NCAP

NATIONAL CARDIAC AUDIT PROGRAMME

NICOR

National Audit of Cardiac Rhythm Management (NACRM)

Annual Report 2025

(2024/25)

BHRS

British Heart Rhythm Society

Report at a glance

Devices

- 80,818 cardiac implantable electronic device (CIED) procedures performed.
- 17,856 CIED procedures were for complex implants (ICDs, CRT).
- 51% hospitals performed more than 80 new pacemaker or 60 complex implants, meeting BHRS minimum recommended volumes.
- There is an increasing proportion of CRT-P to CRT-D prescription (currently 1.1:1).
- 3.5% one year mortality after ICD implant
- 4.4% 1 year re-intervention rates for simple CIED implants, but variable between hospitals.
- There was a 4-fold increase in conduction system pacing.
- There was a 37% fall in leadless pacemaker procedures.

Ablation

- 24,323 total ablation procedures performed.
- 10,372 AF ablation procedures, increasing 53% since 2015.
- 77% hospitals performed more than 100 ablations, meeting the BHRS minimum recommended volume.
- 38% rate of general anaesthetic provision for ablation procedures, varying from 5 to 100% between hospitals.
- Re-intervention rate for accessory pathway ablation is 5.9%, 3 x the rate for other standard ablation procedures.

Abbreviations:
AF= Atrial Fibrillation; BHRS= British Heart Rhythm Society; CIED= Cardiac Implantable Electronic Devices; CRT= Cardiac Resynchronisation Therapy; ICD= Implantable Cardioverter Defibrillator.

Recommendations

Clinical practice:

- **Device therapy:** As pacemaker and ICD implantation rates remain lower than comparable countries, regional services should review waiting lists and local practice against guidelines.
- **AF Ablation:** Given variation across regions, local services should review patient selection and re-intervention rates for AF ablation.
- **Re-intervention rates:** Hospitals should review accessory pathway ablation practice given relatively high re-intervention rates.
- **Emerging technologies:** Regional services should review appropriate clinical use and access to emerging technologies (such as leadless pacing, conduction system pacing or pulsed field ablation).

Data completion:

- **Implant records**: There is an increasing obligation to monitor medical implants and all operators should ensure implant identifiers and relevant clinical fields are completed and submitted to the NACRM within agreed timelines (see background for more details on captured fields).
- **Emerging technologies**: There is a growth of emerging heart rhythm technologies and all operators should ensure correct submissions are made to facilitate monitoring of procedures and outcomes of changing practice.

Introduction to the report

The National Audit of Cardiac Rhythm Management (NACRM) is part of the National Cardiac Audit Programme (NCAP) delivered by the National Institute for Cardiovascular Outcomes Research (NICOR). Cardiac rhythm management (CRM) helps patients with a variety of heart rhythm conditions. Treatment includes the use of pacemakers and defibrillators (collectively termed cardiac implantable electronic devices or CIEDs) as well as cardiac electrophysiological ablation procedures.

The report presents data from April 2024 to March 2025 across England, Wales and Northern Ireland, along with longer-term trends (data for Scotland can be found in the Scottish Cardiac Audit Programme). New data included in this report include the use of general anaesthesia for electrophysiological procedures, activity for more recent technologies, and a new quality indicator for appropriateness of implantable cardioverter-defibrillator implantation.

The slides in the report are interactive so you can select and explore the data that interest you. Geographical maps are included to highlight variations in practice for specific areas of practice.

All summary statistics are based on data submitted by hospitals which have then gone through a validation process to adjudicate their accuracy. The numbers might therefore vary slightly from the recently-published interim report (produced for the first time this year) which utilised both validated as well as unadjudicated data from the participating hospitals. More details on the methods used can be found here, and this contains descriptions of the various arrhythmias, treatments, and practicalities on data submission. To support more rapid reporting in future, all hospitals are asked to submit audit data to NICOR on a monthly basis.

We are grateful to all involved in contributing to the development of this audit. Detailed information about more than 80,000 procedures has been diligently entered by hospitals, queried and cleaned before analysis is undertaken by the NICOR team. Expert advice on the design and outputs of the NACRM comes from members of the British Heart Rhythm Society (BHRS).

NICOR NACRM audit team

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Overall Cardiac Implantable Electronic Device (CIED) activity is stable, but more heart rhythm monitoring devices and fewer therapeutic devices are being used

80,181 Cardiac Implantable Electronic Device (CIED) procedures were reported in 2024/25, from 163 hospitals in England and Wales. The total has risen since the pandemic but there are some changes to pre-pandemic activity levels.

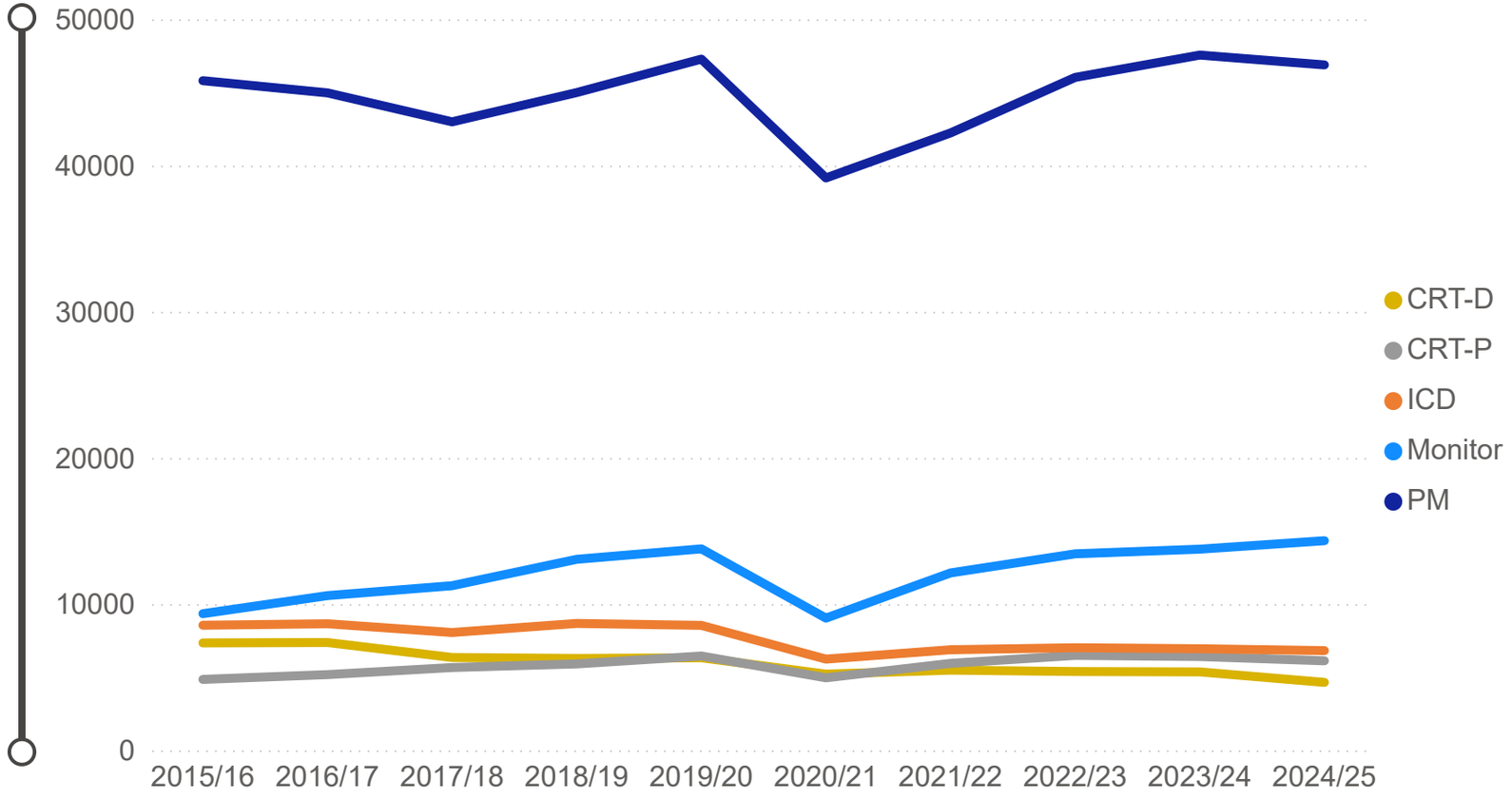
In 2024/25, there were 46,883 pacemaker (PM) procedures, slightly down from 2023/24 but similar to 2019/20. 17,457 complex CIED (which include ICDs, CRT-Ps and CRT-Ds) procedures were reported. Since 2015/16, ICD and CRT-D procedures have fallen whilst CRT-P procedures have increased. There has been a rise in the number of implantable loop recorders (ILRs), used to help diagnose the cause of symptoms that might result from abnormal heart rhythms.

Comparing implant rate per million population to Europe, PM and ICD rates are below and CRT rates are above the European average.[1]

Key:
CRT-D = Cardiac Resynchronisation Therapy (CRT) Defibrillator
CRT-P = Cardiac Resynchronisation Therapy (CRT) Pacemaker
ICD = Implantable Cardioverter-Defibrillator
Monitor = Implantable Loop Recorder
PM = Pacemaker

80,181	46,883	17,586	14,337
Total Procedures	Pacemaker Procedures	Complex Procedures	Monitor Procedures

All CIED procedures by type



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Most hospitals delivered more than the minimum recommended number of CIED procedures

The British Heart Rhythm Society (BHRS) Standards (2024 January revision) recommend that device centres undertake a minimum procedure volume per year:

A minimum of 80 new pacemaker implants per year.
A minimum of 60 new ICD or CRT implants per year

Of the 163 centres submitting data, 100 (60%) met BHRS standards for pacemaker implant volume.
Of the 108 centres performing ICD or CRT implants, 78% met BHRS standards for complex device implants.
It is accepted that some centres cannot meet this standard, mainly paediatric hospitals. Private hospital data are also included.

