

NCAP

NATIONAL CARDIAC AUDIT PROGRAMME

NICOR

Left Atrial Appendage Occlusion (LAAO) Registry



Annual Report 2025
(2024/25)



14 centres have registered with NICOR and 13 submitted data for the 2024/25 report

0 private institutions provided data

267 LAAO procedures in total included in this report (up from 77 in 2023/24)

4% average annual stroke risk for patients prior to treatment

61% of patients had suffered a previous stroke but patients had low disability and frailty scores

73% of LAAO patients were over 70 years of age

67% of those undergoing an LAAO procedure were male

12.5% of patients with known ethnicity were from non-white or mixed ethnic groups



1. All hospitals providing LAAO procedures should register with the NICOR audit and submit complete and accurate data for all cases

Commissioning requirements are that all implanting centres should audit their full left atrial appendage occlusion program, including selection of patients, and the entire implant process, with benchmarking against other hospitals and published data nationally and internationally.

2. All hospitals should submit data within two weeks of an implant



This report summarises the key findings from the Left Atrial Appendage Occlusion (LAAO) Registry, part of the National Cardiac Audit Programme (NCAP) which is run by the National Institute for Cardiovascular Outcomes Research (NICOR).

NHS England has commissioned LAAO procedures since 2018. The left atrial appendage (LAA) is part of the back left chamber of the heart (the left atrium). With some rhythm disturbances of the heart (especially, atrial fibrillation, AF), the flow of blood through the heart chambers is affected and a clot (thrombus) may occur in this chamber, especially within the left atrial appendage. If this clot comes off the wall of the appendage and gets loose in the circulation, it can travel up to the brain and cause a stroke. To prevent this, patients with AF are prescribed blood-thinning treatment (anticoagulants). Some patients are unable to take these drugs however, either because they have had a significant bleed whilst taking them or are deemed to be at very high risk of having a bleed. Such patients are eligible for the LAAO procedure as an alternative treatment. Patients can be selected for this treatment after discussion of their case by a multidisciplinary team that weighs up the pros and cons of treatment, which can then be discussed with the patient before final decisions are made.

The LAAO Registry was launched in late 2023. The first phase of the programme is to ensure that all hospitals performing these procedures are registered and are submitting data on all patients where a procedure has been attempted. This process is on-going currently and so available data are preliminary. As cases build up in the Registry, it will be possible to monitor the standard of care provided by the hospitals and to ensure the best outcomes for patients. More details on the LAAO Registry and its methodology can be found [here](#).

NHS England has requested hospitals to submit data to the Registry within two weeks of a procedure. Some centres are finding it difficult to comply with this request but the more timely the data, the more useful it becomes. Hospitals will be provided with the means of evaluating the care they provide and comparing their performance with the national standards.

We are very grateful to the clinical teams in hospitals and their supporting audit teams for engaging with the Registry and to build up a powerful system to ensure the NHS delivers a very high quality of care for patients selected for this treatment.

NICOR LAAO Registry team

Relatively few hospitals perform LAAO procedures and some areas have no local hospital that patients can be referred to in 2024/25



25 hospitals, both NHS and private, performed LAAO procedures in 2024/25 (though some of these centres are no longer undertaking such cases).

It is notable that patients in some parts of the country do not have a local hospital that they can be referred to for an LAAO procedure.

-  NHS LAAO Centres in England and Northern Ireland
20
-  Private LAAO Centres in England
5
-  NHS LAAO Centres in Scotland
1

LAAO centres in the UK

● NHS ● NHS Scotland ● Private



Many hospitals have set a good example in registering and submitting data, though others need to do the same



All hospitals performing this procedure should register with NICOR and submit their data.

We still await data from Liverpool Heart and Chest Hospital and Birmingham's Queen Elizabeth Hospital, both of which have mature LAAO services and will have significant numbers to contribute to the registry.

The NICOR LAAO Registry team is working with active hospitals to complete registration and start data submission.

NHS hospitals REGISTERED AND SUBMITTING DATA (as of 26th September 2025)

Freeman Hospital	Royal Brompton Hospital
Glenfield Hospital	Royal Papworth Hospital
Guy's and St Thomas' Hospital	Royal Stoke University Hospital
Harefield Hospital	Royal Sussex County Hospital
John Radcliffe Hospital	St Bartholomew's Hospital
Leeds General Infirmary	Wythenshawe Hospital
Nottingham City Hospital	

NHS hospitals REGISTERED BUT NOT SUBMITTING DATA

King's College Hospital

NHS hospitals NOT REGISTERED

Hammersmith Hospital	Queen Elizabeth Hospital, Birmingham
Liverpool Heart and Chest Hospital	Royal Victoria Hospital, Belfast
New Cross Hospital	St Mary's Hospital, London

Private hospitals carrying out LAAO procedures but NOT REGISTERED

Cromwell Hospital
Harley Street Clinic
London Bridge Hospital
Nuffield Health at Barts
Spire Hospital, Nottingham

Data completeness is generally good, but does vary between centres in 2024/25



Hospitals should ideally upload complete data for each procedure within 14 days of the date it was undertaken, including the essential details of the implanted device.

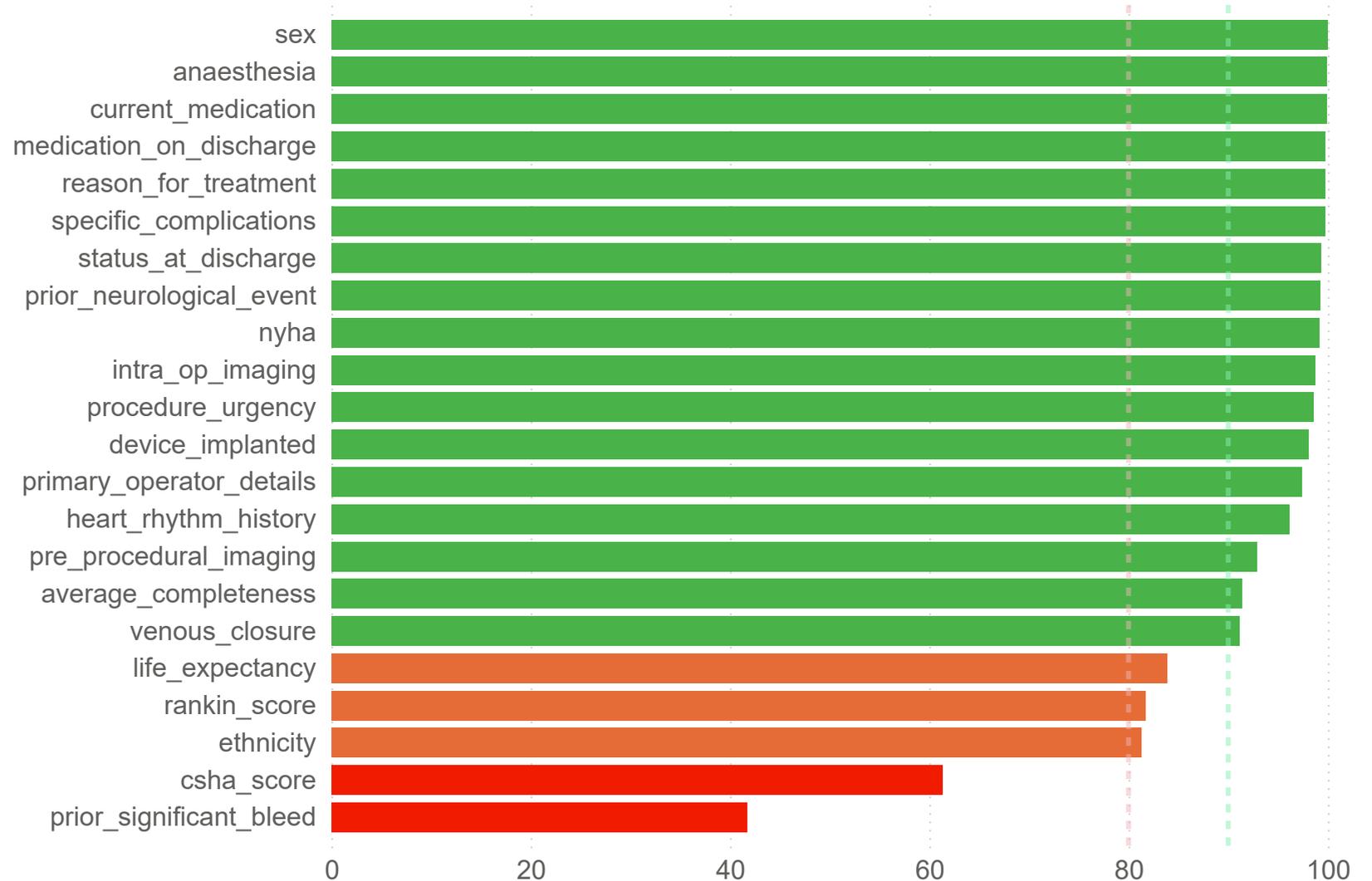
Those hospitals that have submitted data for 2024/25 have generally completed most of the required data fields.

