

**UK CAROTID ENDARTERECTOMY
AUDIT
CLINICAL AUDIT REPORT
ROUND 3 PUBLIC REPORT**

Prepared on behalf of

The CIA Steering Group

by

The Clinical Standards Department

Royal College of Physicians of London

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This new report (2011), funded by the Healthcare Quality Improvement Partnership (HQIP), presents the latest finding from Round 3 of the National Carotid Interventions Audit. The audit focussed on the process and outcomes of patients undertaking carotid endarterectomy between 1st October 2009 and 30th September 2010. It covers many of the aspects of the pathway, from the characteristics of the patient, the key delays prior to surgery, the surgery itself and any post operative outcomes.

The general public who want to know more about the quality of carotid surgery will find this report gives the most recent description in relation to clinical guidelines and national policy. It publishes findings on a national audit to measure the key delays that occur between symptom and surgery, in comparison to the National Clinical Guidelines for Stroke (2009) and the National Stroke Strategy (2007). This report also reports on the outcomes arising from CEA post operatively, within 30 days and at a post discharge follow-up appointment. From Round 3, trusts are measured on the amount of cases they contribute to this audit, compared to that found in HES.

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Foreword

The increasing public expectation of early referral and high quality stroke management can only be met by clinicians demonstrating that the care provided is improving in line with evidence based standards. The carotid intervention audit, a joint audit by the Vascular Society of Great Britain & Ireland and the Royal College of Physicians of London, now reports the results of surgical care against national standards for the third time. This report contains both good news and aspirations for improvement. Round three sees the highest level of participation and recorded cases in this national audit since its inception. Along with increasing participation, there are further reductions in the time between symptoms, referral and treatment.

Whilst these improvements are good news for patients and clinicians, there is some way to go before the surgical component of the stroke pathway can be regarded as mature. The NICE standard of 14 days from symptom to treatment is not yet achieved and the National Stroke Strategy target of 48 hours by 2017 looks like a major challenge. The clinical community needs to collectively re-double its efforts and refine the pathway of care. This will require an increased awareness of the importance of the symptoms of impending stroke and a commitment to rapid referral, investigation and treatment. NHS organisations will need to ensure rapid access to clinicians, imaging and surgical teams. Clinical teams will need to recognise TIA as an emergency requiring a rapid response to deliver high quality care in a timely manner.

One of the first steps is to make this audit truly representative of national practice, not just a large proportion of it. To this end, the Steering Group has decided to set standards for data entry and these are presented by NHS Trust for the first time. In the future we will be looking to present these data by individual surgeon, so that patients can identify those whose data is most likely to truly reflect their practice.

National clinical audit is part of the process of driving up standards of care for patients requiring carotid intervention in the UK. We are all stakeholders in the NHS and it is important that we promote the value of good clinical audit.

Good clinical audit is about more than just entering data into databases. It requires a commitment to validation of data entry. This report contains an example of how this process may be conducted. The report also presents a patient's perspective of care. It reminds us that caring for the patient is not solely about targets, but that high quality communication is a critical part of the pathway. This report marks a step in the right direction and stands as a challenge to us to improve our service in the future.

Mr David Mitchell MA MB BS FRCS
Chair of the Vascular Society of Great Britain and
Ireland Audit and Quality Improvement Committee

Summary of Clinical UK Carotid Endarterectomy Audit (Round 3)

Background

This report is based on Round 3 of the National Carotid Interventions Audit, which includes all carotid endarterectomies performed between 1st October 2009 and 30th September 2010 that were submitted to the audit by 31st December 2010. Round 3 builds on progress made within Round 1 (1st December 2005 - 31st December 2007) and Round 2 (1st January 2008 – 30th September 2009).

Aims

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

Methods

Data are entered, by vascular surgeons, prospectively into a secure webtool that captures core demographic data as well as clinical data about symptoms, medication and treatment for each case. The data captures key timings in the pathway including the initial symptom, the referral and the operation. Outcomes such as stroke and cranial nerve injury are captured as well as survival within hospital and at 30 days post intervention. The final place of discharge is also captured.

Data are analysed by a dedicated team within the Clinical Standards Department of the Royal College of Physicians using statistical input to illustrate performance comparisons with previous rounds of the audit.

Key Findings

Data were returned by 87% of eligible surgeons, reporting 79% (4780/6079) of comparable cases reported in HES in the same time period (1st October 2009 to 30th September 2010).

Denominator	Number of cases
All patients	4971
All symptomatic patients	4197
All patients with 30 day survival data	4742
All cases where a follow up appointment was conducted	4068

Symptom	National %
Amaurosis fugax or TIA	66
Stroke	33
None of the above	1

- The median number of days from symptom to surgery 21 (IQR 9-54)
- The median number of days from symptom to referral was 6 (IQR 2-20)
- The median number of days from referral to operation was 12 (IQR 5-31)

When delay between symptom and surgery was more than 14 days, the main causes of delay as reported by the auditor, included delay in referral (41%), , delay in patient presentation (25%), operation cancellation as unfit or patient choice (18%) and delay in carotid imaging (13%), amongst others.

The rate of complication at 30 days was	National %
Stroke and death	3
Myocardial infarct	0.8
Bleeding post-operatively	4
Cranial nerve injury	4

Key Messages from Round 3

1. **Continuing evidence of improvement in the three rounds.** This round of the national carotid intervention audit shows continuing improvement in performance against the national standards. Surgeons and stroke teams are to be congratulated on improving the process of care delivery. Reported stroke and death rates are comparable to other national audits.
2. **Increased data contribution in Round 3.** Although data contribution rates have climbed to 79%, the data is still incomplete. This means that there is a significant likelihood of bias. We have examined the HES dataset to provide comparator data where possible, but many aspects of the pathway are not captured in national statistics. The CIA remains the most complete picture of the carotid intervention service in the UK.
3. **Variation in data quality.** When the quality of data is examined, data quality is worse in small volume units. Units performing occasional carotid interventions need to consider if patients would receive better care by linking the service to a bigger service nearby. Some hospitals may find that the service they can provide is improved by linking; others may feel that the service should move to a unit that is better able to manage the pathway and meet the needs of patients.
4. **Regional variations in data quality.** There is evidence of regional variation in performance with significant variation in the time from symptoms to intervention for symptomatic patients. Some individual Trust performance is based on only a few cases as we can only measure performance where dates are given. The variation highlights the need for commissioning bodies to commission to national standards to drive up the quality of care provided.
5. **Clinical audit needs to be placed at the centre of patient care.** There is evidence of variable contribution to this audit, which is part of the quality accounts. Trusts need to ensure compliance with audit as part of the process of delivering good quality care. Most clinicians recognise that the consultant contract contains time within it for audit. This needs to become part of the culture of care delivery, providing evidence of the quality of care for patients.
6. **Coding reviews will improve data contributions.** Each successive round of the audit has identified issues around comparing HES data to that provided in the CIA. NHS Trusts spend significant resources on coding, but evidence of inaccuracies persist. Units with good data returns achieve this by coding reviews and we propose that this should become standard practice for national audits.
7. **More education is needed.** The delays in the pathway show that there is still uncertainty about the significance of symptoms of impending stroke (TIA and amaurosis fugax) in the general population. Studies in Leicester confirm this. It will not be possible to meet national targets without further public education programmes. Service providers have a role in educating clinicians and professionals allied to medicine to recognise symptoms and the importance of rapid referral for assessment and treatment.
8. **Services need to be well organised.** Services need to be designed to meet the needs of patients not the convenience of clinicians. This means having a team that can see and assess patients 7 days a week. There needs to be rapid access to imaging, further imaging if needed and to surgical services. The surgical service needs to respond to the patient need for intervention quickly. This may mean that patients cannot always be treated on elective operating lists. CEPOD lists should have staff of appropriate seniority to be able to deliver safe and prompt care to patients needing carotid intervention.
9. **There is a need to learn from best practice.** There is considerable variation in care delivery and this can be improved by standardising best practice. The examples given in this report illustrate the importance of education, good team working both within the hospital sector and between commissioners and providers. Good communication is needed to reassure patients who find the experience of urgent surgery frightening. Focusing the care pathway on the needs of the patient is the key to good care delivery. Commissioners and service providers should review their service against the 11 point plan given in the example of good clinical practice.

Chapter 1: Background and Methods

1.1 Introduction

The carotid intervention audit (CIA) was initiated in 2005 as a collaboration between the Vascular Society of Great Britain & Ireland and the Royal College of Physicians. Its purpose is to gather information about the pathway of care for patients with carotid stenosis requiring interventions (either surgery or endovascular stenting). Data allows the audit to follow the patient journey and compare clinical performance to national guidelines for care delivery.

CAROTID ENDARTERECTOMY



1.2 Background

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 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 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, 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 captures information about the patient journey and provides data on the functioning of the pathway of care.

1.3 Evidence Base

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*

1.4 Funding

We would like to thank the Healthcare Quality Improvement Partnership (HQIP) for central funding for this project and the Vascular Society of Great Britain and Ireland (VSGBI) who contributed to the funding of the Clinical Audit web-based data collection tool. We would like to thank the Stroke Association and the Northern Ireland Chest Heart and Stroke Association who funded the preliminary work.

1.5 Project Team

The audit is supported by a multidisciplinary Steering Group comprising professional organisations and patients, as mentioned on page 2.

Day to day management of the audits (including running the helpdesk, analysis and reporting of results) takes place within the Clinical Standards Department of the Royal College of Physicians of London (RCP). The RCP vision is to improve patient care by the setting, monitoring and implementation of clinical standards.

1.6 Aims

The aims of this clinical audit into CEA provision were to:

1. Assess the current speed of delivery of CEA in the UK
2. Assess variations in access and quality of care for patients needing CEA
3. Assess 30-day mortality and complications rate following CEA
4. Stimulate improvements over time in the quality of care provided to patients of CEA

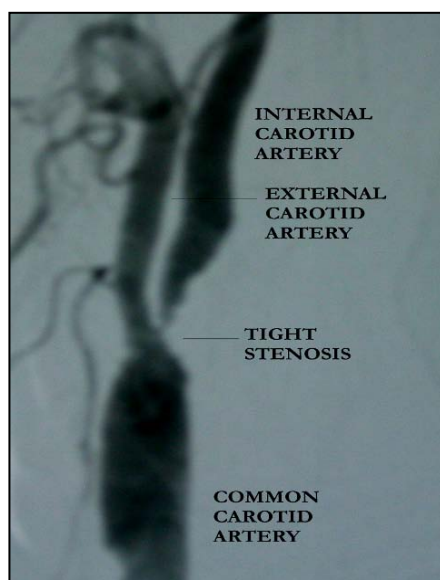
1.7 Methods

1.7.1 Data collection

- The questionnaire was devised by the Steering Group to capture pertinent aspects of CEA provision in relation to describing the process and outcomes of care for a group of patients (referred to as cases) who have CEA in the UK based on the guidelines.
- This questionnaire was applied via the National Vascular Database online web tool. The full questionnaire may be seen in **Appendix 2**.
- The questions capture the whole of the pathway, from the initial symptom, referral to the vascular surgeon, the operation itself, post operative stay and the follow-up appointment post hospital discharge.
- All vascular surgeons (consultant grade) who might potentially undertake CEA in the UK were contacted by the Project Team and 434 surgeons confirmed that they undertake the operation. This group are referred to throughout this report as 'eligible surgeons' and was also confirmed with HES data
- Surgeons were required to complete one questionnaire per CEA performed (case).
- This round of the audit collected CEA operations performed between 1st October 2009 and 30th September 2010 inclusive.
- The deadline for submitting data for this round was 31st December 2010.
- 4971 cases (with varying data completeness) were included in the analysis.

