul Tisi             |
|         |                 | Cambridge University Hospitals NHS Foundation Trust            | Mr Jonathan Boyle        |
|         |                 |                                                                | Mr Patrick Coughlin      |
|         |                 |                                                                | Mr Michael Gaunt         |
|         |                 |                                                                | Mr Manj Gohel            |
|         |                 |                                                                | Mr Paul Hayes            |
|         |                 |                                                                | Mr Peter Kirkpatrick     |
|         |                 |                                                                | Mr Kevin Varty           |
|         |                 | Colchester Hospital University NHS Foundation Trust            | Mr Abdusalam Abu-Own     |
|         |                 |                                                                | Mr Chris Backhouse       |

| Country | Region | Trust name                                                     | Consultant Name            |
|---------|--------|----------------------------------------------------------------|----------------------------|
|         |        |                                                                | Mr Sohail Chosky           |
|         |        |                                                                | Mr Adam Howard             |
|         |        |                                                                | Mr Isam Osman              |
|         |        | East and North Hertfordshire NHS Trust                         | Mr Shah Md Golam Kibria    |
|         |        |                                                                | Mr Matt Metcalfe           |
|         |        |                                                                | Mr Sadasivam Selvakumar    |
|         |        | Ipswich Hospital NHS Trust                                     | Mr Abdulalam Abu-Own       |
|         |        |                                                                | Mr Isam Osman              |
|         |        |                                                                | Mr Fahed Youssef           |
|         |        | Mid Essex Hospital Services NHS Trust                          | Mr Tom Browne              |
|         |        |                                                                | Mr Ioannis Panayiotopoulos |
|         |        |                                                                | Mr Ioannis Prionidis       |
|         |        | Norfolk and Norwich University Hospitals NHS Foundation Trust  | Mr Matthew Armon           |
|         |        |                                                                | Mr Rob Brightwell          |
|         |        |                                                                | Mr James Clarke            |
|         |        |                                                                | Miss Felicity Meyer        |
|         |        |                                                                | Mr Darren Morrow           |
|         |        |                                                                | Miss Yvonne Wilson         |
|         |        | Peterborough and Stamford Hospitals NHS Foundation Trust       | Mr Brandon Krijgsman       |
|         |        |                                                                | Mr John Kuriakose          |
|         |        |                                                                | Mr Peter Taylor            |
|         |        | Princess Alexandra Hospital NHS Trust                          | Mr Ahmed Abidia            |
|         |        |                                                                | Mr Jonathan Refson         |
|         |        | Southend University Hospital NHS Foundation Trust              | Mr James Brown             |
|         |        |                                                                | Mr Matthew Jakeways        |
|         |        | West Hertfordshire Hospitals NHS Trust                         | Mr Tahir Bhatti            |
|         |        |                                                                | Mr Mustapha Halawa         |
|         |        |                                                                | Mr Sanjeev Sarin           |
|         | London | Barking, Havering And Redbridge University Hospitals NHS Trust | Mr Timothy Cheatle         |
|         |        |                                                                | Mr Julian Coker            |
|         |        |                                                                | Mr Sabu Jacob              |
|         |        |                                                                | Mr Gabriel Sayer           |
|         |        |                                                                | Mr Shukri Shami            |
|         |        |                                                                | Mr Raghu Vindlacheruvu     |
|         |        | Barnet and Chase Farm Hospitals NHS Trust                      | Mr Hamish Hamilton         |
|         |        |                                                                | Mr Nicholas Law            |
|         |        | Barts Health NHS Trust                                         | Professor Karim Brohi      |
|         |        |                                                                | Mr James Crinnion          |
|         |        |                                                                | Mr Harpaul Flora           |
|         |        |                                                                | Mr Vijay Gadhvi            |
|         |        |                                                                | Mr Martin Griffiths        |
|         |        |                                                                | Mr Constantinos Kyriakides |
|         |        |                                                                | Mr Wayne Sapsford          |
|         |        |                                                                | Mr Nigel Tai               |
|         |        |                                                                | Mr Michael Walsh           |
|         |        | Guy's and St Thomas' Hospital NHS Foundation Trust             | Miss Rachel Bell           |
|         |        |                                                                | Mr Tom Carrell             |
|         |        |                                                                | Mr Bijan Modarai           |
