National Vascular Registry

Supplementary Materials for the 2025 Report

November 2025

Royal College of Surgeons of England
ADVANCING SURGICAL CARE

VASCULAR SOCIETY
OF GREAT BRITAIN AND IRELAND

BSIR British Society of Interventional Radiology

Commissioned by:

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Foreword

It is always fascinating and enlightening to read the State of the Nation report, and it is my pleasure this year to be invited to write the foreword for this excellent document.

The consistently high standard of case ascertainment should reassure us that the data presented here are both valid and accurate. Vascular units across the country and the Royal College of Surgeons of England deserve congratulations for achieving this. The findings make for compelling reading, and it is reassuring to see that the majority of our patients continue to receive high-quality, evidence-based care. It is also gratifying to reflect on how patient outcomes have improved over the course of my career as a consultant vascular surgeon.

High-quality reports such as this often raise as many questions as they answer, and this document highlights several areas that warrant further investigation. The reduction in the number of AAA repairs, for instance—does this represent a genuine fall in incidence, or might it reflect better secondary prevention and improved management of small aneurysms, resulting in slower expansion rates and fewer reaching the threshold for repair? Likewise, the emergence of diabetes as a more prevalent risk factor for PAD than smoking prompts the question: would earlier and more intensive glucose control alter PAD incidence? Current evidence remains equivocal [Soyoye, 2021].

Variation between units—for example, in the ratios of open versus endovascular interventions, or in above- versus below-knee amputations—also merits closer examination, as does variation in time to treatment and the consequences of treatment delays. The Clinical Effectiveness Unit and Circulation Foundation Research Fellows have made excellent progress in this regard for CLTI, and are now investigating the impact of the PAD QIP [Atkins, 2024 and Birmpili, 2025]. The fact that no unit has yet achieved the target of operating on 80% of AAA patients within eight weeks of referral should prompt further exploration into the causes and consequences of this delay.

I also find myself reflecting on how this already excellent document might be further enhanced. The inclusion of long-term outcomes for PAD interventions is being addressed by the current CF / BSIR Research Fellow. Incorporating patient-reported outcomes and measures of quality of life would also add significant value. Although the logistical challenges are considerable, the difficulty of data collection should not preclude its inclusion. Promising mechanisms—such as linkage to research databases, notably through the NIHR HAMLET and EARNEST trials—are already under development.

Another opportunity for improvement lies in broadening the scope of procedures reported. Thousands of venous and haemodialysis access procedures are performed annually by vascular surgeons, yet these remain excluded from the NVR. As this information is recorded within the National Consultant Information Programme (NCIP) database, integrating such data would further strengthen the report's value.

This outstanding report is a testament to the expertise and dedication within the Clinical Effectiveness Unit and to the leadership of the Vascular Society and BSIR. On behalf of the Vascular Society of Great Britain and Ireland—and personally—I would like to express my

gratitude to everyone involved for their commitment and professionalism. In particular, my thanks go to Sam Waton, David Cromwell, and Colin Bicknell for their exceptional work and expertise.

Prof Ian Chetter
President of the Vascular Society of Great Britain & Ireland

As President of the British Society of Interventional Radiology (BSIR), I am pleased to write the foreword for the 2025 National Vascular Registry (NVR) State of the Nation Report. The NVR State of the Nation Report is one of the highlights of the vascular calendar presenting the latest outcomes of UK specialist work in lower limb, carotid and aortic vascular disease. As in previous years, this report is an excellent example of the ongoing collegiate working relationship between the Royal College of Surgeons, the Vascular Society and the British Society of Interventional Radiology.

The 2025 report illustrates that there is an abundance of excellent work being undertaken by vascular specialists in aortic, lower limb and carotid disease in the United Kingdom. The adverse outcomes presented confirm once more that vascular specialists deliver care safely in the United Kingdom.

Looking at my own specialist field, peripheral vascular disease, I am pleased to see that case ascertainment rates for lower limb angioplasty continue to increase, but at 63% illustrates that there is still some way to go before they reach the ascertainment rates of 90% for lower limb surgical bypass. We must all try harder to encourage our colleagues who perform lower limb angioplasty, whether they are radiologists or surgeons, to further increase the recording of their lower limb procedural outcomes, and entry thereof into the NVR database.

Regarding time to revascularisation for Chronic Limb Threatening Ischaemia (CLTI), with the requirement to achieve interventions within 5 days, only 49% of centres are reaching this target. This is a reminder to all of us of the ongoing stretched resources for PAD treatment in the UK. This will only be resolved by increased central funding for vascular disease treatment including an increase in the workforce involved in the therapy of patients with vascular disease.

As President of the BSIR, I again thank everybody who has been involved in the work required to create this report. I want to offer special thanks to Mr Sam Waton, (NVR Product Manager), Mr Amandeep Johal (Senior Statistician), Dr Qiuju Li (Research Fellow in Medical Statistics), Dr Frances Sheehan (NVR Clinical Research Fellow), Ms Panagiota Birmpili, and Professor David Cromwell for leading on the production of the report. Thanks also are due to Prof Colin Bicknell and Prof Arun Pherwani (representing the VSGBI) and Dr Robin Williams and Dr James Harding (representing the BSIR) for providing their expertise as society specialist experts to drive this project forward to the impressive, completed document that you see before you.

Prof Robert Morgan
President of the British Society of Interventional Radiology

1. Introduction

Hospital-based vascular services provide care for a variety of conditions that affect blood circulation (conditions that are part of the broad spectrum of cardiovascular disease). Treatments are typically aimed at reducing the risk of cardiovascular events such as a heart attack, stroke or rupture of an artery, and the appropriate therapeutic options will depend upon the severity of a patient's condition as well as the extent of other coexisting conditions.

The National Vascular Registry (NVR) was established in 2013 to measure the quality and outcomes of care for adult patients who undergo major vascular procedures in NHS hospitals, and to support vascular services to improve the quality of care for these patients.

This document provides supplementary materials for our 2025 State of the Nation Report (available at: https://www.vsqip.org.uk/reports-publications/2025-nvr-state-of-the-nation-report/)

Information is presented on clinical practice in the calendar year of 2024, and on surgical outcomes for the previous three-year period (2022-24). The NVR publishes information on emergency and elective procedures for the following patient groups:

1. **patients with peripheral arterial disease (PAD)** who undergo either (a) lower limb angioplasty/stent, (b) lower limb bypass surgery, or (c) lower limb amputation
2. patients who have a repair procedure for **(abdominal) aortic aneurysm (AAA) or dissection**
3. patients who **undergo carotid endarterectomy or carotid stenting.**

The NVR was designed as a procedure-based audit. Although vascular units provide care to patients with a variety of conditions that affect blood circulation, not all patients will receive a procedure within the scope of the NVR.

The NVR is commissioned by the Healthcare Quality Improvement Partnership (HQIP) on behalf of NHS England, as part of the National Clinical Audit and Patient Outcomes Programme (NCAPOP). Clinical audits commissioned by HQIP typically cover NHS hospitals in England and Wales. The NVR encourages all NHS hospitals in England, Wales, Scotland and Northern Ireland to participate, so that it continues to support the work of the Vascular Society of Great Britain and Ireland (VSGBI) and British Society of Interventional Radiologists (BSIR) to improve the care provided by vascular services within the UK. It is mandatory for individual clinicians to collect data on the outcomes of these procedures for medical revalidation, and the NVR is designed to facilitate this. The information patterns of practice and patient outcomes also play a crucial role in the commissioning of NHS vascular services.

1.1 The 2025 NVR Report Supplementary Materials

The aim of this Supplementary Materials document is to give a description of the care provided by NHS vascular units, and outcomes delivered to patients.

It is aimed at those who provide, receive, commission and regulate vascular services. This includes clinicians and other healthcare professionals working within hospital vascular units, clinical commissioners and regulators, as well as patients and the public who are interested in knowing how NHS vascular services are delivered.

More information about the various vascular diseases described in this report can be found on the Circulation Foundation website at:

https://www.circulationfoundation.org.uk/patient_info/

The outcome indictors adopted by the NVR were chosen to help vascular specialists benchmark their performance and, where possible, reduce the risk associated with the procedure. Short-term survival after surgery is the principal outcome measure for all arterial procedures, but this report also provides information about other outcomes, waiting times for treatment and the complications that may occur as part of treatment.

The NVR process measures are linked to standards of care that are drawn from various national guidelines. These focus on (i) specific aspects of care before and after a vascular intervention, and (ii) the time taken by patients to move along the care pathway. An overall framework for vascular services is described by the "Provision of Services for People with Vascular Disease" published by the Vascular Society [VSGBI 2024]. Standards of care specific to the various vascular conditions procedures are described within the documents listed below. In addition, in response to the COVID-19 pandemic, the VSGBI and other organisations made a number of recommendations for the delivery of care to vascular patients. These are referenced at appropriate places within the chapters of the report.

For elective AAA repair

- The Vascular Society. "Quality Improvement Framework for AAA" [VSGBI 2012]
- Standards and outcome measures for the National AAA Screening Programme (NAAASP) [NAAASP 2020].

For peripheral arterial disease

- The Vascular Society. "A Best Practice Clinical Care Pathway for Peripheral Arterial Disease" [VSGBI 2022]
- The Vascular Society. "A Best Practice Clinical Care Pathway for Major Amputation Surgery" [VSGBI 2016]
- National Institute for Health and Clinical Excellence (NICE). Guidance for peripheral arterial disease (CG147) [NICE 2012].

For carotid endarterectomy

- National Institute for Health and Clinical Excellence (NICE). Stroke: The diagnosis and acute management of stroke and transient ischaemic attacks (NG128) [NICE 2019]
- National Stroke Strategy [DH 2007] and its associated publication "Implementing the National Stroke Strategy – an imaging guide" [DH 2008].

1.2 Publication of information on the VSQIP website

There are additional resources that accompany this document available on the NVR website at: https://www.vsqip.org.uk/reports-publications/2025-nvr-state-of-the-nation-report/

These include the main state of the nation report document and appendices (data tables) containing individual NHS trust results.

The website also provides access to:

- all previous Annual Reports
- the NVR's interactive results dashboard
- information on how to access your NVR data
- links to resources that support local services' quality improvement initiatives
- information on how the Registry collects and analyses patient data
- links to other sources of information about vascular conditions.

The results from the NVR are used by various other national healthcare organisations. In particular, the NVR has worked with HQIP and the Care Quality Commission (CQC) intelligence team to create a dashboard to support their inspections.

1.3 How to read this document

The results in this document are based primarily on vascular interventions that took place within the UK between 1 January 2022 and 31 December 2024. As noted above, the scope of the NVR extends only to patients who underwent a procedure. The NVR does not collect the details of patients who were admitted to hospital with a vascular condition (e.g. a ruptured AAA) but did not undergo an operation.

The data used in this document was extracted from the NVR IT system in June 2025. This was to enable NHS hospitals to enter follow-up information about the patients having these vascular interventions, and to provide a period in which NHS consultants could check the completeness and accuracy of their data. The analysis of the 2022-24 audit period only included records on the NVR IT system that were "locked" by NHS staff (i.e. this mechanism indicates that data entry is complete).

Results are typically presented as totals and/or percentages, medians and interquartile ranges (IQR). Where appropriate, numerators and denominators are given. In a few instances, the percentages do not add up exactly to 100%, which is typically due to the rounding up or down of the individual values, or where multiple responses can be recorded.

Where individual NHS trust and Health Board results are given, the denominators are based on the number of cases for which the question was applicable and answered. The number of cases included in each analysis may vary depending on the level of information that has been provided by NHS services and the total number of cases that meet the inclusion criteria for each analysis. Details of data submissions are given in the NHS trusts tables available on the NVR website.

For clarity of presentation, the terms NHS trust or Trusts have been used generically to describe NHS trusts and Health Boards. Appendix 1 provides a list of NHS vascular units for which results are published.

Unless stated otherwise, results are presented for all four UK nations (England, Wales, Scotland and Northern Ireland). Where case ascertainment is mentioned, the number of records in the NVR were compared to the number of procedures recorded in the administrative hospital databases used in each nation: HES in England, PEDW in Wales, SMR01 in Scotland and HIS in Northern Ireland.

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

The postoperative mortality rates for each NHS vascular unit are adjusted to take into account differences in the case mix of patients treated at each organisation. The risk-adjusted rates were derived using multivariable logistic models. These models estimate the likelihood of postoperative death for each individual having a procedure, and these probabilities were then summed to calculate the predicted number of events for each NHS trust.

Waiting times plots are used to show the comparison of NHS trusts. In these plots the median time is represented by a black dot. The interquartile ranges (IQRs) are shown by horizontal green lines. Any horizontal lines in red indicate that the upper quartile is beyond the upper limit of the x axis of the graph (usually as a result of a small volume of procedures). The vertical red line on the graphs represents the current national average or the national target.

In some chapters, the change in distribution of patient waiting times by month is shown using a graph that uses a sequence of box plots. Each box plot summarises five points in the distribution. The bottom and top lines of the blue rectangles indicate the lower (Q1) and upper quartiles (Q3). The horizontal line inside the rectangle represents the median time. The lower and upper whiskers show the minimum or maximum values (or the distance that is 1.5 times the inter-quartile range (Q3 - Q1) if this is closer to the median).

2. Lower limb revascularisation for PAD

2.1 Introduction

This chapter describes the processes and outcomes of care for patients who have a lower limb revascularisation. Lower limb revascularisation procedures can be performed using open surgery (bypass), endovascular techniques or a Combined Open with Endovascular Revascularisation procedure (COWER, also known as a hybrid procedure). In this chapter, we report on procedures performed between January 2024 and December 2024.

The analysis focuses on the first procedure undergone by a patient during an admission; subsequent procedures are considered to be re-operations. Hybrid procedures are analysed with the open surgical (bypass/endarterectomy) procedures, except for Table 2.1 and Figure 2.1.

Figure 2.1 shows the frequency of each type of procedure by NHS trust, for those Trusts that perform all three types. For Trusts that have lower case ascertainment for angioplasty compared to bypass in the NVR, the figure does not depict the true distribution of procedures and should be interpreted with caution.

Table 2.1: Number (percentage) of lower limb revascularisation procedures recorded in NVR, by year

	2020	2021	2022	2023	2024
Endovascular procedures	6,742 (55.3)	7,305 (54.2)	8,483 (56.2)	10,021 (58.0)	9,637 (58.0)
Bypass procedures	4,249 (34.8)	4,437 (32.9)	4,559 (30.2)	4,927 (28.5)	4,529 (27.2)
Hybrid procedures	1,201 (9.9)	1,733 (12.9)	2,058 (13.6)	2,339 (13.5)	2,453 (14.8)

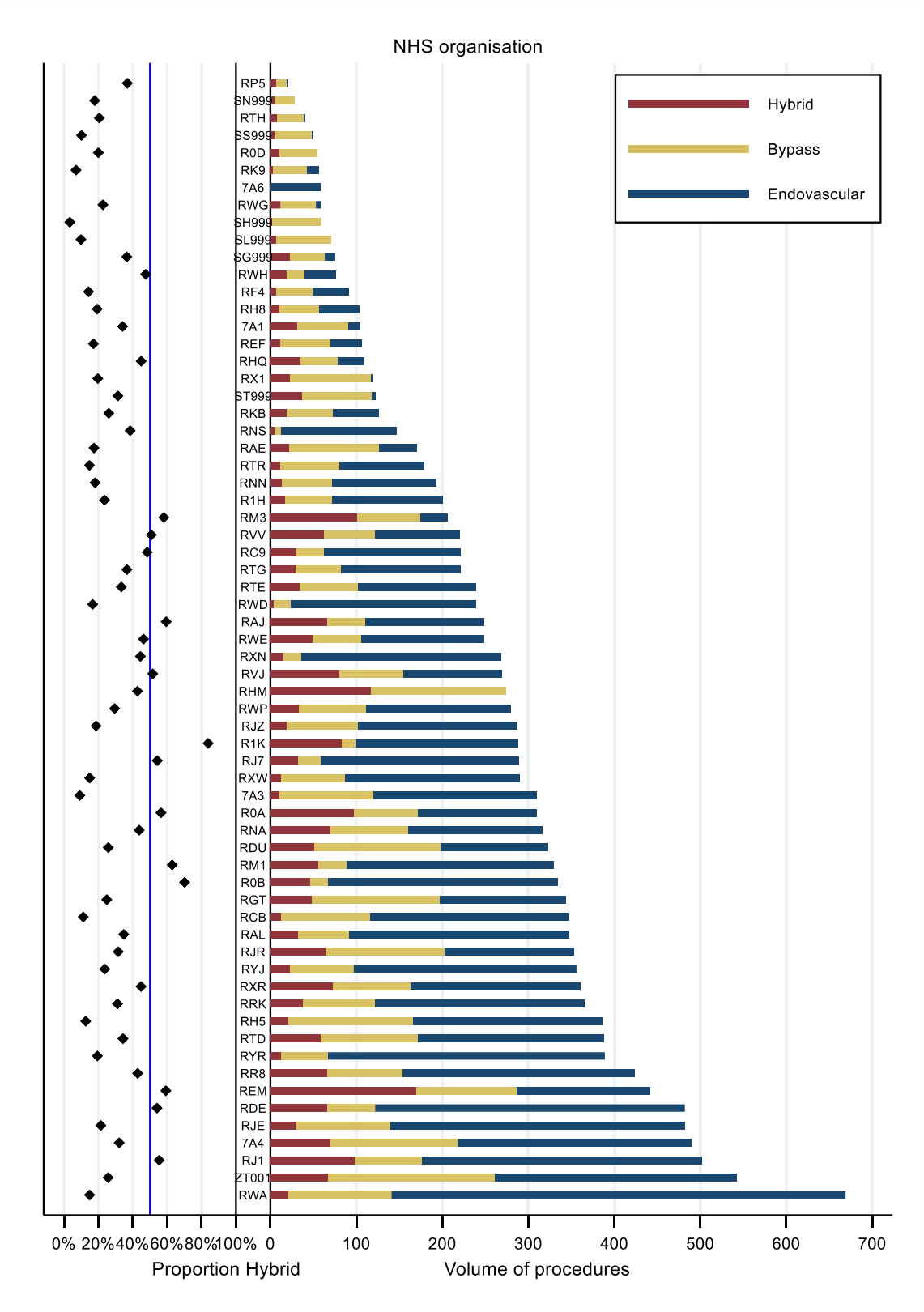
Table 2.2: Estimated case ascertainment for lower limb revascularisation procedures, by year