1.7.2 Presentation of results

- The average used to present results is the median because it is the middle point of the data and 50% of the values lie on either side.
- Results are also presented as totals, percentages, and/or inter-quartile ranges (IQR).
- The number of cases included in each analysis varies across questions as some were not answered for every case.
- For clarity of presentation, the term trust(s) is used generically for trusts and health boards.
- A full glossary is presented in **Appendix 1**.



DIGITAL SUBTRACTION ANGIOGRAPHY

Chapter 2: Results

2.1 Participation

The Round 3 findings in this report are based on 4971 operations that were submitted by a total of 382/434 (88%) surgeons representing 126/130 (97%) trusts.

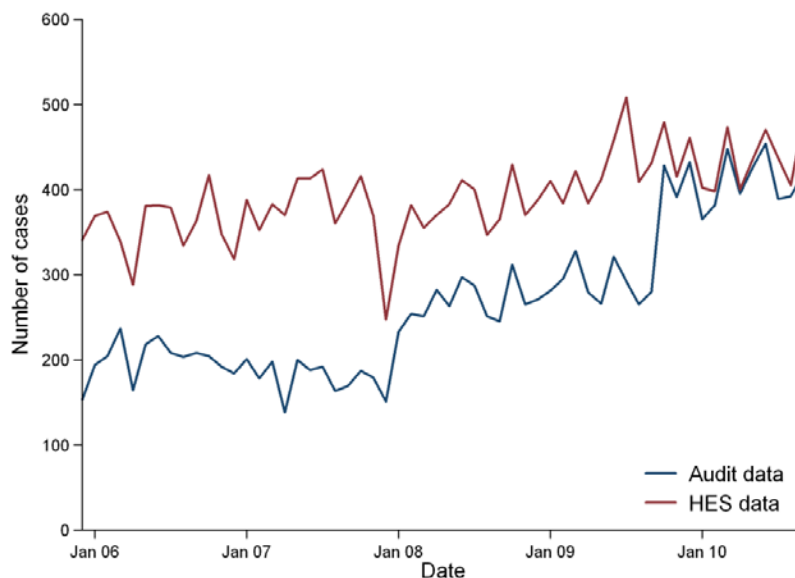
HES is the national statistical data warehouse for England of the care provided by NHS hospitals and for NHS hospital patients treated elsewhere. HES is the data source for a wide range of healthcare analysis for the NHS, Government and many other organisations. There are equivalent agencies in Wales, Scotland and Northern Ireland.

In this report, the term *HES* is used generically to describe data that are collected by these national agencies. The number of carotid endarterectomy procedures (codes L29.4 and L29.5) that were performed according to HES, over the equivalent audit period was used to compare the completeness of cases contributed to the audit by each Trust/Health Board.

There were 6079 CEA cases recorded on HES for the Round 3 time period. The audit captured 4780/6079 comparable cases. The audit, therefore, represents 79% (4780/6079) of HES recorded cases.

Although a much greater proportion of HES reported carotid operations now appear in the UK CIA Audit, surgeons are urged to ensure that as many cases as possible are submitted for inclusion in the national audit. This requires vascular units to liaise more closely with colleagues in their hospital coding departments.

The number of cases compared to HES has increased dramatically since the inception of the audit. The graph below shows this increase.



2.2 Patient demographics

Age is an important predictive factor for outcome. The risk of complications following surgery increases with age (Miller et al., 2009). The median age within the audit was 72 years which is consistent with the previous randomised controlled trials.

Twice as many men (68%) as women underwent carotid surgery. The indications for treatment are very similar in males and females (Kapral et al., 2003) suggesting that the difference in numbers between these two groups is a reflection of a difference in rates of disease rather than patient selection.

2.3 Patient symptoms

Carotid endarterectomy is performed on patients to reduce the risk of stroke caused by carotid stenosis. A symptomatic patient is a patient displaying outward symptoms of carotid stenosis whilst an asymptomatic patient does not yet show symptoms. In this round of the audit, 4197/4971 (84%) of patients were symptomatic, whereas 774 (16%) of patients were asymptomatic.

There is a robust evidence base (Rothwell et al., 2004) for providing CEA to symptomatic patients. There is less benefit in asymptomatic patients. Research evidence (Halliday et al., 2010) indicates that early intervention in appropriate patients will reduce the incidence of stroke.

Table 2: Symptoms that triggered referral

Symptom	National %
Amaurosis fugax (loss of vision in one eye) or Transient ischaemic attack (TIA)	66%
Stroke	33%
None of the three listed above	1%

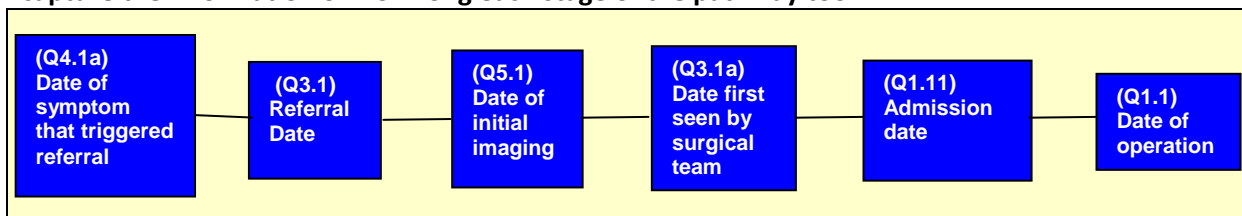
Approximately one third of patients nationally presented with stroke and the remainder with TIA or amaurosis fugax.

2.4 Summary of Key Delays

There is evidence that greater benefit from CEA is achieved when surgery is performed as soon as possible, ideally within two weeks of the initial symptom (Rothwell et al., 2004).

The typical patient pathway is set out in Figure 1 below:

Figure 1: Typical example of the patient path to operation and the audit question number used to capture the information on how long each stage of the pathway took.



The ten year National Stroke Strategy sets a target of 48 hours from symptom to operation (to be effected by 2017) to minimise the risk of high risk patients with TIA developing a stroke. The current NICE guidelines recommend two weeks. This round of the audit showed:

- The median number of days from symptom to referral was 6 (IQR 2-20), which is shorter than Round 2 when it was 8 (IQR 3-26).
- The median number of days from referral to operation was 12 (IQR 5-31), which is shorter than Round 2 when it was 19 (IQR 5-29).
- **The median number of days from symptom to operation was 21 (IQR 9-54),* which is shorter than Round 2 when it was 28 (IQR 12-68).**

*The symptom to operation median cannot be calculated from summing the symptom to referral median with the referral to operation median.

These results show that patient progress along the care pathway has speeded up since Round 2. Vascular surgeons are to be congratulated upon these improvements to patient care. However the NICE Guideline of 14 days between symptom and surgery has not yet been achieved.

2.5 Changes in Delays During Rounds 2 and 3

To illustrate the reductions in delays, the symptomatic cases submitted for the Round 2 period (21 months) were divided into *three equal seven month periods*. The symptomatic cases for the Round 3 period (12 months) were then divided into *two equal six month* and added to the graphs below, showing the whole 33 month period.