Hospitals can submit data directly through the NICOR data entry portal or transfer data from their own databases. The latter option has improved the number of submissions. We will continue to consider user feedback to assist with improvements in data submission.

Select a hospital below to see its data completeness.

Select hospital ▼
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Percentage data completeness by registry data field (2024/25)



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Number of cases

Procedural measures

Outcomes

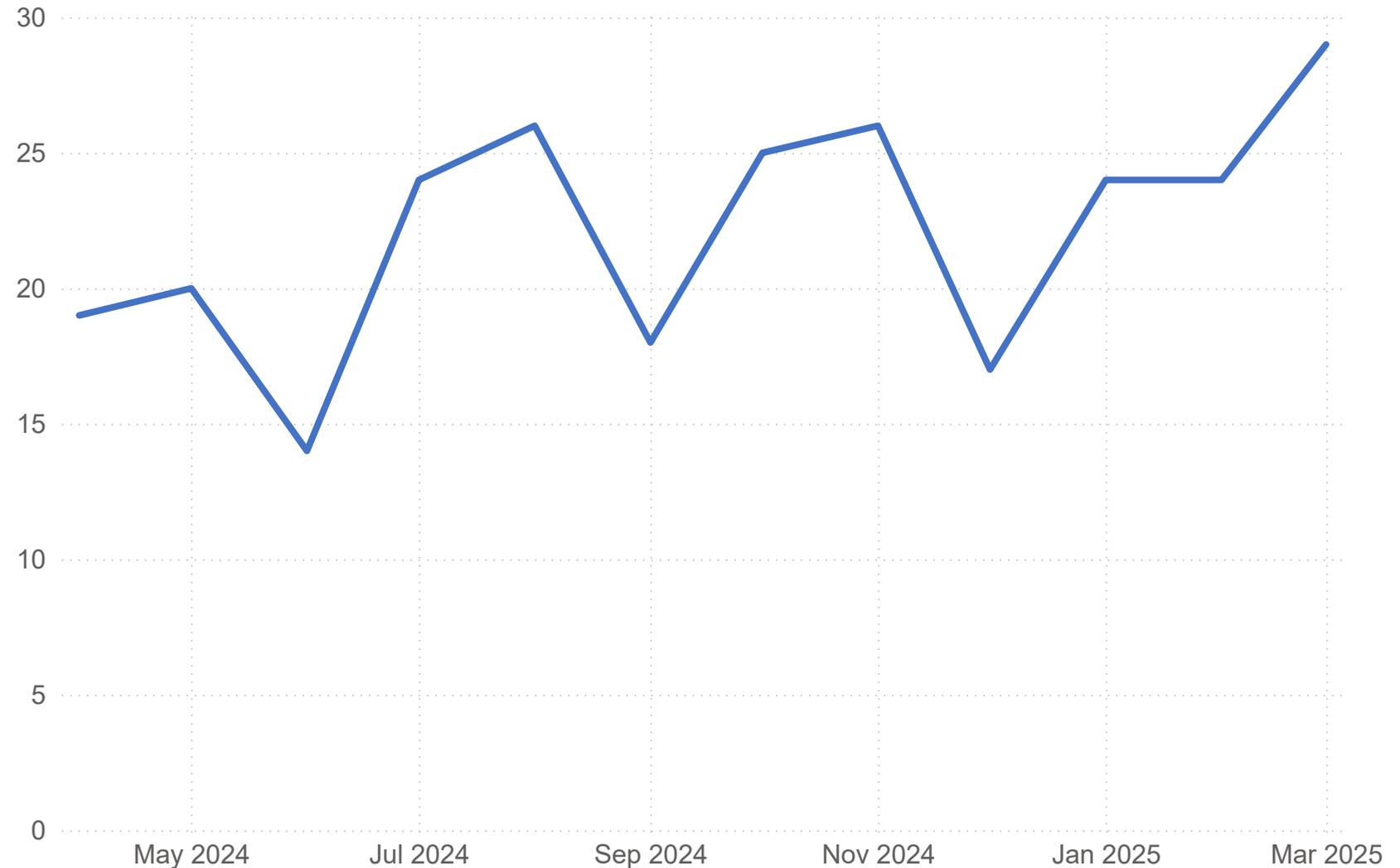
Almost 400 cases have been submitted in total to the LAAO registry since its inception



Data on 266 LAAO cases were submitted to the registry in 2024/25 (up from 77 in 2023/24 and 31 in 2022/23).

Since the start of the registry, a total of 374 cases have been submitted.

Number of LAAO procedures submitted by month



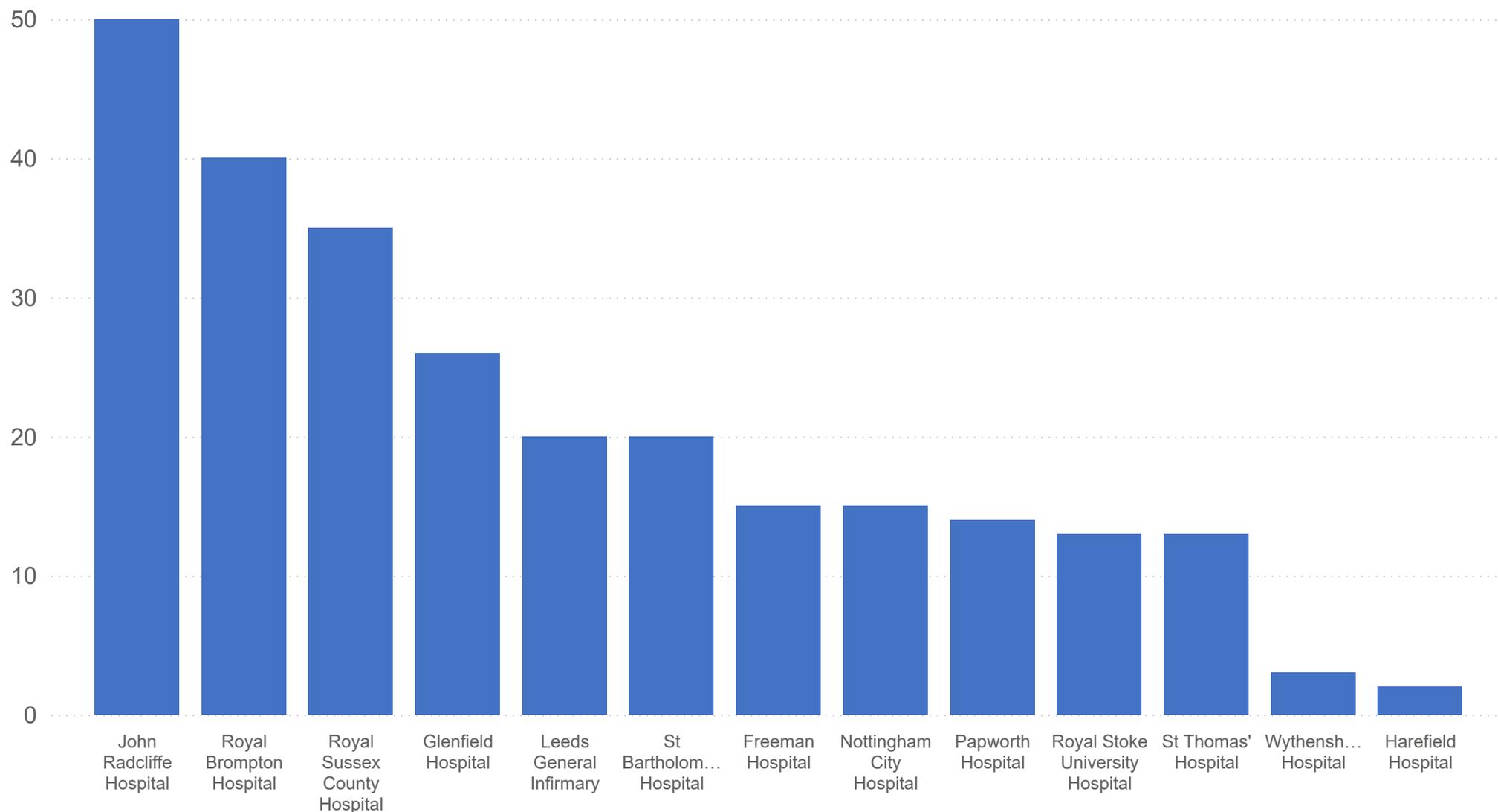
13 hospitals submitted data for their LAAO procedures in 2024/25