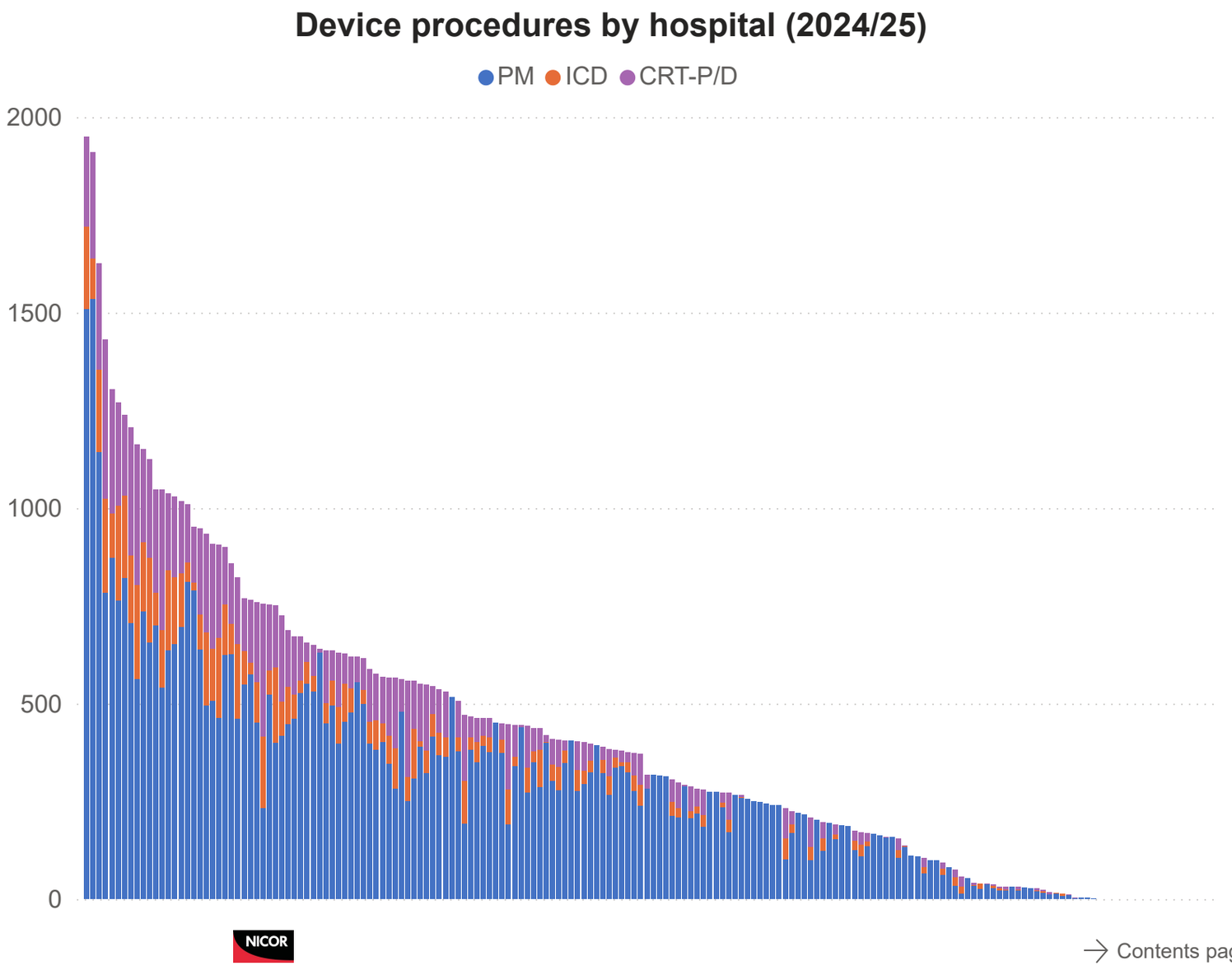
Selecting a Cardiac Network and/or hospital below shows the data for that selection.
Key:
CRT-D = Cardiac Resynchronisation Therapy (CRT) Defibrillator
CRT-P = Cardiac Resynchronisation Therapy (CRT) Pacemaker
ICD = Implantable Cardioverter-Defibrillator
Monitor = Implantable Loop Recorder
PM = Pacemaker

Hospital name

All

Cardiac Network

All



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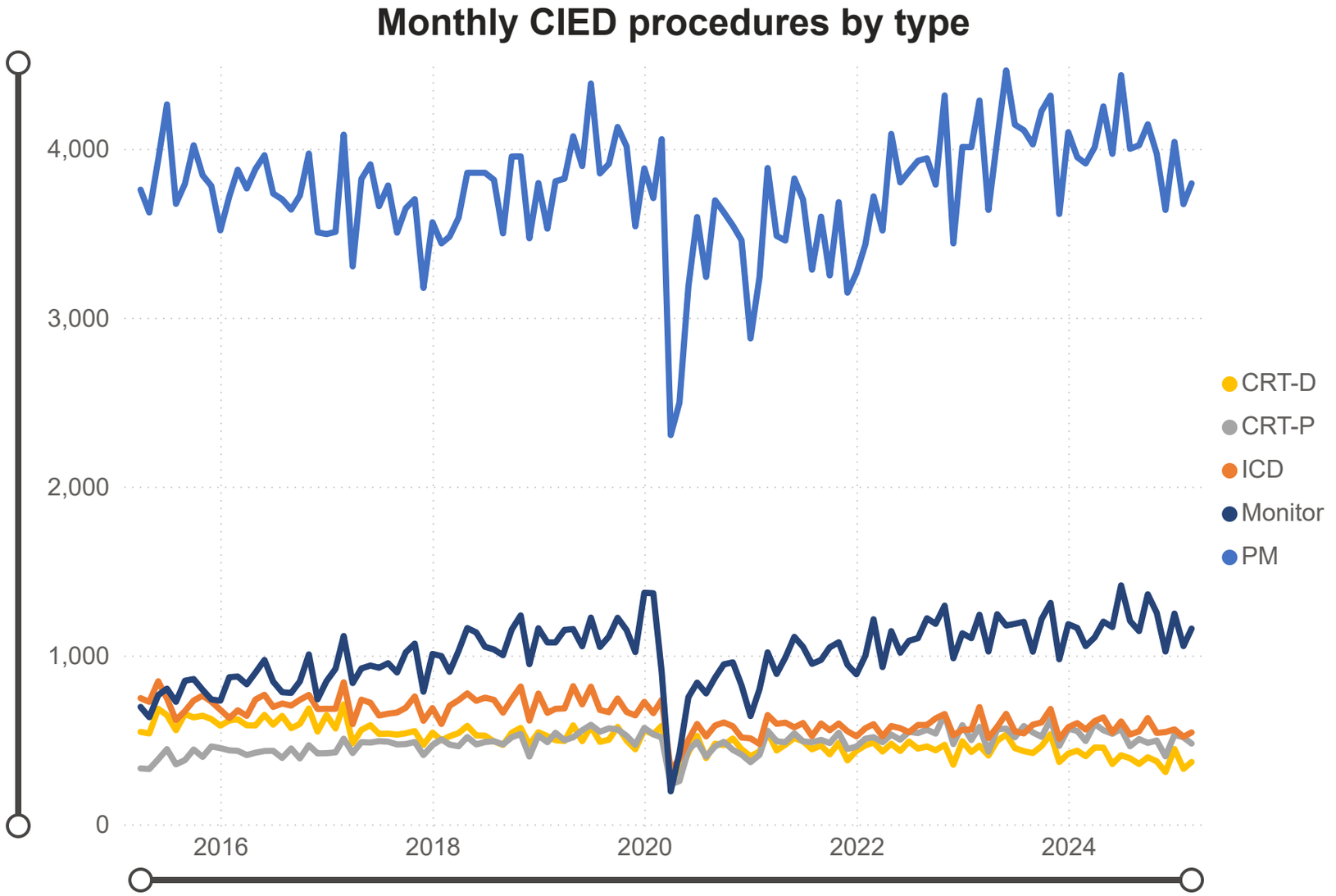
There is a monthly fluctuation in CIED procedure volume

The chart highlights the impact of the COVID-19 pandemic on CIED procedure numbers, especially during the first peak of COVID-19 hospital admissions in 2020/21.

The chart shows variation by month for CIED procedure numbers. The biggest fluctuations during 2024/25 were for pacemaker and implantable monitor procedures.

Key:
CRT-D = Cardiac Resynchronisation Therapy (CRT) Defibrillator
CRT-P = Cardiac Resynchronisation Therapy (CRT) Pacemaker
ICD = Implantable Cardioverter-Defibrillator
Monitor = Implantable Loop Recorder
PM = Pacemaker



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There was a thirteen-fold variation in levels of pacemaker implantation across Integrated Care Boards in England and Health Boards in Wales

There is a wide variation in patient procedures (left map) and treatment delivery (right map) based on the rate of pacemaker (PM) procedures per million population (pmp) across the 42 Integrated Care Boards (ICBs) in England and the seven Health Boards in Wales. In 2024/25, the overall rate for England and Wales was 577 pmp. The lowest rate by ICB was 90 pmp in Cardiff and Vale University Health Board with the highest being 1,150 pmp in Norfolk and Waveney ICB. Across Cardiac Networks, the lowest rate was 344 pmp in South London compared with the highest of 837 pmp in South West (Peninsula) cardiac network.

This large variation could result from differences in:

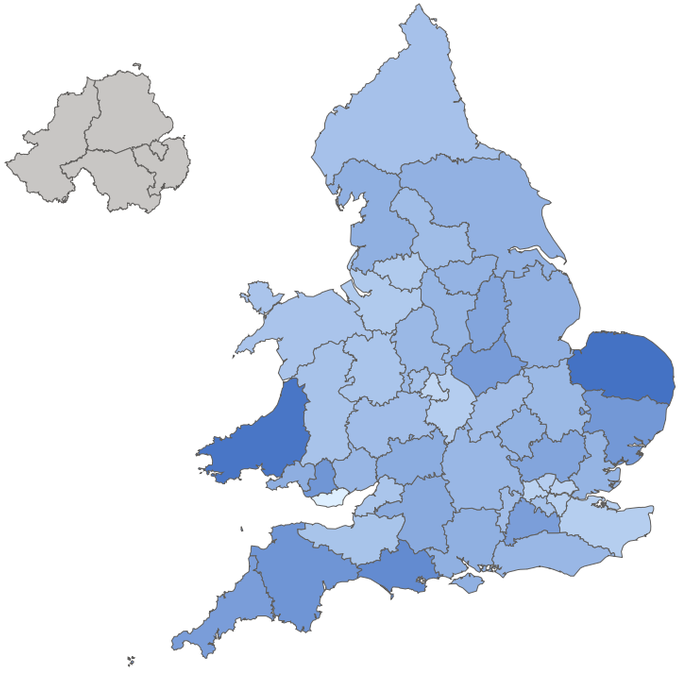
- The demographics of the population, particularly age and sex
- Access to treatment
- Treatment capacity within hospitals.
- Variation in practice

Variations are modified but persist once the data are age-adjusted.