|         |        |                                                                | Mr Peter Taylor            |

| Country | Region     | Trust name                                               | Consultant Name             |
|---------|------------|----------------------------------------------------------|-----------------------------|
|         |            |                                                          | Mr Mark Tyrrell             |
|         |            |                                                          | Mr Hany Zayed               |
|         |            | Imperial College Healthcare NHS Trust                    | Mr Colin Bicknell           |
|         |            |                                                          | Professor Nicholas Cheshire |
|         |            |                                                          | Professor Saroj Das         |
|         |            |                                                          | Professor Alun Davies       |
|         |            |                                                          | Mr Ian Franklin             |
|         |            |                                                          | Mr George Geroulakos        |
|         |            |                                                          | Mr Richard Gibbs            |
|         |            |                                                          | Mr Michael Jenkins          |
|         |            |                                                          | Mr Morgan McMonagle         |
|         |            |                                                          | Mr Maziar Mireskandari      |
|         |            |                                                          | Professor Nigel Standfield  |
|         |            |                                                          | Mr John Wolfe               |
|         |            | King's College Hospital NHS Foundation Trust             | Mr Michael Dialynas         |
|         |            |                                                          | Mr Andrew McIrvine          |
|         |            |                                                          | Mr Hisham Rashid            |
|         |            |                                                          | Mr Mark Tyrrell             |
|         |            |                                                          | Mr Domenico Valenti         |
|         |            | Lewisham Healthcare NHS Trust                            | Mr Edmund Chaloner          |
|         |            |                                                          | Mr Aaron B J Sweeney        |
|         |            | North West London Hospitals NHS Trust                    | Professor Saroj Das         |
|         |            |                                                          | Mr George Geroulakos        |
|         |            |                                                          | Mr David Greenstein         |
|         |            |                                                          | Mr Syed Tahir Hussain       |
|         |            |                                                          | Miss Sophie Renton          |
|         |            | Royal Free Hampstead NHS Trust                           | Mr Daryll Baker             |
|         |            |                                                          | Mr Richard Bird             |
|         |            |                                                          | Miss Meryl Davis            |
|         |            |                                                          | Mr Hamish Hamilton          |
|         |            |                                                          | Mr Alexander Loh            |
|         |            |                                                          | Miss Fiona Myint            |
|         |            |                                                          | Miss Janice Tsui            |
|         |            |                                                          | Mr Alan Wilson              |
|         |            | St George's Healthcare NHS Trust                         | Mr Stephen Black            |
|         |            |                                                          | Mr Josh Derodra             |
|         |            |                                                          | Mr Robert Hinchliffe        |
|         |            |                                                          | Mr Keith Jones              |
|         |            |                                                          | Mr Ian Loftus               |
|         |            |                                                          | Mr Tom Loosemore            |
|         |            |                                                          | Mr Sudip Ray                |
|         |            |                                                          | Professor Matt Thompson     |
|         |            | University College London Hospitals NHS Foundation Trust | Mr Obiekezie Agu            |
|         |            |                                                          | Mr Christopher Bishop       |
|         |            |                                                          | Professor Peter Harris      |
|         |            |                                                          | Mr Toby Richards            |
|         | North East | City Hospitals Sunderland NHS Foundation Trust           | Mr Ben Banerjee             |
|         |            |                                                          | Mr Andrew Brown             |
|         |            |                                                          | Mr Paul Dunlop              |
|         |            |                                                          | Mr Klaus Overbeck           |
|         |            |                                                          | Mr Shanmugam Vetrivel       |

| Country | Region     | Trust name                                                    | Consultant Name                |
|---------|------------|---------------------------------------------------------------|--------------------------------|
|         |            | County Durham and Darlington NHS Foundation Trust             | Mr Nigel Corner                |
|         |            |                                                               | Mr Philip Davey                |
|         |            |                                                               | Mr Ian Hawthorn                |
|         |            |                                                               | Mr Gareth Tervit               |