LAAO procedures submitted to the registry by hospital (2024/25)

The number of LAAO cases performed by each hospital ranged from 2 to 50.

6 hospitals performed 20 cases or more in 2024/25.



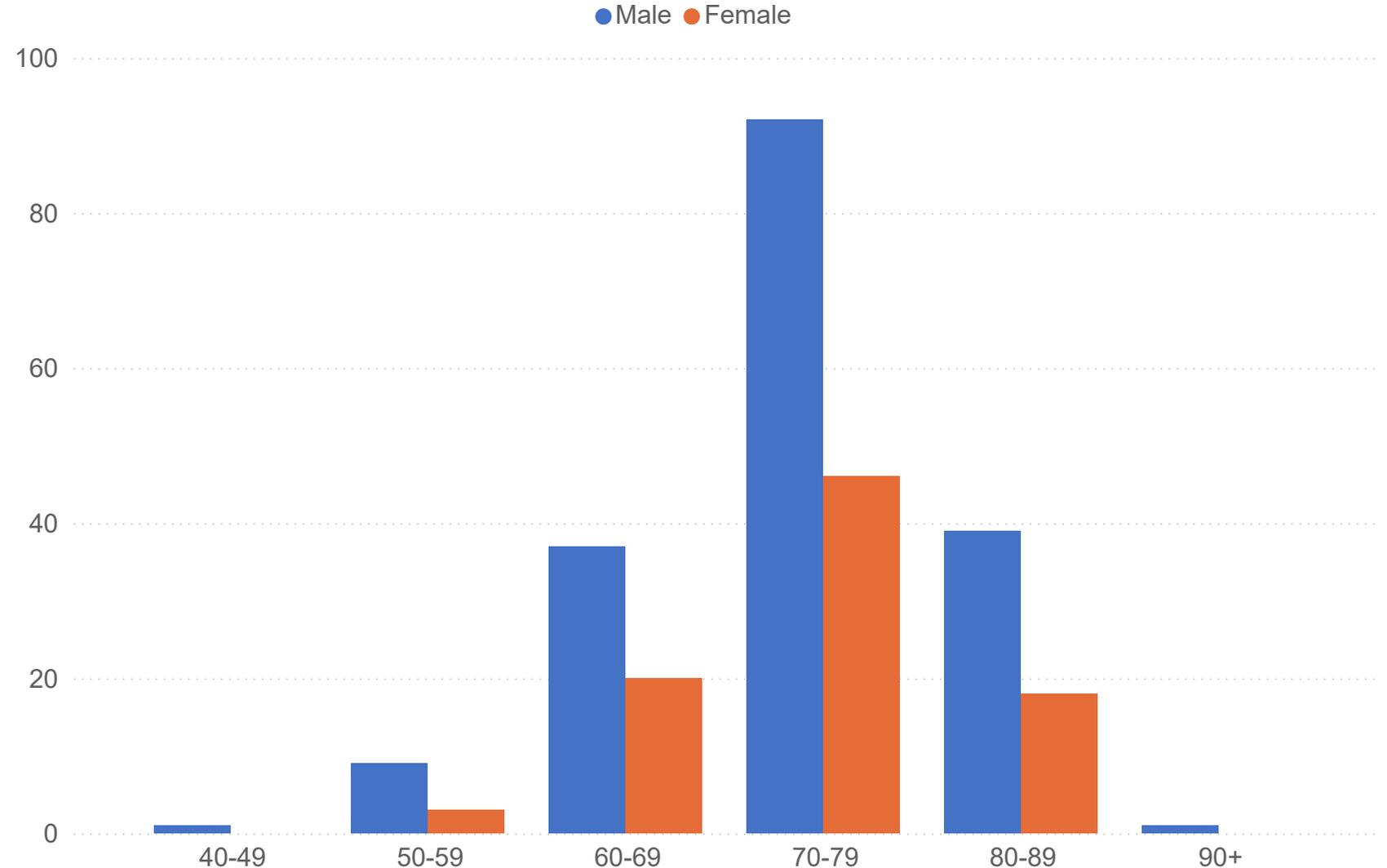
Most LAAO procedures in 2024/25 involved male patients



Most LAAO patients are over the age of 65, which is as expected given that LAAO is primarily undertaken as a stroke risk reduction procedure and the risk of stroke increases with age.

67% of patients in 2024/25 were male and 33% female. Females are considered to make up 47% of the global incidence of atrial fibrillation (AF), which suggests they are not undergoing LAAO procedures as frequently as they should. This phenomenon has been reported in large registries across Europe and the US.

LAAO procedures in differing age groups, by sex (2024/25)



Ethnic minorities are under-represented in those who underwent an LAAO procedure in 2024/25



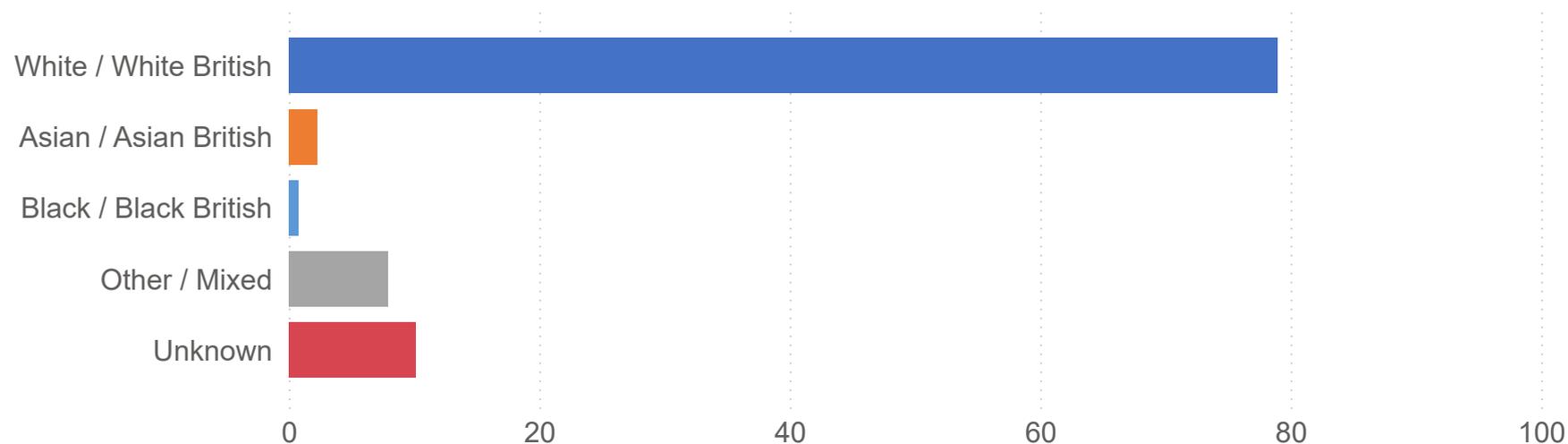
Hospitals have not submitted data on ethnicity for all cases and the data provided have not been age-standardised.