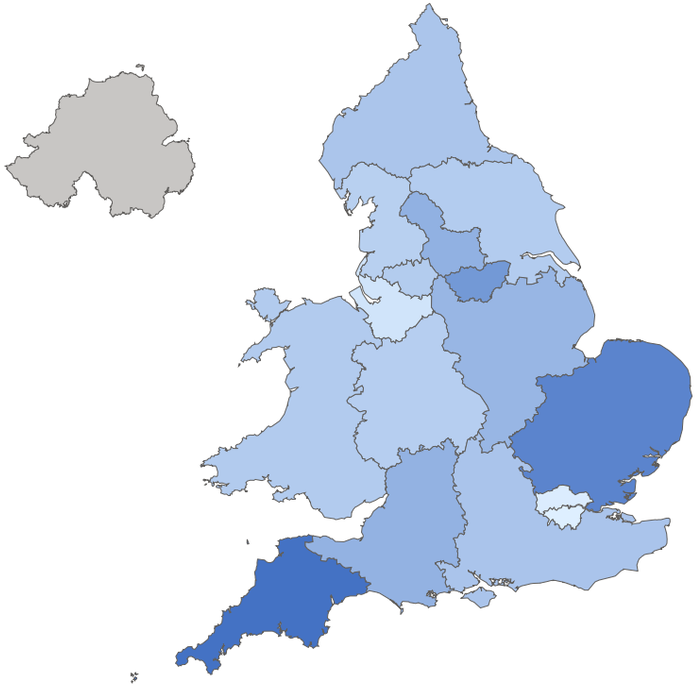
Select the actual or age-adjusted rate below or hover over the maps to see specific data.

Actual rate | Age-standardised rate

PM procedures per million population by ICB/HB based on patient home location (2024/25)



PM procedures per million population by Cardiac Network based on hospital location (2024/25)



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There was an eight-fold variation in the rate of CRT-P procedures across the Cardiac Networks

A Cardiac Resynchronisation Therapy Pacemaker (CRT-P) paces different parts of the left and right ventricles (the heart's pumping chambers) at the same time ('biventricular pacing'). This helps improve impaired heart function. It does not have a defibrillator function.

There is a wide variation in patient procedures (left map) and treatment delivery (right map). In 2024/25, the overall rate was 61 per million population (pmp). The highest rate was 180 pmp in Cornwall and the Isles of Scilly and lowest was 0 pmp in Cardiff and Vale. For Cardiac Networks, the highest rate was 139 pmp in the South West (Peninsula) and the lowest was 17 pmp in North London.

This large variation could result from differences in:

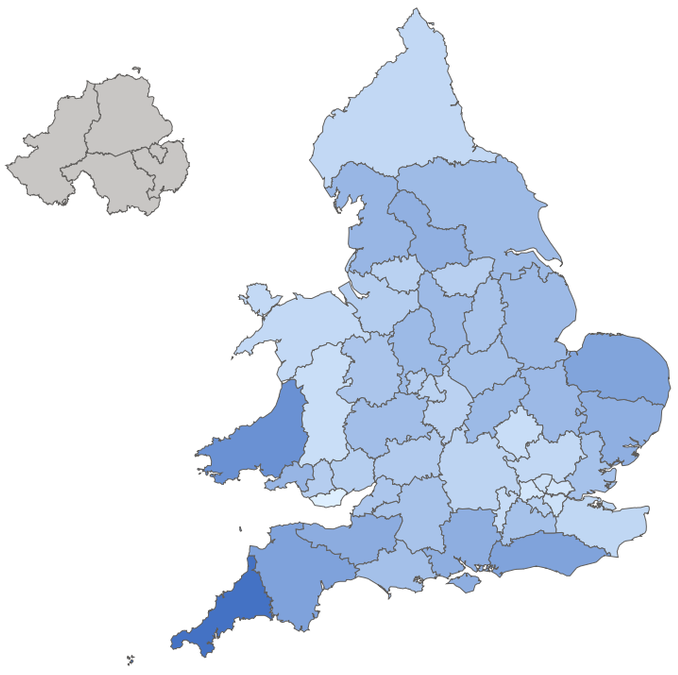
- The demographics of the population, particularly age and sex
- Access to treatment
- Treatment capacity within hospitals.
- Variation in practice

Variations are modified but persist after age-adjustment.

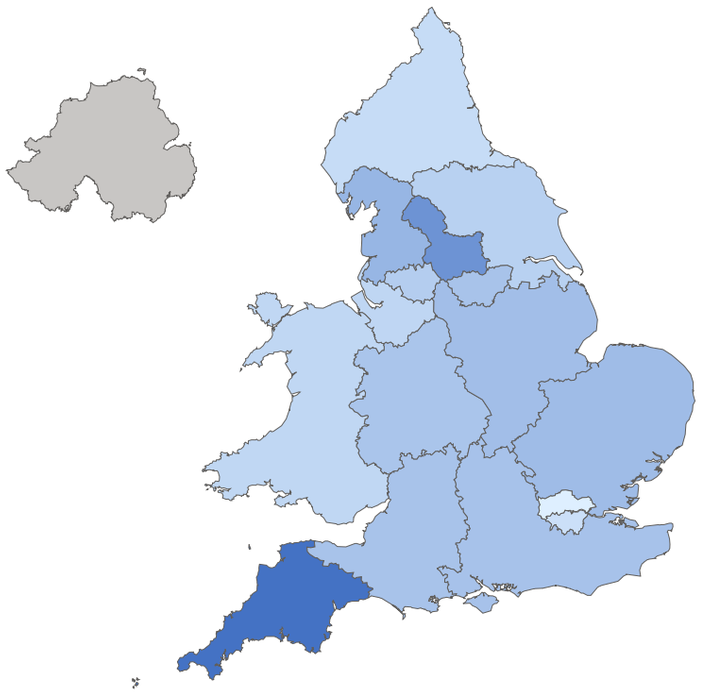
Select the actual or age-adjusted rate below or hover over the maps to see specific data

Actual rate | Age-standardised rate

CRT-P procedures per million population by ICB/HB based on patient home location (2024/25)



CRT-P procedures per million population by Cardiac Network based on hospital location (2024/25)



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There was a twenty-fold difference in the rate of CRT-D procedures across the Integrated Care Boards in England and Health Boards in Wales

A Cardiac Resynchronisation Therapy Defibrillator (CRT-D) is like a CRT-P device but has defibrillator function.

There is a wide variation in patient procedures (left map) and treatment delivery (right map). In 2024/25, the overall national implant rate across the 42 Integrated Care Boards in England and the seven Welsh Health Boards was 37 per million population (pmp). The highest rate was 117 pmp in Somerset ICB and the lowest was 6 pmp in Cardiff and Vale University Health Board. For Cardiac Networks, the highest rate was 50 pmp in West of England compared with the lowest of 18 pmp in Cheshire and Merseyside.

This large variation could result from differences in:

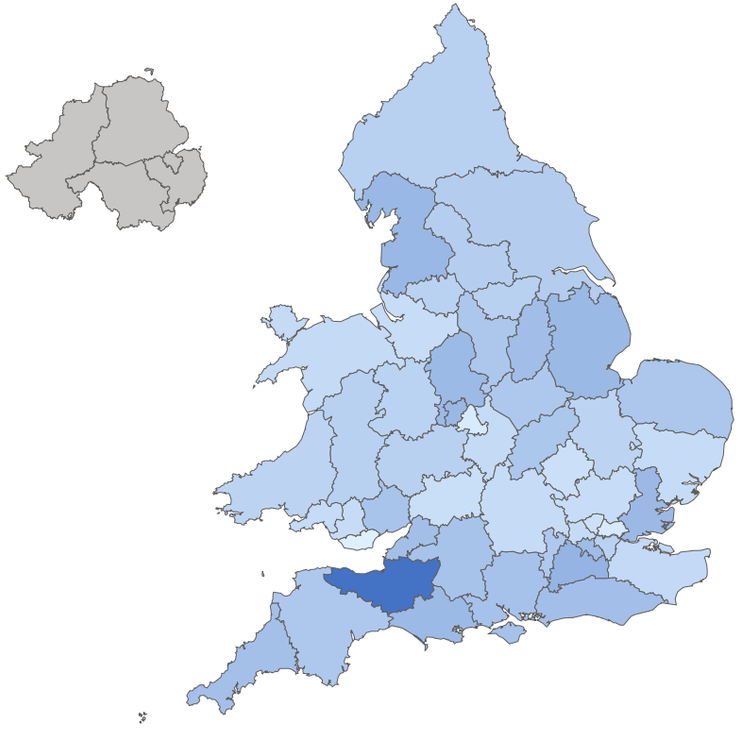
- The demographics of the population, particularly age and sex
- Access to treatment
- Treatment capacity within hospitals.
- Variation in practice

Variation persists after age-adjustment.

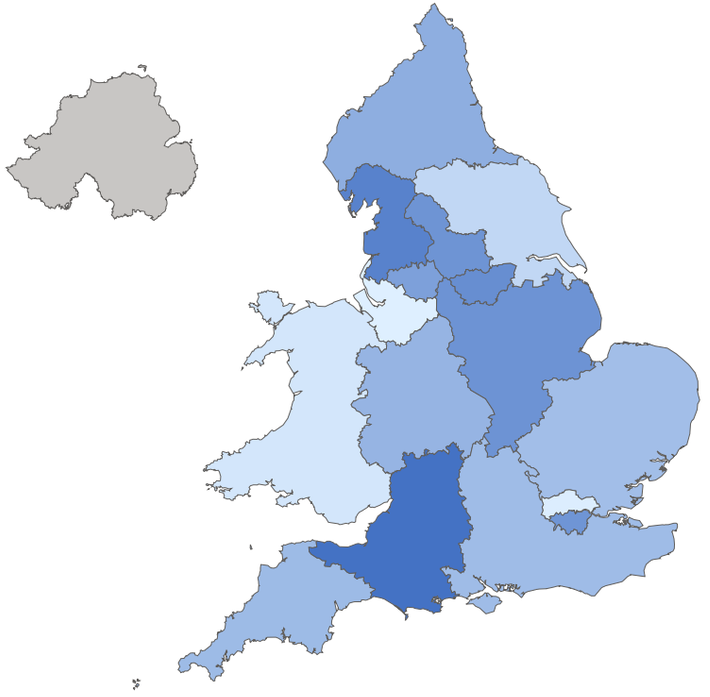
Select the actual or age-adjusted rate below or hover over the maps to see specific data.