|         |            | Gateshead Health NHS Foundation Trust                         | Mr Hamdy Ashour                |
|         |            |                                                               | Mr Vish Bhattacharya           |
|         |            |                                                               | Mr Ahmed Mudawi                |
|         |            | Newcastle upon Tyne Hospitals NHS Foundation Trust            | Mr Michael Clarke              |
|         |            |                                                               | Mr Sreevalsan Kappadath        |
|         |            |                                                               | Mr David Lambert               |
|         |            |                                                               | Mr Tim Lees                    |
|         |            |                                                               | Professor Gerard Stansby       |
|         |            |                                                               | Ms Lucy Wales                  |
|         |            |                                                               | Mr Michael Wyatt               |
|         |            | South Tees Hospitals NHS Foundation Trust                     | Miss Monica Hansrani           |
|         |            |                                                               | Mr Reza Mofidi                 |
|         |            |                                                               | Mr Kurian Mylankal             |
|         |            |                                                               | Mr Ian Nichol                  |
|         |            |                                                               | Mr Andrew Parry                |
|         | North West | Aintree University Hospitals NHS Foundation Trust             | Mr Jos Joseph                  |
|         |            |                                                               | Mr Jonathan Smout              |
|         |            |                                                               | Mr Francesco Torella           |
|         |            | Bolton NHS Foundation Trust                                   | Mr Graeme H Ferguson           |
|         |            |                                                               | Mr Madu Onwudike               |
|         |            | Central Manchester University Hospitals NHS Foundation Trust  | Mr David Murray                |
|         |            |                                                               | Mr Ferdinand Serracino-Inglott |
|         |            |                                                               | Mr John Smyth                  |
|         |            | Countess of Chester Hospital NHS Foundation Trust             | Mr Sameh Dimitri               |
|         |            |                                                               | Mr Maher Hamish                |
|         |            | East Lancashire Hospitals NHS Trust                           | Mr Haytham Al-Khaffaf          |
|         |            |                                                               | Mr Simon Hardy                 |
|         |            |                                                               | Mr Asad Rahi                   |
|         |            |                                                               | Mr Robert Salaman              |
|         |            | Lancashire Teaching Hospitals NHS Foundation Trust            | Miss Susan Drinkwater          |
|         |            |                                                               | Mr Anselm Egun                 |
|         |            |                                                               | Mr George Thomson              |
|         |            | Mid Cheshire Hospitals NHS Foundation Trust                   | Mr Magdi Hanafy                |
|         |            | North Cumbria University Hospitals NHS Trust                  | Mr Thomas Joseph               |
|         |            |                                                               | Mr Theophilus Ojimba           |
|         |            | Pennine Acute Hospitals NHS Trust                             | Mr Nile Allaf                  |
|         |            |                                                               | Mr Matthew Hadfield            |
|         |            |                                                               | Mr Riza Ibrahim                |
|         |            |                                                               | Mr Manmohan Madan              |
|         |            |                                                               | Mr Taohid Oshodi               |
|         |            |                                                               | Mr Graham Riding               |
|         |            |                                                               | Mr Raashid Shahbazi            |
|         |            |                                                               | Mr Gerard Williams             |
|         |            | Royal Liverpool and Broadgreen University Hospitals NHS Trust | Mr John Brennan                |
|         |            |                                                               | Mr Robert Fisher               |



| Country | Region           | Trust name                                                   | Consultant Name                 |
|---------|------------------|--------------------------------------------------------------|---------------------------------|
|         |                  |                                                              | Mr David Jones                  |
|         |                  |                                                              | Mr Jagjeeth Naik                |
|         |                  |                                                              | Mr Jonathan Smout               |
|         |                  |                                                              | Mr Rao Vallabhaneni             |
|         |                  | Southport and Ormskirk Hospital NHS Trust                    | Mr David Jones                  |
|         |                  | Tameside Hospital NHS Foundation Trust                       | Mr Leszek Wolowczyk             |
|         |                  | University Hospital of South Manchester NHS Foundation Trust | Professor Mohamed Baguneid      |
|         |                  |                                                              | Mr Jonathan Ghosh               |
|         |                  |                                                              | Professor Charles McCollum      |