Figure 3: Index symptom to referral (number of days) during Rounds 2 and 3

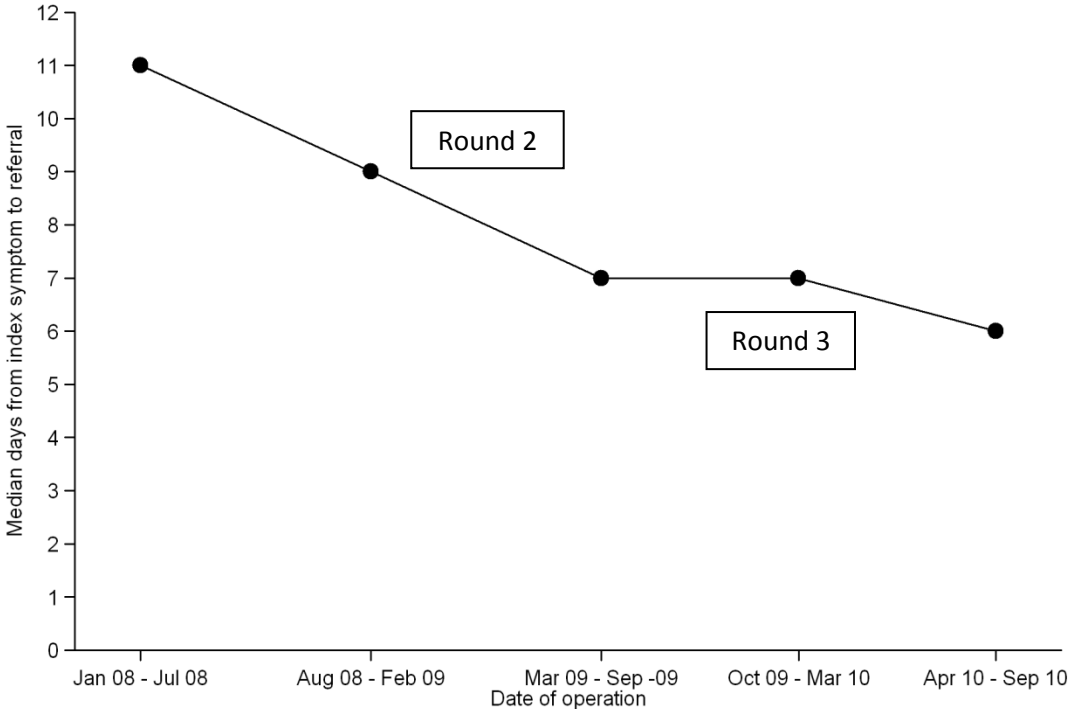


Figure 4: Referral to operation (number of days) during Rounds 2 and 3

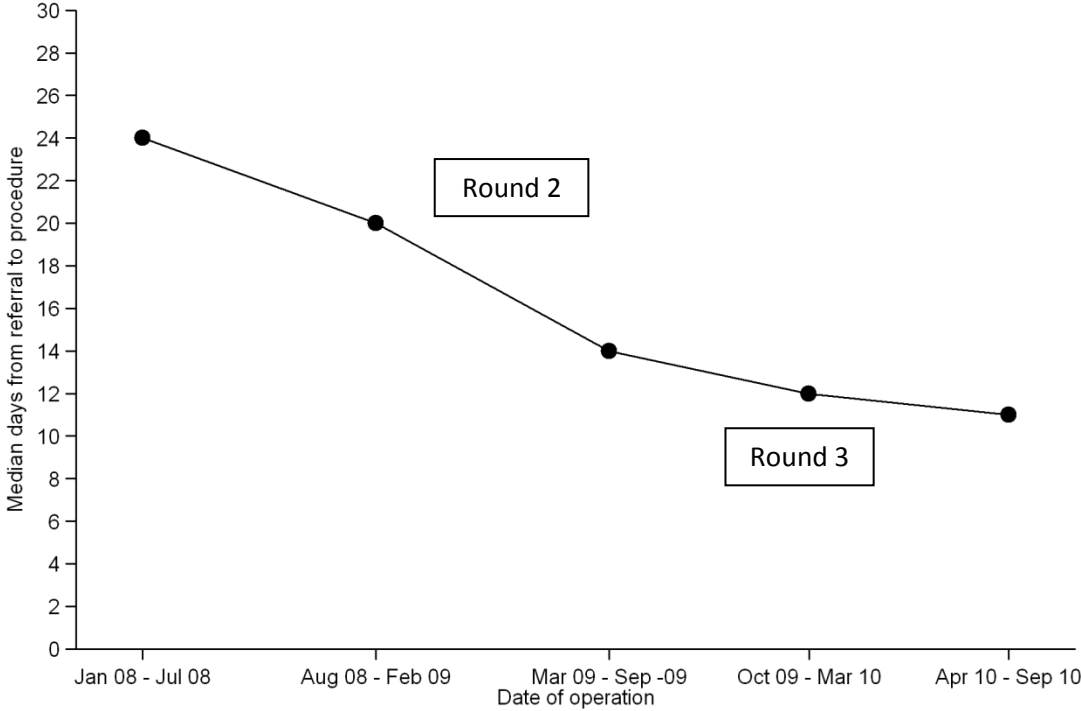
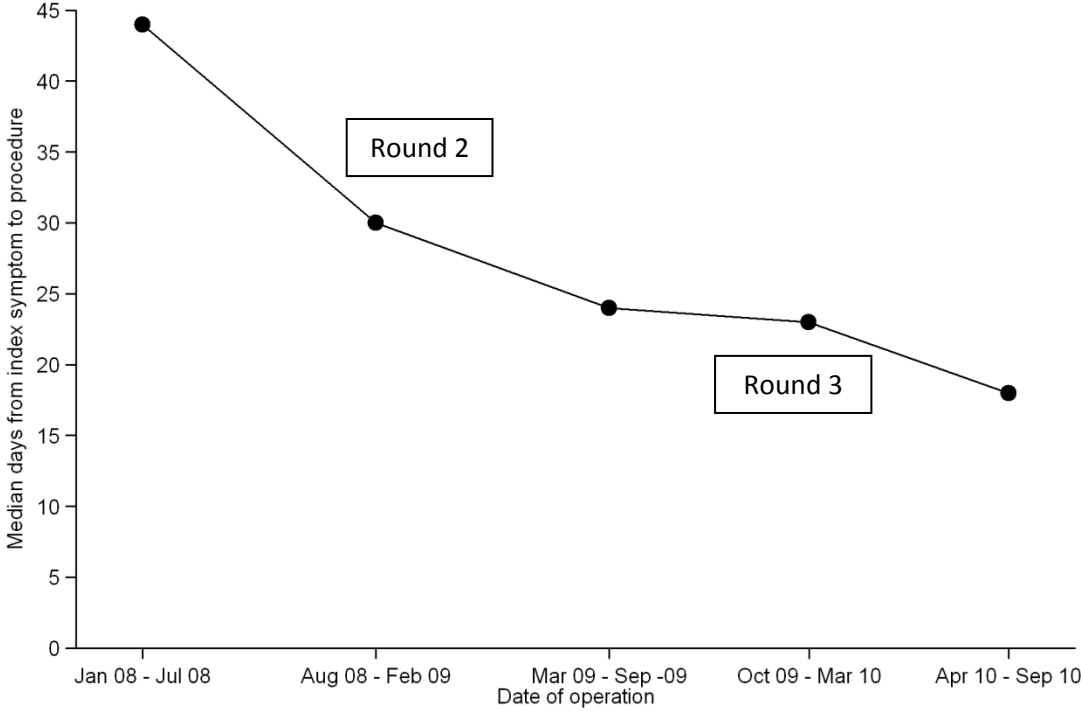


Figure 5: Index symptom to operation (number of days) during Rounds 2 and 3



There has been continuing improvement in progress along the pathway from round 1 to 2 and now to round 3. Clinical teams are to be congratulated on this improvement. There is a need to shorten times to referral and from referral to admission.

Table 3: Reasons for delays of more than two weeks between index symptom and surgery

Reason cited*	Based on 2123 patients (%)
Delay in patient presenting at GP or hospital	25%
Delay in referral	41%
Delay in carotid imaging	13%
Patient cancellation/delay - unfit	9%
Patient cancellation/delay - patient choice	9%
Limited availability of surgeon	6%
Limited availability of anaesthetist	1%
Limited availability of radiologist	0.1%
Lack of operating time	8%
Other case took priority	2%
Other	14%

* More than one option could be selected.



These data show that the most common reasons for delay, according to the auditor, before surgery were related to presentation and referral. Raising public awareness of stroke and TIA has been a recent priority (for example the NHS F.A.S.T campaign) and should continue in order to educate the public and healthcare professionals of the importance of early referral and treatment. If patients are to be treated within two weeks, and ideally within 48 hours, further reorganisation of vascular services will be needed to minimise the delays associated with lack of operating time and limited surgeon availability. Concerns remain that the times to imaging are also a cause of significant delay in the pathway. Trusts need to ensure daily access to imaging for patients with symptomatic carotid disease.

2.6 Duration of surgery

There may be an increase in risk associated with very long or very short CEA operations. This round of the audit showed that CEAs take a median of 120 minutes (IQR 95-145), which has remained fairly consistent over the three rounds. The median operation time in Round 1 was 116 minutes (IQR 90-140) and was 120 (IQR 95-150) in Round 2.

2.7 A Patient's Experience of Carotid Intervention

Andrew, age 59

On April 4th 2010 while eating lunch I suddenly lost partial vision in my right eye for about 1 minute, I asked my wife if she could see anything wrong with my eye the answer was no, all looked okay. I didn't think anymore about it but a couple of weeks later on visiting the doctor for a routine blood pressure check I mentioned what had happened. He advised me to go for a eye test which I did but also seemed concerned and said I may have had a TIA and told me I should have gone to A&E. He immediately emailed the local stroke physician. In less than 2 weeks I had a phone call from the hospital asking me to go in the next day for tests. I had an ultrasound scan that showed a tight narrowing of my artery. A second scan was performed and confirmed the degree of narrowing. I was concerned but very impressed with how quickly and efficiently I was dealt with.

I was referred to my surgeon at the nearby hospital and seen very quickly. He explained everything to me very clearly and I was operated on the same week. The operation went well and I came home the next day. I did have a horrendous migraine that weekend and my wife phoned the on-call doctor because of the pain I was in. The doctor told me I could take more of the tablets which I was given on leaving hospital and that did alleviate the problem.

I have had no recurring problems with my eye and the scarring is barely visible. I feel very relieved that this was caught in time as I know what damage strokes can cause.

Sue, Andrew's wife

When my husband asked me if I could see anything wrong with his eye, my answer was no it looked perfectly alright. I didn't think anymore about it until he went to the doctor's a few weeks later and was told it could be a TIA. I had never heard of this before and at that point didn't feel too concerned, although at times if he was a little late home I did wonder if something had happened.

When he went to the hospital for his tests, I was very impressed with how quickly it was going, we both saw the stroke doctor that same day. He explained about the blockage and that it was a mini stroke, it was at that point it really hit me. I felt very upset and frightened for the future thinking we may not even have one, or not one that we were hoping for.

We went away for a couple of days after that and in my mind I was thinking will we be able to do this again. Soon after that my husband saw the surgeon and on talking with him I felt a lot better, although I know there are always risks with any operation.

Apart from the migraine my husband had after the operation, which was worrying as he was in agony, everything appears okay now and I am very grateful to all concerned who helped him.

What can the surgeons and those involved learn from this experience?

1. There was a lack of awareness of the seriousness of Andrew's symptoms. This led to a delay in seeking help. Analysis of the data shows that amaurosis fugax is associated with significantly longer delays in presentation compared to TIA and stroke.
2. There was a further delay from his GP referring him to hospital (appropriately by email) to seeing the stroke physician of about 2 weeks
3. Once Andrew and Sue were aware of the seriousness of the problem, this caused significant anxiety
4. There were shorter delays in the hospital phase of the pathway of care, but still a few days between stroke physician review and surgical opinion
5. There was then a three day delay from seeing surgeon to operation
6. Overall the delay from symptom to operation was 53 days.
7. While the delay in presentation cannot be influenced by clinicians, there were cumulative delays along the pathway. Clinicians need to co-ordinate their activities to provide care focussed on patients' needs.

2.8 Patient Outcomes and Complications

Carotid endarterectomy is a generally safe operation (Sheng & Busuttill, 1986). The likelihood of complication is low however it is important to understand the risks and how these may be reduced or approached.

When a complication occurs, it is likely to 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 following table reports the rate of complication and death across the UK following CEA.

Table 4: Reported complications

Complication	Stage complication was experienced	Round 2 (21 months)		Round 3 (12 months)	
		National N	Percentage	National N	Percentage
Myocardial Infarct (MI)	Inpatient	48/6983	07%	40/4971	0.8%
Bleeding	Inpatient	192/6983	2.7%	177/4971	4%
Cranial Nerve Injury (CNI)	Inpatient CNI	136/6983	1.9%	96/4971	2%
	Overall CNI (inpatient or at follow-up)	217/6983	3.9%	184/4971	4%
Transient Ischaemic Attack	Inpatient	28/5274	0.5%	26/4971	0.5%
Stroke	Inpatient stroke	75/6983	1.1%	104/4971	2%
	Stroke at any point by follow-up	109/6151	1.8%	134/4749	3%
	Stroke within 30 days of operation	83/6135*	0.5%	124/4749	3%
Death	Inpatient death	38/6983	0.5%	37/4954	0.8%
	Death within 30 days of the operation	50/6151	1.8%	39/4742	0.8%
Stroke/Death	Death and/or stroke within 30 days*	112/6135*	1.8%	139/4749	3%
MI/Stroke/Death	Inpatient	12/6983	1.8%	150/4954	3%

* Data not available for 16 cases.

There were 52 inpatient deaths following CEA recorded for England by the national agency (HES) and 32 reported in the audit.

The most common reason for return to theatre was bleeding (110/4971, 2%) which is similar to the findings of randomised controlled trials (Meier et al., 2010).

One concern about expediting CEA in patients with recent TIA/stroke was that it might be associated with an increase in the procedural risk. The Round 3 data suggest that this has not occurred, but there are still concerns about the overall reliability of the 30-day risks which remain lower than those reported in contemporary randomised trials. For this reason, surgeons are urged to seek independent review of their cases following surgery.

In addition to the complications listed on the previous page, there were 276 other post operative complications recorded within Round 3. These are shown in the table below.

Table 3: Other specified post-operative complications

	Round 2 (21 months) (5274 cases)	Round 3 (12 months) (4971 cases)
Complication specified	National N (%)	National N (%)
Amaurosis fugax	1 (0.02%)	1 (0.02%)
Heart failure	22 (0.4%)	38 (0.8%)
Urinary complications	33 (0.6%)	38 (0.8%)
Cardiac arrest	5 (0.1%)	70 (1%)
Fitting	11 (0.2%)	10 (0.2%)
Occlusion of the operated carotid	2 (0.04%)	4 (0.1%)
Respiratory complications	35 (0.7%)	48 (1%)
Thromboembolism related to the treated carotid artery	6 (0.1%)	2 (0.04%)
Post-operative hypertension	54 (1%)	64 (1%)
Sub-dural bleed		1 (0.02%)

Chapter 3: Participation Compared to HES

3.1 Comparison of Audit Data with Hospital Episode Statistics (HES)

HES is the national statistical data warehouse for England of the care provided by NHS hospitals and for NHS hospital patients treated elsewhere. HES is the data source for a wide range of healthcare analysis for the NHS, Government and many other organisations. There are equivalent agencies in Wales, Scotland and Northern Ireland.

In this report, the term *HES* is used generically to describe data that are collected by these national agencies. The number of carotid endarterectomy procedures (codes L29.4 and L29.5) that were performed according to HES, over the equivalent audit period was used to compare the completeness of cases contributed to the audit by each Trust/Health Board.

There were 6079 CEA cases recorded on HES for the Round 3 time period. The audit captured 4780/6079 comparable cases. The audit, therefore, represents 79% (4780/6079) of HES recorded cases. This is an improvement on Round 2 (70%). The number of comparable cases, 4780 is less than the number of cases included in this audit (4971) for two reasons:




1. The final HES figures for Northern Ireland are not known yet, so cases performed in Northern Ireland are not included in any HES comparison.
2. 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 2010, so were included in this audit, but were discharged from hospital in October 2010 or later, so are not included in HES.