However, based on the number of cases submitted to the registry to date, it appears that the proportion of Black, Asian and other ethnic minority patients undergoing LAAO is low.

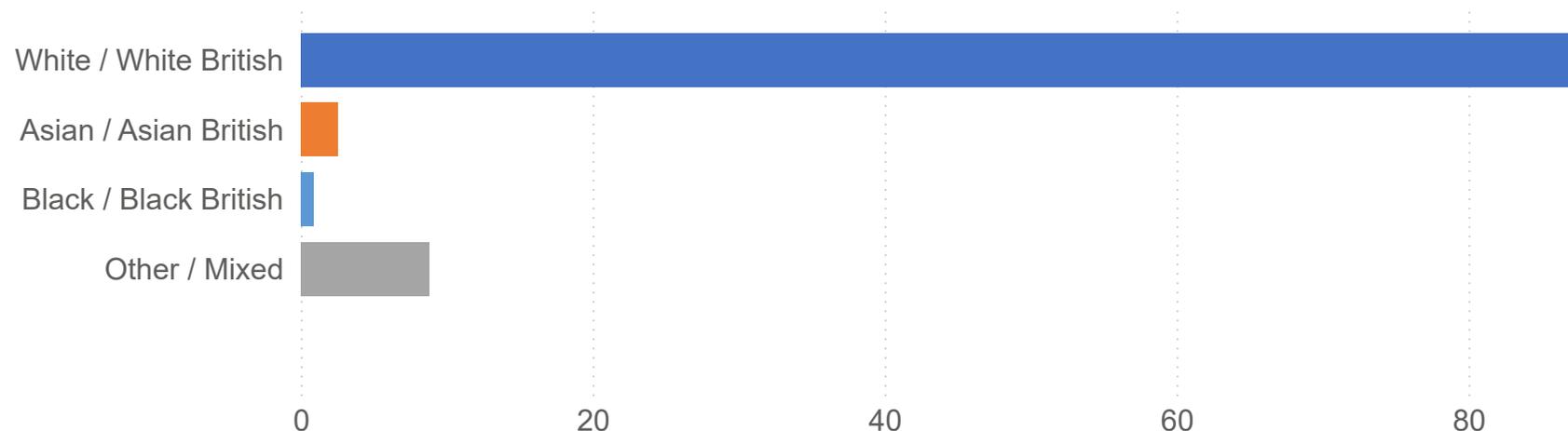
There is no clear explanation for this, but it should prompt centres to review their clinical pathways and educational or promotional materials to ensure wide and fair access to treatment.

Hospitals should also ensure they submit complete and accurate ethnicity data to the registry to enable this important analysis to be completed.

Percentage of all LAAO cases by patient ethnicity (2024/25)



Percentage of all LAAO cases by patient ethnicity, where ethnicity is recorded (2024/25)



The majority of patients in 2024/25 had low frailty and disability scores despite their age and co-morbidities

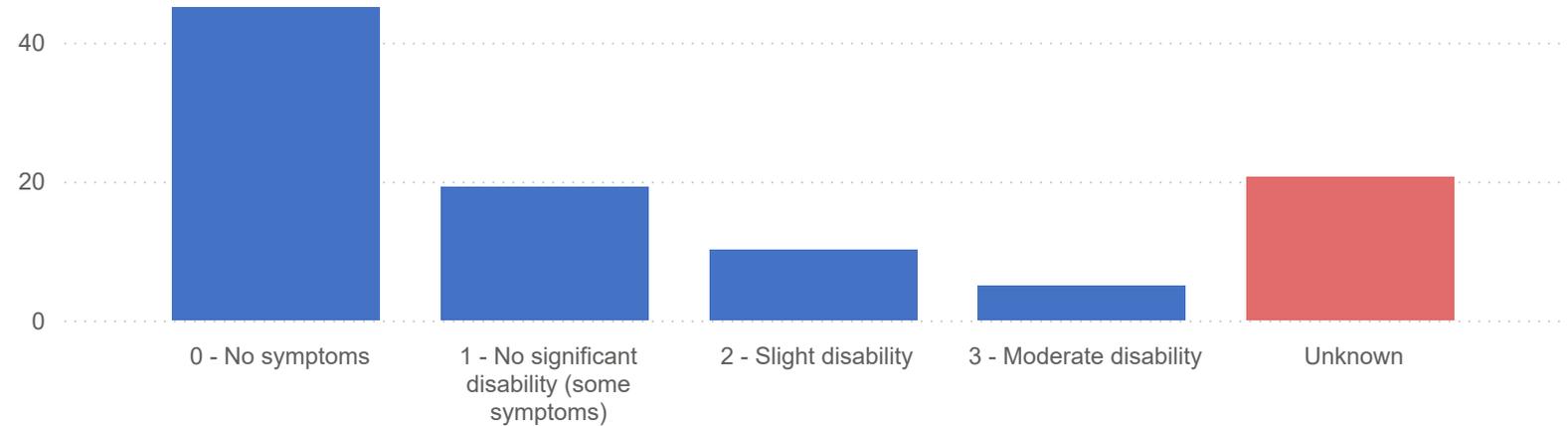


Although many patients are elderly and do have other comorbidities, data on frailty suggest that LAAO implanters are selecting patients appropriately for these procedures.

No patient had a Rankin score above 3, or a CSHA score above 4. Current commissioning guidance suggests that a modified Rockwood (CHSA) frailty score of under 6 should be a contra-indication to LAAO, as the patient would be considered 'too frail' to undergo and benefit from the procedure.

Some hospitals have not provided complete frailty data and it is important to provide accurate and complete data for all patients.

Percentage of LAAO cases by pre-procedural Rankin score (2024/25)



Percentage of LAAO cases by pre-procedural CSHA score (2024/25)



Most LAAO device recipients were at a high risk of stroke prior to the procedure in 2024/25



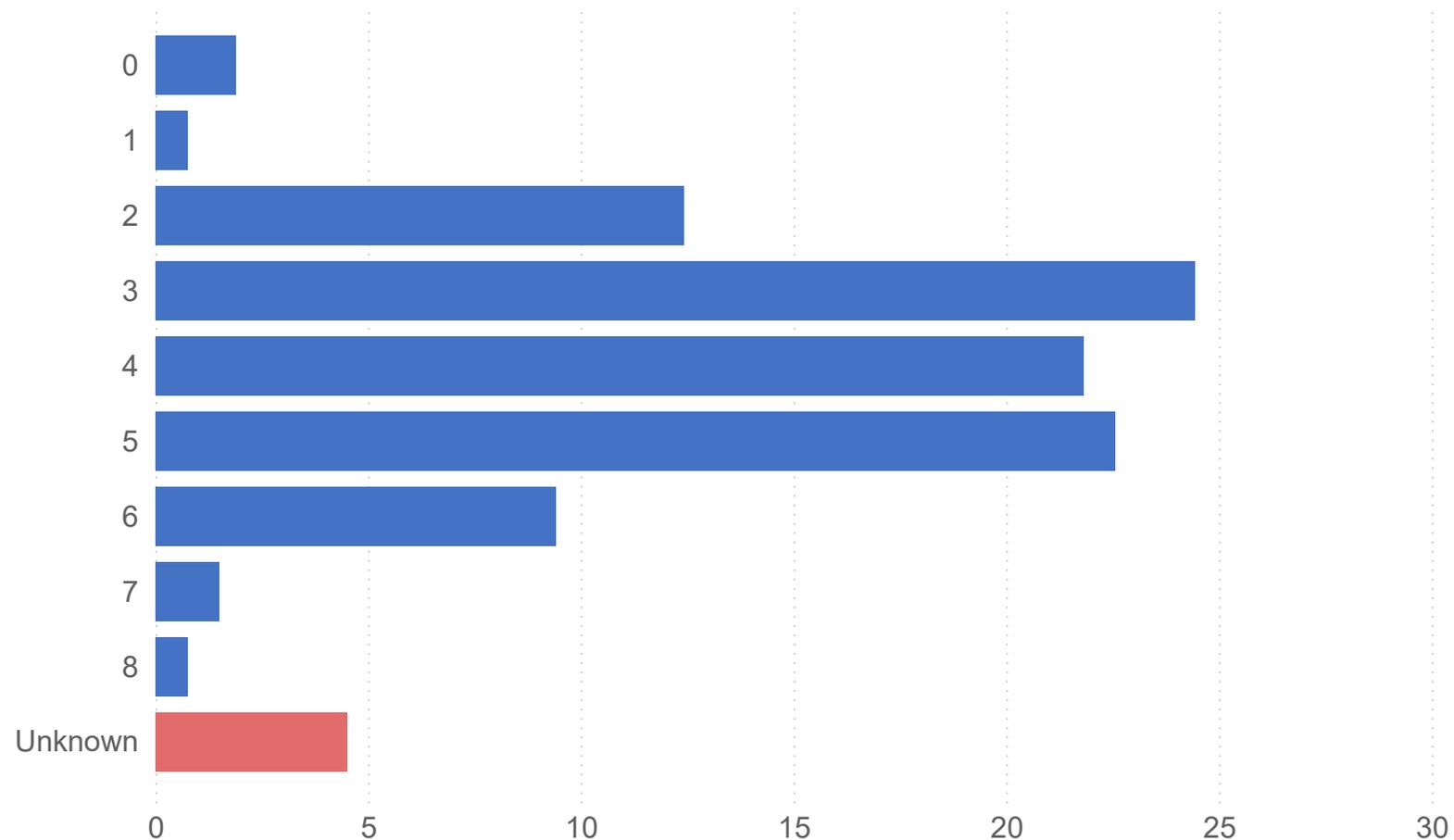
The majority of LAAO patients in 2024/25 had an annual stroke risk estimated between 2.5% and almost 10% per annum with the majority having a CHADSVASc score of 2 or more.