|         |                  |                                                              | Mr Mark Welch                   |
|         |                  | University Hospitals Of Morecambe Bay NHS Foundation Trust   | Mr John Abraham                 |
|         |                  |                                                              | Mr Moatasiem Bukhari            |
|         |                  |                                                              | Mr John Calvey                  |
|         |                  |                                                              | Mr Mark Tomlinson               |
|         |                  |                                                              | Mr Paul Wilson                  |
|         |                  | Warrington and Halton Hospitals NHS Foundation Trust         | Mr Andrew Paul Moody            |
|         |                  |                                                              | Mr Thomas Nicholas              |
|         |                  |                                                              | Mr Oladeji Olojugba             |
|         |                  |                                                              | Mr Nee Teo                      |
|         |                  | Wirral University Teaching Hospital NHS Foundation Trust     | Mr Stephen Blair                |
|         |                  |                                                              | Mr Colin Chan                   |
|         |                  |                                                              | Mr Ramasubramanyan Chandrasekar |
|         |                  |                                                              | Mr Leith Williams               |
|         |                  | Wrightington, Wigan And Leigh NHS Foundation Trust           | Mr Mohideen Jameel              |
|         |                  |                                                              | Mr John Mosley                  |
|         |                  |                                                              | Mr Ramanathan Shivalingam       |
|         | South Central    | Buckinghamshire Hospitals NHS Trust                          | Mr Patrick Lintott              |
|         |                  |                                                              | Mr Andrew Northeast             |
|         |                  | Milton Keynes Hospital NHS Foundation Trust                  | Miss Debbie Phillips            |
|         |                  |                                                              | Mr Simon Ray-Chaudhuri          |
|         |                  | Oxford University Hospitals NHS Trust                        | Mr Christopher Darby            |
|         |                  |                                                              | Professor Alison Halliday       |
|         |                  |                                                              | Mr Ashok Handa                  |
|         |                  |                                                              | Miss Linda Hands                |
|         |                  |                                                              | Mr Jeremy Perkins               |
|         |                  | Portsmouth Hospitals NHS Trust                               | Mr Andras Palffy                |
|         |                  |                                                              | Mr Simon Payne                  |
|         |                  |                                                              | Mr Mark Pemberton               |
|         |                  | University Hospital Southampton NHS Foundation Trust         | Mr Stephen Baxter               |
|         |                  |                                                              | Mr Gareth Morris                |
|         |                  |                                                              | Mr Kurian Mylankal              |
|         |                  |                                                              | Mr Mike Phillips                |
|         |                  |                                                              | Professor Cliff Shearman        |
|         |                  |                                                              | Mr Nicholas Wilson              |
|         | South East Coast | Ashford And St Peter's Hospitals NHS Foundation Trust        | Mr Tahir Ali                    |
|         |                  |                                                              | Mr Neil Browning                |
|         |                  |                                                              | Mr Marcus Cleanthis             |
|         |                  |                                                              | Mr Kieran Dawson                |

| Country | Region     | Trust name                                                        | Consultant Name          |
|---------|------------|-------------------------------------------------------------------|--------------------------|
|         |            | Brighton and Sussex University Hospitals NHS Trust                | Mr Michael Brooks        |
|         |            |                                                                   | Mr Matthew Button        |
|         |            |                                                                   | Mr Mario Caruana         |
|         |            |                                                                   | Mr Karim El Sakka        |
|         |            |                                                                   | Mr Mahmoud Salman        |
|         |            |                                                                   | Mr Syed Yusuf            |
|         |            | Dartford and Gravesham NHS Trust                                  | Mr Andrew McIrvine       |
|         |            | East Kent Hospitals University NHS Foundation Trust               | Mr Robert Insall         |
|         |            |                                                                   | Mr Thomas Rix            |
|         |            |                                                                   | Mr Jawaharlal Senaratne  |
|         |            | East Sussex Healthcare NHS Trust                                  | Mr George Evans          |
|         |            | Frimley Park Hospital NHS Foundation Trust                        | Mr Patrick Chong         |
|         |            |                                                                   | Mr David Gerrard         |
|         |            |                                                                   | Mr Peter Leopold         |