A trust's HES comparator may also be larger than the number of cases analysed in Round 3, as cases analysed in Round 2 but discharged from hospital in October 2009 will be included.

The median number of cases per trust in England was:

- 33 (IQR 18-51) reported in the audit
- 42 (IQR 28-66) recorded on HES

There is concern amongst many Healthcare Professionals regarding the accuracy of HES data, and this was examined further in an organisational audit in 2009. Currently, however, HES is the only national data available with which to compare. As part of the organisational audit, 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.

From Round 3 onwards, the steering group has decided to use a traffic light system for 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.

As the HES data is 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 3.

Table 14.3: Trust Contribution Compared to HES

Trust Name	Total Number of Cases in Round 3	Number in R3 for HES Comparison	Number of Cases in HES	%	
East Midlands					
Derby Hospitals NHS Foundation Trust	33	31	34	91%	✓
Kettering General Hospital NHS Foundation Trust	34	34	35	97%	✓
Northampton General Hospital NHS Trust	32	32	32	100%	✓
Nottingham University Hospitals NHS Trust	83	82	83	99%	✓
Sherwood Forest Hospitals NHS Foundation Trust	26	25	27	93%	✓
United Lincolnshire Hospitals NHS Trust	7	7	28	25%	✗
University Hospitals of Leicester NHS Trust	137	136	143	95%	✓
East of England					
Basildon and Thurrock University Hospital NHS Foundation Trust	18	18	23	78%	⬢
Bedford Hospital NHS Trust	28	28	39	72%	✗
Cambridge University Hospitals NHS Foundation Trust	94	93	128	73%	✗
Colchester Hospital University NHS Foundation Trust	32	32	40	80%	⬢
East and North Hertfordshire NHS Trust	16	16	22	73%	✗
Ipswich Hospital NHS Trust	41	41	41	100%	✓
Mid Essex Hospital Services NHS Trust	24	24	36	67%	✗
Norfolk and Norwich University Hospitals NHS Foundation Trust	99	98	100	98%	✓
Peterborough and Stamford Hospitals NHS Foundation Trust	8	8	15	53%	✗
Princess Alexandra Hospital NHS Trust	29	30	30	100%	✓
Southend University Hospital NHS Foundation Trust	46	44	53	83%	⬢
West Hertfordshire Hospitals NHS Trust	35	35	59	59%	✗
London					
Barking, Havering and Redbridge Hospitals NHS Trust	27	28	47	60%	✗
Barnet and Chase Farm Hospitals NHS Trust	43	43	50	86%	⬢
Barts and The London NHS Trust	38	36	50	72%	✗
Croydon Health Services NHS Trust	0	0	10	0%	✗
Ealing Hospital NHS Trust	6	6	10	60%	✗
Epsom and St Helier University Hospitals NHS Trust	3	3	12	25%	✗
Guy's and St Thomas' Hospital NHS Foundation Trust	15	17	30	57%	✗
Hillingdon Hospital NHS Trust	15	15	21	71%	✗
Imperial College Healthcare NHS Trust	109	104	125	83%	⬢
King's College Hospital NHS Foundation Trust	50	52	72	72%	✗
Lewisham Hospital NHS Trust	18	17	21	81%	⬢
North West London Hospitals NHS Trust	9	9	24	38%	✗
Royal Free Hampstead NHS Trust	15	16	12	133%	⬢
St George's Healthcare NHS Trust	44	45	51	88%	⬢
University College London Hospitals NHS Foundation Trust	30	31	34	91%	✓
Whipps Cross University Hospital NHS Trust	1	2	11	18%	✗
Whittington Hospital NHS Trust	2	2	4	50%	✗
North East					
City Hospitals Sunderland NHS Foundation Trust	49	48	49	98%	✓
County Durham and Darlington NHS Foundation Trust	36	36	42	86%	⬢
Gateshead Health NHS Foundation Trust	19	18	18	100%	✓
Newcastle upon Tyne Hospitals NHS Foundation Trust	83	81	95	85%	⬢
South Tees Hospitals NHS Foundation Trust	64	64	61	105%	✓
North West					
Aintree University Hospitals NHS Foundation Trust	28	28	47	60%	✗
Blackpool, Fylde & Wyre Hospitals NHS Foundation Trust	1	1	70	1%	✗
Central Manchester University Hospitals NHS Trust	49	50	72	69%	✗

Trust Name	Total Number of Cases in Round 3	Number in R3 for HES Comparison	Number of Cases in HES	%	
Countess of Chester Hospital NHS Foundation Trust	45	48	49	98%	✓
East Lancashire Hospitals NHS Trust	50	49	97	51%	✗
Lancashire Teaching Hospitals NHS Foundation Trust	52	52	55	95%	✓
Mid Cheshire Hospitals NHS Foundation Trust	32	32	30	107%	✓
North Cumbria University Hospitals NHS Trust	27	27	31	87%	⚠
Pennine Acute Hospitals NHS Trust	81	82	135	61%	✗
Royal Bolton Hospital NHS Foundation Trust	32	32	35	91%	✓
Royal Liverpool and Broadgreen University Hospitals NHS Trust	38	39	40	98%	✓
Salford Royal NHS Foundation Trust	N/A	N/A	3	N/A	N/A
Southport and Ormskirk Hospital NHS Trust	20	20	20	100%	✓
Tameside Hospital NHS Foundation Trust	27	29	37	78%	⚠
The Walton Centre NHS Foundation Trust	12	12	14	86%	⚠
University Hospital of South Manchester NHS Foundation Trust	106	108	98	110%	✓
University Hospitals of Morecambe Bay NHS Foundation Trust	32	32	44	73%	✗
Warrington and Halton Hospitals NHS Foundation Trust	43	45	53	85%	⚠
Wirral University Teaching Hospital NHS Foundation Trust	55	55	55	100%	✓
Wrightington, Wigan and Leigh NHS Foundation Trust	24	24	23	104%	✓
South Central					
Basingstoke and North Hampshire NHS Foundation Trust	4	4	4	100%	✓
Buckinghamshire Hospitals NHS Trust	88	88	76	116%	⚠
Milton Keynes Hospital NHS Foundation Trust	11	11	11	100%	✓
Oxford Radcliffe Hospitals NHS Trust	72	72	88	82%	⚠
Portsmouth Hospitals NHS Trust	61	60	77	78%	⚠
Royal Berkshire NHS Foundation Trust	12	12	13	92%	✓
Southampton University Hospitals NHS Trust	87	87	95	92%	✓
Winchester and Eastleigh Healthcare NHS Trust	N/A	N/A	6	N/A	N/A
South East Coast					
Ashford and St Peter's Hospital NHS Trust	21	21	19	111%	⚠
Brighton and Sussex University Hospitals NHS Trust	24	23	23	100%	✓
Dartford and Gravesham NHS Trust	0	0	5	0%	✗
East Kent Hospitals NHS Trust	64	63	67	94%	✓
East Sussex Hospitals NHS Trust	5	5	13	38%	✗
Frimley Park Hospital NHS Foundation Trust	51	53	58	91%	✓
Maidstone and Tunbridge Wells NHS Trust	13	13	12	108%	✓
Medway NHS Foundation Trust	39	39	39	100%	✓
Surrey and Sussex Healthcare NHS Trust	37	39	40	98%	✓
Western Sussex Hospitals NHS Trust	43	42	45	93%	✓
South West					
Dorset County Hospital NHS Foundation Trust	33	33	33	100%	✓
Gloucestershire Hospitals NHS Foundation Trust	63	62	75	83%	⚠
Great Western Hospitals NHS Foundation Trust	7	7	14	50%	✗
North Bristol NHS Trust	33	31	30	103%	✓
Northern Devon Healthcare NHS Trust	27	27	25	108%	✓
Plymouth Hospitals NHS Trust	40	40	40	100%	✓
Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	44	44	54	81%	⚠
Royal Cornwall Hospitals NHS Trust	64	64	72	89%	⚠
Royal Devon and Exeter NHS Foundation Trust	18	18	41	44%	✗
Royal United Hospital Bath NHS Trust	63	63	66	95%	✓
Salisbury NHS Foundation Trust	20	20	20	100%	✓
South Devon Healthcare NHS Foundation Trust	20	19	18	106%	✓
Taunton and Somerset NHS Foundation Trust	47	45	46	98%	✓

Trust Name	Total Number of Cases in Round 3	Number in R3 for HES Comparison	Number of Cases in HES	%	
University Hospitals of Bristol NHS Foundation Trust	48	49	50	98%	✓
West Midlands					
Dudley Group of Hospitals NHS Trust	75	73	77	95%	✓
Heart of England NHS Foundation Trust	15	14	57	25%	✗
Mid Staffordshire NHS Foundation Trust	14	13	12	108%	✓
Royal Wolverhampton Hospitals NHS Trust	17	18	33	55%	✗
Sandwell and West Birmingham Hospitals NHS Trust	46	45	45	100%	✓
Shrewsbury & Telford Hospital NHS Trust	48	47	52	90%	⬢
University Hospital Of North Staffordshire NHS Trust	0	0	63	0%	✗
University Hospitals Birmingham NHS Foundation Trust	32	32	63	51%	✗
University Hospitals Coventry and Warwickshire NHS Trust	64	62	80	78%	⬢
Walsall Hospitals NHS Trust	39	39	40	98%	✓
Worcestershire Acute Hospitals NHS Trust	71	71	97	73%	✗
Yorkshire and The Humber					
Bradford Teaching Hospitals NHS Foundation Trust	42	39	39	100%	✓
Calderdale and Huddersfield NHS Foundation Trust	31	27	30	90%	⬢
Doncaster and Bassetlaw Hospitals NHS Foundation Trust	57	57	67	85%	⬢
Hull and East Yorkshire Hospitals NHS Trust	70	70	73	96%	✓
Leeds Teaching Hospitals NHS Trust	36	36	73	49%	✗
Mid Yorkshire Hospitals NHS Trust	38	38	41	93%	✓
Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	16	16	23	70%	✗
Scarborough and North East Yorkshire Health Care NHS Trust	0	0	15	0%	✗
Sheffield Teaching Hospitals NHS Foundation Trust	74	74	85	87%	⬢
York Hospitals NHS Foundation Trust	95	94	92	102%	✓
ENGLAND TOTAL	4291	4271	5257	81%	⬢
Northern Ireland					
Belfast Health and Social Care Trust	146	Not known due to masking of small numbers, and only 9 months of data being available.			
Southern Health and Social Care Trust	11				
Western Health and Social Care Trust	14				
NORTHERN IRELAND TOTAL	171				
Scotland					
NHS Ayrshire & Arran	21	22	46	48%	✗
NHS Dumfries & Galloway	35	35	32	109%	✓
NHS Fife	17	17	17	100%	✓
NHS Forth Valley	29	30	32	94%	✓
NHS Grampian	19	19	28	68%	✗
NHS Greater Glasgow & Clyde	27	27	118	23%	✗
NHS Highland	53	53	57	93%	✓
NHS Lanarkshire	5	5	36	14%	✗
NHS Lothian	83	83	79	105%	✓
NHS Tayside	25	25	49	51%	✗
SCOTLAND TOTAL	314	316	494	64%	✗
Wales					
Abertawe Bro Morgannwg University Local Health Board	64	63	114	55%	✗
Aneurin Bevan Local Health Board	62	61	66	92%	✓
Betsi Cadwaladr University Local Health Board	43	41	44	93%	✓
Cardiff and Vale University Local Health Board	16	18	54	33%	✗
Cwm Taf Local Health Board	10	10	50	20%	✗
WALES TOTAL	195	193	328	59%	✗
UK TOTAL	4971				
UK TOTAL (excluding Northern Ireland)		4780	6079	79%	⬢