	Open surgical procedures			Endovascular procedures		
	2022	2023	2024	2022	2023	2024
NVR procedures	6,617	7,266	6,982	8,483	10,021	9,636
Expected procedures	7,210	7,648	7,884	14,808	15,869	16,613
Estimated case ascertainment	92%	95%	89%	57%	63%	58%

Table 2.3: Estimated case ascertainment rates in 2024 by UK country

	Open surgical procedures	Endovascular procedures
England	91%	61%
Wales	>100%	>100%
Scotland	42%	6%
Northern Ireland	100%	65%

Figure 2.1: Frequency of each type of revascularisation procedure by NHS trust for 2024



2.2 Patient characteristics

Table 2.4: Characteristics of patients undergoing lower limb revascularisation in 2024

	Elective				Non-elective			
	Endovascular		Open surgical		Endovascular		Open surgical	
	No.	%	No.	%	No.	%	No.	%
Total procedures	6,015	62.4	4,089	58.6	3,621	37.6	2,893	41.4
Age group (years)								
Under 60	903	15.1	684	16.8	515	14.3	555	19.3
60 to 69	1,754	29.3	1,386	34.1	1,022	28.3	835	29.0
70 to 79	2,020	33.7	1,506	37.0	1,160	32.2	1,027	35.7
80 and over	1,320	22.0	494	12.1	909	25.2	464	16.1
Men	4,127	68.6	3,021	73.9	2,572	71.0	2,069	71.5
Women	1,888	31.4	1,068	26.1	1,049	29.0	824	28.5
Smoking status								
Current smoker	1,444	24.1	1,353	33.1	848	23.6	1,220	42.3
Ex-smoker	3,332	55.6	2,277	55.7	1,710	47.7	1,322	45.8
Never smoked	1,216	20.3	455	11.1	1,030	28.7	344	11.9
Comorbidities								
None	567	9.4	440	10.8	203	5.6	334	11.6
Diabetes	3,120	52.0	1,531	37.5	2,489	69.0	1,243	43.1
Hypertension	3,890	64.8	2,822	69.1	2,296	63.6	1,865	64.6
Chronic lung disease	1,061	17.7	1,002	24.5	682	18.9	748	25.9
Ischaemic heart disease	1,609	26.8	1,202	29.4	1,132	31.4	899	31.2
Chronic heart failure	605	10.1	264	6.5	576	16.0	262	9.1
Chronic renal disease	1,033	17.2	425	10.4	943	26.1	369	12.8
Stroke	506	8.4	276	6.8	396	11.0	251	8.7
Medication								
None	152	2.5	19	0.5	82	2.3	10	0.4
Antiplatelet	4,686	78.1	3,475	85.0	2,548	70.6	2,174	75.2
Statin	4,471	74.5	3,398	83.1	2,656	73.6	2,183	75.5
Beta blocker	1,751	29.2	1,048	25.6	1,408	39.0	835	28.9
ACE inhibitor	2,160	36.0	1,490	36.5	1,431	39.7	1,038	35.9

2.3 Procedure characteristics

Most endovascular procedures in 2024 were performed under local anaesthetic (88.1%), with 3.0% under regional and 8.9% under general anaesthetic. The procedures involved 16,170 interventions in vessels in 2024.

Half of the endovascular procedures involved treatment of a single vessel (53.2%), with 32.6% treating two, 11.5% treating 3 and 2.7% treating 4 or more vessels.

Balloon angioplasty was the most common type of intervention (12,061 vessels, 74.6%), while 4,109 (25.4%) were a combination of angioplasty and stenting. The success rate of the procedures (defined as successful by the operator) was high overall, although the rate decreased slightly for anatomic locations further down the leg.

Table 2.5: Treated vessels during lower limb endovascular procedures between 2022 and 2024

	2022		2023		2024	
Artery	Number	%	Number	%	Number	%
Aorta	76	0.6	94	0.6	104	0.6
Common iliac	1,726	12.6	2,049	12.5	1,970	12.2
External iliac	1,453	10.6	1,680	10.2	1,618	10.0
Superficial femoral	4,044	29.5	4,643	28.3	4,512	27.9
Common femoral/ profunda femoral	486	3.5	636	3.9	825	5.1
Popliteal	2,561	18.7	3,037	18.5	3,024	18.7
Tibial/pedal	2,833	20.7	3,631	22.1	3,525	21.8
Within graft	539	3.9	625	3.8	592	3.7
Total vessels	13,718		16,395		16,170	

Table 2.6: Characteristics of lower limb endovascular procedures undertaken in 2024 by anatomical location

	Vessels treated		Stent insertion		Non-occlusive[1]		Procedure success[2]	
	n	%	n	%	n	%	n	%
Aorta	104	0.6	67	64.4	-	-	-	-
Common iliac	1,970	12.2	1,405	71.3	1,330	67.5	1,907	96.8
External iliac	1,618	10.0	881	54.4	1,166	72.1	1,565	96.7
Superficial femoral	4,512	27.9	952	21.1	2,460	54.5	4,242	94.0
CFA, PFA	825	5.1	139	16.8	569	69.0	759	92.0
Popliteal	3,024	18.7	479	15.8	1,714	57.0	2,836	93.8
Tibial/pedal	3,525	21.8	144	4.1	1,582	44.9	2,978	84.5
Within graft	592	3.7	42	7.1	504	85.1	544	91.9

[1] The other indication for intervention was occlusion.

[2] The other outcomes were residual stenosis and failure.

Table 2.7: Characteristics of lower limb revascularisation procedures undertaken in 2024

	Elective		Non-elective	
	Endovascular	**Open**	**Endovascular**	**Open**
Chronic limb ischaemia				
Asymptomatic	340 (5.7%)	37 (0.9%)	53 (1.5%)	28 (1.0%)
Intermittent claudication	1,845 (30.7%)	1,025 (25.1%)	119 (3.3%)	40 (1.4%)
Nocturnal/resting pain	1,120 (18.6%)	1,315 (32.2%)	422 (11.7%)	531 (14.4%)
Necrosis/gangrene	2,437 (40.6%)	1,136 (27.8%)	2,721 (75.2%)	1,508 (52.1%)
Acute limb ischaemia	157 (2.6%)	206 (5.0%)	248 (6.8%)	593 (20.5%)
Trauma	8 (0.1%)	7 (0.2%)	13 (0.4%)	50 (1.7%)
Aneurysm	101 (1.7%)	362 (8.9%)	42 (1.2%)	143 (4.9%)

Trusts should aim to perform at least 75% of lower limb revascularisation on planned operating lists.

Overall, 97.6% of the endovascular revascularisations were performed between 8am and 6pm on a weekday, which was assumed to mean they had been on planned operating lists. The percentage of endovascular procedures performed on planned lists was at least 75% for all but two NHS trust among those that submitted 10 or more procedures in 2024. This suggests that, among those Trusts with high case ascertainment, most met the VSGBI PAD QIF target of at least 75% during the 2024 audit period (62 out of 64 NHS trusts, 96.9%).

There were 4,089 (58.6%) elective open procedures and 2,893 (41.4%) non-elective procedures in 2024. For open procedures in 2024, 89.8% were performed under general anaesthetic, 7.7% under regional and 2.5% under local.

There were 6,431 (93.9%) open procedures undertaken in 2024 that were performed between 8am and 6pm. This is 98.7% for elective and 87.0% for non-elective procedures. The percentage of open surgical procedures performed on planned lists was at least 75% for all but two NHS trusts that submitted 10 or more procedures in the NVR in 2024 (63 out of 65 NHS trusts, 96.9%).

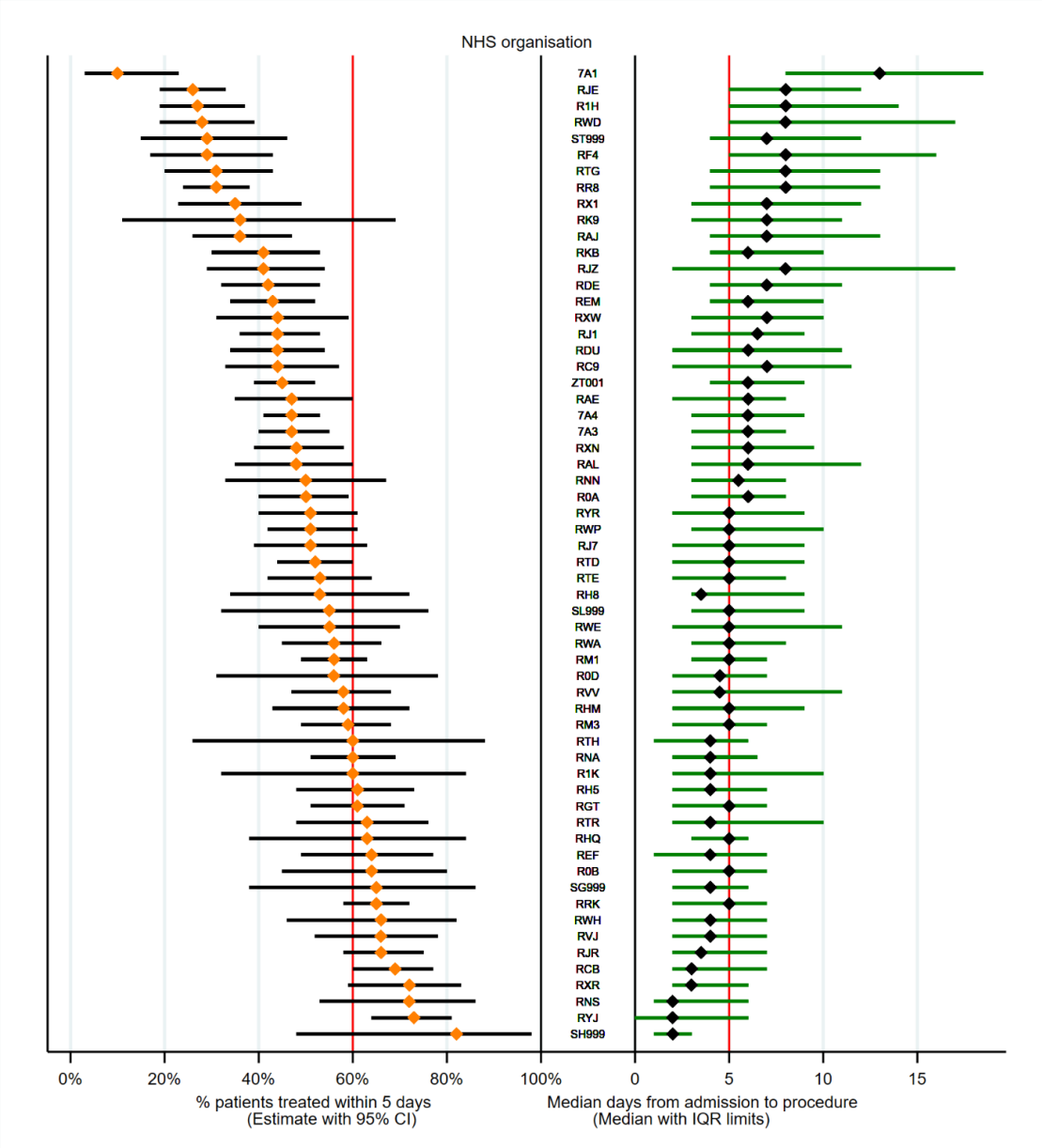
Table 2.8: Time to intervention for patients admitted non-electively with CLTI

		Time from admission to intervention					
	N (%)	% ≤5 days			Median (IQR), days		
	2024	2022	2023	2024	2022	2023	2024
Endovascular	6,700	-	-	-	-	-	-
Elective	3,557 (53.1%)	-	-	-	-	-	-
Non-elective	3,143 (46.9%)	48.5%	48.9%	47.6%	6 (3-9)	6(3-9)	6 (3-10)
Open	4,490		-	-	-	-	-
Elective	2,451 (54.6%)		-	-	-	-	-
Non-elective	2,039 (45.4%)	53.8%	53.0%	51.9%	5 (2-8)	5 (2-8)	5 (2-8)
Total	11,190	-	-	-	-	-	
Elective	6,008 (53.7%)	-	-	-	-	-	
Non-elective	5,182 (46.3%)	50.9%	50.6%	49.3%	5 (3-9)	5(3-9)	6 (3-9)

Figure 2.2 depicts the proportion of patients revascularised within 5 days from admission (left panel) across the 60 NHS trusts that performed 10 or more revascularisation procedures for non-elective CLTI admissions in 2024. The right panel summarises the median (IQR) time from admission to procedure for the same NHS trusts. In summary:

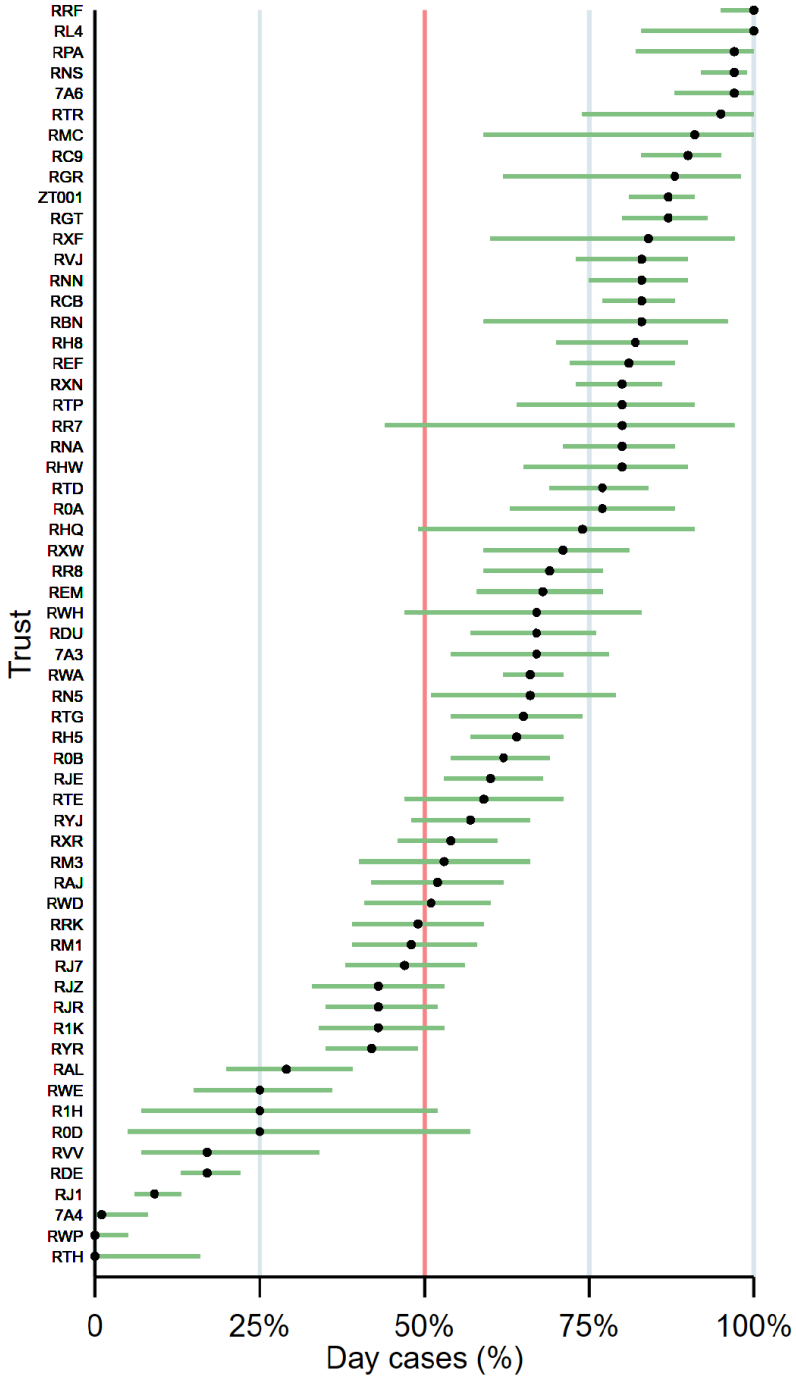
- at 27 vascular units, the pathway from admission to surgery took more than five days for half of patients with CLTI,
- at 18 vascular units, the pathway took longer than 10 days for a quarter of patients,
- 18 vascular units had more than half of their non-elective CLTI patients operated on within 5 days.