When taken together with the data on age and frailty, this suggests patients are being selected appropriately for an LAAO procedure.

LAAO is performed either to prevent a stroke occurring or to prevent a recurrent stroke in those who had already suffered one.

61% of all LAAO patients treated to date have been recorded as having suffered a previous stroke.

Percentage of LAAO cases by risk of stroke as given by CHADSVASc score (2024/25)



Individual operator volumes for LAAO procedures varied from 1 to over 40 in 2024/25



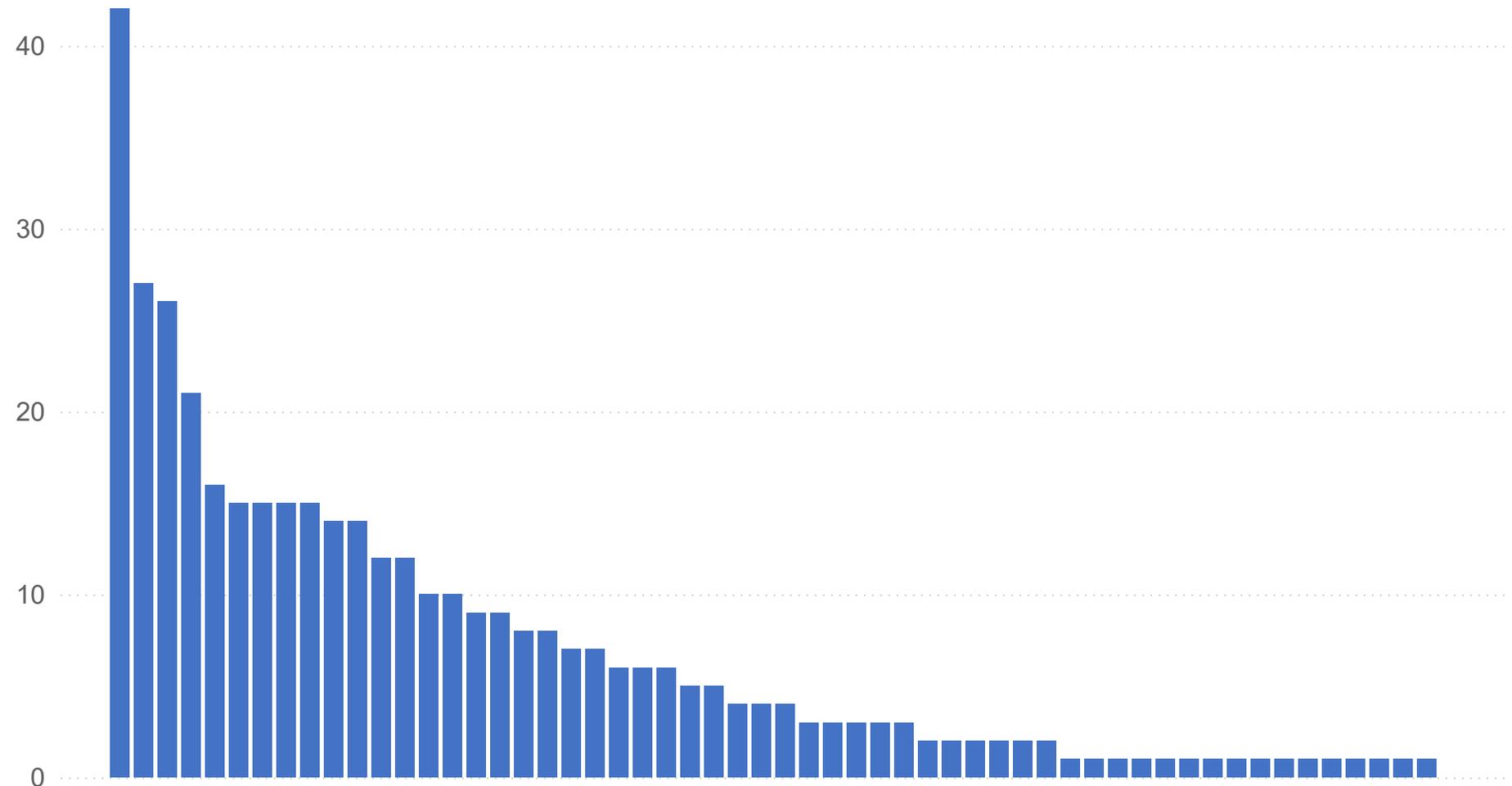
Number of LAAO cases by operator (2024/25)

There is currently a wide variation in the number of LAAO cases performed by each individual operator.

This is to be expected for a new procedure such as LAAO, given that hospitals develop such services at different speeds.

As operators acquire experience, procedures are often performed with a proctor and in many cases dual consultant procedures are performed as the team builds its experience.

It is expected that this graph will change significantly over time as experience grows.