|         |            |                                                                   | Ms Catharine McGuinness  |
|         |            |                                                                   | Mr Peter Rutter          |
|         |            |                                                                   | Ms Sabine Sonnenberg     |
|         |            |                                                                   | Mr Richard Wilson        |
|         |            | Maidstone and Tunbridge Wells NHS Trust                           | Mr Mark Tyrrell          |
|         |            | Medway NHS Foundation Trust                                       | Mr Samuel Andrews        |
|         |            |                                                                   | Miss Ginny Bowbrick      |
|         |            |                                                                   | Mr Waleed Edrees         |
|         |            | Surrey and Sussex Healthcare NHS Trust                            | Mr Nicholas Hopkins      |
|         |            | Western Sussex Hospitals NHS Trust                                | Mr David Beattie         |
|         |            |                                                                   | Mr Hany Hafez            |
|         | South West | Dorset County Hospital NHS Foundation Trust                       | Mr Nicolas Lagattolla    |
|         |            |                                                                   | Mr Robin Windhaber       |
|         |            | Gloucestershire Hospitals NHS Foundation Trust                    | Mr Richard Bulbulia      |
|         |            |                                                                   | Mr David Cooper          |
|         |            |                                                                   | Mr Jonothan Earnshaw     |
|         |            |                                                                   | Mr Nick Matharu          |
|         |            |                                                                   | Mr Keith Poskitt         |
|         |            |                                                                   | Miss Caroline Rodd       |
|         |            |                                                                   | Mr Mark Whyman           |
|         |            | Great Western Hospitals NHS Foundation Trust                      | Mr Ravinder Singh Ranger |
|         |            | North Bristol NHS Trust                                           | Mr Antony Baker          |
|         |            |                                                                   | Mr David Mitchell        |
|         |            |                                                                   | Mr Bill Neary            |
|         |            |                                                                   | Mr Andrew Weale          |
|         |            | Northern Devon Healthcare NHS Trust                               | Mr John V Taylor         |
|         |            |                                                                   | Mr David Williams        |
|         |            | Plymouth Hospitals NHS Trust                                      | Mr Simon Ashley          |
|         |            |                                                                   | Mr Jamie Barwell         |
|         |            |                                                                   | Mr Francis Dix           |
|         |            |                                                                   | Surg Cdr Cris Parry      |
|         |            | Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust | Mr Christopher Lee       |
|         |            |                                                                   | Mr Dynesh Rittoo         |
|         |            |                                                                   | Mr Lasantha Wijesinghe   |
|         |            | Royal Cornwall Hospitals NHS Trust                                | Mr Jonathan Davies       |
|         |            |                                                                   | Mr Damian Kelleher       |
|         |            |                                                                   | Mr Graham Riding         |

| Country | Region        | Trust name                                           | Consultant Name            |
|---------|---------------|------------------------------------------------------|----------------------------|
|         |               |                                                      | Mr Kenneth Woodburn        |
|         |               | Royal Devon and Exeter NHS Foundation Trust          | Mr David Birchley          |
|         |               |                                                      | Mr Andrew Robert Cowan     |
|         | West Midlands |                                                      | Mr John F Thompson         |
|         |               | Royal United Hospital Bath NHS Trust                 | Mr John Budd               |
|         |               |                                                      | Professor Michael Horrocks |
|         |               |                                                      | Mr Mahesh Pai              |
|         |               |                                                      | Ms Rebecca Winterborn      |
|         |               | Salisbury NHS Foundation Trust                       | Mr Saboor Ghauri           |
|         |               |                                                      | Miss Sarah Hulin           |
|         |               |                                                      | Mr Charles Ranaboldo       |
|         |               | South Devon Healthcare NHS Foundation Trust          | Mr Ian Currie              |
|         |               |                                                      | Mr Robert McCarthy         |
|         |               | Taunton and Somerset NHS Foundation Trust            | Mr John Chester            |
|         |               |                                                      | Mr Paul Eyers              |
|         |               |                                                      | Mr Ian Hunter              |
|         |               |                                                      | Mr Andrew Stewart          |
|         |               |                                                      | Mr John V Taylor           |
|         |               |                                                      | Mr David Williams          |
|         |               | University Hospitals of Bristol NHS Foundation Trust | Mr Marcus Brooks           |