Figure 2.2: Proportion of non-elective patients with CLTI who had revascularisation (open, endovascular or hybrid) within 5 days from admission by active NHS trust with a volume of ≥10 non-elective CLTI cases per year in 2024.



The 2018 GIRFT report on vascular services emphasised the potential gains in efficiency that could stem from a greater number of endovascular revascularisation procedures being performed on a same-day basis [Horrocks 2018]. The NVR data for 2024 revealed substantial variation in the proportion of elective procedures done as day cases (Figure 2.3). Overall, 57.3% of elective endovascular procedures were performed as day cases in 2024, compared to 60.3% in 2023 and 61.0% in 2022.

Figure 2.3: Proportion of elective endovascular procedures performed as day cases, by NHS trust with a volume of ≥10 elective cases per year in 2024.



2.4 Outcomes of lower limb revascularisation procedures

Table 2.9: Postoperative outcomes after lower limb revascularisation for 2024 by procedure type

	Elective		Non-elective	
	Endovascular	**Open**	**Endovascular**	**Open**
Total procedures	6,015	4,089	3,621	2,893
Post-op destination	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Ward	2,729 (45.4%)	2,833 (69.3%)	3,348 (92.7%)	2,035 (70.3%)
Level 2 (HDU/PACU)	111 (1.8%)	953 (23.3%)	84 (2.3%)	598 (20.7%)
Level 3 (ICU)	24 (0.4%)	266 (6.5%)	47 (1.3%)	258 (8.9%)
Died in theatre	0 (0.0%)	<5 (0.0%)	<5 (0.0%)	<5 (0.1%)
Day-case unit	3,144 (52.3%)	34 (0.8%)	130 (3.6%)	0 (0.0%)
Complications	**Rate**	**Rate**	**Rate**	**Rate**
None	93.8	85.5	84.5	72.1
Cardiac	0.4	1.8	1.8	3.7
Respiratory	0.3	2.2	2.0	3.9
Limb ischaemia	0.6	2.3	3.7	7.7
Renal failure	0.2	0.9	1.1	1.6
Further procedures				
None	94.4	92.8	76.5	78.8
Angioplasty/stent	2.8	1.8	8.1	3.7
Bypass	1.0	1.9	2.9	4.2
Minor amputation	1.3	1.3	11.1	5.5
Major amputation	0.7	0.8	5.8	6.0
30-day major amputation	1.4	1.1	8.2	7.2
In-hospital mortality	0.7	1.1	3.6	4.2
Re-admission to higher level care	0.6	1.9	1.8	3.3
Re-admission within 30 days	10.6	11.4	19.7	14.8
	Median (IQR)	**Median (IQR)**	**Median (IQR)**	**Median (IQR)**
Overall LOS (days)	0 (0 - 2)	5 (3 - 8)	13 (7 - 26)	15 (9 - 26)
Admission-to-procedure (days)	0 (0 - 0)	0 (0 - 0)	5 (2 - 9)	4 (1 - 7)
Post-op LOS (days)	0 (0 - 1)	4 (3 - 7)	6 (2 - 16)	9 (5 - 19)

Table 2.10: Postoperative outcomes following lower limb revascularisation, for patients with CLTI[1] undergoing non-elective revascularisation in 2024, by admission-to-procedure time in days

	Admission-to-procedure ≤5 days		Admission-to-procedure >5 days	
	Endovascular	**Open**	**Endovascular**	**Open**
Procedures	1,488 (47.6%)	1,053 (51.9%)	1,640 (52.4%)	977 (48.1%)
	Median (IQR)	**Median (IQR)**	**Median (IQR)**	**Median (IQR)**
Overall length of stay (LOS)	7 (4 - 15)	11 (7 - 20)	20 (13 - 34)	21 (14 - 34)
Post-op LOS	4 (1 - 12)	8 (5 - 17)	8 (3 - 20)	10 (6 - 20)
Complications	**Rate**	**Rate**	**Rate**	**Rate**
None	87.0	76.5	82.3	70.1
Cardiac	1.1	3.2	2.3	3.9
Respiratory	1.9	3.8	2.2	3.7
Limb ischaemia	2.7	5.9	4.3	6.8
Renal	0.7	1.1	1.4	1.6
Further unplanned procedures				
None	76.9	80.2	74.1	77.1
Angioplasty/stent	6.9	3.8	9.5	4.4
Bypass	2.8	3.5	2.8	4.1
Minor amputation	12.8	6.4	11.9	7.9
Major amputation	5.8	4.8	6.0	6.7
30-day major amputation	8.4	5.3	8.5	8.1
In-hospital mortality	2.4	3.7	4.8	3.5
Re-admission to higher level care	1.4	2.8	1.7	3.3
Re-admission within 30 days	19.1	14.2	21.0	17.0

[1] Fontaine score 3 or 4

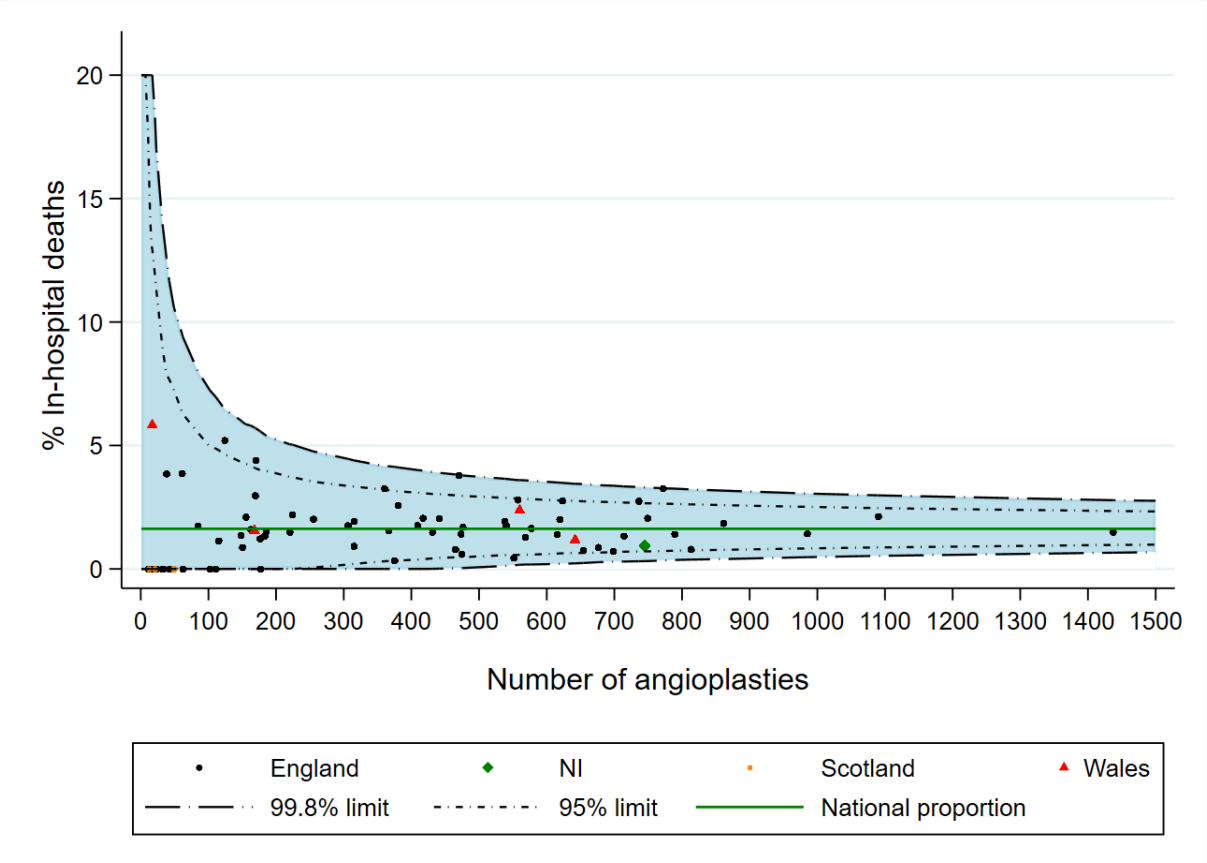
2.5 Postoperative mortality rates for lower limb revascularisations

Figure 2.4 presents the risk-adjusted mortality rates for each NHS trust that submitted 10 or more endovascular revascularisations between January 2022 and December 2024. All NHS trusts had a risk-adjusted rate of postoperative in-hospital mortality that fell within the expected range of the overall national average of 1.6% (95% CI: 1.5 to 1.8).

The rates of in-hospital mortality after endovascular revascularisation were adjusted to take account of the differences in patient populations within each organisation. The model included admission mode, Fontaine score, patient age, chronic lung disease, Ischaemic heart disease, chronic renal disease, chronic heart failure and smoking status.

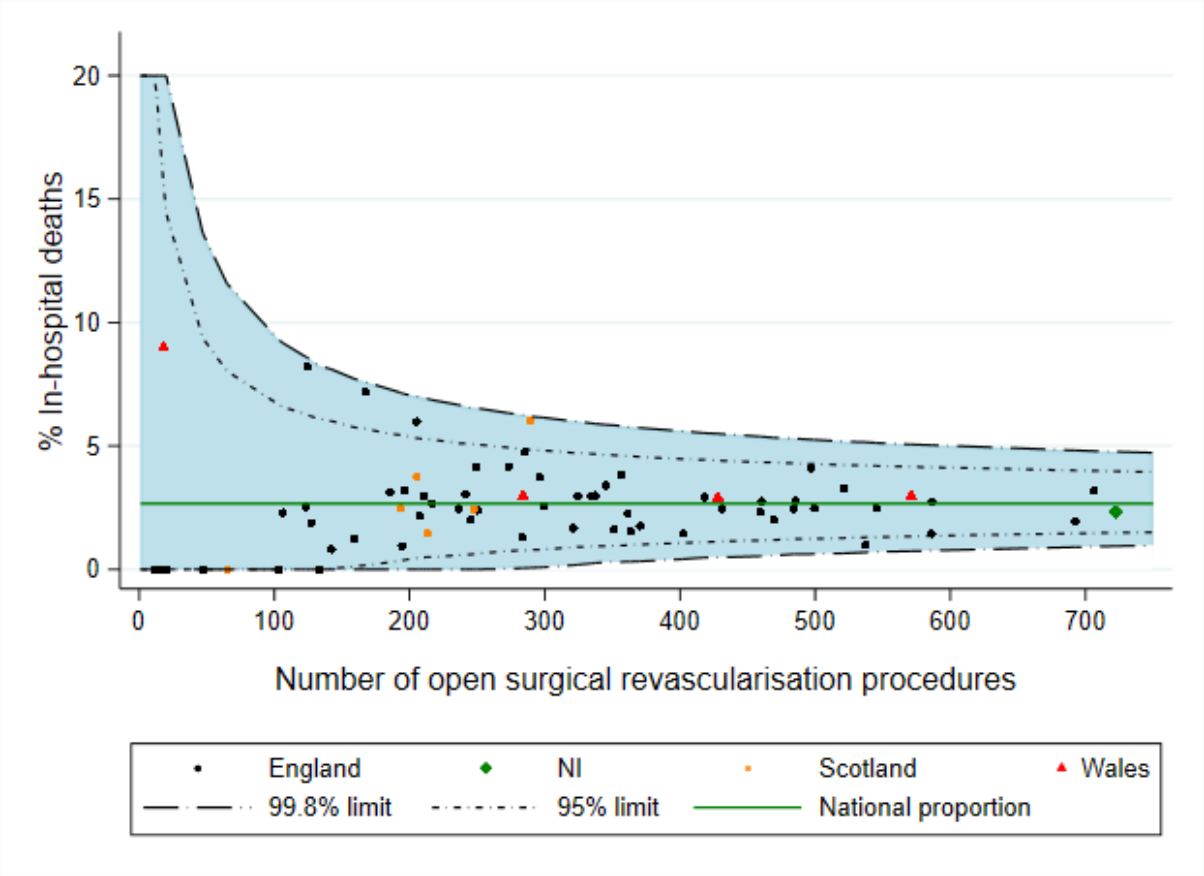
The funnel plot for open surgical procedures is shown in Figure 2.5. All NHS trusts had risk-adjusted mortality rates that were within the expected range of the national average (=2.7%, 95% CI: 2.5 to 2.9). The risk adjustment model accounted for age, sex, procedure type, Fontaine score, mode of admission, ASA grade, chronic lung disease, use of antiplatelets, white blood count, haemoglobin, creatinine, sodium and potassium levels.

Figure 2.4: Funnel plot of risk-adjusted in-hospital deaths after lower limb endovascular revascularisation for NHS trusts from January 2022 to December 2024.



Note: This figure is based on data from NHS trusts that continue to offer endovacsular revascularisation, with 10 or more procedures in the NVR.

Figure 2.5: Funnel plot of risk-adjusted in-hospital deaths from lower limb bypass for NHS trusts, shown for procedures performed between January 2022 and December 2024.



3. Major lower limb amputation

3.1 Introduction

This chapter describes the patterns of care and outcomes for patients undergoing unilateral major lower limb amputations due to vascular disease during the audit period from January 2024 to December 2024.

Table 3.1: Number of major amputations submitted to NVR. AKA: Above knee amputation; BKA: below knee amputation

	2022		2023		2024	
	AKA	BKA	AKA	BKA	AKA	BKA
Total major amputations	1,972	2,257	2,028	2,449	1,823	2,140
Bilateral	33 (1.7%)	25 (1.1%)	29 (1.4%)	38 (1.6%)	27 (1.4%)	18 (0.8%)
Due to trauma	16 (0.8%)	18 (0.8%)	22 (1.1%)	17 (0.7%)	18 (1.0%)	23 (1.1%)
Major amputations performed within 30 days of a lower limb revascularisation procedure	234 (11.9%)	330 (14.6%)	242 (11.9%)	374 (15.3%)	221 (12.1%)	324 (15.1%)

Procedures that were bilateral and/or due to trauma were excluded from the analysis of this chapter thereafter. During the audit period from January 2024 to December 2024, 3,877 major unilateral amputations were recorded in the NVR, which consisted of 2,099 (54.1%) below the knee amputations (BKAs) and 1,778 (45.9%) above the knee amputations (AKAs). Through knee amputations (TKAs) have been analysed as part of the BKA group. TKAs accounted for 3.2% of all major amputations recorded on the NVR during 2024.