Actual rate | Age-standardised rate

CRT-D procedures per million population by ICB/HB based on patient home location (2024/25)



CRT-D procedures per million population by Cardiac Network based on hospital location (2024/25)



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There was an eight-fold difference in the rate of ICD implants across the Integrated Care Boards in England and University Health Boards in Wales

Implantable cardioverter-defibrillator (ICD) devices are used to treat most life threatening fast heart rates by delivering a small shock. They are not designed to improve heart pump function.

There is a wide variation in patient procedures (left map) and treatment delivery (right map). Across the 42 Integrated Care Boards in England and seven Welsh Health Boards, the overall rate was 80 per million population (pmp). The highest rate was 132 pmp in Dorset ICB, and the lowest was 17 pmp in Cardiff and Vale University Health Board. For Cardiac Networks, the highest rate was 126 pmp in South Yorkshire compared with 43 pmp in Lancashire and South Cumbria.

This large variation could result from differences in:

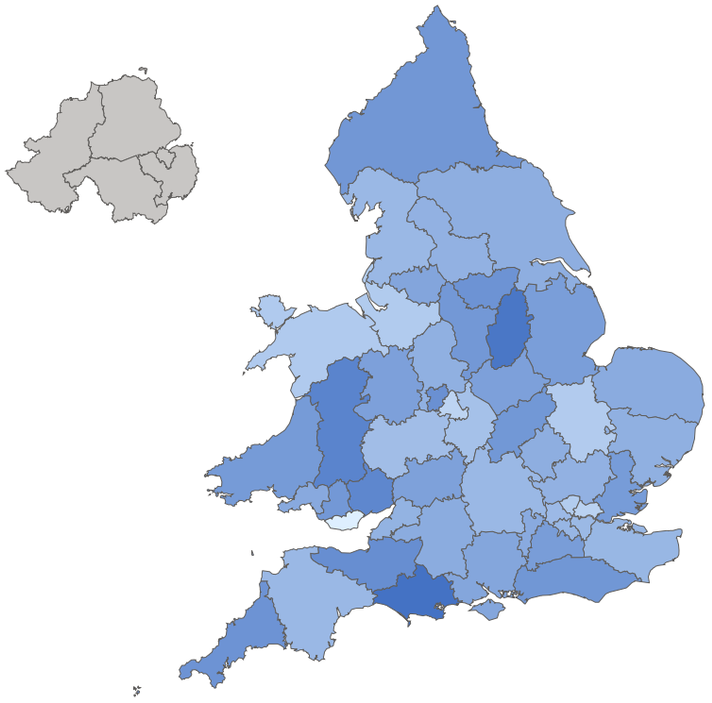
- The demographics of the population, particularly age and sex
- Access to treatment
- Treatment capacity within hospitals.
- Variation in practice

Variations persist after age-adjustment.

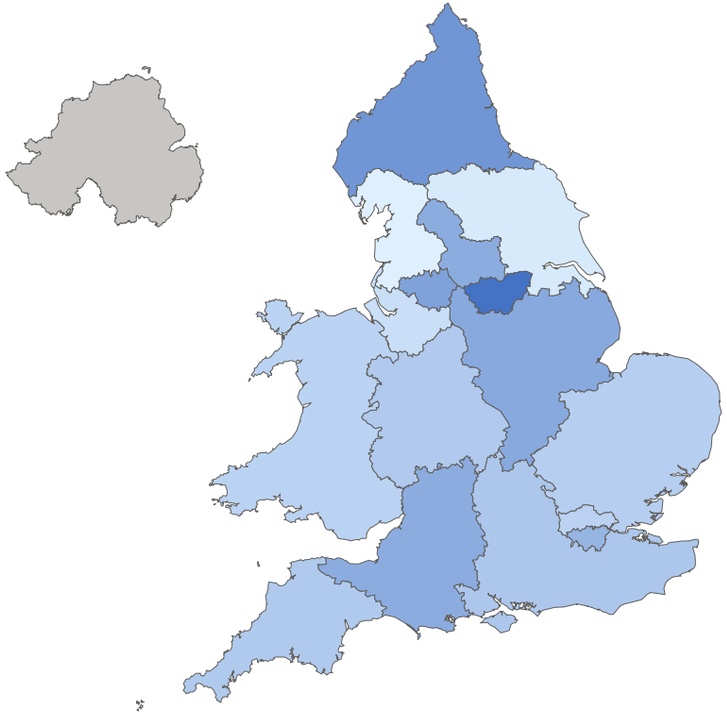
Select the actual or age-adjusted rate below or hover over the maps to see specific data

Actual rate | Age-standardised rate

ICD procedures per million population by ICB/HB based on patient home location (2024/25)



ICD procedures per million population by Cardiac Network based on hospital location (2024/25)



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As the number of patients with a pacemaker increases, there is a gradual rise in the number of procedures to provide a new battery ("box changes")

In 2024/25, new pacemaker implant procedures (32,586) were slightly lower than 2015/16 (34,368), with a transient sharper fall during the COVID-19 pandemic. The number of generator ('box') changes in 2024/25 (10,199) has increased compared to 2015/16 (8,149). At the start of the COVID-19 pandemic, given the uncertainty of what procedural activity was going to be possible, there was a spike in the number of box changes as procedures were brought forward to clear waiting lists. The remainder of procedures, such as lead interventions, are not shown in the graph.

Selecting a Cardiac Network and/or hospital below shows the annual and monthly procedures for that selection.

Key:
Total includes all new procedures, generator changes, upgrades, revisions, downgrades and explants
First implants includes first implants only
Box changes includes generator changes, upgrades and downgrades

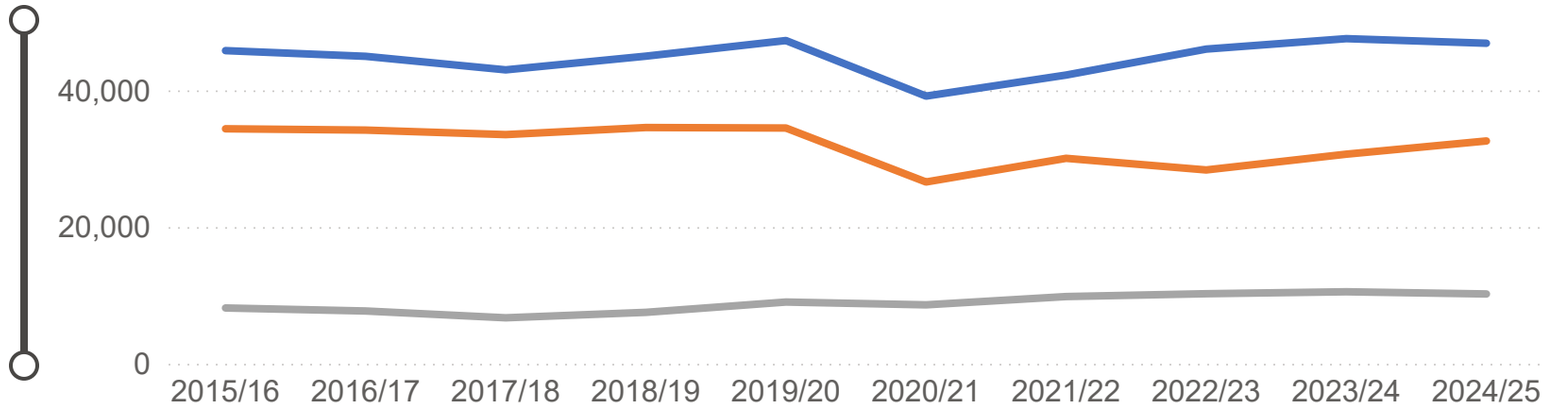
Select Cardiac Network

All

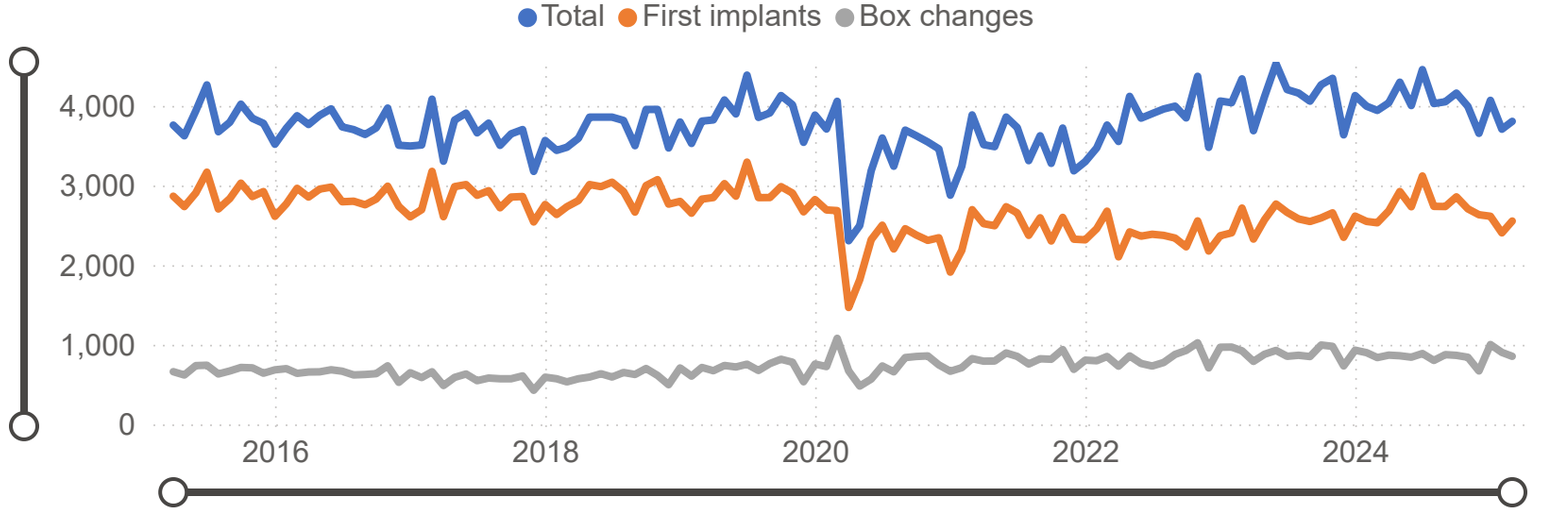
Select hospital

All

Pacemaker procedure numbers by financial year



Pacemaker procedures by month



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The proportion of cardiac resynchronisation therapy pacemakers has increased compared to other complex CIED procedures