Table 14.4: SHA Contribution Compared to HES

Region	ROUND 1 (Operations 1 st Dec 2005 to 31 st Dec 2007)	ROUND 2 (Operation dates: 1 st Jan 2008 to 30 th Sept 2009)	Round 3 (Operation dates: 1 st Oct 2009 to 30 th Sept 2010)		
	Total Round 1 cases as recorded by HES (based on contributing trusts only)	Round 2 cases as recorded by HES (based on contributing trusts only)	Round 3 cases as recorded by HES	Round 3 cases contributed to this audit (% of HES cases)	
East Midlands	404	477	382	347 (91%)	✓
East of England	641	477	586	462 (74%)	✗
London	918	1017	584	426 (73%)	✗
North East	545	483	265	247 (93%)	✓
North West	1079	1421	1008	765 (76%)	⦿
South Central	163	649	370	334 (90%)	⦿
South East Coast	373	579	321	298 (93%)	✓
South West	1047	972	584	522 (89%)	⦿
W Midlands	985	1032	619	414 (67%)	✗
Yorkshire and The Humber	901	923	538	451 (84%)	⦿
ENGLAND	7056	8345	5257	4271 (81%)	⦿
NHS Ayrshire	-	96	46	22 (48%)	✗
NHS Dumfries and Galloway	-	41	32	35 (109%)	✓
NHS Fife	48	46	17	17 (100%)	✓
NHS Forth Valley	82	57	32	30 (94%)	✓
NHS Grampian	-	65	28	19 (68%)	✗
NHS Greater Glasgow	289	218	118	27 (23%)	✗
NHS Highland	74	83	57	53 (93%)	✓
NHS Lanarkshire	-	-	36	5 (14%)	✗
NHS Lothian	182	153	79	83 (105%)	✓
NHS Tayside	80	63	49	25 (51%)	✗
SCOTLAND	793	822	494	316 (64%)	✗
Wales Mid and West	280	87	114	63 (55%)	✗
Wales North	-	190	44	41 (93%)	✓
Wales South East	250	324	170	89 (52%)	✗
WALES	530	601	328	193 (59%)	✗
Belfast Health and Social Care Board	Not available – masked by data agency	Not available – masked by data agency	Not available – masked by data agency		
Southern Health Social Services Board					
Western Health Social Services Board					
NORTHERN IRELAND	324	252			
UK	8703	10,020			

Chapter 4: Key Indicators for Carotid Endarterectomy

The nine key indicators for carotid endarterectomy (CEA) are based on recent guidance and policy: The NICE Acute stroke and TIA guideline and The National Stroke Strategy and have been selected in consultation with the Vascular Society of Great Britain and Ireland. As in the first time that these data were presented, the volume and sensitivity of the available data warrants careful consideration. It was therefore decided to present 7 at trust level and a further 2 at SHA level.

This is because the complication rate for CEA is very low; the sample would need to be much larger for statistical significance for each individual trust and no adjustment has been made for the age or severity of the patient who suffered complications compared to those who did not.

Presentation of results

The results are based on all symptomatic Round 3 cases (N = 4197) that were submitted to the audit by a total of 126/130 (97%) trusts. The number (N) and percentage (%) of cases receiving care within the specified timeframe is given. These are presented in alphabetical order by country, SHA then name of Trust. The national figures for comparison are presented on the top row. National refers to all eligible Trusts within the UK.

At trust-level and SHA-level

- Number of cases in HES
- N (%) of patients referred within 2 days of symptom (Q4.1a to Q3.1)
- N (%) of patients referred within 14 days of symptom (Q4.1a to Q3.1)
- N (%) of patients receiving surgery within 2 days of referral (Q3.1 to Q1.1)
- N (%) of patients receiving surgery within 14 days of referral (Q3.1 to Q1.1)
- N (%) of patients receiving surgery within 2 days of symptom that triggered referral (Q4.1a to Q1.1)
- N (%) of patients receiving surgery within 14 days of symptom that triggered referral (Q4.1a to Q1.1)

At SHA-level only:

- N (%) of symptomatic patients, with stroke as the symptom that triggered referral, who had a stroke or died within 30 days of undergoing CEA
- N (%) of symptomatic patients, with TIA or amaurosis fugax as the symptom that triggered referral, who had a stroke or died within 30 days of undergoing CEA

England

The results that are relevant to your trust and SHA can be found in the tables that follow.

Northern Ireland, Scotland and Wales

Due to the small volume of operations that are carried out at the individual trusts, some key indicator results for Northern Ireland, Scotland and Wales are presented at SHA-level only

Trust-Level Key Indicators

Trust name	All cases in the audit	HES Comparator	Cases in HES	Symptomatic patients		Time from index symptom to referral (A to B on Figure 1)			Time from referral to surgery (B to C on Figure 1)			Time from symptom to surgery (A to C on Figure 1)		
				Symptomatic cases	Patients referred because of stroke or TIA or amaurosis fugax	Patients with exact symptom and referral dates	Patients referred within 2 days of symptom	Patients referred within 14 days of symptom	Patients with exact referral and operation dates	Patients receiving surgery within 2 days of referral	Patients receiving surgery within 14 days of referral	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
National <i>Median per Trust</i> <i>N.B. HES data is not known for Northern Ireland.</i>	4971 33	4780 *	6079 * 42*	4197 29	4137 28	3501 23	904 (26%)	2394 (68%)	4197 29	499 (12%)	2400 (57%)	3577 24	83 (2%)	1420 (40%)
EAST MIDLANDS														
Derby Hospitals NHS Foundation Trust	33	31	34	33	33	19	8 (42%)	16 (84%)	33	12 (36%)	23 (70%)	19	2 (11%)	13 (68%)
Kettering General Hospital NHS Foundation Trust	34	34	35	31	27	25	1 (4%)	11 (44%)	31	1 (3%)	6 (19%)	25	0 (0%)	2 (8%)
Northampton General Hospital NHS Trust	32	32	32	30	30	27	4 (15%)	24 (89%)	30	2 (7%)	15 (50%)	29	0 (0%)	12 (41%)
Nottingham University Hospitals NHS Trust	83	82	83	75	75	65	14 (22%)	52 (80%)	75	37 (49%)	62 (83%)	65	4 (6%)	40 (62%)
Sherwood Forest Hospitals NHS Foundation Trust	26	25	27	21	21	19	3 (16%)	8 (42%)	21	0 (0%)	10 (48%)	19	0 (0%)	3 (16%)
United Lincolnshire Hospitals NHS Trust	7	7	28	7	6	6	2 (33%)	3 (50%)	7	2 (29%)	3 (43%)	6	1 (17%)	3 (50%)
University Hospitals of Leicester NHS Trust	137	136	143	109	109	101	29 (29%)	74 (73%)	109	16 (15%)	87 (80%)	102	2 (2%)	59 (58%)
EAST OF ENGLAND														
Basildon and Thurrock University Hospital NHS Foundation Trust	18	18	23	16	15	14	2 (14%)	9 (64%)	16	0 (0%)	1 (6%)	14	0 (0%)	1 (7%)
Bedford Hospital NHS Trust	28	28	39	24	24	22	5 (23%)	13 (59%)	24	4 (17%)	11 (46%)	22	1 (5%)	8 (36%)

Trust name	All cases in the audit	HES Comparator	Cases in HES	Symptomatic patients		Time from index symptom to referral (A to B on Figure 1)			Time from referral to surgery (B to C on Figure 1)			Time from symptom to surgery (A to C on Figure 1)		
				Symptomatic cases	Patients referred because of stroke or TIA or amaurosis fugax	Patients with exact symptom and referral dates	Patients referred within 2 days of symptom	Patients referred within 14 days of symptom	Patients with exact referral and operation dates	Patients receiving surgery within 2 days of referral	Patients receiving surgery within 14 days of referral	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
National <i>Median per Trust</i> N.B. HES data is not known for Northern Ireland.	4971 33	4780 *	6079 * 42*	4197 29	4137 28	3501 23	904 (26%)	2394 (68%)	4197 29	499 (12%)	2400 (57%)	3577 24	83 (2%)	1420 (40%)
Cambridge University Hospitals NHS Foundation Trust	94	93	128	76	76	70	26 (37%)	48 (69%)	76	3 (4%)	28 (37%)	75	0 (0%)	22 (29%)
Colchester Hospital University NHS Foundation Trust	32	32	40	26	26	21	7 (33%)	15 (71%)	26	6 (23%)	18 (69%)	21	0 (0%)	10 (48%)
East and North Hertfordshire NHS Trust	16	16	22	15	15	7	0 (0%)	2 (29%)	15	2 (13%)	5 (33%)	7	0 (0%)	2 (29%)
Ipswich Hospital NHS Trust	41	41	41	31	31	24	5 (21%)	6 (25%)	31	0 (0%)	1 (3%)	24	0 (0%)	0 (0%)
Mid Essex Hospital Services NHS Trust	24	24	36	21	21	17	3 (18%)	8 (47%)	21	0 (0%)	2 (10%)	17	0 (0%)	0 (0%)
Norfolk and Norwich University Hospitals NHS Foundation Trust	99	98	100	78	76	63	15 (24%)	41 (65%)	78	16 (21%)	40 (51%)	65	6 (9%)	25 (38%)
Peterborough and Stamford Hospitals NHS Foundation Trust	8	8	15	8	8	8	2 (25%)	6 (75%)	8	1 (13%)	5 (63%)	8	0 (0%)	3 (38%)
Princess Alexandra Hospital NHS Trust	29	30	30	16	16	16	2 (13%)	10 (63%)	16	2 (13%)	7 (44%)	16	0 (0%)	6 (38%)
Southend University Hospital NHS Foundation Trust	46	44	53	35	35	32	11 (34%)	29 (91%)	35	3 (9%)	21 (60%)	34	1 (3%)	21 (62%)
West Hertfordshire Hospitals NHS Trust	35	35	59	26	26	23	5 (22%)	12 (52%)	26	2 (8%)	12 (46%)	24	0 (0%)	11 (46%)
LONDON														
Barking, Havering and Redbridge Hospitals NHS Trust	27	28	47	27	27	25	2 (8%)	9 (36%)	27	1 (4%)	16 (59%)	26	0 (0%)	5 (19%)
Barnet and Chase Farm Hospitals NHS Trust	43	43	50	26	25	20	2 (10%)	13 (65%)	26	5 (19%)	15 (58%)	20	1 (5%)	8 (40%)
Barts and The London NHS Trust	38	36	50	22	22	20	8 (40%)	15 (75%)	22	2 (9%)	13 (59%)	20	0 (0%)	8 (40%)