Table 3.2: Estimated case ascertainment for major unilateral lower limb vascular amputations by year

Case ascertainment	2022	2023	2024
NVR procedures	4,138	4,372	3,877
Expected procedures	4,613	4,876	4,612
Estimated case ascertainment	90%	90%	84%

Table 3.3: Estimated case ascertainment rates in 2024 by UK country

	Major Lower Limb Amputation
England	87%
Wales	>100%
Scotland	40%
Northern Ireland	100%

3.2 Patient Characteristics

Table 3.4: Characteristics of patients undergoing major unilateral lower limb amputation in 2024

	Below knee	%	Above knee	%
Total procedures	2,099		1,778	
Age group (years)				
Under 60	595	28.4	356	20.1
60 to 64	363	17.3	223	12.6
65 to 69	357	17.0	315	17.8
70 to 74	288	13.7	296	16.7
75 to 79	253	12.1	266	15.0
80 and over	240	11.5	317	17.9
Sex				
Men	1,633	77.8	1,250	70.3
Women	466	22.2	528	29.7
Smoking				
Current smoker	572	27.6	680	38.4
Ex-smoker	977	47.1	777	43.9
Never smoked	527	25.4	313	17.7
Presenting problem				
Acute limb ischemia	168	8.0	323	18.2
Chronic limb ischemia	589	28.1	550	31.0
Neuropathy	27	1.3	13	0.7
Tissue loss	788	37.6	618	34.9
Uncontrolled infection	522	24.9	245	13.8
Aneurysm	<5	0.1	23	1.3
Previous ipsilateral limb procedure*	1,190	67.5	869	58.6
Type of previous ipsilateral limb procedure**				
Minor amputation only	232	19.8	36	4.2
Angioplasty/stent	589	50.3	224	26.3
Surgical revascularisation	287	24.5	399	46.8
Major amputation	64	5.5	194	22.7

*Column percentages calculated from records with available data on previous ipsilateral limb procedure Yes/No; **Column percentages calculated from records with available data in patients with previous ipsilateral limb procedure

Table 3.5: Preoperative care and risk factors of patients undergoing lower limb amputation in 2024

	Below knee	%	Above knee	%
Total procedures	2,099		1,778	
Pre-op ASA grade				
Normal	25	1.2	9	0.5
Mild disease	109	5.2	70	3.9
Severe, not life-threatening disease	1,525	72.8	1,128	63.5
Severe, life-threatening disease, or moribund patient	437	20.8	570	32.1
Comorbidities				
None	144	6.9	150	8.4
Diabetes	1,546	73.7	881	49.6
Hypertension	1,276	60.8	1,116	62.8
Chronic lung disease	352	16.8	487	27.4
Ischaemic heart disease	658	31.3	641	36.1
Chronic heart failure	242	11.5	251	14.1
Chronic renal disease	491	23.4	317	17.8
Stroke	202	9.6	231	13.0
Active/managed cancer	110	5.2	149	8.4
Medication				
None	17	0.8	13	0.7
Anti-platelet	1,411	67.2	1,192	67.0
Statin	1,547	73.7	1,244	70.0
Beta-blocker	667	31.8	602	33.9
ACE inhibitor/ARB	692	33.0	559	31.4
Antibiotic prophylaxis	1,928	91.9	1,651	92.9
DVT prophylaxis	1,429	68.1	1,192	67.0
Oral anticoagulant	436	20.8	435	24.5

3.3 Care Pathways

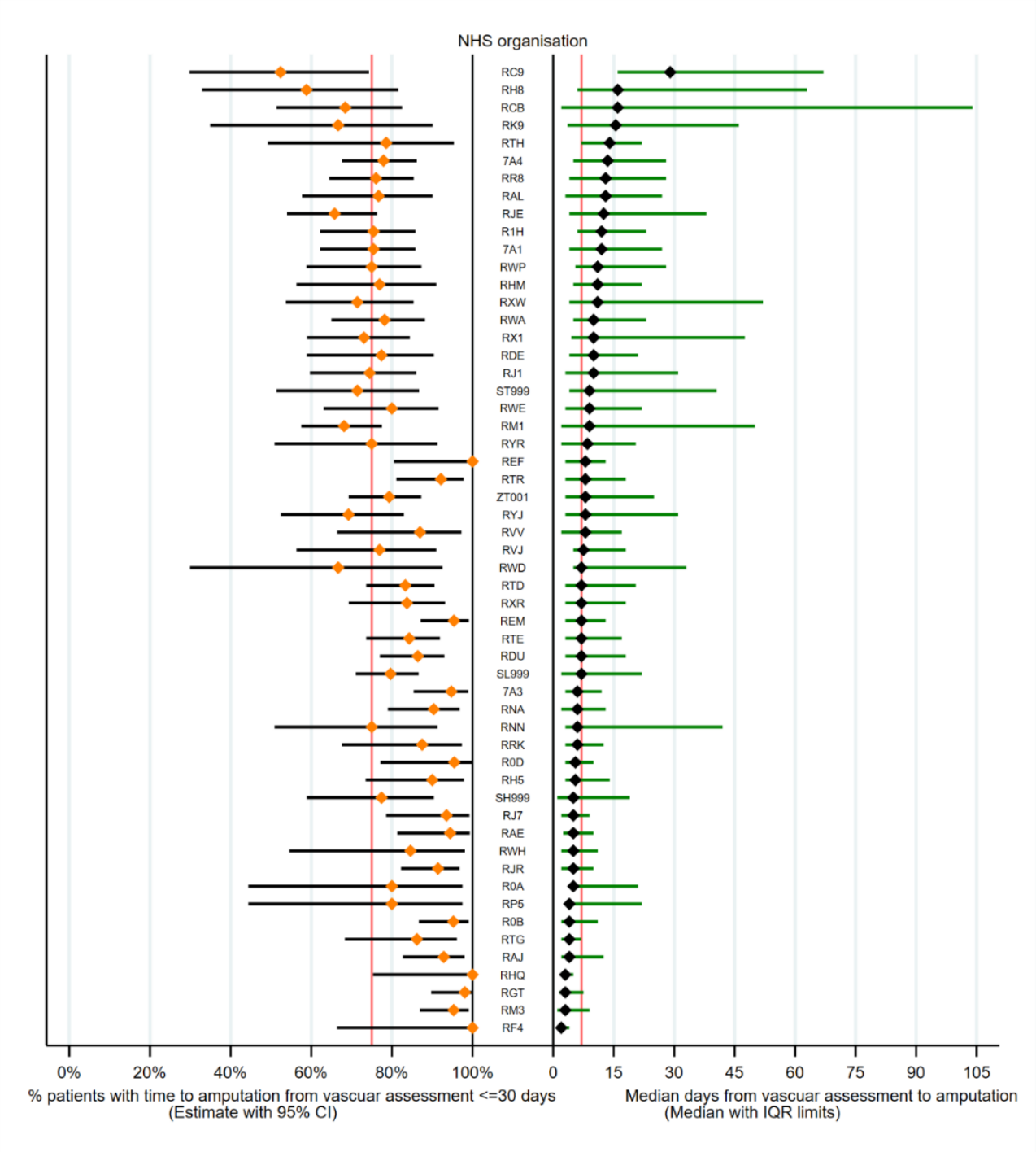
NHS vascular units have to balance the urgency of surgery with the need to optimise patients' condition before their operation. The median time from vascular assessment to amputation in 2024 was:

- 7 days (IQR: 3 to 20 days) for non-elective patients,
- 33 days (IQR: 11 to 90 days) for elective patients, and
- 9 days (IQR: 3 to 28 days) for all patients.

Figure 3.1 describes the times from vascular assessment to amputation by NHS trust for patients admitted non-electively in 2024. Among the 25% of patients at each trust who have the longest waits, there was a considerably greater variation across NHS trusts. At 13 NHS trusts, more than 25% of patients had a wait that exceed 30 days.

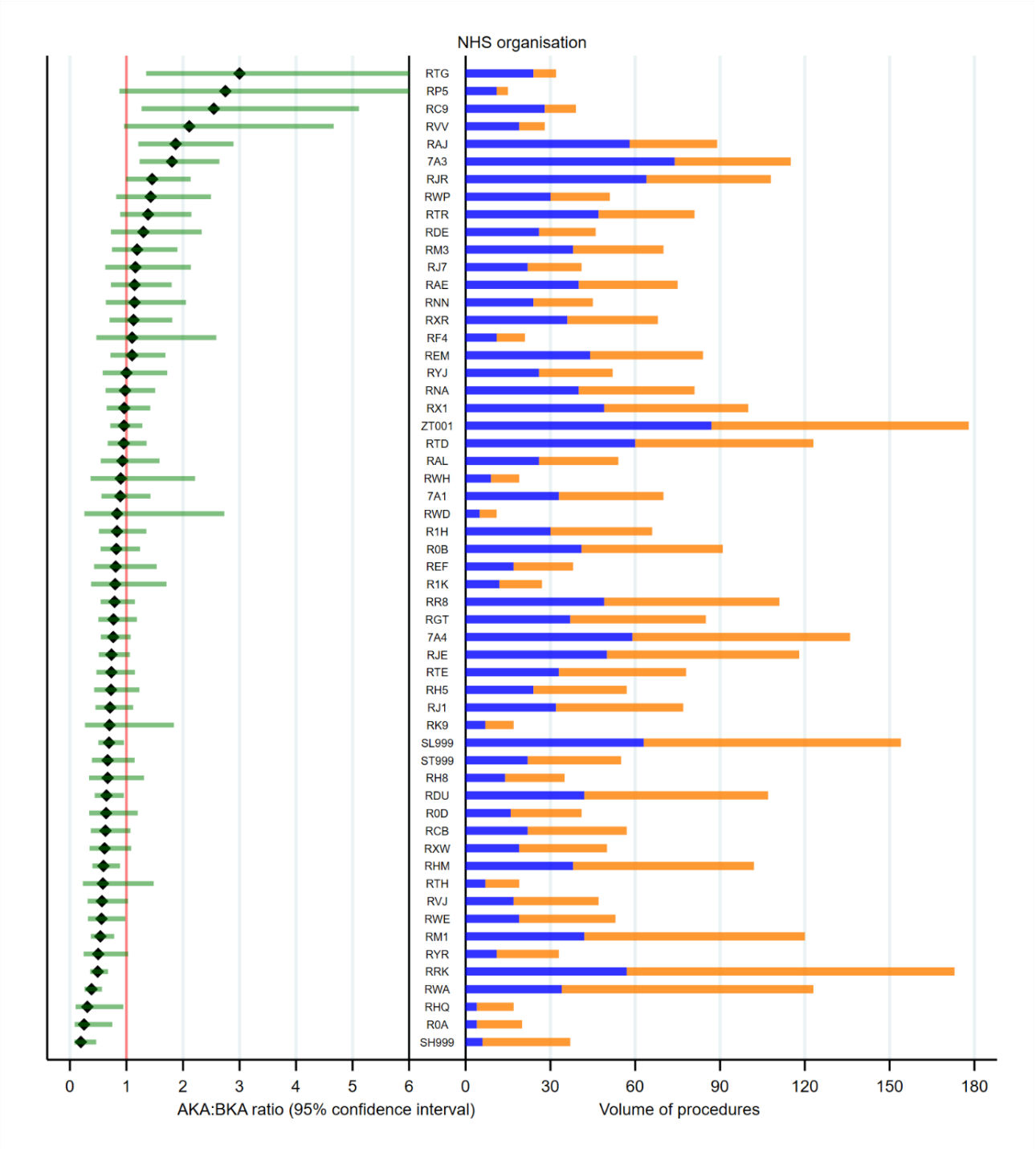
Figure 3.2 describes the volume of activity and the AKA:BKA ratio in 2024, by NHS trust. Nationally, the AKA:BKA ratio was 0.85 (95% CI: 0.80 to 0.90) in 2024. Most of the NHS trusts had a ratio of less than 1 (39 out of 56), whilst 17 units had ratio above one and 4 units had ratio above 2.

Figure 3.1: Median (IQR) time from vascular assessment to non-elective amputation for procedures performed in 2024, by NHS trust[1], together with percentage (95% CI) of patients with time to amputation from vascular assessment <30 days.



[1]Figure presents NHS trusts reporting ≥10 non-elective major amputations in 2024.

Figure 3.2: Volume and ratio of above knee to below knee amputations for procedures performed in 2024, by NHS trust[1]. The blue horizontal line indicates the volume of above knee amputations, and the orange horizontal line shows the volume of below knee amputations.

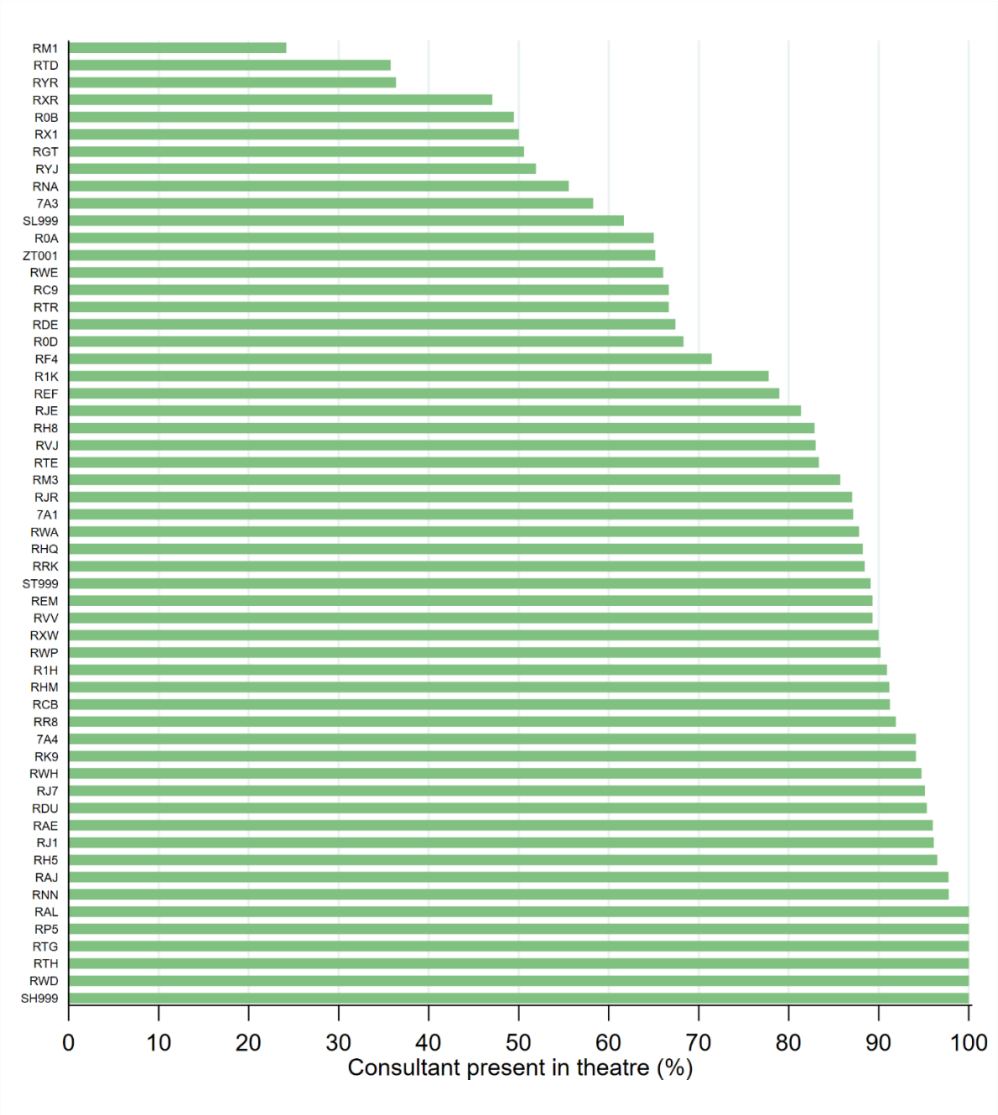


[1]Figure presents NHS trusts reporting ≥10 major amputations in 2024.

Table 3.6: Perioperative care of patients undergoing lower limb major amputation in 2024

	Below knee	%	Above knee	%
Procedures	2,099		1,778	
Mode of admission				
Elective	379	18.1	249	14.0
Non-elective	1,720	81.9	1,529	86.0
Time procedure started				
8am to 6pm	1,895	90.3	1,614	90.8
6pm to midnight	164	7.8	136	7.6
Midnight to 8am	40	1.9	28	1.6
Consultant present in theatre	1,611	76.8	1,347	75.8

Figure 3.3: Percentage of major amputations where a consultant surgeon was present in theatre in 2024, by NHS trust[1]



[1]Figure presents NHS trusts reporting ≥10 lower limb major amputations performed in 2024

3.4 In-hospital outcomes following major amputation

Patient outcomes immediately following a major lower limb amputation are summarised in Table 3.7. The overall rate of in-hospital death in 2024 was 7.1% (95% CI: 6.3% to 7.9%), similar to the rate of 7.0% (95% CI: 6.3% to 7.8%) in 2023 and 8.0% (95% CI: 7.1% to 8.8%) in 2022.

The 30-day in-hospital mortality was 5.9% (95% CI: 5.2% to 6.7%) in 2024, similar to the rate of 5.4% (95% CI: 4.8% to 6.2%) in 2023 and 6.3% (95% CI: 5.6% to 7.1%) in 2022.

The overall median length of hospital stay in 2024 associated with major lower limb amputations was 22 days (IQR: 14 to 36).

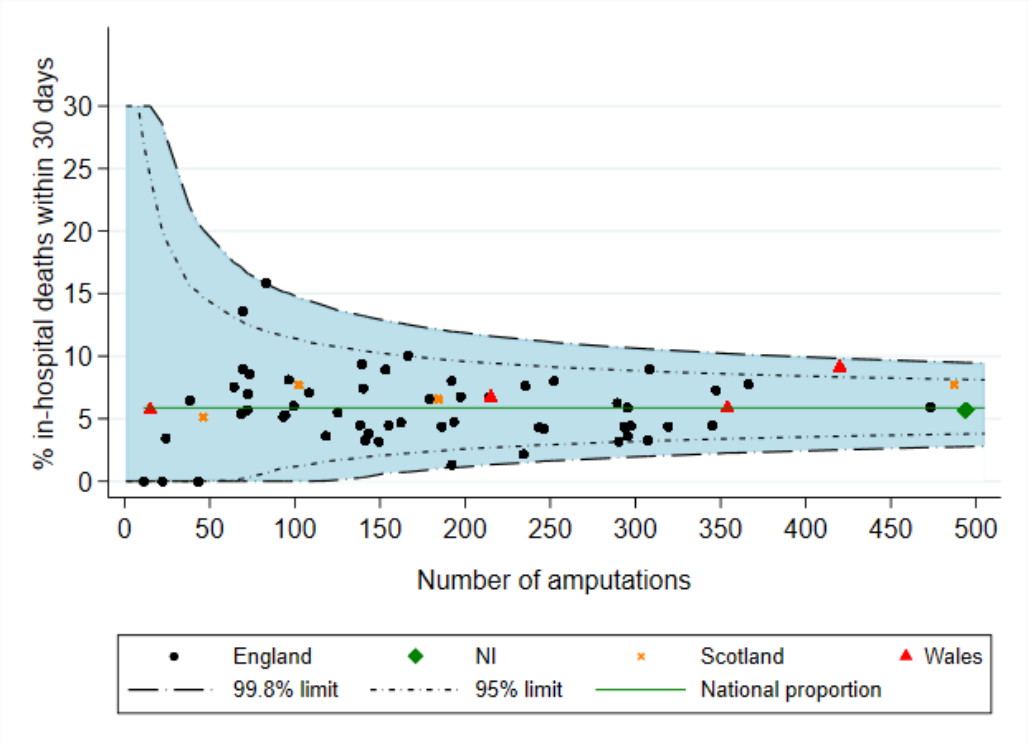
Overall, 24.6% of patients in 2024 suffered at least one of the reported complications following a major amputation, compared with 25.8% in 2023 and 27.7% in 2022.