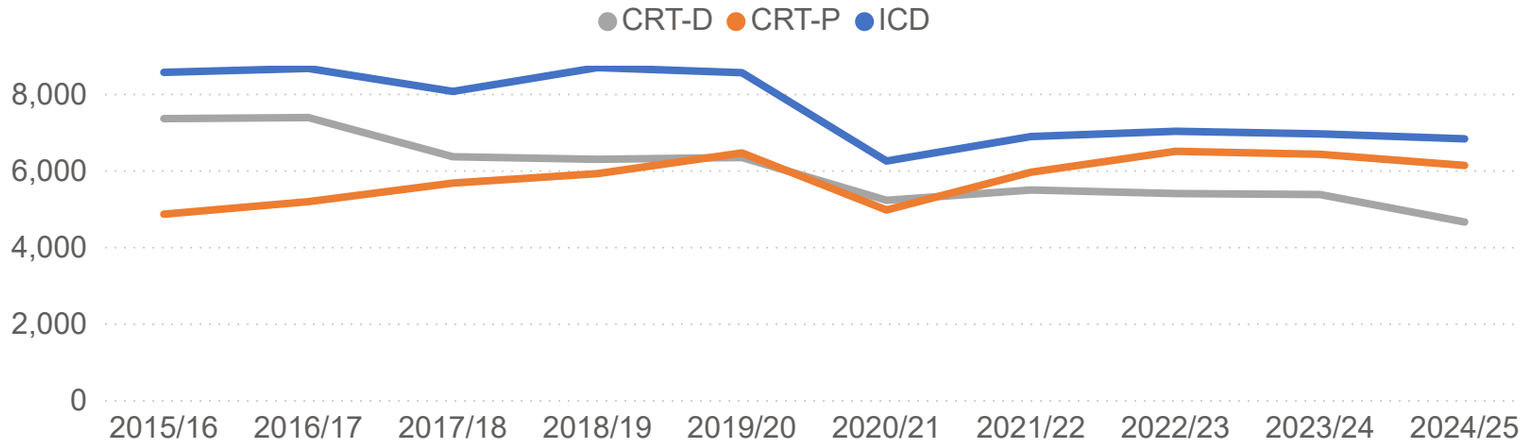
CRT-P procedure numbers have been rising since 2015/16 and recovered after the dip during the pandemic. The ratio of CRT-D to CRT-P implants has decreased from 1.5:1 in 2015/16 to 0.8:1 in 2024/25. This likely reflects a gradual shift in clinical practice and guidelines, as trials such as DANISH have been published.

Select a Cardiac Network/hospital below or hover over the graphs to see specific data.

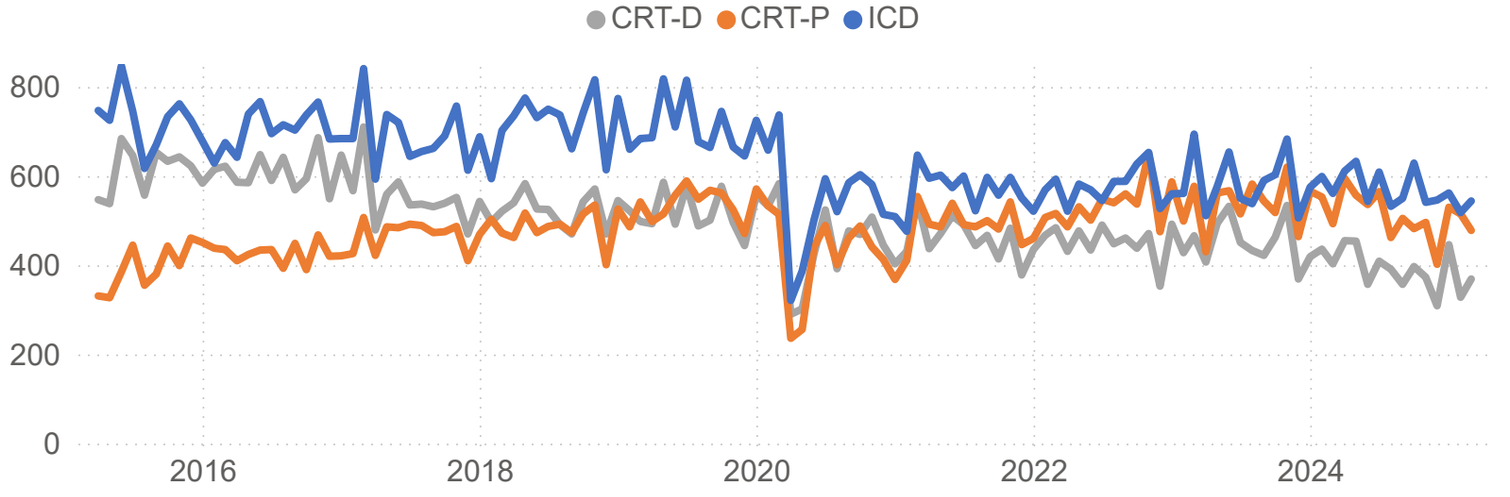
Note: The numbers displayed are total procedures, whether new implants, generator changes, upgrades, revisions, downgrades or explants.
Data submission deadlines have been brought forward, so figures for the most recent year may appear lower due to submissions received after the new cut-off date.

Key:
ICD = Implantable Cardioverter-Defibrillator
CRT-P = Cardiac Resynchronisation Therapy Pacemaker
CRT-D = Cardiac Resynchronisation Therapy Defibrillator

Complex CIED procedures by type



Monthly complex CIED procedures by type



Select Cardiac Network

All

Select hospital

All

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There was large variability in the use of CRT-D compared to CRT-P between implanting hospitals

The ratio of CRT-D to CRT-P implants reflects the factors influencing the decision to implant CRT devices with and without defibrillator therapy. There is no correct proportion for best practice.

In 2024/25, the median ratio across all hospitals was 0.81. There was wide variation across individual hospitals, with the ratio ranging from 0 to 5.

Variation could result from differences in:

- Population demographics, particularly age and sex
- Access to treatment
- Clinical indications
- Variation in practice.

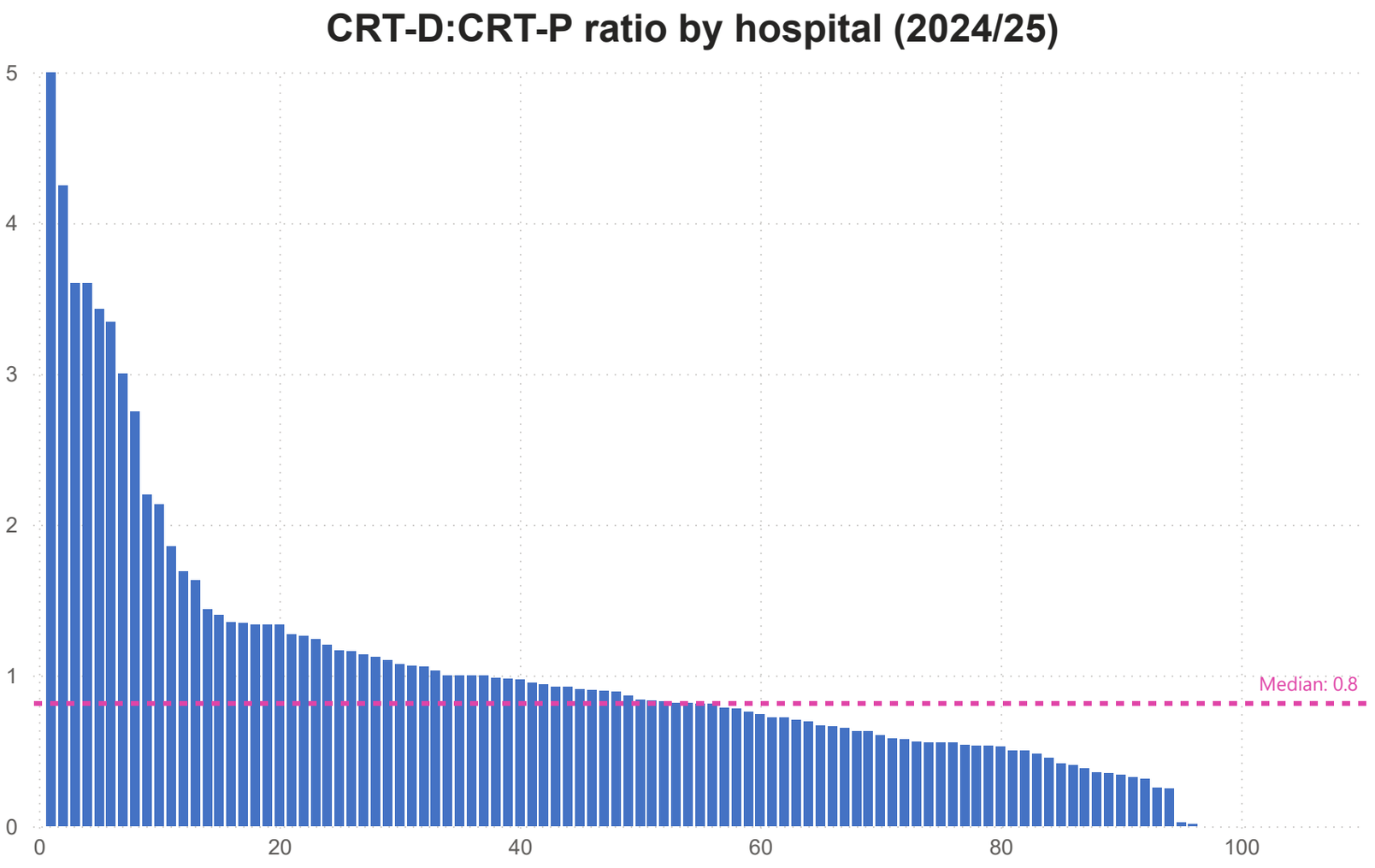
Select a Cardiac Network or hospital below to see its specific data.