Trust name	All cases in the audit	HES Comparator	Cases in HES	Symptomatic patients		Time from index symptom to referral (A to B on Figure 1)			Time from referral to surgery (B to C on Figure 1)			Time from symptom to surgery (A to C on Figure 1)		
				Symptomatic cases	Patients referred because of stroke or TIA or amaurosis fugax	Patients with exact symptom and referral dates	Patients referred within 2 days of symptom	Patients referred within 14 days of symptom	Patients with exact referral and operation dates	Patients receiving surgery within 2 days of referral	Patients receiving surgery within 14 days of referral	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
National <i>Median per Trust</i> N.B. HES data is not known for Northern Ireland.	4971 33	4780 *	6079 * 42*	4197 29	4137 28	3501 23	904 (26%)	2394 (68%)	4197 29	499 (12%)	2400 (57%)	3577 24	83 (2%)	1420 (40%)
Croydon Health Services NHS Trust	No Data													
Ealing Hospital NHS Trust	6	6	10	2	2	2	0 (0%)	0 (0%)	2	0 (0%)	0 (0%)	2	0 (0%)	0 (0%)
Epsom and St Helier University Hospitals NHS Trust	3	3	12	3	3	3	0 (0%)	1 (33%)	3	0 (0%)	2 (67%)	3	0 (0%)	0 (0%)
Guy's and St Thomas' Hospital NHS Foundation Trust	15	17	30	14	13	13	7 (54%)	11 (85%)	14	0 (0%)	14 (100%)	13	0 (0%)	10 (77%)
Hillingdon Hospital NHS Trust	15	15	21	10	10	9	1 (11%)	5 (56%)	10	0 (0%)	5 (50%)	9	0 (0%)	2 (22%)
Imperial College Healthcare NHS Trust	109	104	125	76	73	61	23 (38%)	47 (77%)	76	27 (36%)	61 (80%)	63	3 (5%)	36 (57%)
King's College Hospital NHS Foundation Trust	50	52	72	40	39	34	18 (53%)	25 (74%)	40	8 (20%)	29 (73%)	34	4 (12%)	23 (68%)
Lewisham Hospital NHS Trust	18	17	21	14	14	9	1 (11%)	4 (44%)	14	0 (0%)	3 (21%)	9	0 (0%)	1 (11%)
North West London Hospitals NHS Trust	9	9	24	6	5	5	2 (40%)	4 (80%)	6	1 (17%)	6 (100%)	5	0 (0%)	4 (80%)
Royal Free Hampstead NHS Trust	15	16	12	15	15	10	2 (20%)	8 (80%)	15	2 (13%)	12 (80%)	12	0 (0%)	6 (50%)
St George's Healthcare NHS Trust	44	45	51	39	39	31	14 (45%)	28 (90%)	39	11 (28%)	34 (87%)	33	1 (3%)	25 (76%)
University College London Hospitals NHS Foundation Trust	30	31	34	25	25	20	9 (45%)	15 (75%)	25	10 (40%)	24 (96%)	20	3 (15%)	13 (65%)
Whipps Cross University Hospital NHS Trust	1	2	11	1	1	1	0 (0%)	1 (100%)	1	0 (0%)	0 (0%)	1	0 (0%)	0 (0%)
Whittington Hospital NHS Trust	2	2	4	2	2	2	0 (0%)	2 (100%)	2	0 (0%)	1 (50%)	2	0 (0%)	1 (50%)
NORTH EAST														

Trust name	All cases in the audit	HES Comparator	Cases in HES	Symptomatic patients		Time from index symptom to referral (A to B on Figure 1)			Time from referral to surgery (B to C on Figure 1)			Time from symptom to surgery (A to C on Figure 1)		
				Symptomatic cases	Patients referred because of stroke or TIA or amaurosis fugax	Patients with exact symptom and referral dates	Patients referred within 2 days of symptom	Patients referred within 14 days of symptom	Patients with exact referral and operation dates	Patients receiving surgery within 2 days of referral	Patients receiving surgery within 14 days of referral	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
National <i>Median per Trust</i> N.B. HES data is not known for Northern Ireland.	4971 33	4780 *	6079 * 42*	4197 29	4137 28	3501 23	904 (26%)	2394 (68%)	4197 29	499 (12%)	2400 (57%)	3577 24	83 (2%)	1420 (40%)
City Hospitals Sunderland NHS Foundation Trust	49	48	49	43	43	39	3 (8%)	18 (46%)	43	0 (0%)	25 (58%)	39	0 (0%)	7 (18%)
County Durham and Darlington NHS Foundation Trust	36	36	42	35	35	32	9 (28%)	25 (78%)	35	0 (0%)	15 (43%)	32	0 (0%)	10 (31%)
Gateshead Health NHS Foundation Trust	19	18	18	19	19	17	4 (24%)	10 (59%)	19	0 (0%)	10 (53%)	17	0 (0%)	3 (18%)
Newcastle upon Tyne Hospitals NHS Foundation Trust	83	81	95	65	64	62	15 (24%)	41 (66%)	65	4 (6%)	50 (77%)	64	1 (2%)	29 (45%)
South Tees Hospitals NHS Trust	64	64	61	63	63	60	21 (35%)	50 (83%)	63	4 (6%)	55 (87%)	60	0 (0%)	38 (63%)
NORTH WEST														
Aintree University Hospitals NHS Foundation Trust	28	28	47	26	26	24	10 (42%)	21 (88%)	26	6 (23%)	22 (85%)	25	3 (12%)	19 (76%)
Blackpool, Fylde & Wyre Hospitals NHS Foundation Trust	1	1	70	1	1	1	1 (100%)	1 (100%)	1	0 (0%)	0 (0%)	1	0 (0%)	0 (0%)
Central Manchester University Hospitals NHS Trust	49	50	72	45	45	21	8 (38%)	12 (57%)	45	0 (0%)	15 (33%)	21	0 (0%)	6 (29%)
Countess of Chester Hospital NHS Foundation Trust	45	48	49	42	37	30	12 (40%)	17 (57%)	42	3 (7%)	25 (60%)	32	0 (0%)	15 (47%)
East Lancashire Hospitals NHS Trust	50	49	97	44	42	30	17 (57%)	27 (90%)	44	11 (25%)	22 (50%)	33	4 (12%)	18 (55%)
Lancashire Teaching Hospitals NHS Foundation Trust	52	52	55	44	44	29	6 (21%)	18 (62%)	44	1 (2%)	18 (41%)	32	0 (0%)	7 (22%)

Trust name	All cases in the audit	HES Comparator	Cases in HES	Symptomatic patients		Time from index symptom to referral (A to B on Figure 1)			Time from referral to surgery (B to C on Figure 1)			Time from symptom to surgery (A to C on Figure 1)		
				Symptomatic cases	Patients referred because of stroke or TIA or amaurosis fugax	Patients with exact symptom and referral dates	Patients referred within 2 days of symptom	Patients referred within 14 days of symptom	Patients with exact referral and operation dates	Patients receiving surgery within 2 days of referral	Patients receiving surgery within 14 days of referral	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
National <i>Median per Trust</i> N.B. HES data is not known for Northern Ireland.	4971 33	4780 *	6079 * 42*	4197 29	4137 28	3501 23	904 (26%)	2394 (68%)	4197 29	499 (12%)	2400 (57%)	3577 24	83 (2%)	1420 (40%)
Mid Cheshire Hospitals NHS Foundation Trust	32	32	30	24	24	24	7 (29%)	14 (58%)	24	0 (0%)	3 (13%)	24	0 (0%)	3 (13%)
North Cumbria University Hospitals NHS Trust	27	27	31	24	24	22	4 (18%)	15 (68%)	24	4 (17%)	18 (75%)	22	0 (0%)	10 (45%)
Pennine Acute Hospitals NHS Trust	81	82	135	69	69	31	6 (19%)	15 (48%)	69	6 (9%)	21 (30%)	34	1 (3%)	9 (26%)
Royal Bolton Hospital NHS Foundation Trust	32	32	35	28	28	23	6 (26%)	12 (52%)	28	1 (4%)	10 (36%)	23	0 (0%)	5 (22%)
Royal Liverpool and Broadgreen University Hospitals NHS Trust	38	39	40	30	30	26	6 (23%)	21 (81%)	30	7 (23%)	26 (87%)	27	1 (4%)	18 (67%)
Southport and Ormskirk Hospital NHS Trust	20	20	20	20	20	19	4 (21%)	13 (68%)	20	2 (10%)	14 (70%)	19	0 (0%)	6 (32%)
Tameside Hospital NHS Foundation Trust	27	29	37	24	24	17	6 (35%)	15 (88%)	24	2 (8%)	10 (42%)	17	0 (0%)	4 (24%)
The Walton Centre NHS Foundation Trust	12	12	14	11	11	7	1 (14%)	2 (29%)	11	0 (0%)	2 (18%)	7	0 (0%)	0 (0%)
University Hospital of South Manchester NHS Foundation Trust	106	108	98	96	91	23	8 (35%)	15 (65%)	96	6 (6%)	38 (40%)	26	1 (4%)	9 (35%)
University Hospitals of Morecambe Bay NHS Trust	32	32	44	27	22	22	20 (91%)	21 (95%)	27	7 (26%)	14 (52%)	22	4 (18%)	11 (50%)
Warrington and Halton Hospitals NHS Foundation Trust	43	45	53	37	37	22	1 (5%)	11 (50%)	37	1 (3%)	14 (38%)	23	1 (4%)	6 (26%)
Wirral University Teaching Hospital NHS Foundation Trust	55	55	55	51	51	44	14 (32%)	31 (70%)	51	2 (4%)	21 (41%)	45	0 (0%)	15 (33%)
Wrightington, Wigan and Leigh NHS Trust	24	24	23	23	22	16	4 (25%)	8 (50%)	23	0 (0%)	4 (17%)	16	0 (0%)	2 (13%)
SOUTH CENTRAL														
Basingstoke and North Hampshire NHS	4	4	4	4	4	2	0 (0%)	0 (0%)	4	0 (0%)	0 (0%)	2	0 (0%)	0 (0%)

Trust name	All cases in the audit	HES Comparator	Cases in HES	Symptomatic patients		Time from index symptom to referral (A to B on Figure 1)			Time from referral to surgery (B to C on Figure 1)			Time from symptom to surgery (A to C on Figure 1)		
				Symptomatic cases	Patients referred because of stroke or TIA or amaurosis fugax	Patients with exact symptom and referral dates	Patients referred within 2 days of symptom	Patients referred within 14 days of symptom	Patients with exact referral and operation dates	Patients receiving surgery within 2 days of referral	Patients receiving surgery within 14 days of referral	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
National <i>Median per Trust</i> N.B. HES data is not known for Northern Ireland.	4971 33	4780 *	6079 * 42*	4197 29	4137 28	3501 23	904 (26%)	2394 (68%)	4197 29	499 (12%)	2400 (57%)	3577 24	83 (2%)	1420 (40%)
Foundation Trust														
Buckinghamshire Hospitals NHS Trust	88	88	76	55	53	44	12 (27%)	24 (55%)	55	2 (4%)	23 (42%)	44	0 (0%)	12 (27%)
Milton Keynes Hospital NHS Foundation Trust	11	11	11	11	10	10	1 (10%)	4 (40%)	11	0 (0%)	5 (45%)	10	0 (0%)	2 (20%)
Oxford Radcliffe Hospitals NHS Trust	72	72	88	61	61	54	11 (20%)	37 (69%)	61	4 (7%)	35 (57%)	57	0 (0%)	15 (26%)
Portsmouth Hospitals NHS Trust	61	60	77	51	51	36	11 (31%)	26 (72%)	51	1 (2%)	16 (31%)	37	0 (0%)	13 (35%)
Royal Berkshire NHS Foundation Trust	12	12	13	12	12	11	6 (55%)	11 (100%)	12	1 (8%)	8 (67%)	12	0 (0%)	6 (50%)
Southampton University Hospitals NHS Trust	87	87	95	62	62	56	8 (14%)	48 (86%)	62	6 (10%)	43 (69%)	57	1 (2%)	33 (58%)
SOUTH EAST COAST														
Ashford and St Peter's Hospital NHS Trust	21	21	19	16	16	12	2 (17%)	7 (58%)	16	0 (0%)	3 (19%)	12	0 (0%)	1 (8%)
Brighton and Sussex University Hospitals NHS Trust	24	23	23	20	20	14	4 (29%)	12 (86%)	20	2 (10%)	12 (60%)	14	0 (0%)	7 (50%)
Dartford and Gravesham NHS Trust	No Data													
East Kent Hospitals NHS Trust	64	63	67	47	47	46	7 (15%)	32 (70%)	47	17 (36%)	32 (68%)	46	0 (0%)	26 (57%)
East Sussex Hospitals NHS Trust	5	5	13	5	5	1	0 (0%)	0 (0%)	5	0 (0%)	3 (60%)	1	0 (0%)	0 (0%)
Frimley Park Hospital NHS Foundation Trust	51	53	58	45	45	44	17 (39%)	40 (91%)	45	9 (20%)	40 (89%)	44	1 (2%)	28