Most procedures were completed with a single LAAO device in 2024/25



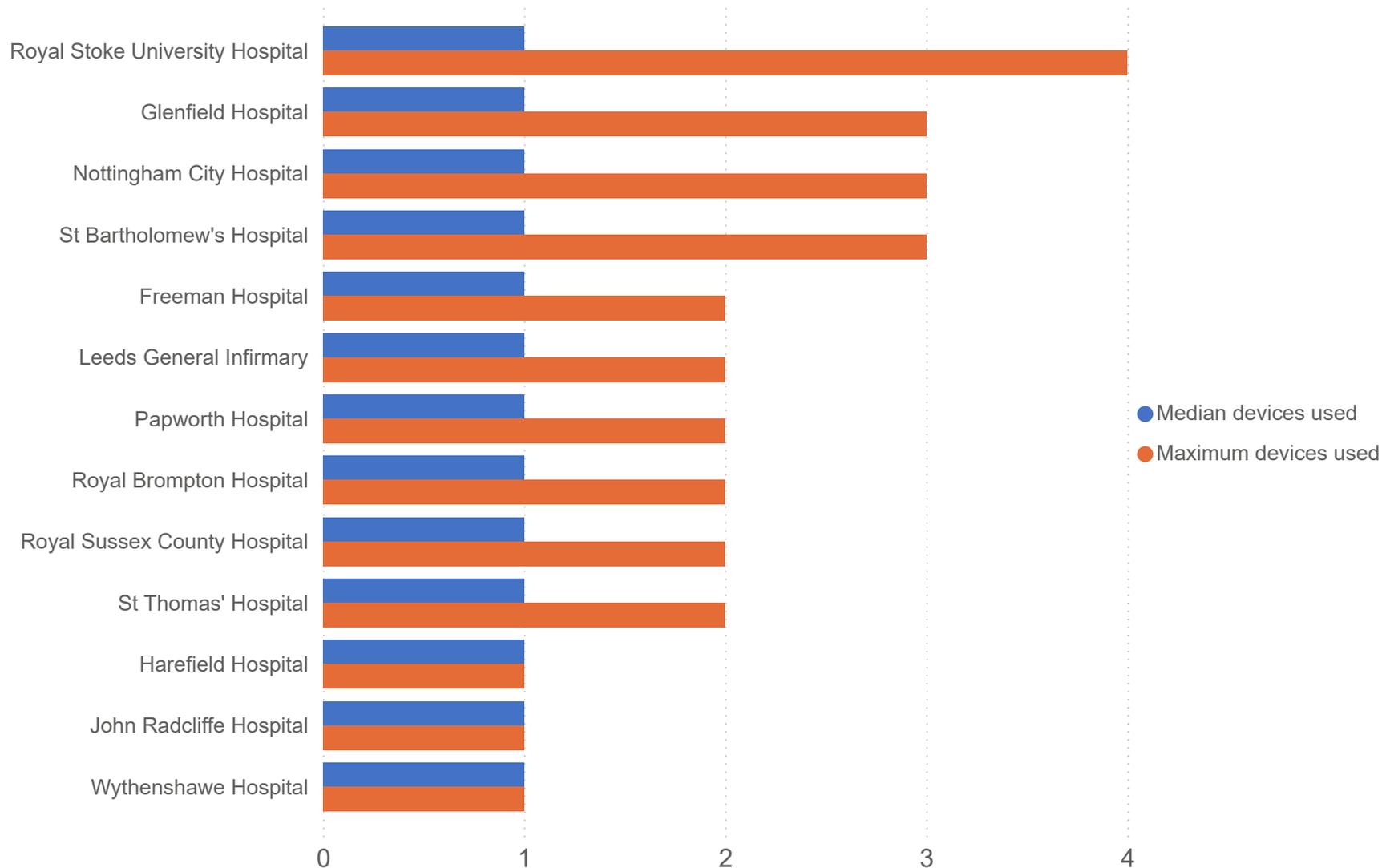
Most LAAO cases in 2024/25 involved the implantation of 1 device. This shows that in the vast majority of cases, operators can judge the correct size of device to implant, and then successfully deploy it.

Occasionally more devices may be used because of issues with:

- Deployment (leading to either an upsize or downsize in choice prior to final device-release)
- Manufacturing issues
- Appendage morphology or other anatomical issues
- Operator experience.

These numbers are given to aid hospitals in benchmarking their device use and aiding local discussion and reflection.

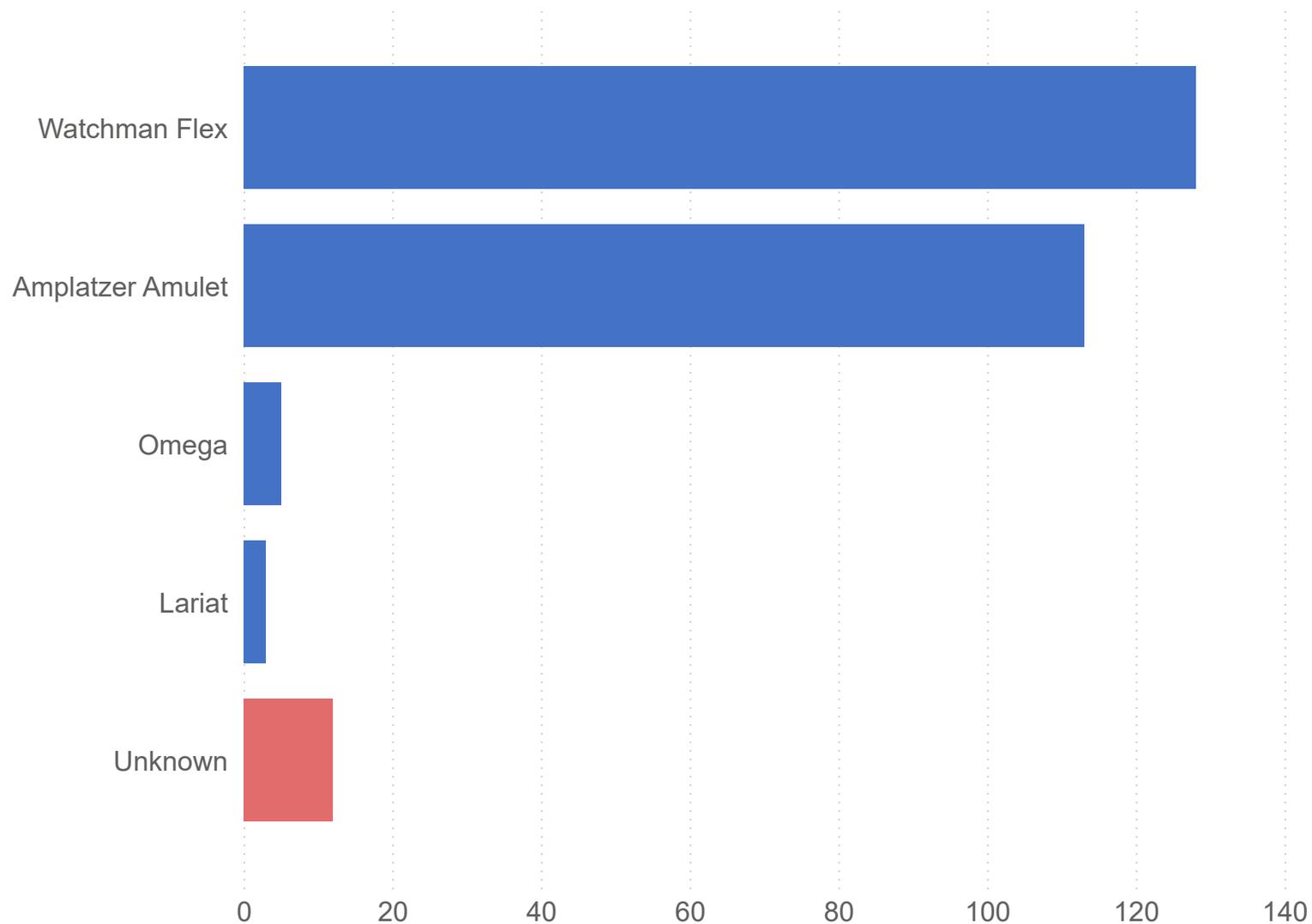
Median and maximum number of devices used for LAAO cases (2024/25)



Most LAAO procedures in 2024/25 were performed using the Watchman and Amulet devices



Number of LAAO cases by device manufacturer (2024/25)



Two manufacturers provide the vast majority of implanted devices for LAAO procedures:

- Boston Scientific 'Watchman'
- Abbott Medical 'Amulet'

Numbers are too low currently to perform any meaningful analysis of outcomes with respect to different devices.