Table 3.7: Patient outcomes following major lower limb amputations undertaken in 2024

	Below knee		Above knee	
Procedures	2,099		1,778	
Post-op destination				
Ward	1,882	89.7%	1,466	82.7%
Level 2 (HDU/PACU)	132	6.3%	146	8.2%
Level 3 (ICU)	83	4.0%	157	8.9%
	Median	**IQR**	**Median**	**IQR**
Days in level 2 critical care	2	1 to 4	2	1 to 3
Days in level 3 critical care	4	2 to 6	4	2 to 6
Overall length of stay (days)	22	14 to 36	22	13 to 37
Postoperative length of stay (days)	14	9 to 25	15	9 to 26
	Rate	**95% CI**	**Rate**	**95% CI**
Overall in-hospital mortality	4.8	3.9 to 5.8	9.8	8.4 to 11.3
30-day in-hospital mortality	4.0	3.2 to 5.0	8.1	6.9 to 9.6
Procedure complications				
Respiratory	5.7	4.7 to 6.7	7.8	6.6 to 9.1
Cardiac	3.4	2.7 to 4.2	4.2	3.3 to 5.3
Limb ischaemia	3.0	2.4 to 3.9	2.4	1.7 to 3.2
Renal failure	1.9	1.3 to 2.5	3.0	2.2 to 3.9
Surgical site infection	3.9	3.1 to 4.8	2.8	2.0 to 3.6
Postoperative confusion	2.6	1.9 to 3.3	2.4	1.8 to 3.2
Haemorrhage	0.4	0.2 to 0.7	0.3	0.1 to 0.7
Cerebral	0.4	0.2 to 0.8	0.3	0.1 to 0.7
No defined complications	76.6	74.7 to 78.4	74.0	71.9 to 76.0
Return to theatre	9.5	8.3 to 10.8	6.0	4.9 to 7.2
Re-admission to higher level care	2.4	1.8 to 3.2	1.7	1.1 to 2.4

The rates were adjusted for age, ASA grade (1-3 vs 4-5), admission mode, level of amputation (below or above the knee), ischaemic heart disease, chronic renal disease, and active/managed cancer.

Figure 3.4: Risk-adjusted 30-day in-hospital death rate following major amputation for procedures undertaken during January 2022 and December 2024[1], shown in comparison to the three-year overall national average of 5.9%



[1]Figure presents NHS trusts reporting ≥10 major lower limb amputations between January 2022 and December 2024.

3.5 Discharge and follow-up

Table 3.7: Discharge and follow-up of patients undergoing lower limb amputations in 2024, among patients discharged alive

	Below knee (n=1,930)	%	Above knee (n=1,585)	%
Wound healed at 30 days*	626	75.8	502	82.6
Referred to rehabilitation/limb fitting	1,627	85.3	1,165	74.2
Re-admission within 30 days*	223	11.6	164	10.4

* Figures calculated from patient records with available follow-up data

4. Repair of elective infra-renal abdominal aortic aneurysm

4.1 Background

An abdominal aortic aneurysm (AAA) is the local expansion of the abdominal aorta. The condition tends not to produce symptoms until the aneurysm ruptures. Most aneurysms occur below the kidneys (i.e., are infra-renal).

The organisation of vascular services undertaking AAA repair continues to evolve. The number of NHS vascular units performing any AAA repairs decreased from 69 in 2022 to 66 in 2024.

Table 4.1: Estimated case ascertainment of elective infra-renal AAA repairs*

	2022	2023	2024
Audit procedures	2,889	2,803	2,511
NVR HES Equivalent Procedures	3,271	3,191	2,891
Expected procedures	3,176	3,270	3,162
Estimated case ascertainment	103%	98%	91%

*The numbers NVR-HES Equivalent Procedures are larger than the numbers in the rest of this chapter. This is because it includes fenestrated procedures for infra-renal or juxta-renal AAAs (with an infra-renal OPCS code) in order to directly compare with the HES data.

Table 4.2: Estimated case ascertainment rates in 2024 by UK country

	Elective infra-renal AAA repair
England	91%
Wales	>100%
Scotland	64%
Northern Ireland	100%

Table 4.3: Split of open and endovascular elective infra-renal AAA procedures by year

Year	Open	EVAR	Total	% EVAR
2022	1,160	1,729	2,889	59.8
2023	1,067	1,736	2,803	61.9
2024	955	1,556	2,511	62.0
Total	3,182	5,021	8,203	61.2

Figure 4.1: Distribution of elective infra-renal AAA repairs by age group between 2022 and 2024

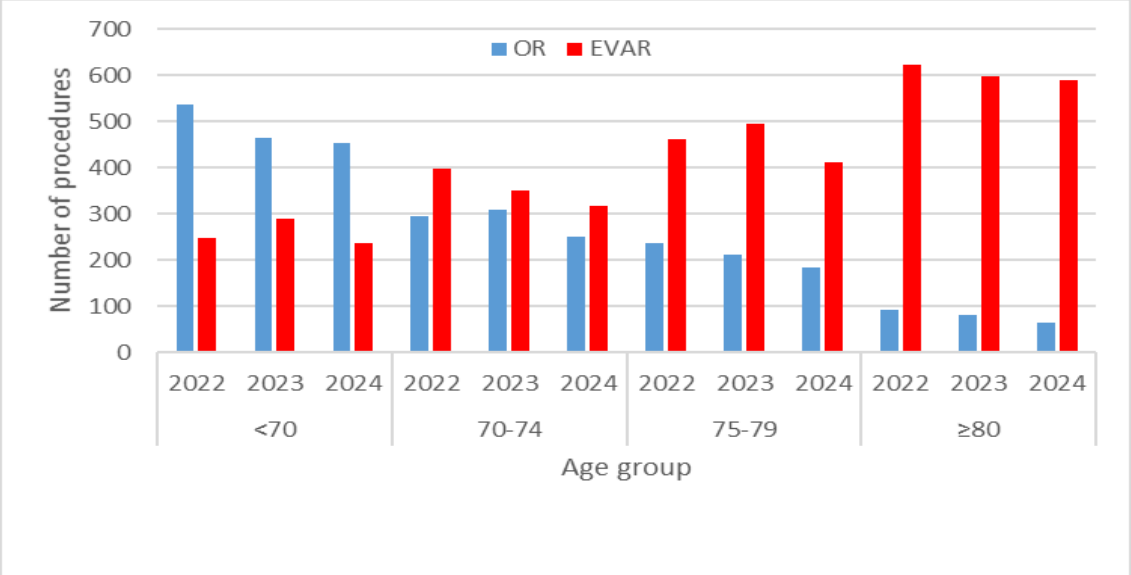
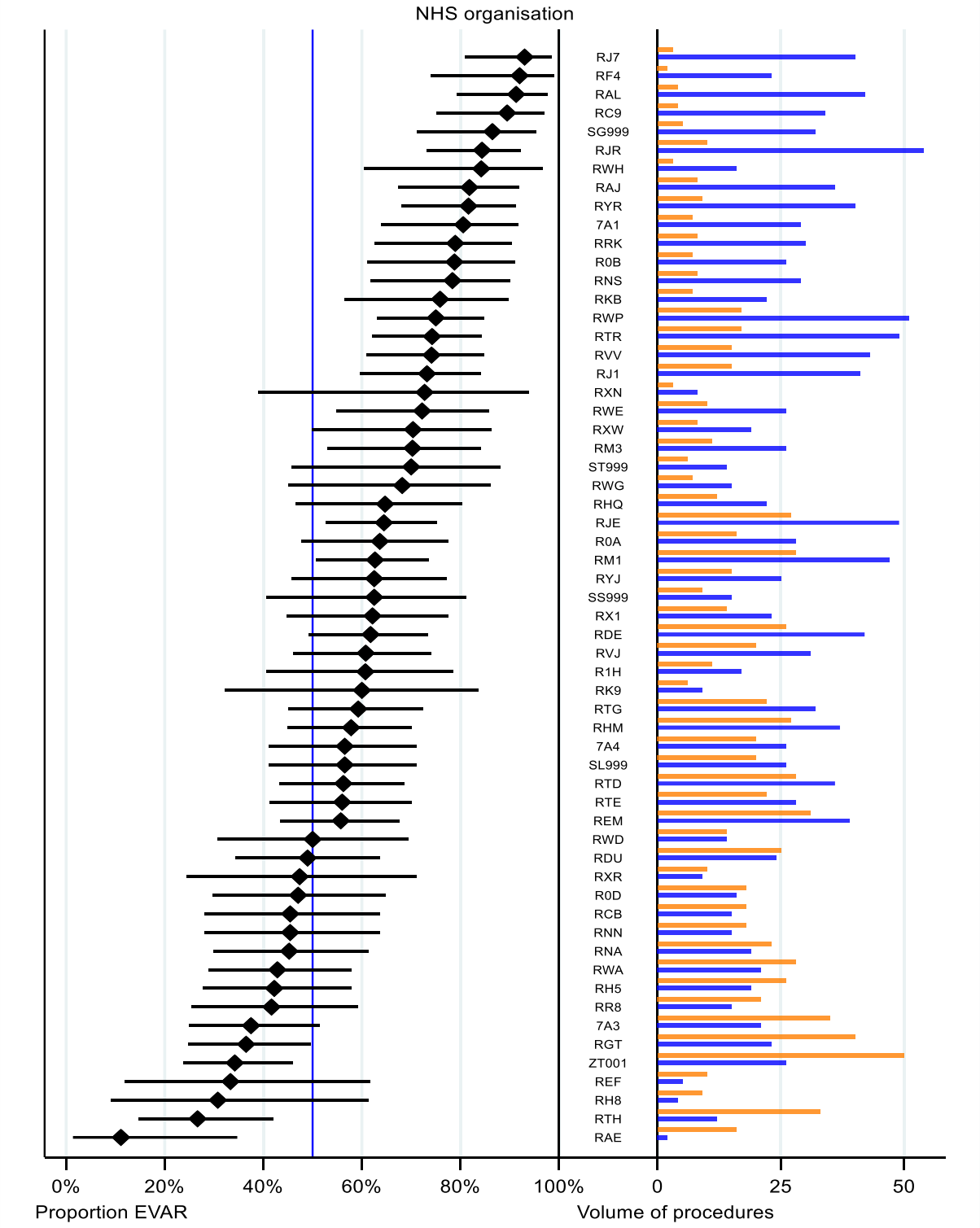


Figure 4.2: Percentage of EVARs (left panel: the black horizontal bars depict their 95% confidence intervals) and number of open repairs and EVARs (right panel) by NHS trust in 2024 with at least 10 procedures. Orange bars show open repairs and blue bars show EVARs. 16 of the 59 (27%) Trusts were performing more open repairs than EVARs



4.2 Patient Characteristics

Table 4.4: Characteristics of patients who had elective infra-renal AAA repair between January and December 2024

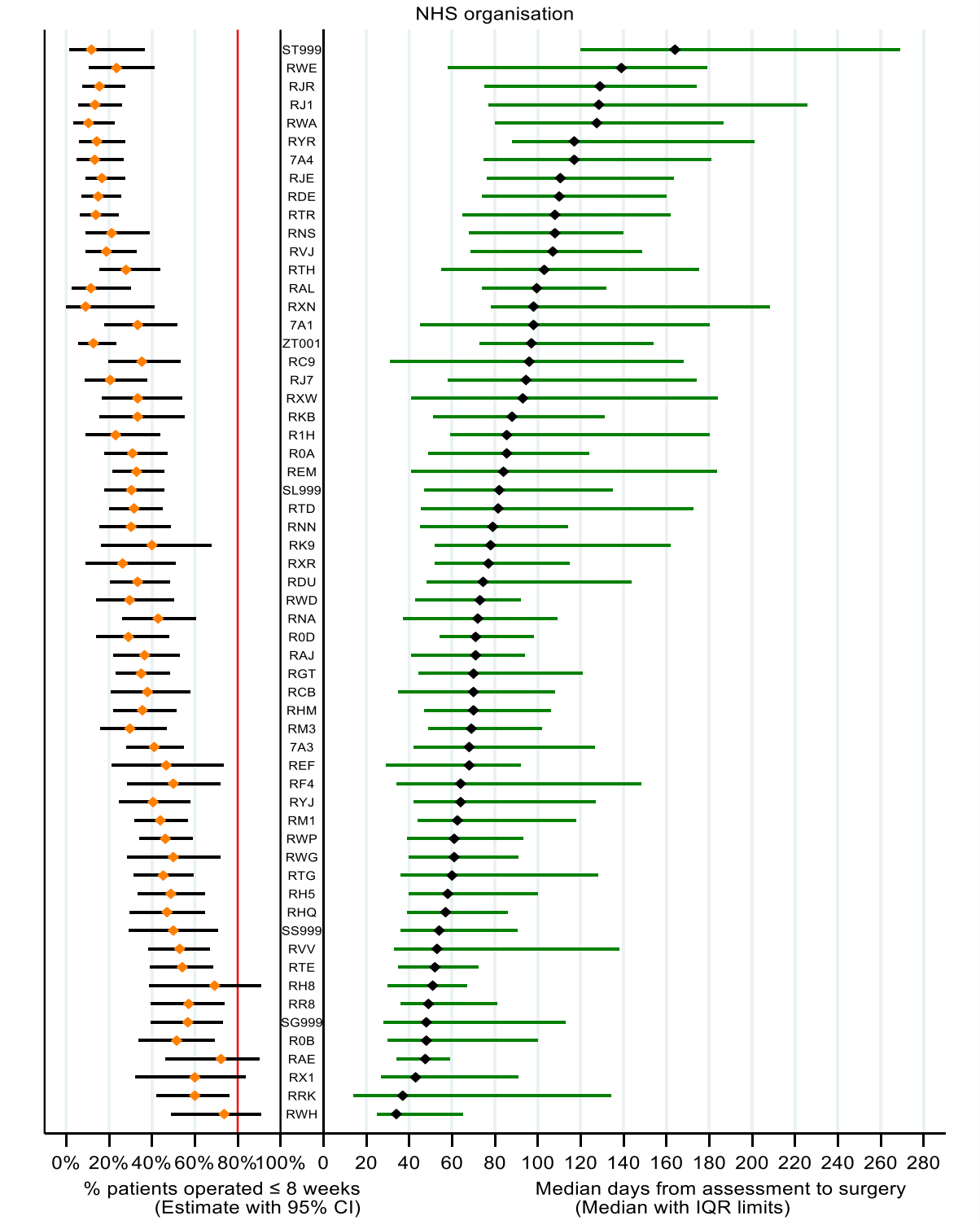
		Open repair	%	EVAR	%	Total
Total procedures		955		1,556		2,511
Age group (years)	Under 66	253	26.6	103	6.6	356
	66 to 75	492	51.8	512	33.1	1,004
	76 to 85	199	20.9	809	52.2	1,008
	86 and over	6	0.6	125	8.1	131
Male		863	90.4	1,421	91.3	2,284
Female		92	9.6	135	8.7	227
Current smoker		246	25.8	269	17.3	515
Previous AAA surgery		6	0.6	99	6.4	105
Indication	Screen detected	573	60.4	733	50.1	1,306
	Non-screen	252	26.6	523	35.7	775
	Other	124	13.1	207	14.1	331
AAA diameter (cm)	Under 5.5	103	10.8	220	14.2	323
	5.5 to 6.9	770	80.6	1,177	75.7	1,947
	7.0 and over	82	8.6	157	10.1	239
ASA fitness grade	1,2	239	25.0	224	14.4	463
	3	672	70.4	1,218	78.3	1,890
	4,5	44	4.6	113	7.3	157
Comorbidities	Hypertension	637	66.7	1,055	67.8	1,692
	Ischemic heart disease	214	22.4	531	34.1	745
	Chronic heart failure	11	1.2	125	8.0	136
	Stroke	53	5.5	121	7.8	174
	Diabetes	138	14.5	312	20.1	450
	Chronic renal failure	93	9.7	262	16.8	355
	Chronic lung disease	211	22.1	476	30.6	687

4.3 Pre-operative pathway for elective infra-renal aneurysms

Table 4.5: Overall compliance with standards related to the VSGBI elective AAA care pathway

	Percentage of patients meeting standard		
	2024	**2023**	**2022**
Elective patients were discussed at MDT meetings	2,150/2,511 (85.6%)	86.7%	87.9%
Patients with an AAA diameter ≥5.5cm deemed suitable for repair had a preoperative CT/MR angiography assessment	2,050/2,186 (93.8%)	93.3%	93.6%
Patients underwent a formal anaesthetic review	2,433/2,511 (96.9%)	97.6%	97.0%
Patients whose anaesthetic review was done by a consultant vascular anaesthetist	2,225/2,433 (91.5%)	90.5%	91.8%
Patients who had their fitness measured	2,144/2,511 (85.4%)	83.7%	83.3%
Most common assessment methods:			
CPET	1,211/2,144 (56.5%)	56.8%	57.3%
Echocardiogram	1,016/2,144 (47.4%)	45.7%	45.8%

Figure 4.3: Median (IQR) time from assessment to treatment (days) for patients who had elective infra-renal AAA repair between January and December 2024 (black diamonds) among the 59 NHS organisations with 10 or more AAA repairs. The national median was: 81 (IQR 46-138). Left panel shows proportion seen within 8 weeks of assessment; 33% nationally (orange diamonds). The grey horizontal bars depict their 95% confidence intervals. The red line shows the 80% target indicated by NAAASP.