Trust name	All cases in the audit	HES Comparator	Cases in HES	Symptomatic patients		Time from index symptom to referral (A to B on Figure 1)			Time from referral to surgery (B to C on Figure 1)			Time from symptom to surgery (A to C on Figure 1)		
				Symptomatic cases	Patients referred because of stroke or TIA or amaurosis fugax	Patients with exact symptom and referral dates	Patients referred within 2 days of symptom	Patients referred within 14 days of symptom	Patients with exact referral and operation dates	Patients receiving surgery within 2 days of referral	Patients receiving surgery within 14 days of referral	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
	N	N	N	N	N	N	N (%)	N (%)	N	N (%)	N (%)	N	N (%)	N (%)
National <i>Median per Trust</i> N.B. HES data is not known for Northern Ireland.	4971 33	4780 *	6079 * 42*	4197 29	4137 28	3501 23	904 (26%)	2394 (68%)	4197 29	499 (12%)	2400 (57%)	3577 24	83 (2%)	1420 (40%)
														(64%)
Maidstone and Tunbridge Wells NHS Trust	13	13	12	9	9	8	1 (13%)	5 (63%)	9	1 (11%)	7 (78%)	8	0 (0%)	5 (63%)
Medway NHS Foundation Trust	39	39	39	33	33	32	9 (28%)	25 (78%)	33	1 (3%)	16 (48%)	32	0 (0%)	10 (31%)
Surrey and Sussex Healthcare NHS Trust	37	39	40	33	33	30	12 (40%)	23 (77%)	33	7 (21%)	22 (67%)	31	1 (3%)	18 (58%)
Western Sussex Hospitals NHS Trust	43	42	45	41	41	39	7 (18%)	31 (79%)	41	5 (12%)	30 (73%)	39	0 (0%)	16 (41%)
SOUTH WEST														
Dorset County Hospital NHS Foundation Trust	33	33	33	29	29	22	4 (18%)	12 (55%)	29	5 (17%)	11 (38%)	23	0 (0%)	7 (30%)
Gloucestershire Hospitals NHS Foundation Trust	63	62	75	55	55	50	16 (32%)	42 (84%)	55	4 (7%)	38 (69%)	50	0 (0%)	26 (52%)
Great Western Hospitals NHS Foundation Trust	7	7	14	7	6	5	2 (40%)	2 (40%)	7	0 (0%)	0 (0%)	5	0 (0%)	0 (0%)
North Bristol NHS Trust	33	31	30	30	30	30	6 (20%)	18 (60%)	30	5 (17%)	21 (70%)	30	0 (0%)	11 (37%)
Northern Devon Healthcare NHS Trust	27	27	25	24	24	22	1 (5%)	13 (59%)	24	0 (0%)	7 (29%)	22	0 (0%)	2 (9%)
Plymouth Hospitals NHS Trust	40	40	40	35	35	31	16 (52%)	24 (77%)	35	6 (17%)	25 (71%)	33	1 (3%)	17 (52%)
Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust	44	44	54	40	40	23	14 (61%)	22 (96%)	40	8 (20%)	23 (57%)	24	3 (13%)	16 (67%)
Royal Cornwall Hospitals NHS Trust	64	64	72	55	55	51	17 (33%)	41 (80%)	55	11 (20%)	46 (84%)	51	2 (4%)	35

Trust name	All cases in the audit	HES Comparator	Cases in HES	Symptomatic patients		Time from index symptom to referral (A to B on Figure 1)			Time from referral to surgery (B to C on Figure 1)			Time from symptom to surgery (A to C on Figure 1)		
				Symptomatic cases	Patients referred because of stroke or TIA or amaurosis fugax	Patients with exact symptom and referral dates	Patients referred within 2 days of symptom	Patients referred within 14 days of symptom	Patients with exact referral and operation dates	Patients receiving surgery within 2 days of referral	Patients receiving surgery within 14 days of referral	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
National <i>Median per Trust</i> N.B. HES data is not known for Northern Ireland.	4971 33	4780 *	6079 * 42*	4197 29	4137 28	3501 23	904 (26%)	2394 (68%)	4197 29	499 (12%)	2400 (57%)	3577 24	83 (2%)	1420 (40%)
														(69%)
Royal Devon and Exeter NHS Foundation Trust	18	18	41	17	17	17	11 (65%)	13 (76%)	17	2 (12%)	11 (65%)	17	1 (6%)	8 (47%)
Royal United Hospital Bath NHS Trust	63	63	66	40	37	36	18 (50%)	32 (89%)	40	7 (18%)	33 (83%)	36	1 (3%)	23 (64%)
Salisbury NHS Foundation Trust	20	20	20	20	20	19	7 (37%)	14 (74%)	20	4 (20%)	18 (90%)	19	0 (0%)	10 (53%)
South Devon Healthcare NHS Foundation Trust	20	19	18	19	19	18	3 (17%)	10 (56%)	19	4 (21%)	13 (68%)	18	0 (0%)	9 (50%)
Taunton and Somerset NHS Foundation Trust	47	45	46	42	42	40	9 (23%)	31 (78%)	42	1 (2%)	23 (55%)	41	0 (0%)	14 (34%)
University Hospitals of Bristol NHS Foundation Trust	48	49	50	45	45	44	8 (18%)	26 (59%)	45	5 (11%)	29 (64%)	44	1 (2%)	15 (34%)
WEST MIDLANDS														
Dudley Group of Hospitals NHS Trust	75	73	77	54	54	51	11 (22%)	30 (59%)	54	2 (4%)	23 (43%)	51	0 (0%)	17 (33%)
Heart of England NHS Foundation Trust	15	14	57	14	14	12	0 (0%)	4 (33%)	14	0 (0%)	2 (14%)	13	0 (0%)	1 (8%)
Mid Staffordshire NHS Foundation Trust	14	13	12	12	11	11	0 (0%)	8 (73%)	12	1 (8%)	3 (25%)	12	0 (0%)	1 (8%)
Royal Wolverhampton Hospitals NHS Trust	17	18	33	13	13	11	3 (27%)	8 (73%)	13	1 (8%)	8 (62%)	11	0 (0%)	5 (45%)
Sandwell and West Birmingham Hospitals NHS Trust	46	45	45	39	38	36	4 (11%)	24 (67%)	39	0 (0%)	19 (49%)	38	0 (0%)	9 (24%)
Shrewsbury & Telford Hospital NHS Trust	48	47	52	35	35	30	9 (30%)	17 (57%)	35	2 (6%)	13 (37%)	31	1 (3%)	9 (29%)
University Hospital Of North Staffordshire NHS	No Data													

Trust name	All cases in the audit	HES Comparator	Cases in HES	Symptomatic patients		Time from index symptom to referral (A to B on Figure 1)			Time from referral to surgery (B to C on Figure 1)			Time from symptom to surgery (A to C on Figure 1)		
				Symptomatic cases	Patients referred because of stroke or TIA or amaurosis fugax	Patients with exact symptom and referral dates	Patients referred within 2 days of symptom	Patients referred within 14 days of symptom	Patients with exact referral and operation dates	Patients receiving surgery within 2 days of referral	Patients receiving surgery within 14 days of referral	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
	N	N	N	N	N	N	N (%)	N (%)	N	N (%)	N (%)	N	N (%)	N (%)
National <i>Median per Trust</i> N.B. HES data is not known for Northern Ireland.	4971 33	4780 *	6079 * 42*	4197 29	4137 28	3501 23	904 (26%)	2394 (68%)	4197 29	499 (12%)	2400 (57%)	3577 24	83 (2%)	1420 (40%)
Trust														
University Hospitals Birmingham NHS Foundation Trust	32	32	63	19	18	16	5 (31%)	10 (63%)	19	1 (5%)	6 (32%)	16	1 (6%)	5 (31%)
University Hospitals Coventry and Warwickshire NHS Trust	64	62	80	53	52	44	13 (30%)	27 (61%)	53	4 (8%)	27 (51%)	45	1 (2%)	14 (31%)
Walsall Hospitals NHS Trust	39	39	40	39	37	32	10 (31%)	21 (66%)	39	6 (15%)	16 (41%)	34	4 (12%)	14 (41%)
Worcestershire Acute Hospitals NHS Trust	71	71	97	64	64	55	12 (22%)	33 (60%)	64	7 (11%)	42 (66%)	57	0 (0%)	23 (40%)
YORKSHIRE AND THE HUMBER														
Bradford Teaching Hospitals NHS Foundation Trust	42	39	39	41	41	41	7 (17%)	25 (61%)	41	10 (24%)	34 (83%)	41	0 (0%)	16 (39%)
Calderdale and Huddersfield NHS Foundation Trust	31	27	30	28	28	27	8 (30%)	24 (89%)	28	0 (0%)	17 (61%)	27	0 (0%)	12 (44%)
Doncaster and Bassetlaw Hospitals NHS Foundation Trust	57	57	67	54	54	45	11 (24%)	29 (64%)	54	3 (6%)	43 (80%)	45	0 (0%)	20 (44%)
Hull and East Yorkshire Hospitals NHS Trust	70	70	73	62	62	62	5 (8%)	33 (53%)	62	12 (19%)	42 (68%)	62	2 (3%)	18 (29%)
Leeds Teaching Hospitals NHS Trust	36	36	73	35	35	27	11 (41%)	24 (89%)	35	17 (49%)	31 (89%)	29	6 (21%)	23 (79%)
Mid Yorkshire Hospitals NHS Trust	38	38	41	37	37	37	10 (27%)	28 (76%)	37	1 (3%)	22 (59%)	37	0 (0%)	14 (38%)

Trust name	All cases in the audit	HES Comparator	Cases in HES	Symptomatic patients		Time from index symptom to referral (A to B on Figure 1)			Time from referral to surgery (B to C on Figure 1)			Time from symptom to surgery (A to C on Figure 1)		
				Symptomatic cases	Patients referred because of stroke or TIA or amaurosis fugax	Patients with exact symptom and referral dates	Patients referred within 2 days of symptom	Patients referred within 14 days of symptom	Patients with exact referral and operation dates	Patients receiving surgery within 2 days of referral	Patients receiving surgery within 14 days of referral	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
	N	N	N	N	N	N	N (%)	N (%)	N	N (%)	N (%)	N	N (%)	N (%)
National <i>Median per Trust</i> N.B. HES data is not known for Northern Ireland.	4971 33	4780 *	6079 * 42*	4197 29	4137 28	3501 23	904 (26%)	2394 (68%)	4197 29	499 (12%)	2400 (57%)	3577 24	83 (2%)	1420 (40%)
Northern Lincolnshire and Goole Hospitals NHS Foundation Trust	16	16	23	14	13	11	2 (18%)	8 (73%)	14	1 (7%)	4 (29%)	11	0 (0%)	3 (27%)
Scarborough and North East Yorkshire Health Care NHS Trust	No Data													
Sheffield Teaching Hospitals NHS Foundation Trust	74	74	85	67	66	56	3 (5%)	31 (55%)	67	8 (12%)	27 (40%)	60	0 (0%)	14 (23%)
York Hospitals NHS Foundation Trust	95	94	92	78	77	64	19 (30%)	51 (80%)	78	29 (37%)	72 (92%)	64	6 (9%)	41 (64%)
NORTHERN IRELAND														
Belfast Health and Social Care Trust	146	Not Known		105	105	101	12 (12%)	59 (58%)	105	7 (7%)	54 (51%)	102	0 (0%)	29 (28%)
Southern Health and Social Care Trust	11			11	11	10	2 (20%)	10 (100%)	11	1 (9%)	5 (45%)	10	0 (0%)	3 (30%)
Western Health and Social Care Trust	14			13	11	12	0 (0%)	4 (33%)	13	0 (0%)	7 (54%)	12	0 (0%)	0 (0%)
WALES														
Wales Mid & West	64	63	114	49	49	44	14 (32%)	26 (59%)	49	5 (10%)	24 (49%)	45	2 (4%)	10 (22%)
Wales North	43	41	44	40	39	26	4 (15%)	13 (50%)	40	2 (5%)	12 (30%)	27	0 (0%)	5 (19%)
Wales South East	88	89	170	73	72	61	14 (23%)	42 (69%)	73	8 (11%)	34 (47%)	62	2 (3%)	17 (27%)
SCOTLAND														