Cardiac Network

All

Hospital name

All



There was a five-fold difference in the use of CRT-D compared to CRT-P across the Integrated Care Boards / Health Boards in England and Wales

There is variation in the use of CRT-D to CRT-P implants, which may relate to indication, patient factors and co-morbidities. This will be more informed by future trials.

There is a wide variation depending on patient postcode (left), implanting hospital location (centre) and implanting region (right).

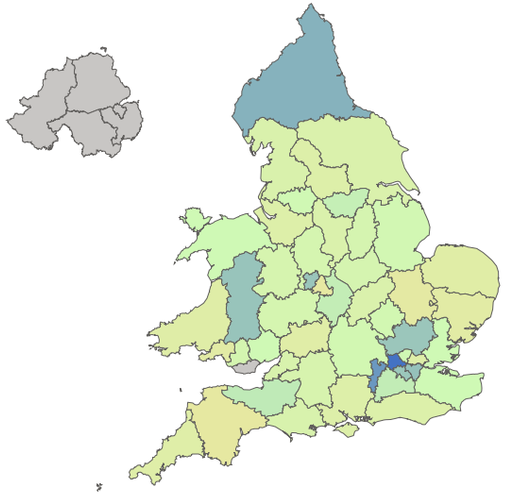
The region with the highest proportion of CRT-D to CRT-P implants was NHS North West London ICB (128 to 85), and the region with the lowest proportion was NHS Devon (70 to 232).

Variation could result from differences in:

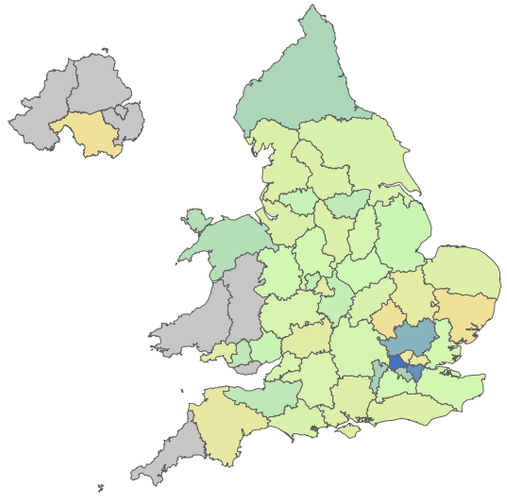
- Population demographics, particularly age and sex
- Access to treatment
- Clinical indications
- Variation in practice.

Key:
Blue = more CRT-D
Green = roughly equal
Yellow = more CRT-P
Grey = incomplete or no data

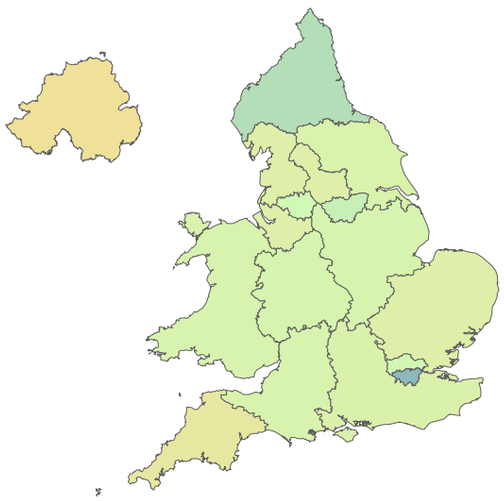
CRT-D:CRT-P ratio by ICB/HB, based on patient home address (2024/25)



CRT-D:CRT-P ratio by ICB/HB, based on hospital location (2024/25)



CRT-D:CRT-P ratio by Cardiac Network, based on hospital location (2024/25)



ICD procedure volume has declined since 2015

ICD implant volumes declined 25% between 2018/19 and 2024/25.

This could be related to:

- A change in clinical practice
- Better prevention of heart failure (e.g. by revascularisation)
- Better treatment of heart failure (e.g. by new medication therapies).

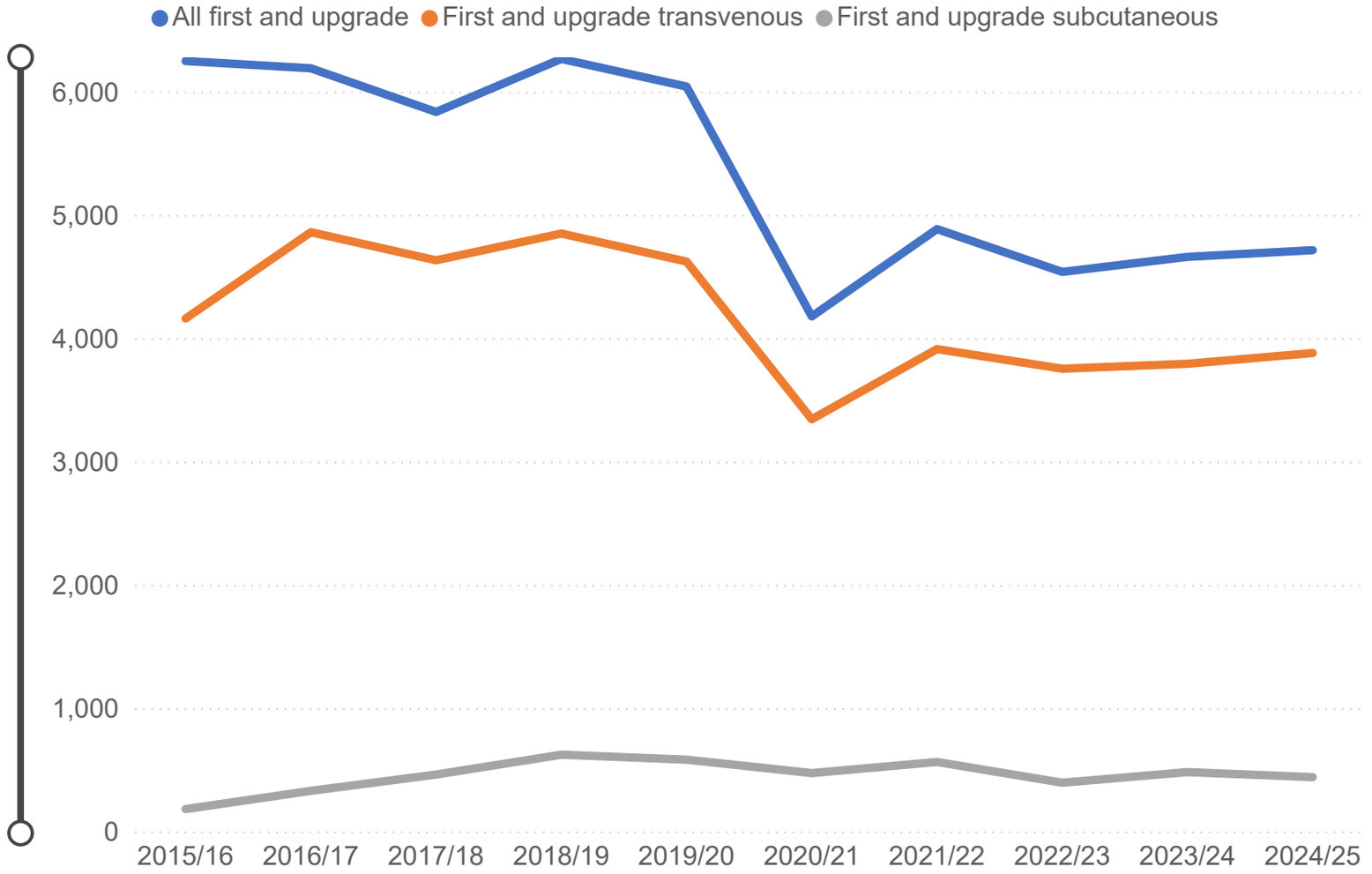
Selecting a Cardiac Network below shows the total figures across hospitals in that area.

Note: Volume stated does not include lead intervention procedures which are not shown in the graph.

Select Cardiac Network

All

Implantable cardioverter defibrillator procedures



One year mortality after defibrillator implantation was 3.5% but varied from 2 to 24% between hospitals

Defibrillators are used to prevent sudden cardiac death, and so implantation is only recommended in patients who have an expectation of good quality survival of greater than one year.

The median one year mortality rate after ICD or CRT-D implant was 3.5% overall. The range across hospitals is between 2 and 24%. Variation in one year mortality reflects appropriateness of patient selection and does not represent procedural risk.

Select a Cardiac Network/hospital below or hover over the graph to see specific data.