4.4 Postoperative outcomes after elective infra-renal AAA repair

Table 4.6: Postoperative details of elective infra-renal repairs undertaken in 2024

		Open repair (n=955)		EVAR (n=1,556)	
Admitted to	Ward	1.6%		67.6%	
	Level 2	53.2%		27.2%	
	Level 3	45.2%		5.2%	
	Died in theatre	0.0%		0.0%	
		Median	***IQR***	***Median***	***IQR***
Days in critical care:	Level 2	2	1 to 4	1	0 to 1
	Level 3	3	2 to 5	2	1 to 4
Post-op length of stay (days)		7	6 to 10	2	1 to 3
		Rate	***95% CI***	***Rate***	***95% CI***
In-hospital postoperative mortality		3.1	2.1 to 4.5	0.3	0.1 to 0.7
Defined complications					
	Cardiac	3.8	2.7 to 5.2	0.7	0.4 to 1.3
	Respiratory	9.6	7.8 to 11.7	0.5	0.2 to 1.0
	Haemorrhage	1.0	0.5 to 1.9	0.6	0.3 to 1.1
	Limb ischaemia	3.0	2.0 to 4.3	1.1	0.6 to 1.7
	Renal failure	4.4	3.2 to 5.9	0.3	0.1 to 0.7
	Other	13.0	10.9 to 15.3	4.1	3.2 to 5.2
	None of the above	69.9	66.9 to 72.8	92.9	91.5 to 94.2
Return to theatre		8.6	6.9 to 10.5	2.6	1.8 to 3.5
Readmission within 30 days		5.6	4.2 to 7.3	5.4	4.3 to 6.7

Table 4.7: Postoperative details of endoleaks following elective endovascular repairs

Endoleak type	2022	2023	2024	Total
No endoleak	1,385	1,345	1,195	3,925
Type 1	81	89	78	248
Type 1 & 2	<5	0	0	<5
Type 2	201	223	217	641
Type 3	10	8	7	25
Type 4	<5	5	<5	10
Unclassified	5	6	10	21
Missing	42	60	48	150
Total	1,729	1,736	1,556	5,021

4.5 Postoperative in-hospital mortality for elective infra-renal AAA repair

Figure 4.4: Risk-adjusted in-hospital mortality rates after elective infra-renal AAA repair among NHS vascular units (January 2022 and December 2024). The overall in-hospital mortality rate was 1.3%.

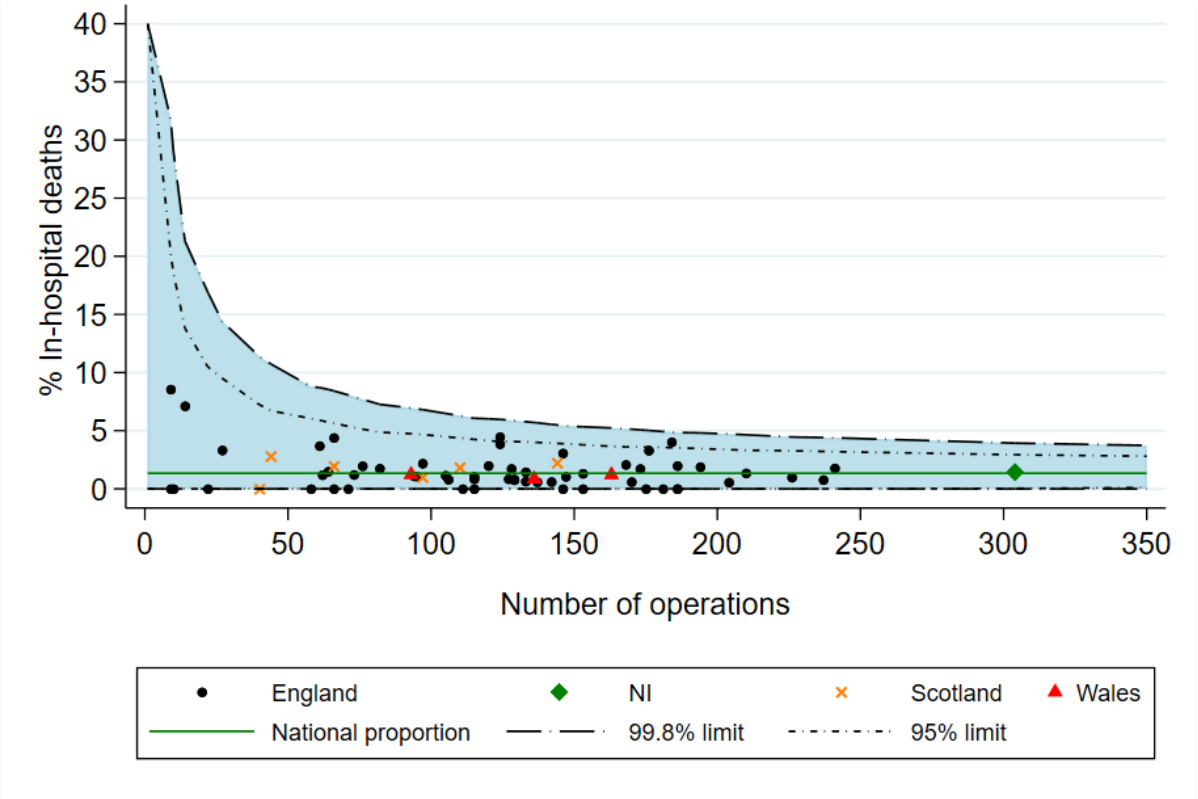
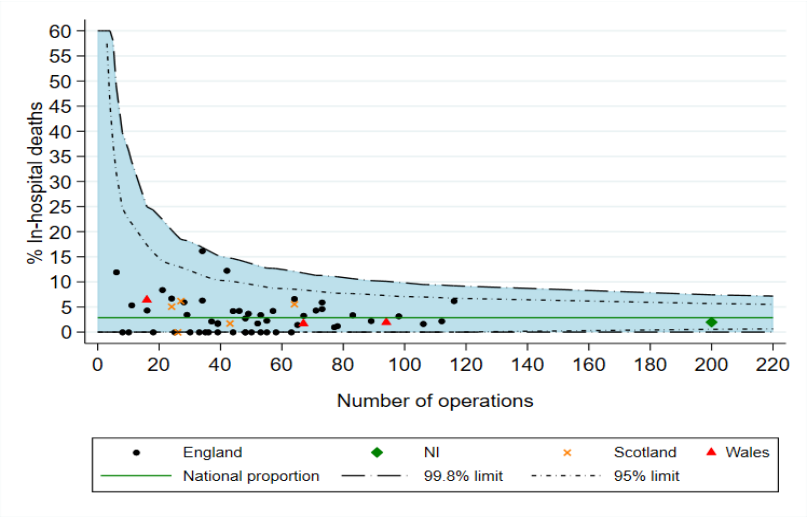


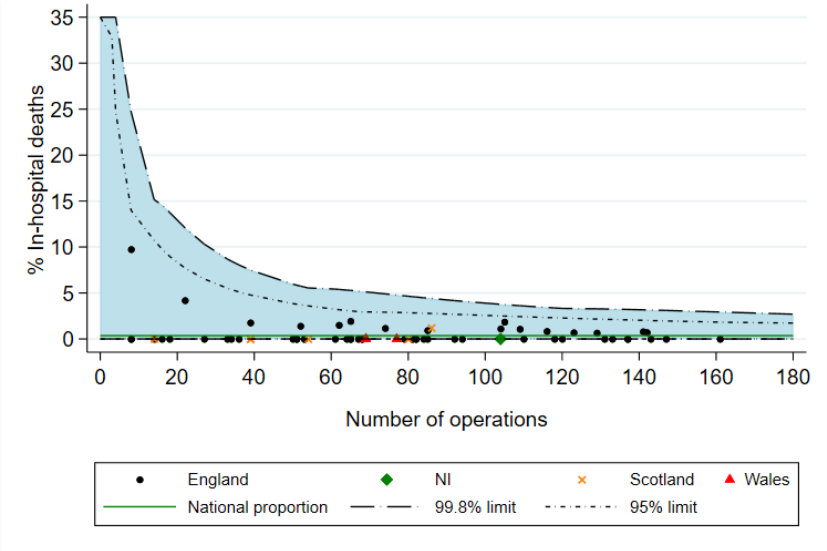
Figure 4.5: Funnel plot of risk-adjusted in-hospital mortality after elective AAA repair for open and EVAR procedures performed between 2022 and 2024.

A: Open repairs



The postoperative in-hospital mortality rate for open repair procedures was 2.9%

B: EVAR procedures



The postoperative in-hospital mortality rate for EVAR procedures was 0.4%

5. Other elective repair of aortic conditions

5.1 Background

Aneurysms can occur at various locations along the aorta. In addition to infra-renal aneurysms, a distinction is made between three other types:

- juxta-renal (that occur near to the renal arteries)
- supra-renal (that occur above the renal arteries), and
- thoraco-abdominal (more extensive aneurysms involving the thoracic and abdominal aorta).

Table 5.1:

Other elective procedures		No. of procs	%
Total procedures		1,532	
Type of procedure	FEVAR	1,216	79.4
	BEVAR	290	18.9
	Other	24	1.6
	Missing	<5	0.1

5.2 Patient Characteristics

Table 5.2: Characteristics of patients who had other primary open elective and endovascular repairs between January 2022 and December 2024

Other elective procedures		Open repair	%	Endovascular	%	Total
Total procedures		253		1,532		1,785
Age group (years)	Under 66	78	30.8	150	9.8	228
	66 to 75	120	47.4	646	42.3	766
	76 to 85	55	21.7	701	45.9	756
	86 and over	0	0.0	31	2.0	31
Male		217	85.8	1,325	86.5	1,542
Female		36	14.2	207	13.5	243
Current smoker		82	32.4	357	23.5	439
AAA diameter (cm)	Under 5.5	11	4.3	67	4.4	78
	5.5 to 6.9	183	72.3	1,118	73.5	1,301
	7.0 and over	59	23.3	337	22.1	396
ASA fitness grade	1,2	50	19.8	238	15.6	288
	3	175	69.2	1,176	76.9	1,351
	4,5	28	11.1	116	7.6	144
Comorbidities	Hypertension	176	69.6	1,097	71.6	1,273
	Ischemic heart disease	62	24.5	528	34.5	590
	Chronic heart failure	<5	1.2	97	6.3	100
	Stroke	15	5.9	139	9.1	154
	Diabetes	39	15.4	268	17.5	307
	Chronic renal failure	25	9.9	277	18.1	302
	Chronic lung disease	55	21.7	532	34.7	587

Table 5.3: Postoperative details of other elective repairs undertaken between January 2022 and December 2024

Other elective procedures		Open repair (n=253)		Endovascular (n=1,532)	
Admitted to	Ward	1.2%		21.9%	
	Level 2	37.5%		58.3%	
	Level 3	60.9%		19.8%	
	Died in theatre	0.4%		0.1%	
		Median	***IQR***	***Median***	***IQR***
Days in critical care:	Level 2	3	2 to 6	2	1 to 2
	Level 3	3	2 to 6	2	1 to 3
Post-op length of stay (days)		9	7 to 14	4	2 to 7
		Rate	***95% CI***	***Rate***	***95% CI***
In-hospital postoperative mortality		9.9	6.5 to 14.2	1.5	1.0 to 2.2
Return to theatre		9.5	6.2 to 13.8	4.8	3.7 to 5.9
Readmission within 30 days		9.7	6.2 to 14.3	7.3	6.1 to 8.8

5.3 Repair of thoracic aortic conditions

Table 5.4: Characteristics of patients who had TEVARs between January 2022 and December 2024

TEVARs		Elective	%	Non-elective	%	Total
Total procedures		428		432		860
Age group (years)	Under 66	89	20.8	195	45.3	284
	66 to 75	176	41.1	119	27.7	295
	76 to 85	152	35.5	100	23.3	252
	86 and over	11	2.6	16	3.7	27
Male		276	64.5	280	64.8	556
Female		152	35.5	152	35.2	304
Current smoker		74	17.4	120	28.6	194
AAA diameter (cm)	Under 5.5	115	27.1	278	69.3	393
	5.5 to 6.9	236	55.7	72	18.0	308
	7.0 and over	73	17.2	51	12.7	124
ASA fitness grade	1,2	61	14.3	37	8.6	98
	3	329	76.9	170	39.5	499
	4,5	38	8.9	223	51.9	261
Comorbidities	Hypertension	320	74.8	275	63.7	595
	Ischemic heart disease	100	23.4	60	13.9	160
	Chronic heart failure	18	4.2	17	3.9	35
	Stroke	20	4.7	13	3.0	33
	Diabetes	44	10.3	36	8.3	80
	Chronic renal failure	54	12.6	35	8.1	89
	Chronic lung disease	119	27.8	79	18.3	198
Indication	Asymptomatic	313	73.5	30	7.0	343
	Symptomatic unruptured	35	8.2	91	21.2	126
	Ruptured	0	0	74	17.2	74
	Transection	<5	0.5	55	12.8	57
	Acute dissection	17	4.0	162	37.8	179
	Chronic dissection	59	13.8	17	4.0	76

Table 5.5: Postoperative details of TEVARs undertaken between January 2022 and December 2024

TEVARS		**Elective (n=428)**		**Non-elective (n=432)**	
Admitted to	Ward	31.8%		8.5%	
	Level 2	51.4%		40.8%	
	Level 3	16.8%		49.5%	
	Died in theatre	0.0%		1.2%	
		Median	***IQR***	***Median***	***IQR***
Days in critical care:	Level 2	2	1 to 2.5	2	2 to 5
	Level 3	2	1 to 5	4	2 to 9
Post-op length of stay (days)		4	2 to 7	9	5 to 22
		Rate	***95% CI***	***Rate***	***95% CI***
In-hospital postoperative mortality		1.2	0.4 to 2.7	10.2	7.5 to 13.4
Return to theatre		3.5	2.0 to 5.7	13.6	10.5 to 17.2
Readmission within 30 days		8.8	6.3 to 11.9	9.1	6.4 to 12.4

5.4 Patients with unruptured AAA admitted as an emergency procedure

There are a group of patients with an unruptured AAA who are admitted as an emergency admission. There are also some patients which can be entered under an emergency operative procedure but are recorded under an elective admission mode. During the period between 2022 and 2024, the NVR received details of 1,418 such cases.

Table 5.6: Characteristics of patients who had non-ruptured emergency open and endovascular repairs between January 2022 and December 2024

		Open repair	%	Endovascular	%	Total
Total procedures		645		773		1,418
Age group (years)	Under 66	199	31.0	78	10.1	277
	66 to 75	244	38.1	230	29.8	474
	76 to 85	187	29.2	370	48.0	557
	86 and over	11	1.7	93	12.1	104
Male		533	82.6	641	82.9	1174
Female		112	17.4	132	17.1	244
Current smoker		222	34.5	169	22.0	391
AAA diameter (cm)	Under 5.5	94	14.6	166	21.6	260
	5.5 to 6.9	267	41.4	271	35.2	538
	7.0 and over	284	44.0	333	43.2	617
ASA fitness grade	1,2	121	18.8	75	9.7	196
	3	376	58.4	474	61.3	850
	4,5	147	22.8	224	29.0	371

Table 5.7: Postoperative details of non-ruptured emergency open and endovascular repairs undertaken between January 2022 and December 2024. The overall in-hospital mortality rate for this patient group was 4.7% (95% CI 3.6 to 5.9).

		Open repair (n = 645)		**Endovascular (n = 773)**	
Admitted to	Ward	2.5%		60.6%	
	Level 2	44.5%		28.4%	
	Level 3	52.9%		11.0%	
	Died in theatre	0.2%		0.0%	
		Median	***IQR***	***Median***	***IQR***
Days in critical care:	Level 2	3	2 to 5	1	0 to 2
	Level 3	4	2 to 7	2	1 to 4.5
Post-op length of stay (days)		9	7 to 14	3	2 to 7
		Rate	***95% CI***	***Rate***	***95% CI***
In-hospital postoperative mortality		7.0	5.1 to 9.2	2.7	1.7 to 4.1
Return to theatre		11.2	8.9 to 13.9	3.4	2.2 to 4.9
Readmission within 30 days		7.4	5.4 to 9.8	9.2	7.2 to 11.5

6. Repair of ruptured abdominal aortic aneurysms

6.1 Surgical activity for ruptured AAA

Details of 1,211 procedures were submitted to the NVR in 2022-2024, giving an estimated case ascertainment of 94%.