The median fluoroscopy time was 11 minutes in 2024/25, with some variation between hospitals



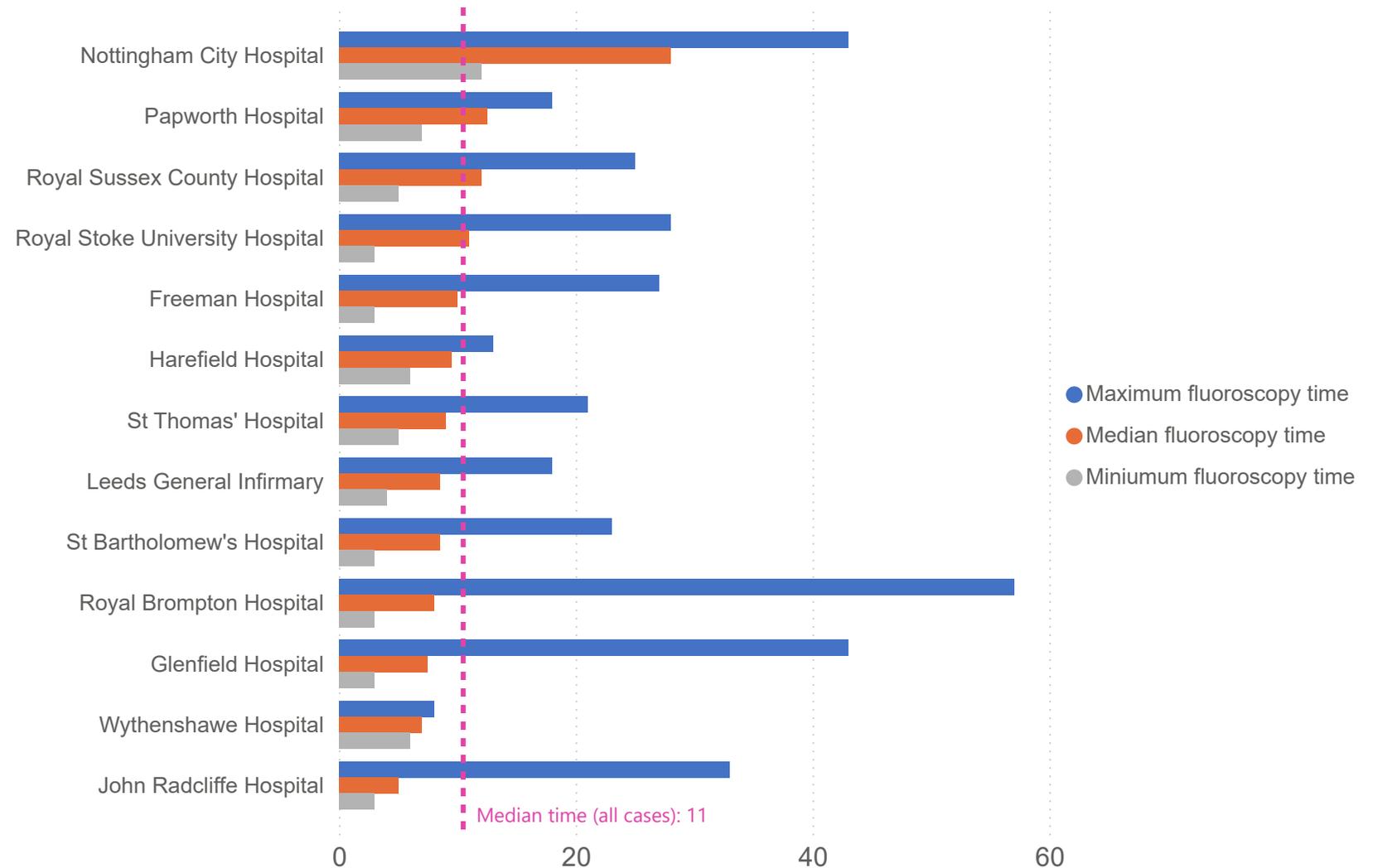
The average fluoroscopy time (time when X-rays are used to aid navigation and deployment of the LAAO device) was 11 minutes in 2024/25.

There is variation in the median times between hospitals.

The maximum times for individual patients are also provided though they are unlikely to represent qualitative differences in practice overall.

These times are shown to allow benchmarking and to encourage internal discussion and reflection on local practice.

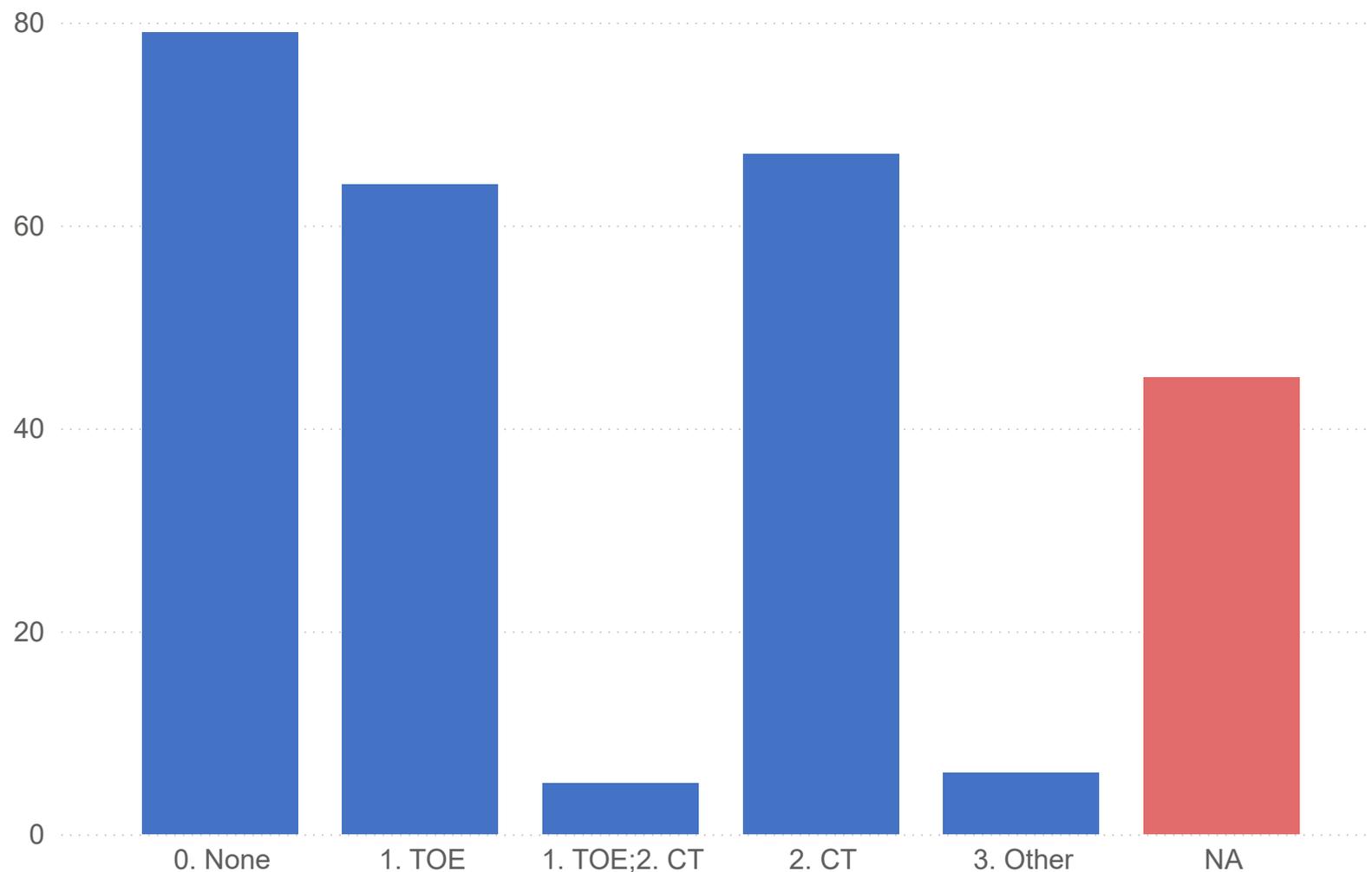
Fluoroscopy times (minutes) for LAAO procedures (2024/25)



The use of different types of pre-procedural imaging varies between hospitals



Use of pre-procedural imaging for LAAO cases (2024/25)



The decision to screen with a computed tomography (CT) scan or use transoesophageal echocardiography (TOE) varies between different hospitals, with about a third of cases not involving any pre-procedural screening.

The registry is not currently collecting data on the use of specialised software to help plan procedures, which mandate the use a CT.