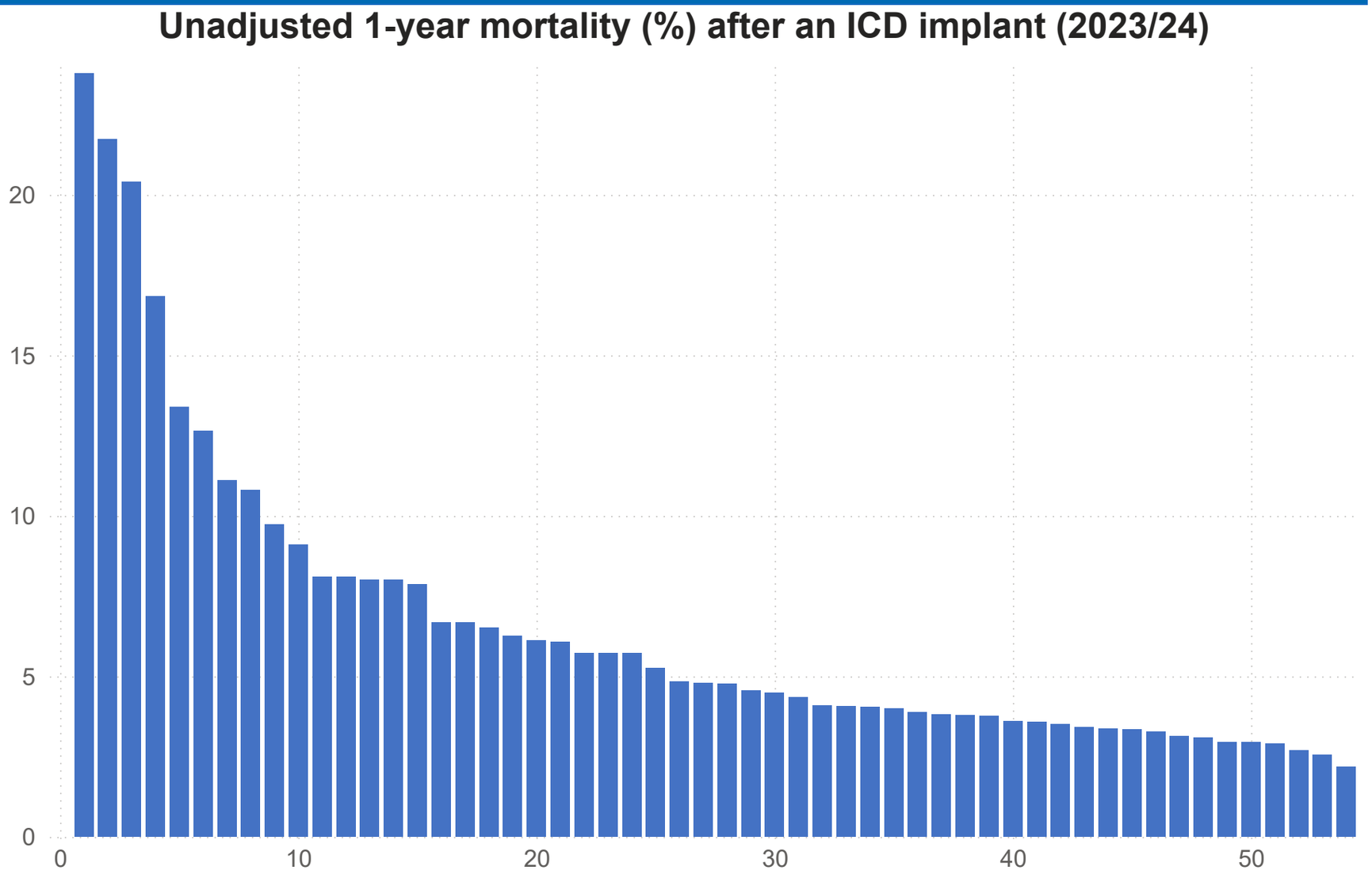
Note: centres with low implant volume > 20 implants per year are excluded.

Select hospital

All

Select Cardiac Network

All



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A fifth of hospitals were unable to demonstrate compliance with the target for the use of dual chamber pacing for sick sinus syndrome

One cause of abnormal heart rhythms is malfunction of the sinus node, the heart's primary pacemaker. This is known as sick sinus syndrome.

NICE guidance recommends the use of dual-chamber pacing (rather than single chamber) in this condition/setting and the audit has recommended hospitals aim to achieve this for 90% of relevant procedures.

In 2024/2025, 82% of dual chamber pacemaker procedures for sick sinus rhythm adhered to NICE TA324 guidance. For those providing data, most hospitals met the target but 26 did not. This proportion has remained similar since 2015/16.

Select a Cardiac Network/hospital below or hover over the graphs to see specific data.

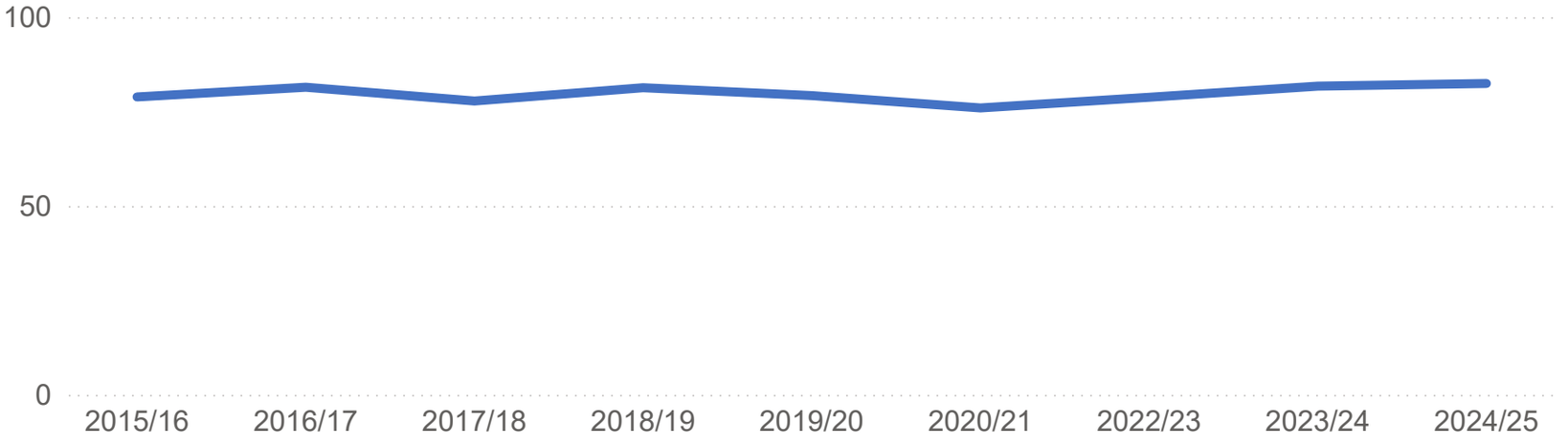
Select Cardiac Network

All

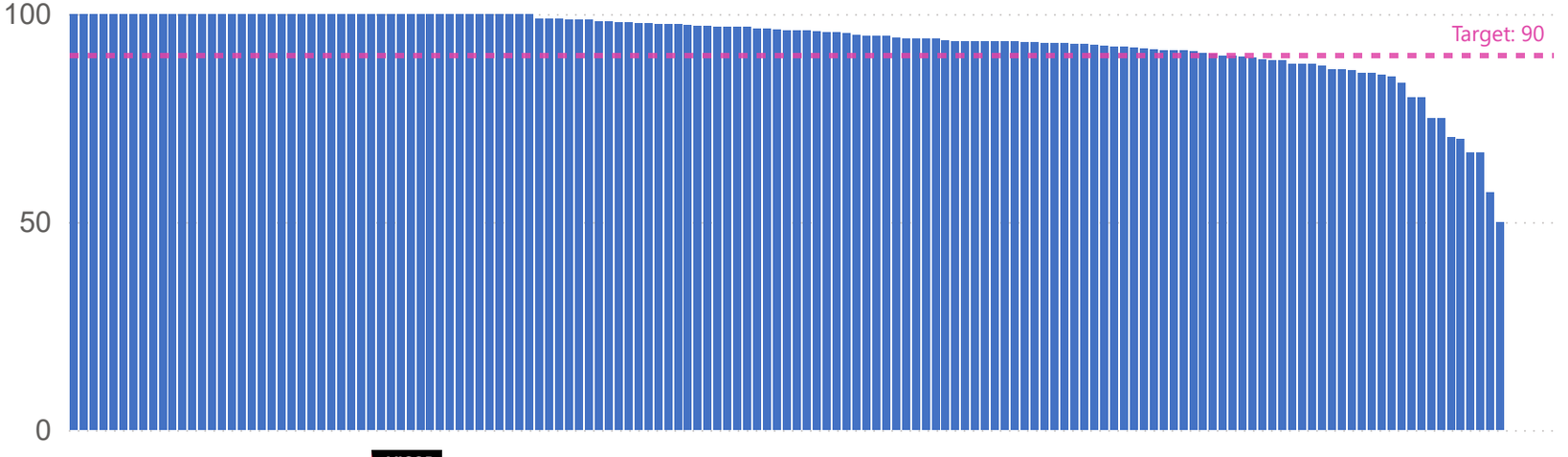
Select hospital

All

Percentage compliance with NICE guidance on dual pacing for sick sinus syndrome



Percentage compliance with NICE guidance on dual pacing for sick sinus syndrome by hospital (2024/25)



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Nearly a third of hospitals were unable to demonstrate compliance with the target for the use of dual chamber pacing in patients with atrio-ventricular block

NICE guidance recommends dual chamber pacing for most people who have atrio-ventricular (AV) block (where the electrical signal from the upper chambers to lower chambers of the heart is impaired) with or without sick sinus syndrome, or for those with atrio-ventricular block without continuous atrial fibrillation.

The audit has recommended hospitals aim to achieve this for 90% of relevant procedures.

In 2024/2025, for those providing data, almost 70% of hospitals met the target but 37 did not. This proportion has remained similar since 2015/16. 84% of procedures adhered to NICE TA88 guidance for dual chamber pacemakers for atrio-ventricular block.

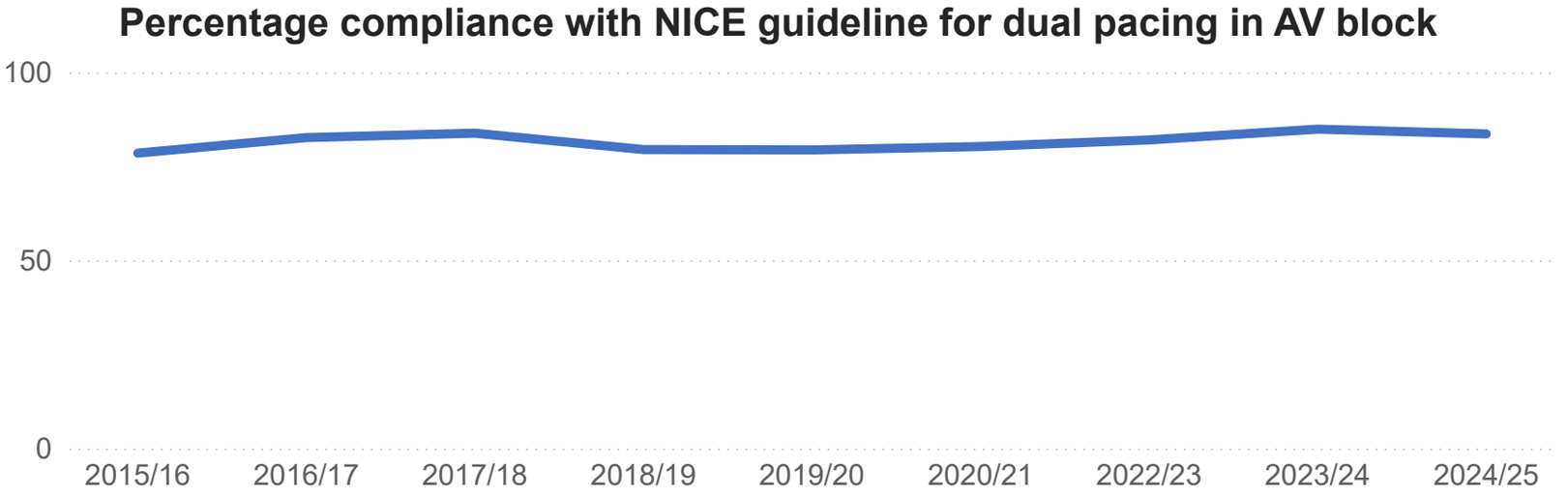
Select a Cardiac Network/hospital below or hover over the graphs to see specific data.