Trust name	All cases in the audit	HES Comparator	Cases in HES	Symptomatic patients		Time from index symptom to referral (A to B on Figure 1)			Time from referral to surgery (B to C on Figure 1)			Time from symptom to surgery (A to C on Figure 1)		
				Symptomatic cases	Patients referred because of stroke or TIA or amaurosis fugax	Patients with exact symptom and referral dates	Patients referred within 2 days of symptom	Patients referred within 14 days of symptom	Patients with exact referral and operation dates	Patients receiving surgery within 2 days of referral	Patients receiving surgery within 14 days of referral	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
National <i>Median per Trust</i> N.B. HES data is not known for Northern Ireland.	4971 33	4780 *	6079 * 42*	4197 29	4137 28	3501 23	904 (26%)	2394 (68%)	4197 29	499 (12%)	2400 (57%)	3577 24	83 (2%)	1420 (40%)
NHS Ayrshire & Arran	21	22	46	19	18	15	4 (27%)	12 (80%)	19	1 (5%)	11 (58%)	15	0 (0%)	8 (53%)
NHS Dumfries and Galloway	35	35	32	31	31	23	3 (13%)	13 (57%)	31	1 (3%)	16 (52%)	23	0 (0%)	2 (9%)
NHS Fife	17	17	17	16	16	14	1 (7%)	13 (93%)	16	0 (0%)	8 (50%)	15	0 (0%)	1 (7%)
NHS Forth Valley	29	30	32	23	21	17	2 (12%)	9 (53%)	23	0 (0%)	10 (43%)	17	0 (0%)	5 (29%)
NHS Grampian	19	19	28	17	17	12	2 (17%)	7 (58%)	17	0 (0%)	12 (71%)	13	0 (0%)	4 (31%)
NHS Greater Glasgow and Clyde	27	27	118	27	27	25	0 (0%)	13 (52%)	27	1 (4%)	22 (81%)	26	0 (0%)	6 (23%)
NHS Highland	53	53	57	51	49	42	3 (7%)	25 (60%)	51	0 (0%)	22 (43%)	43	0 (0%)	7 (16%)
NHS Lanarkshire	5	5	36	5	5	5	1 (20%)	1 (20%)	5	0 (0%)	2 (40%)	5	0 (0%)	1 (20%)
NHS Lothian	83	83	79	81	80	71	21 (30%)	59 (83%)	81	6 (7%)	54 (67%)	71	1 (1%)	32 (45%)
NHS Tayside	25	25	49	24	24	23	12 (52%)	20 (87%)	24	1 (4%)	19 (79%)	23	0 (0%)	13 (57%)

SHA-Level Indicators

SHA	All cases in the audit		Symptomatic cases														
			Index symptom		Time from index symptom to referral (A to B on Figure 1)			Time from referral to surgery (B to C on Figure 1)			Time from symptom to surgery (A to C on Figure 1)			30-day outcomes			
	Total number of cases reported in Round 3	Total cases complete to Phase 2 (required for 30-day outcome evaluation)	Total symptomatic cases	Total cases referred with stroke or TIA or amaurosis fugax as the index symptom	Total cases with exact symptom and referral dates	Total cases referred within 2 days of symptom	Total cases referred within 14 days of symptom	Total cases with exact referral and operation dates	Total cases receiving surgery within 2 days of referral	Total cases receiving surgery within 14 days of referral	Total cases with exact symptom and operation dates	Total cases receiving surgery within 2 days of symptom that triggered referral	Total cases receiving surgery within 14 days of symptom that triggered referral	Total cases, referred because of stroke, whose 30-day outcomes can be evaluated	Total cases, referred because of stroke, with stroke or death within 30 days	Total cases, referred because of TIA or amaurosis fugax, whose 30-day outcomes can be evaluated	Total cases, referred because of TIA or amaurosis fugax, with stroke or death within 30 days
National	4971	4596 (92%)	4197	4137	3501	904 (26%)	2394 (68%)	4197	499 (12%)	2400 (57%)	3577	83 (2%)	1420 (40%)	1310	60 (5%)	2641	62 (2%)
East Midlands	352	345 (98%)	306	301	262	61 (23%)	188 (72%)	306	70 (23%)	206 (67%)	265	9 (3%)	132 (50%)	101	4 (4%)	195	3 (2%)
East of England	470	451 (96%)	372	369	317	83 (26%)	199 (63%)	372	39 (10%)	151 (41%)	327	8 (2%)	109 (33%)	110	4 (4%)	251	5 (2%)
London	425	396 (93%)	322	315	265	89 (34%)	188 (71%)	322	67 (21%)	235 (73%)	272	12 (4%)	142 (52%)	116	5 (4%)	190	8 (4%)
North East	251	209 (83%)	225	224	210	52 (25%)	144 (69%)	225	8 (4%)	155 (69%)	212	1 (0%)	87 (41%)	96	3 (3%)	115	4 (3%)
North West	754	707 (94%)	666	648	431	141 (33%)	289 (67%)	666	59 (9%)	297 (45%)	449	15 (3%)	163 (36%)	162	5 (3%)	463	10 (2%)
South Central	335	322 (96%)	256	253	213	49 (23%)	150 (70%)	256	14 (5%)	130 (51%)	219	1 (0%)	81 (37%)	96	6 (6%)	151	1 (1%)
South East Coast	297	279 (94%)	249	249	226	59 (26%)	175 (77%)	249	42 (17%)	165 (66%)	227	2 (1%)	111 (49%)	80	5 (6%)	163	6 (4%)
South West	527	460 (87%)	458	454	408	132 (32%)	300 (74%)	458	62 (14%)	298 (65%)	413	9 (2%)	193 (47%)	127	10 (8%)	305	10 (3%)

SHA	All cases in the audit		Symptomatic cases																
			Index symptom		Time from index symptom to referral (A to B on Figure 1)			Time from referral to surgery (B to C on Figure 1)			Time from symptom to surgery (A to C on Figure 1)			30-day outcomes					
	Total number of cases reported in Round 3	Total cases complete to Phase 2 (required for 30-day outcome evaluation)	Total symptomatic cases	Total cases referred with stroke or TIA or amaurosis fugax as the index symptom	Total cases with exact symptom and referral dates	Total cases referred within 2 days of symptom		Total cases with exact referral and operation dates	Total cases receiving surgery within 2 days of referral		Total cases receiving surgery within 14 days of referral	Total cases with exact symptom and operation dates	Total cases receiving surgery within 2 days of symptom that triggered referral		Total cases receiving surgery within 14 days of symptom that triggered referral	Total cases, referred because of stroke, whose 30-day outcomes can be evaluated			
						Total cases referred within 14 days of symptom			Total cases receiving surgery within 14 days of referral				Total cases receiving surgery within 2 days of symptom that triggered referral			Total cases, referred because of stroke, with stroke or death within 30 days		Total cases, referred because of stroke or death within 30 days of referral	
N	N (%)	N	N	N	N (%)	N (%)	N	N (%)	N (%)	N	N (%)	N (%)	N	N (%)	N	N (%)	N	N (%)	
National	4971	4596 (92%)	4197	4137	3501	904 (26%)	2394 (68%)	4197	499 (12%)	2400 (57%)	3577	83 (2%)	1420 (40%)	1310	60 (5%)	2641	62 (2%)		
West Midlands	421	361 (86%)	342	336	298	67 (22%)	182 (61%)	342	24 (7%)	159 (46%)	308	7 (2%)	98 (32%)	102	2 (2%)	189	3 (2%)		
Yorkshire and The Humber	459	433 (94%)	416	413	370	76 (21%)	253 (68%)	416	81 (19%)	292 (70%)	376	14 (4%)	161 (43%)	129	9 (7%)	262	7 (3%)		
ENGLAND	4291	3963 (92%)	3612	3562	3000	809 (27%)	2068 (69%)	3612	466 (13%)	2088 (58%)	3068	78 (3%)	1277 (42%)	1119	53 (5%)	2284	57 (2%)		
NORTHERN IRELAND	171	156 (91%)	129	127	123	14 (11%)	73 (59%)	129	8 (6%)	66 (51%)	124	0 (0%)	32 (26%)	34	2 (6%)	88	1 (1%)		
SCOTLAND	314	291 (93%)	294	288	247	49 (20%)	172 (70%)	294	10 (3%)	176 (60%)	251	1 (0%)	79 (31%)	120	2 (2%)	150	2 (1%)		
WALES	195	186 (95%)	162	160	131	32 (24%)	81 (62%)	162	15 (9%)	70 (43%)	134	4 (3%)	32 (24%)	37	3 (8%)	119	2 (2%)		

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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.
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, 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 of 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 which 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, though 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

Phase 1 [Referral to hospital discharge]

Section 1: Demographics

- 1.1 Date procedure was undertaken: _____ [DD/MM/YYYY]
[Date entered should be from 1st 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 1st 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 1st 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 1st 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 1st 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 1st 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:

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 No
[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 Neurosurgeon Radiologist Stroke Physician Other
- 13.1b If answered *Other* to 13.1a, specify: _____
- 13.2 Was this patient in a stenting versus surgery clinical trial? Yes No
- 13.2 If the patient was in a stenting versus surgery trial were they in ICSS or ACST-2? ICSS ACST-2
- 13.3 Pathology: *[Select at least 1 option]* *[If NOT Other, ignore 13.3a]*
 Atherosclerosis Post endarterectomy restenosis Post radiotherapy Other
- 13.3a If answered *Other* to 13.3, specify: _____
- 13.4 Was a carotid shunt used? Yes No Attempted and abandoned *[Tick 1 option only]*
- 13.5 Type of endarterectomy: Standard Eversion *[Tick 1 option only]*
- 13.6 Was a carotid patch used? Yes No *[Tick 1 option only]*
- 13.7 Were distal tacking sutures used? Yes No *[Tick 1 option only]*
- 13.8 Was heart surgery undertaken synchronously? Yes No *[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 Angiography Duplex scan Angioscopy Hand-held Doppler
- 13.10 Site of angioplasty/stenting: *[Select at least 1 option]*
 Carotid bifurcation (including proximal ICA) Distal ICA (below base of skull)
 Common Carotid artery External Carotid artery
- 13.11 Procedure details: Angioplasty alone Stent Cerebral protection device
[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 Abbott Acculink Bard Vivax Boston Scientific Wallstent
 Boston Scientific NEX stent Cordis Precise Invatec Cristallo Medtronic Exponent
 Other
- 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 Flow reversal Proximal occlusion (MoMa) Distal occlusion (PercuSurge) Other
- 13.11d If answered *Other* to 13.11c, specify: _____
- 13.12 Grade of most senior radiologist performing intervention: *[Tick 1 option only]*
 Consultant Non consultant career grade Specialist registrar

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 *[If '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]
- 20.1c 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: _____