Table 6.1: Characteristics of patients who had a repair of a ruptured AAA between January 2022 and December 2024

		Open repair	%	EVAR	%	Total
Total procedures		696		515		1,211
Age group (years)	Under 66	113	16.3	54	10.5	167
	66 to 75	205	29.5	129	25.1	334
	76 to 85	346	49.9	259	50.5	605
	86 and over	30	4.3	71	13.8	101
Male		578	83.0	432	83.9	1010
Female		118	17.0	83	16.1	201
Previous AAA surgery		26	3.7	85	16.5	111
AAA diameter (cm)	Under 5.5	59	8.6	82	16.1	141
	5.5 to 6.9	169	24.5	165	32.4	334
	7.0 and over	461	66.9	262	51.5	723
ASA fitness grade	1 or 2	31	4.5	21	4.1	52
	3	68	9.8	86	16.7	154
	4	431	61.9	335	65.2	766
	5	166	23.9	72	14.0	238

Figure 6.2: Number of open repairs and EVARs for ruptured AAAs between January 2022 and December 2024.

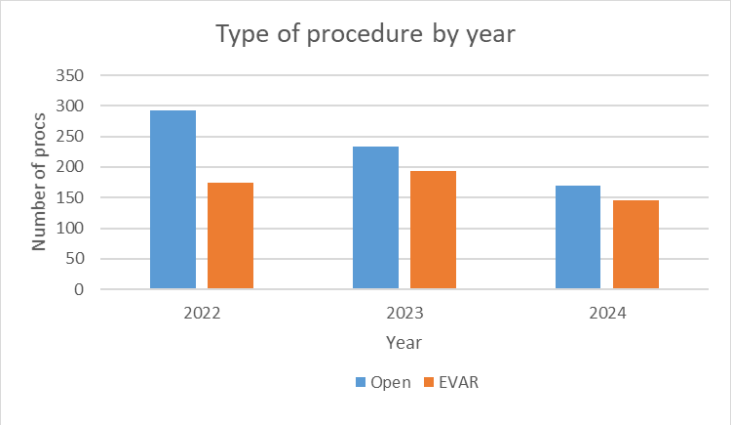


Figure 6.1: Percentage of EVARs (left panel) and number of open repairs and EVARs (right panel) by NHS trust between January 2022 and December 2024 with at least 10 procedures. Orange bars show open repairs and blue bars show EVARs.

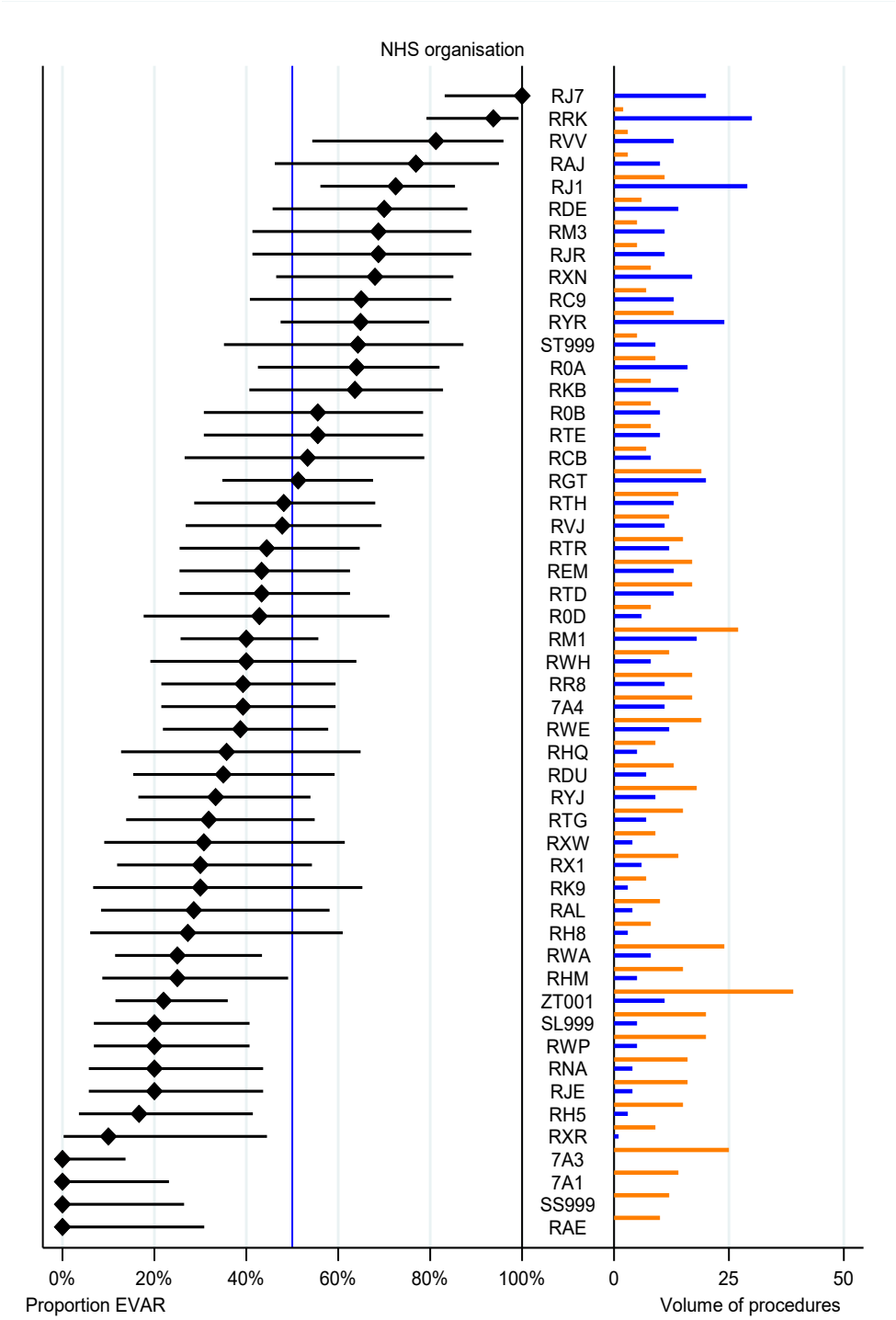
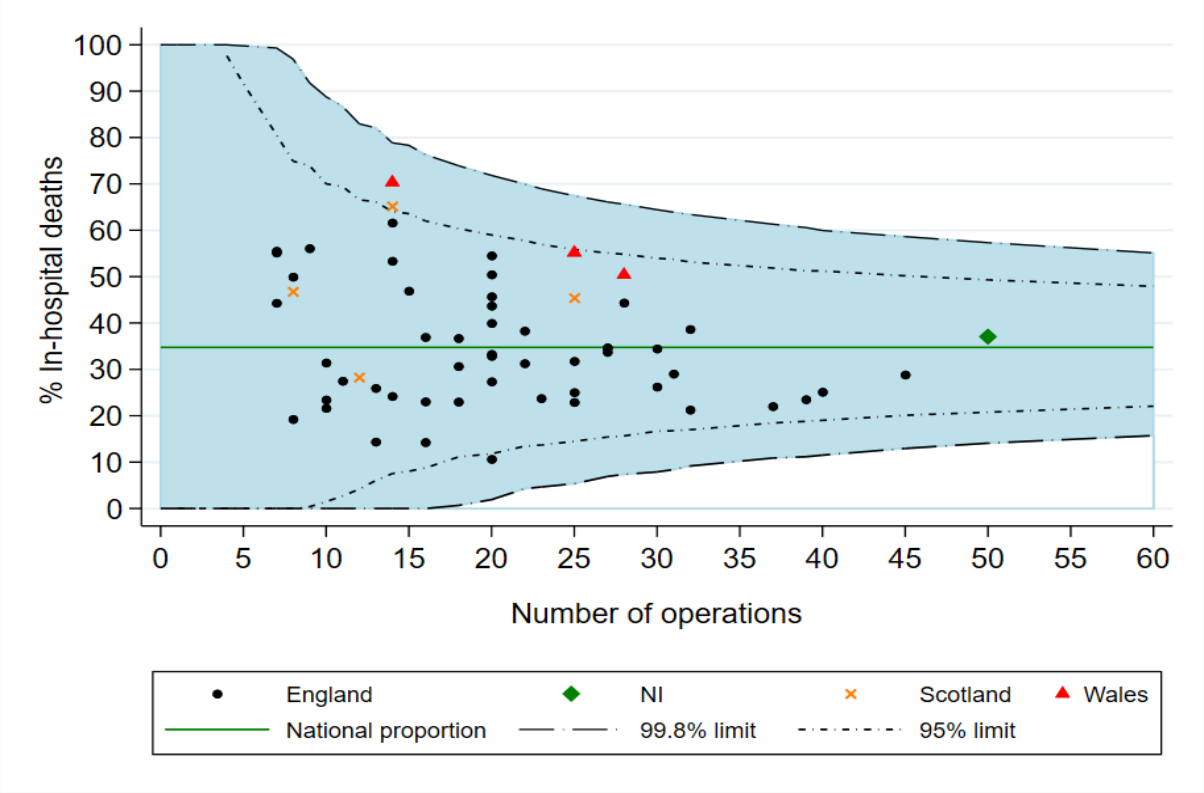


Table 6.2: Postoperative details of emergency repairs for ruptured AAAs undertaken between January 2022 and December 2024

2022-2024		Open repair (n=696)		EVAR (n=515)	
Admitted to	Ward	0.6%		17.0%	
	Level 2	9.1%		35.7%	
	Level 3	82.0%		43.9%	
	Died in theatre	8.3%		3.3%	
		Median	***IQR***	***Median***	***IQR***
Days in critical care: Level 2		5	3 to 11	2	1 to 4
Level 3		5	2 to 10	2	1 to 5
Post-op length of stay (days)		10	3 to 21	8	4 to 15
Post-op length of stay for patients discharged alive (days)		15	10 to 28	8	5 to 16
		Rate	***95% CI***	***Rate***	***95% CI***
In-hospital postoperative mortality		45.7	41.9 to 49.5	20.0	16.6 to 23.7
Defined complications					
	Cardiac	20.4	17.3 to 23.7	9.8	7.4 to 12.8
	Respiratory	29.8	26.3 to 33.5	15.3	12.2 to 18.7
	Stroke	2.4	1.3 to 3.8	0.4	0.0 to 1.4
	Haemorrhage	4.4	2.9 to 6.3	1.6	0.7 to 3.1
	Limb ischaemia	13.5	10.9 to 16.4	4.4	2.8 to 6.6
	Renal failure	23.8	20.6 to 27.3	8.6	6.3 to 11.5
	Ischaemic bowel	10.2	8.0 to 12.8	2.0	1.0 to 3.7
	None of predefined	30.1	26.6 to 33.8	60.4	56.0 to 64.8
Return to theatre		21.0	17.9 to 24.4	7.6	5.5 to 10.3
Readmission within 30 days		7.4	5.0 to 10.5	9.0	6.4 to 12.2

6.2 Postoperative in-hospital mortality for ruptured AAA repair

Figure 6.3: Risk-adjusted in-hospital mortality for emergency repairs of ruptured AAAs between January 2022 and December 2024 by NHS trust. The overall mortality rate was 34.8%. All NHS trusts had a risk-adjusted rate of in-hospital postoperative mortality that fell within the expected range around the national average.



7. Carotid endarterectomy

7.1 Background

The information in this chapter focuses primarily on carotid procedures performed within NHS hospitals between 1 January 2024 and 31 December 2024.

Table 7.1: Estimated case ascertainment of carotid endarterectomy in the UK

	2022	2023	2024
Audit procedures	3,354	3,372	2,877
Expected procedures	3,547	3,586	3,322
Estimated case ascertainment	95%	94%	87%

Table 7.2: Estimated case ascertainment rates in 2024 by UK country

	Carotid endarterectomy
England	87%
Wales	100%
Scotland	55%
Northern Ireland	100%

7.2 Patient and Procedure Characteristics

Table 7.3: Characteristics of patients who had carotid endarterectomy in 2024, compared with characteristics from 2022 and 2023

Patient characteristics	No. of procedures	2024 %	2023 %	2022 %
Total procedures	2,877			
Age (years), (n=2,866)				
Under 66	775	27.0	29.4	28.9
66 to 75	1,047	36.5	35.4	35.7
76 to 85	921	32.1	31.2	31.1
86 and over	123	4.3	4.0	4.3
Male	2,002	69.6	68.5	69.6
Female	875	30.4	31.5	30.4
Asymptomatic	158	5.5	5.8	5.3
Patients symptomatic for carotid disease				
Index symptom if symptomatic: (n=2,719)				
Stroke	1,141	42.0	40.5	39.4
TIA	1,155	42.5	43.1	44.8
Amaurosis fugax	374	13.8	14.3	13.4
None of the three above	49	1.8	2.1	2.5
Grade of ipsilateral carotid stenosis* (n=2,876)				
<50%	39	1.4	1.2	1.5
50-69%	811	28.2	27.4	27.2
70-89%	1,143	39.7	40.5	40.9
90-99%	876	30.5	30.7	30.2
Occluded	7	0.2	0.2	0.2
Rankin score prior to surgery (n=2,875)				
0-2	2,615	91.0	92.0	90.3
3	239	8.3	7.6	9.0
4-5	21	0.7	0.4	0.7
Comorbidities (n=2,874)				
Diabetes	732	25.5	25.1	25.4
Cardiac disease	723	25.2	25.8	23.8

* level of stenosis recorded at the time of initial imaging.

Table 7.4: Operative details of carotid endarterectomies performed from 2022 to 2024

Operation details		Procedures (n=2,877)	2024 %	2023 %	2022 %
Anaesthetic	General	2,017	70.1	65.3	64.8
	GA + block	358	12.4	12.2	11.8
	Block or regional	369	12.8	16.5	16.7
	Local	132	4.6	5.9	6.8
Type of endarterectomy	Standard	219	7.6	9.0	7.3
	Standard + patch	2,552	88.7	86.3	86.9
	Eversion	106	3.7	4.7	5.8
Carotid shunt used		1,949	67.7	65.8	64.9
Ipsilateral patency check		2,039	72.7	69.4	70.3

7.3 Treatment pathways

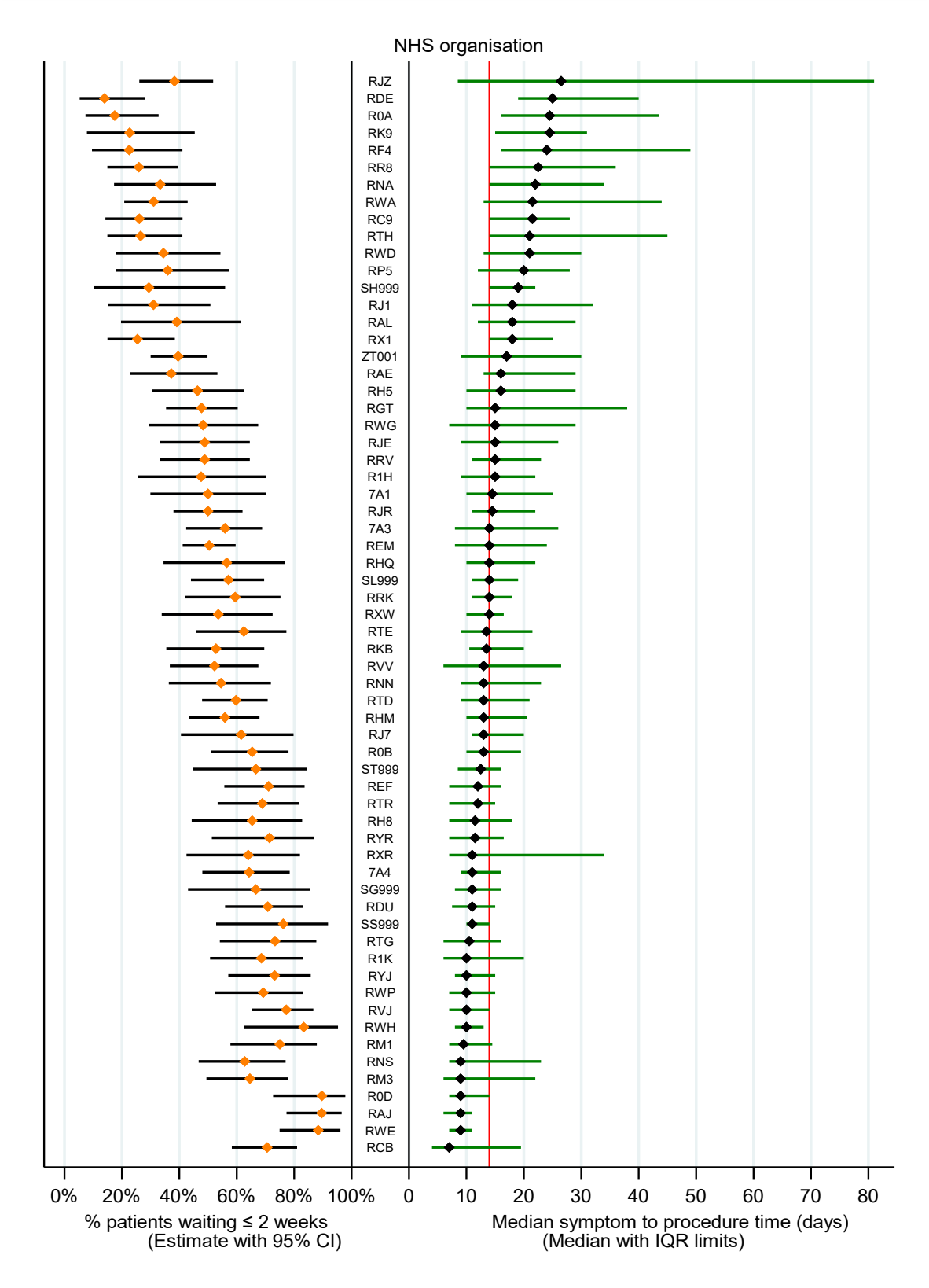
Table 7.5: Source of referral

Source of referral	Procedures (n=2,877)	2024 %
GP	45	1.6
Neurologist	78	2.7
Stroke Physician	2,522	87.7
Radiologist	5	0.2
Care of Elderly Consultant	17	0.6
Vascular Surgeon	82	2.9
Cardiologist or Cardiothoracic Surgeon	30	1.0
Ophthalmologist	42	1.5
Self-Referral	20	0.7
Other Surgeon	9	0.3
Other	27	0.9

Table 7.6: Waiting times amongst symptomatic

Metric	Procedures 2024 (n=2,719)
Symptom to first medical referral	4 (1 - 9)
First medical referral to being seen by vascular team	1 (0 - 4)
Seen by the vascular team to undergoing CEA	6 (3 - 11)
Symptom onset to surgery	14 (9 - 24)

Figure 7.1: Median time (and interquartile range) from symptom to procedure by NHS trust for procedures performed between January and December 2024 (black diamonds) and proportion waiting less than 2 weeks following symptoms (orange diamonds). Fifty-three percent were seen within 14 days.