|         |               |                                                      | Mr Peter Lamont            |
|         |               |                                                      | Mr Frank Smith             |
|         |               | Dudley Group of Hospitals NHS Trust                  | Mr Simon Hobbs             |
|         |               |                                                      | Mr Ajantha Jayatunga       |
|         |               |                                                      | Mr Zahid Khan              |
|         |               |                                                      | Mr Rajiv Pathak            |
|         |               |                                                      | Mr Atiq-Ur Rehman          |
|         |               |                                                      | Miss Sandhya Shiralkar     |
|         |               | Heart of England NHS Foundation Trust                | Mr Donald Adam             |
|         |               |                                                      | Professor Andrew Bradbury  |
|         |               |                                                      | Mr Martin Claridge         |
|         |               |                                                      | Mr Mark Gannon             |
|         |               |                                                      | Mr Harmeet Khaira          |
|         |               |                                                      | Mr Mark Scriven            |
|         |               |                                                      | Mr Antonius Wilmink        |
|         |               | Mid Staffordshire NHS Foundation Trust               | Mr Brian Gwynn             |
|         |               | Royal Wolverhampton Hospitals NHS Trust              | Mr Lionello Coen           |
|         |               |                                                      | Mr Teodor Gardecki         |
|         |               |                                                      | Mr Andrew Garnham          |
|         |               |                                                      | Mr Simon Hobbs             |
|         |               | Sandwell and West Birmingham Hospitals NHS Trust     | Mr Philip Thomas Nicholl   |
|         |               |                                                      | Mr Saurabh Rai             |
|         |               |                                                      | Mrs Rachel Sam             |
|         |               |                                                      | Mr Stanley Silverman       |
|         |               | Shrewsbury & Telford Hospital NHS Trust              | Mr Arun Balakrishnan       |
|         |               |                                                      | Mr Robert Duffield         |
|         |               |                                                      | Mr Antony Fox              |
|         |               |                                                      | Mr Andrew Houghton         |
|         |               |                                                      | Ms Catherine Merriman      |
|         |               |                                                      | Mr Timothy Sykes           |
|         |               | University Hospital of North Staffordshire NHS Trust | Mr Omer Ehsan              |

| Country | Region                   | Trust name                                               | Consultant Name          |
|---------|--------------------------|----------------------------------------------------------|--------------------------|
|         |                          |                                                          | Mr Jack Fairhead         |
|         |                          |                                                          | Mr Richard Morgan        |
|         |                          |                                                          | Mr Laszlo Papp           |
|         |                          |                                                          | Mr Arun Pherwani         |
|         |                          |                                                          | Mr Julian Wong           |
|         |                          | University Hospitals Birmingham NHS Foundation Trust     | Mr Allen Edwards         |
|         |                          |                                                          | Mrs Rachel Sam           |
|         |                          |                                                          | Mr Malcolm Simms         |
|         |                          |                                                          | Mr Alok Tiwari           |
|         |                          |                                                          | Mr Rajiv Vohra           |
|         |                          | University Hospitals Coventry and Warwickshire NHS Trust | Mr Daniel Higman         |
|         |                          |                                                          | Professor Chris Imray    |
|         |                          |                                                          | Mr Asif Mahmood          |
|         |                          |                                                          | Miss Colette Marshall    |
|         |                          | Walsall Hospitals NHS Trust                              | Mr Zahid Khan            |
|         |                          | Worcestershire Acute Hospitals NHS Trust                 | Mr Amarjit Atwal         |
|         |                          |                                                          | Mr Eric Grocott          |
|         |                          |                                                          | Mr Nicholas Hickey       |
|         |                          |                                                          | Mr Isaac Nyamekye        |
|         | Yorkshire and The Humber | Bradford Teaching Hospitals NHS Foundation Trust         | Mr Kevin Mercer          |
|         |                          |                                                          | Mr Kevin Molloy          |
|         |                          |                                                          | Mr Nicholas Shaper       |
|         |                          |                                                          | Professor Peter Vowden   |
|         |                          |                                                          | Mr David Wilkinson       |
|         |                          | Calderdale and Huddersfield NHS Foundation Trust         | Mr Neeraj Bhasin         |
|         |                          |                                                          | Mr Duncan Parry          |