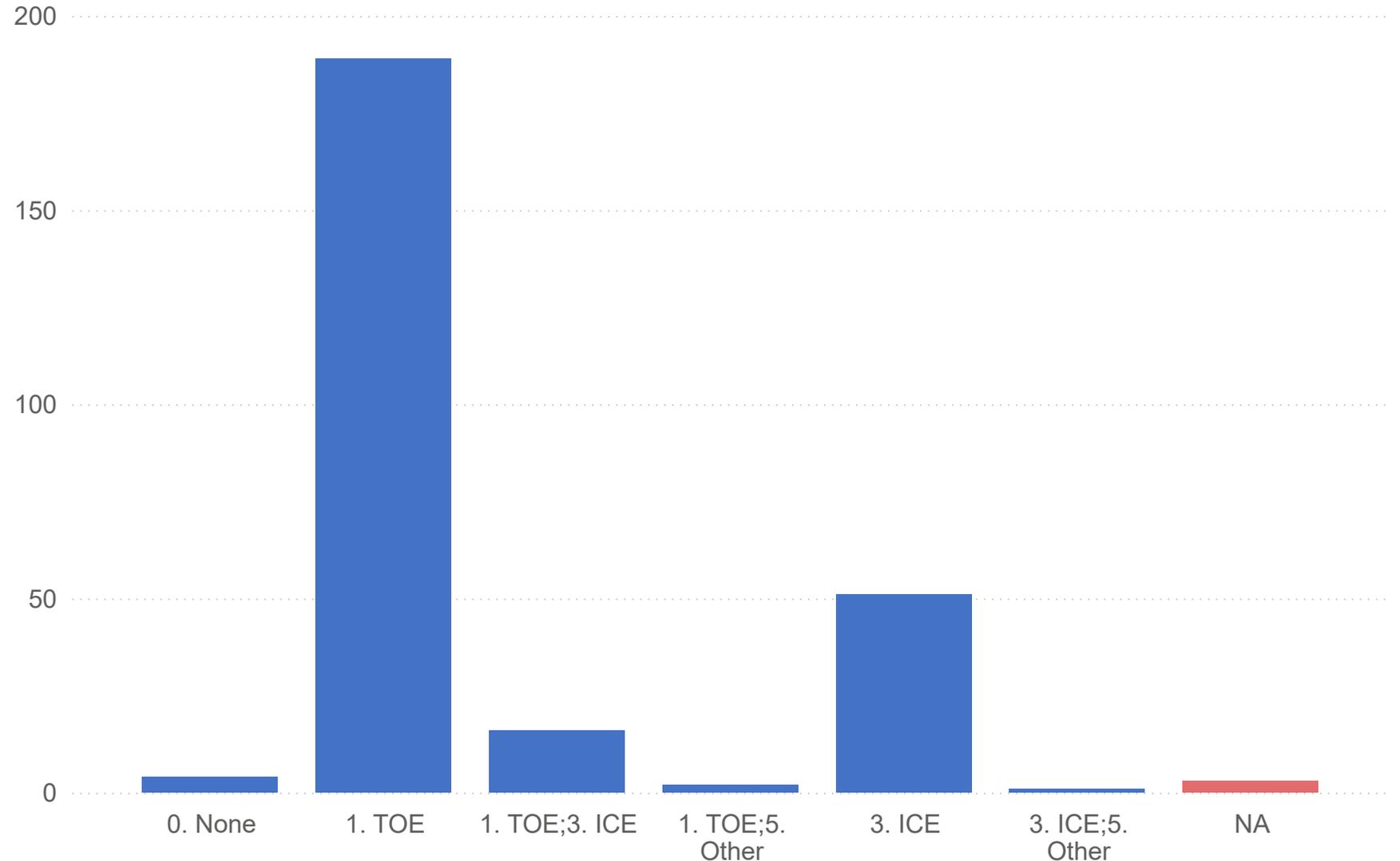
Despite advances in intracardiac echocardiography, TOE remains the most frequent modality used during LAAO procedures in 2024/25



Peri-procedural imaging for LAAO procedures (2024/25)

In most cases, peri-procedural transoesophageal echocardiography is used to guide the procedure, requiring a general anaesthetic. A small number of cases are being done with intracardiac echocardiography (ICE) to guide and assess the procedure.

Cases where both transoesophageal echocardiography (TOE) and ICE are used are likely to be done as 'ICE learning cases', where the ICE operator is gaining familiarisation with the technology, but not relying solely on it.



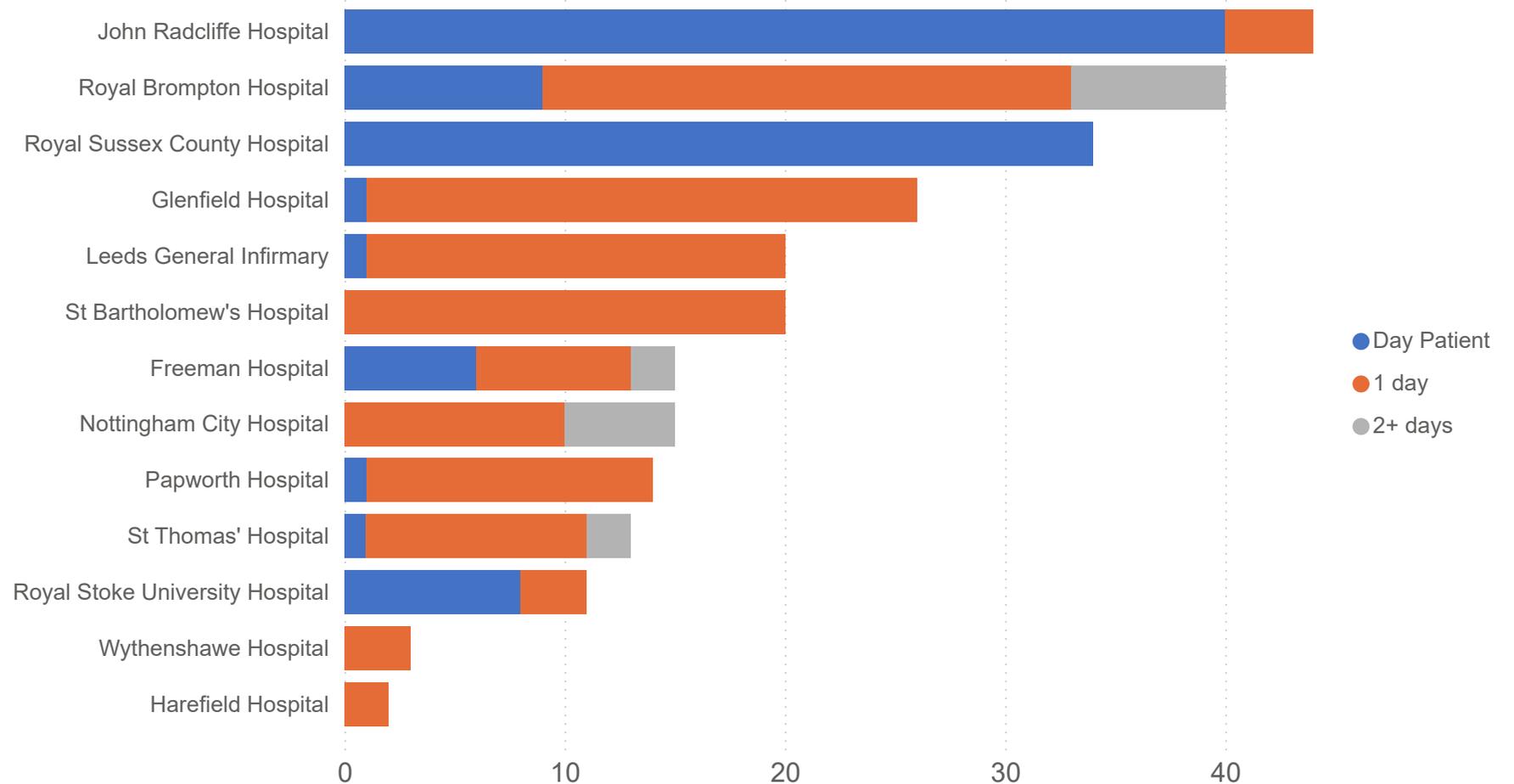
The majority of patients undergoing an LAAO procedure in 2024/25 spent 1 night in hospital or were done as a day case



Most patients are discharged either on the same day as the procedure or after a 1-night stay in hospital.

The presented data do not differentiate between urgent in-patient cases and elective cases, and so variations may not reflect an unintended or unexpected delay in discharge.

Length of stay for an LAAO procedure (2024/25)



Complication rates following LAAO procedures are low in 2024/25



The complication rates following LAAO procedures were very low in 2024/25, with the removal of excess fluid around the heart being the most frequent in 1.1% of cases. No procedural deaths have been reported.

Percentage of different complications following LAAO procedures (2024/25)