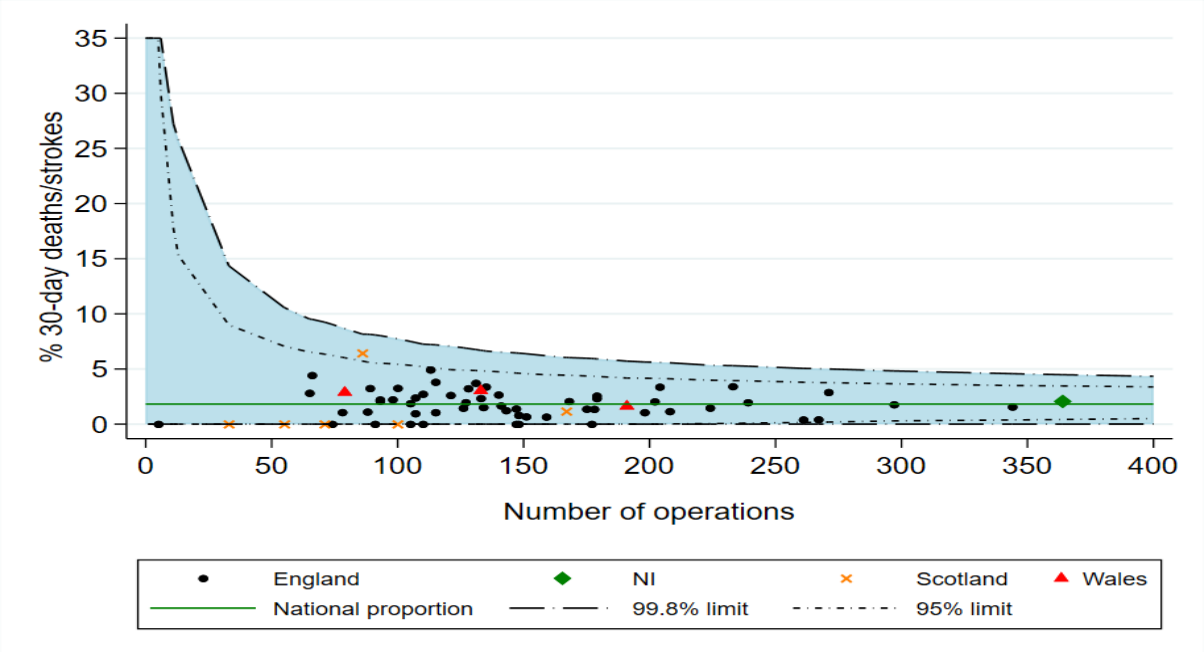
7.4 Outcomes after carotid endarterectomy

Table 7.7: Postoperative outcomes following carotid endarterectomy for 2024

Procedures	**2,877**
Complication	**Complication rate (%) 2024**
Death and/or stroke within 30 days	1.9 (1.4 – 2.4)
Stroke within 30 days	1.6 (1.2 – 2.2)
Death within 30 days	0.5 (0.3 – 0.9)
Bleeding within admission	1.8 (1.3 – 2.3)
Myocardial infarct within admission	0.7 (0.4 – 1.1)
Cranial nerve injury within admission	1.4 (1.0 – 1.9)
TIA within admission	0.4 (0.2 – 0.7)
Post-operative confusion within admission	0.3 (0.2 – 0.6)

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

Figure 7.2: Funnel plot of risk-adjusted rates of stroke/death within 30 days for NHS trusts, for carotid endarterectomies between January 2022 and December 2024



The overall national average rate of stroke/death within 30 days = 1.8%

- the median length of stay was 2 days (IQR: 1 to 4 days)
- the rate of return to theatre was 2.7% (95% CI 2.1 to 3.3), and
- the rate of readmission within 30 days was 4.9% (95% CI 4.2 to 5.8).

Appendix 1: NHS organisations that perform vascular procedures

Code	Organisation Name	AAA	CEA	Angio	Bypass	Amp
7A1	Betsi Cadwaladr University Health Board	Yes	Yes	Yes	Yes	Yes
7A3	Swansea Bay University Health Board	Yes	Yes	Yes	Yes	Yes
7A4	Cardiff and Vale University Health Board	Yes	Yes	Yes	Yes	Yes
7A6	Aneurin Bevan University Health Board	No	No	Yes	No	No
R0A	Manchester University NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
R0B	South Tyneside and Sunderland NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
R0D	University Hospitals Dorset NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
R1H	Barts Health NHS trust	Yes	Yes	Yes	Yes	Yes
R1K	London North West University Healthcare NHS trust	No	Yes	Yes	Yes	Yes
RA9	Torbay and South Devon NHS Foundation Trust	Yes	No	Yes	Yes	Yes
RAE	Bradford Teaching Hospitals NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RAJ	Mid and South Essex NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RAL	Royal Free London NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RBD	Dorset County Hospital NHS Foundation Trust	No	No	Yes	No	No
RBN	Mersey and West Lancashire Teaching Hospitals NHS Trust	No	No	Yes	No	No
RBQ	Liverpool Heart And Chest NHS Foundation Trust	Yes	No	No	No	No
RC9	Bedfordshire Hospitals NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RCB	York Teaching Hospital NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RD8	Milton Keynes Hospital NHS Foundation Trust	No	No	Yes	No	No
RDE	East Suffolk and North Essex NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RDU	Frimley Health NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
REF	Royal Cornwall Hospitals NHS trust	Yes	Yes	Yes	Yes	Yes
REM	Liverpool University Hospitals NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RF4	Barking, Havering and Redbridge University Hospitals NHS trust	Yes	Yes	Yes	Yes	Yes
RFS	Chesterfield Royal Hospital NHS Foundation Trust	No	No	Yes	No	No
RGN	North West Anglia NHS Foundation Trust	No	No	Yes	No	No
RGR	West Suffolk NHS Foundation Trust	No	No	Yes	No	No
RGT	Cambridge University Hospitals NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RH5	Somerset NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RH8	Royal Devon and Exeter NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RHM	University Hospital Southampton NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RHQ	Sheffield Teaching Hospitals NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RHU	Portsmouth Hospitals NHS trust	No	No	Yes	No	No

Code	Organisation Name	AAA	CEA	Angio	Bypass	Amp
RHW	Royal Berkshire NHS Foundation Trust	No	No	Yes	No	No
RJ1	Guy's and St Thomas' NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RJ6	Croydon Health Services NHS Trust	No	No	Yes	No	No
RJ7	St George's University Hospitals NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RJE	University Hospital of North Midlands NHS trust	Yes	Yes	Yes	Yes	Yes
RJR	Countess of Chester Hospital NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RJZ	King's College Hospital NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RK9	University Hospitals Plymouth NHS trust	Yes	Yes	Yes	Yes	Yes
RKB	University Hospitals Coventry and Warwickshire NHS trust	Yes	Yes	Yes	Yes	Yes
RL4	Royal Wolverhampton Hospitals NHS trust	No	No	Yes	No	No
RM1	Norfolk and Norwich University Hospitals NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RM3	Northern Care Alliance NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RMC	Bolton NHS Foundation Trust	No	No	Yes	No	No
RN3	Great Western Hospitals NHS Foundation Trust	No	No	Yes	No	No
RN5	Hampshire Hospitals NHS Foundation Trust	No	No	Yes	No	No
RNA	The Dudley Group NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RNN	North Cumbria Integrated Care NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RNS	Northampton General Hospital NHS trust	Yes	Yes	Yes	Yes	Yes
RP5	Doncaster and Bassetlaw Teaching Hospitals NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RPA	Medway NHS Foundation Trust	No	Yes	Yes	Yes	Yes
RQW	Princess Alexandra Hospital NHS trust	No	No	Yes	No	No
RR7	Gateshead Health NHS Foundation Trust	No	No	Yes	No	No
RR8	Leeds Teaching Hospitals NHS trust	Yes	Yes	Yes	Yes	Yes
RRF	Wrightington, Wigan And Leigh NHS Foundation Trust	No	No	Yes	No	No
RRK	University Hospitals Birmingham NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RRV	University College London Hospitals NHS Foundation Trust	No	Yes	Yes	No	No
RT3	Royal Brompton & Harefield NHS Foundation Trust	Yes	Yes	Yes	Yes	No
RTD	Newcastle upon Tyne Hospitals NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RTE	Gloucestershire Hospitals NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RTG	University Hospitals of Derby and Burton NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RTH	Oxford University Hospitals NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RTK	Ashford and St Peter's Hospitals NHS Foundation Trust	No	No	Yes	No	No
RTP	Surrey and Sussex Healthcare NHS trust	No	No	Yes	No	No
RTR	South Tees Hospitals NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RVR	Epsom and St Helier University Hospitals NHS Trust	No	No	Yes	No	No

Code	Organisation Name	AAA	CEA	Angio	Bypass	Amp
RVJ	North Bristol NHS trust	Yes	Yes	Yes	Yes	Yes
RVV	East Kent Hospitals University NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RWA	Hull University Teaching Hospitals NHS trust	Yes	Yes	Yes	Yes	Yes
RWD	United Lincolnshire Hospitals NHS trust	Yes	Yes	Yes	Yes	Yes
RWE	University Hospitals of Leicester NHS trust	Yes	Yes	Yes	Yes	Yes
RWG	West Hertfordshire Hospitals NHS trust	No	No	Yes	No	No
RWH	East and North Hertfordshire NHS trust	Yes	Yes	Yes	Yes	Yes
RWP	Worcestershire Acute Hospitals NHS trust	Yes	Yes	Yes	Yes	Yes
RWY	Calderdale and Huddersfield NHS Foundation Trust	No	No	Yes	No	No
RX1	Nottingham University Hospitals NHS trust	Yes	Yes	Yes	Yes	Yes
RXC	East Sussex Healthcare NHS Trust	No	No	Yes	No	No
RXF	Mid Yorkshire Hospitals NHS trust	No	No	Yes	No	No
RXN	Lancashire Teaching Hospitals NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
RXQ	Buckinghamshire Healthcare NHS trust	No	No	Yes	No	No
RXR	East Lancashire Hospitals NHS trust	Yes	Yes	Yes	Yes	Yes
RXW	Shrewsbury and Telford Hospital NHS trust	Yes	Yes	Yes	Yes	Yes
RYJ	Imperial College Healthcare NHS trust	Yes	Yes	Yes	Yes	Yes
RYR	University Hospital Sussex NHS Foundation Trust	Yes	Yes	Yes	Yes	Yes
SA999	NHS Ayrshire & Arran	No	No	Yes	No	No
SF999	NHS Fife	No	No	Yes	No	No
SG999	NHS Greater Glasgow and Clyde	Yes	Yes	Yes	Yes	Yes
SH999	NHS Highland	No	No	No	No	No
SL999	NHS Lanarkshire	Yes	Yes	Yes	Yes	Yes
SN999	NHS Grampian	Yes	Yes	Yes	Yes	Yes
SS999	NHS Lothian	Yes	Yes	Yes	Yes	Yes
ST999	NHS Tayside	Yes	Yes	Yes	Yes	Yes
SV999	NHS Forth Valley	No	No	Yes	No	No
SY999	NHS Dumfries and Galloway	No	No	Yes	No	No
ZT001	Belfast Health and Social Care Trust	Yes	Yes	Yes	Yes	Yes

Key

AAA – Perform AAA repair
CEA – Performs carotid endarterectomy
Angio – Performs lower limb angioplasty/stent
Bypass – Performs lower limb bypass
Amp – Performs major lower limb amputation

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Glossary

Abdominal aortic aneurysm (AAA)	This is an abnormal expansion of the aorta. If left untreated, it may enlarge and rupture causing fatal internal bleeding.
Amaurosis fugax	Transient loss of vision in one eye due to an interruption of blood flow to the retina.
ACE inhibitors	Angiotensin-converting enzyme inhibitors are medications designed to decrease blood pressure.
ARBs	Angiotensin-receptor blockers are drugs designed to decrease blood pressure. They are similar to ACE inhibitors but work in a different way.
Angiography	Angiography is a type of imaging technique used to examine blood vessels. It may be carried out non-invasively using computerised tomography (CT) and magnetic resonance imaging (MRI).
Asymptomatic patient	A patient who does not yet show any outward signs or symptoms of plaque.
Cardiopulmonary exercise testing (CPET)	Cardiopulmonary exercise testing is a non-invasive method of assessing the function of the heart and lungs at rest and during exercise.
Carotid endarterectomy (CEA)	Carotid endarterectomy is a surgical procedure in which plaque build-up is removed from the carotid artery in the neck.
Carotid stenosis	Abnormal narrowing of the neck artery to the brain.
Complex AAA	A term used to describe aortic aneurysms that are not located below the arteries that branch off to the kidneys. These are categorised into three types: juxta-renal (that occur near the kidney arteries), supra-renal (that occur above the renal arteries) and thoraco-abdominal (more extensive aneurysms involving the thoracic and abdominal aorta).
Cranial nerve injury (CNI)	Damage to one of the 12 nerves supplying the head and neck.
Chronic limb-threatening ischaemia (CLTI)	The most severe form of peripheral arterial disease, where the blood flow to the legs becomes severely restricted, to such an extent that these parts of the limb are at risk of developing gangrene. CLTI is associated with severe pain at rest, which is often worse at night, and there may also be ulcers on the leg and foot.

Confidence interval (CI)	A statistical term used to describe the range of values that we are confident the metric lies within.
Endovascular aneurysm repair (EVAR)	A method of repairing an abdominal aortic aneurysm by placing a graft within the aneurysm from a small cut in the groin.
Fontaine score	An internationally recognised scoring system or classification of the severity of peripheral arterial disease.
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 is collected by any of these national agencies.
Index case	The first procedure a patient underwent in their hospital admission.
Infra-renal AAA	An abdominal aneurysm that is located below the point where the arteries branch off the aorta to the kidneys.
Interquartile range (IQR)	Once the data are arranged in ascending order, this is the central 50% of all values and is otherwise known as the ‘middle fifty’ or IQR.
Hybrid operating theatre	An operating theatre with built-in radiological imaging capabilities. The imaging equipment is able to move and rotate around a patient and multiple monitors provide good visibility around the operating table.
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.
National Abdominal Aortic Aneurysm Screening Programme (NAAASP)	A programme funded by the Department of Health to screen men over the age of 65 years for AAA.
OPCS	Office of Population and Censuses Surveys. A procedural classification list for describing procedures undertaken during episodes of care in the NHS.

Peripheral arterial disease (PAD)	Peripheral arterial disease (PAD) is a restriction of the blood flow in the lower-limb arteries. The disease can affect various sites in the legs, and produces symptoms that vary in their severity from pain in the legs during exercise to persistent ulcers or gangrene.
Plaque	Scale in an artery made of fat, cholesterol and other substances. This hard material builds up on the artery wall and can cause narrowing or blockage of an artery or a piece may break off causing a blockage in another part of the arterial circulation.
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 after a short time (e.g., within 24 hours).
Trust or Health Board	A public sector corporation that contains a number of hospitals, clinics and health provisions. For example, there were 4 hospitals in the Trust and 3 Trusts in the region.
Vascular Society of Great Britain and Ireland (VSGBI)	The VSGBI is a registered charity founded to relieve sickness and to preserve, promote and protect the health of the public by advancing excellence and innovation in vascular health, through education, audit and research. The VSGBI represents and provides professional support for over 600 members and focuses on non-cardiac vascular disease.

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