|         |                          |                                                          | Mr Narinder Sharma       |
|         |                          | Doncaster and Bassetlaw Hospitals NHS Foundation Trust   | Mr Duncan Drury          |
|         |                          |                                                          | Mr Nandan Haldipur       |
|         |                          |                                                          | Mr Jan Macierewicz       |
|         |                          |                                                          | Mr Woolagasen Pillay     |
|         |                          |                                                          | Mr Sewa Singh            |
|         |                          |                                                          | Mr Peter Tan             |
|         |                          | Hull and East Yorkshire Hospitals NHS Trust              | Mr Bankole Akomolafe     |
|         |                          |                                                          | Professor Ian Chetter    |
|         |                          |                                                          | Mr Brian Johnson         |
|         |                          |                                                          | Mr Rakesh Kapur          |
|         |                          |                                                          | Professor Peter McCollum |
|         |                          |                                                          | Mr Paul Renwick          |
|         |                          | Leeds Teaching Hospitals NHS Trust                       | Mr David Berridge        |
|         |                          |                                                          | Professor Michael Gough  |
|         |                          |                                                          | Mr David Russell         |
|         |                          |                                                          | Professor Julian Scott   |
|         |                          |                                                          | Mr Max Troxler           |
|         |                          | Mid Yorkshire Hospitals NHS Trust                        | Mr Sathish Bhasker       |
|         |                          |                                                          | Mr Paul Curley           |
|         |                          |                                                          | Mr Jon Hossain           |
|         |                          |                                                          | Mr Craig Irvine          |
|         |                          | Sheffield Teaching Hospitals NHS Foundation Trust        | Professor Jonathan Beard |
|         |                          |                                                          | Mr Peter Dominic Dodd    |

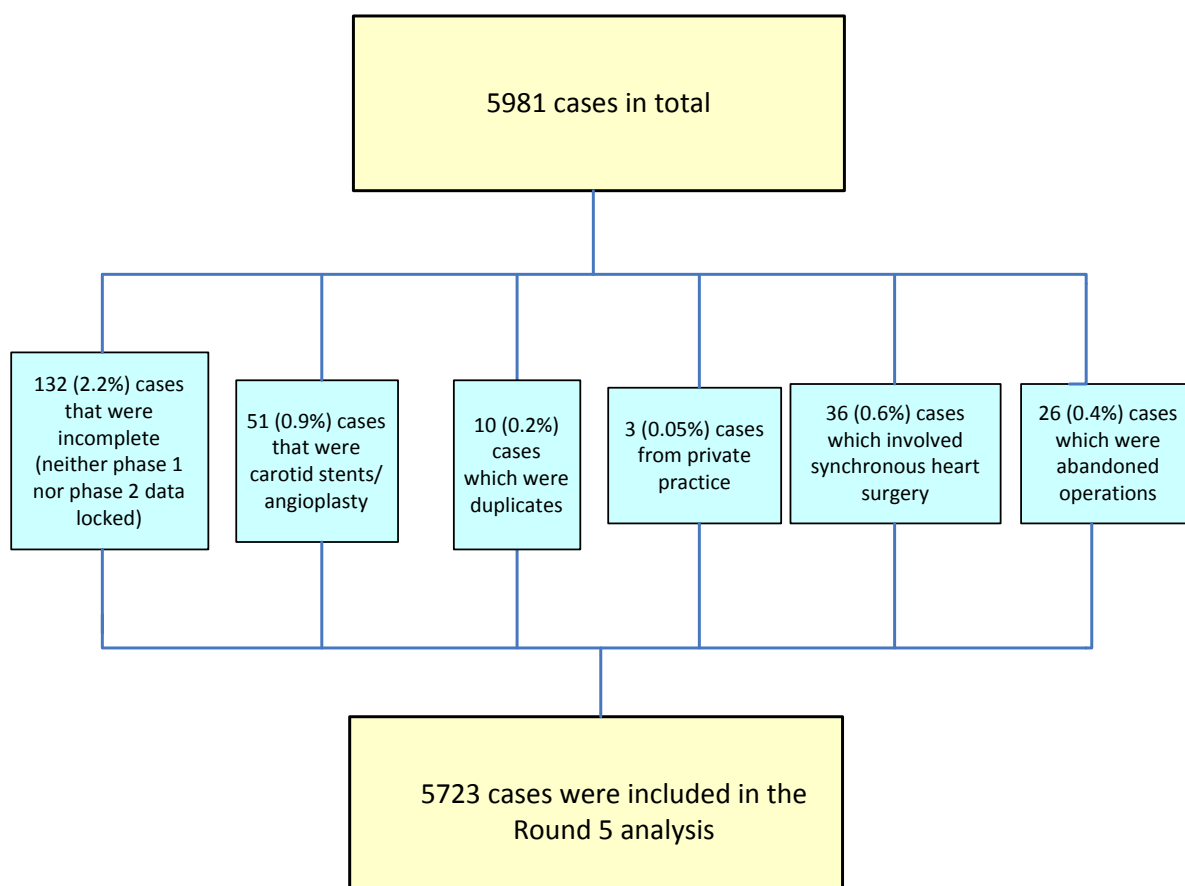
| Country                 | Region                                    | Trust name                                  | Consultant Name            |
|-------------------------|-------------------------------------------|---------------------------------------------|----------------------------|
|                         |                                           |                                             | Mr Robert Lonsdale         |
|                         |                                           |                                             | Mr Ed Mulkern              |
|                         |                                           |                                             | Mr Raj Nair                |
|                         |                                           |                                             | Mr Ahmed Nassef            |
|                         |                                           |                                             | Mr Shah Nawaz              |
|                         |                                           | York Teaching Hospital NHS Foundation Trust | Mr Marco Baroni            |
|                         |                                           |                                             | Mr Stephen Cavanagh        |
|                         |                                           |                                             | Mr Alistair McCleary       |
|                         |                                           |                                             | Mr Andrew Thompson         |
| <b>Northern Ireland</b> | Eastern Health and Social Services Board  | Belfast Health and Social Care Trust        | Mr Robin Baker             |
|                         |                                           |                                             | Mr Paul Blair              |
|                         |                                           |                                             | Mr Raymond Hannon          |
|                         |                                           |                                             | Mr Denis Harkin            |
|                         |                                           |                                             | Mr Louis Lau               |
|                         |                                           |                                             | Mr Bernard Lee             |
|                         |                                           |                                             | Mr Andrew McKinley         |
|                         |                                           |                                             | Miss Julie Reid            |
|                         | Southern Health and Social Services Board | Southern Health and Social Care Trust       | Mr Alastair Lewis          |
|                         |                                           |                                             | Mr Colin Weir              |
|                         | Western Health and Social Care Board      | Western Health and Social Care Trust        | Mr Ken McCune              |
|                         |                                           |                                             | Mr Zola Mzimba             |
| <b>Scotland</b>         | NHS Ayrshire and Arran                    | NHS Ayrshire & Arran                        | Mr Steven Boom             |
|                         | NHS Dumfries and Galloway                 | NHS Dumfries and Galloway                   | Mr Barun Majumder          |
|                         |                                           |                                             | Mr Joseph Sathianathan     |
|                         | NHS Fife                                  | NHS Fife                                    | Mr Alan Milne              |
|                         |                                           |                                             | Ms Ruth Tootill            |
|                         | NHS Forth Valley                          | NHS Forth Valley                            | Mr Richard Holdsworth      |
|                         |                                           |                                             | Ms Karen Murphy            |
|                         |                                           |                                             | Mr Michael Yapanis         |
|                         | NHS Grampian                              | NHS Grampian                                | Mr Paul Bachoo             |
|                         |                                           |                                             | Professor Julie Brittenden |
|                         |                                           |                                             | Mr Euan Munro              |
|                         |                                           |                                             | Mr Michael Sharp           |
|                         |                                           |                                             | Mr Andrew Tambyraja        |
|                         | NHS Greater Glasgow and Clyde             | NHS Greater Glasgow and Clyde               | Mr Kevin Daly              |
|                         |                                           |                                             | Mr David Kingsmore         |
|                         |                                           |                                             | Mr Douglas Orr             |
|                         | NHS Highland                              | NHS Highland                                | Mr Bernhard Wolf           |
|                         | NHS Lanarkshire                           | NHS Lanarkshire                             | Mr Donald Bain             |
|                         |                                           |                                             | Mr Roy Scott               |
|                         | NHS Lothian                               | NHS Lothian                                 | Mr Paul John Burns         |
|                         |                                           |                                             | Mr Roderick Chalmers       |
|                         |                                           |                                             | Mr Raymond Dawson          |
|                         |                                           |                                             | Mr Simon Fraser            |
|                         |                                           |                                             | Mr Dave Lewis              |
|                         |                                           |                                             | Mr Zahid Raza              |
|                         |                                           |                                             | Mr Andrew Tambyraja        |
|                         | NHS Tayside                               | NHS Tayside                                 | Mr Murray Flett            |
|                         |                                           |                                             | Mr Gareth Griffiths        |
|                         |                                           |                                             | Mr Alan Milne              |

| Country | Region                                         | Trust name                                     | Consultant Name         |
|---------|------------------------------------------------|------------------------------------------------|-------------------------|
|         |                                                |                                                | Mr Janos Nagy           |
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|         |                                                |                                                | Mr Chris Davies         |
|         |                                                |                                                | Mr Louis Fligelstone    |
|         |                                                |                                                | Mr Richard Hedges       |
|         |                                                |                                                | Mr Angus Ruddie         |
|         |                                                |                                                | Mr Justin Woolgar       |
|         | Aneurin Bevan Health Board                     | Aneurin Bevan Health Board                     | Mr Richard Blackett     |
|         |                                                |                                                | Mr Peter Lewis          |
|         |                                                |                                                | Mr David McLain         |
|         |                                                |                                                | Mr Ahmed Shandall       |
|         | Betsi Cadwaladr University Health Board        | Betsi Cadwaladr University Health Board        | Mr Tony daSilva         |
|         |                                                |                                                | Miss Ursula Kirkpatrick |
|         |                                                |                                                | Mr Otto Klimach         |
|         |                                                |                                                | Mr Dean Williams        |
|         | Cwm Taf University Health Board                | Cwm Taf University Health Board                | Mr Kevin Conway         |
|         |                                                |                                                | Mr Michael Rocker       |

## Appendix 4: Data Cleaning Process

### FLOW CHART OF DATA CLEANING PROCESSES

Round 5 data were collected over a period of one year and three months, from 1<sup>st</sup> October 2011 to end of 31<sup>st</sup> December 2012. A total of Round 5 cases had been submitted to the audit. Four percent of these cases (258) are not included for analysis; they were set aside by the following selection process:



Only carotid endarterectomy cases (n=5723) meeting these minimum criteria were included in the analyses

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