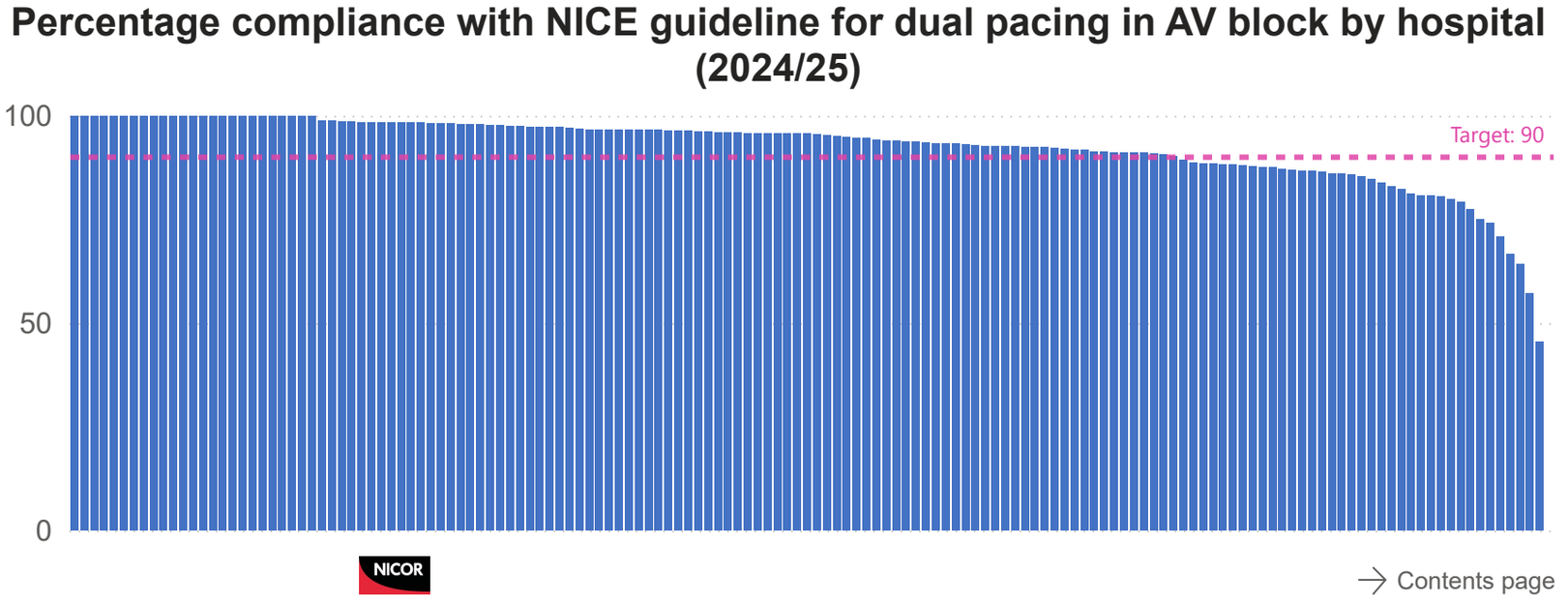
Select Cardiac Network

All

Select hospital

All





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More than half of hospitals could not demonstrate compliance with NICE guidance on the use of an ICD for primary prevention

NICE guidance (TA314) recommends that an implantable cardioverter defibrillator (ICD) should be implanted for primary prevention when a patient is deemed at risk but has not yet suffered from a cardiac arrest that could be life-threatening.

The audit has recommended hospitals aim to achieve this for 80% of relevant procedures.

The average compliance has remained just under 50% since 2015/16.

It is likely that non-compliance is because of data entry issues and does not reflect true performance.

Select a Cardiac Network/hospital below or hover over the graphs to see specific data.

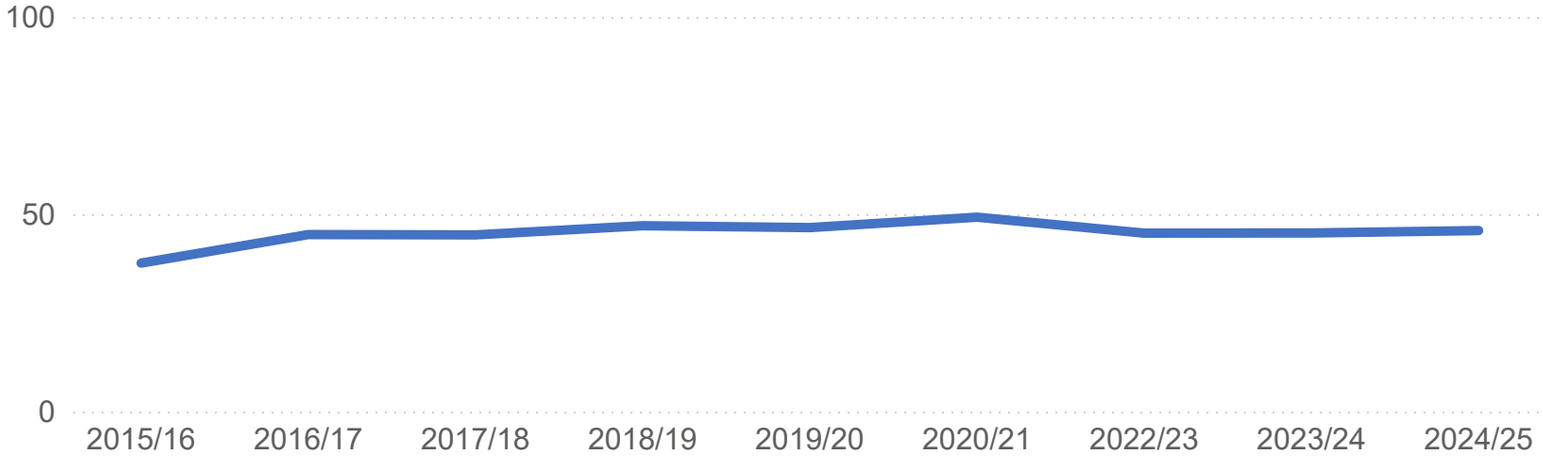
Select Cardiac Network

All

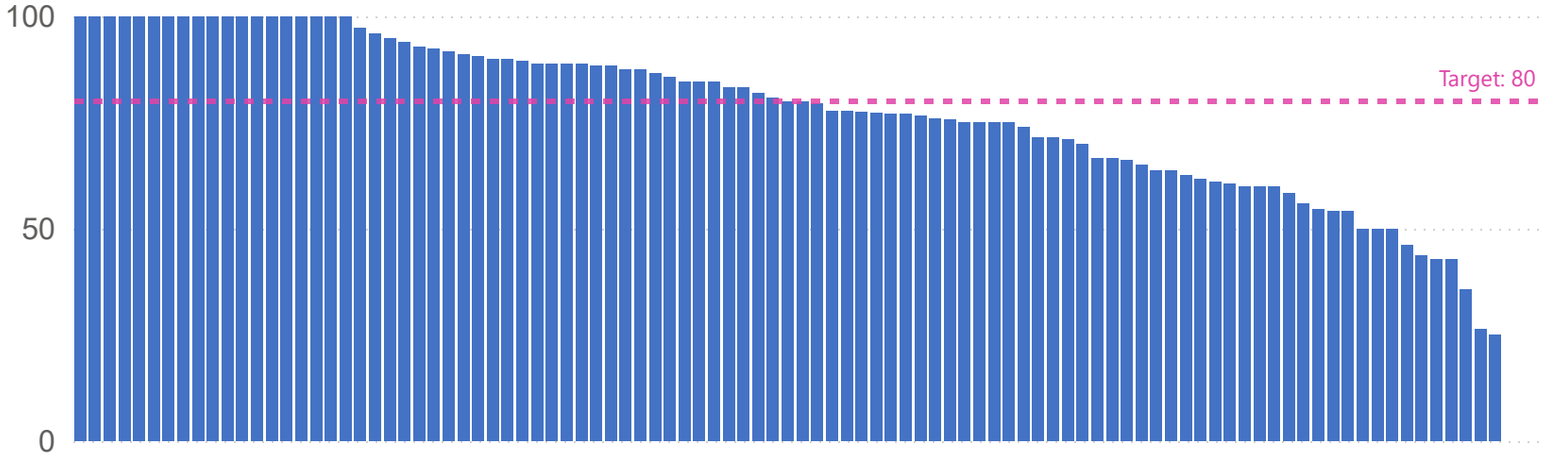
Select hospital

All

Percentage compliance with NICE guidance on ICD use for primary prevention



Percentage compliance with NICE guidance on ICD use for primary prevention by hospital (2024/25)



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Over 40% of hospitals were unable to demonstrate compliance with NICE guidance on the use of an ICD for secondary prevention

NICE guidance (TA314) has set criteria for when a cardioverter defibrillator (ICD) should be implanted in someone for secondary prevention (i.e. they have already survived a cardiac arrest).

The audit has recommended that, on average, 80% of implants should meet this guidance.

The average across all procedures in 2024/25 was 40%. Of those providing data, while 35 hospitals met the target, 53 did not.

It is likely that non-compliance with this guideline is the result of issues to do with data submission.

Select a Cardiac Network/hospital below or hover over the graphs to see specific data.

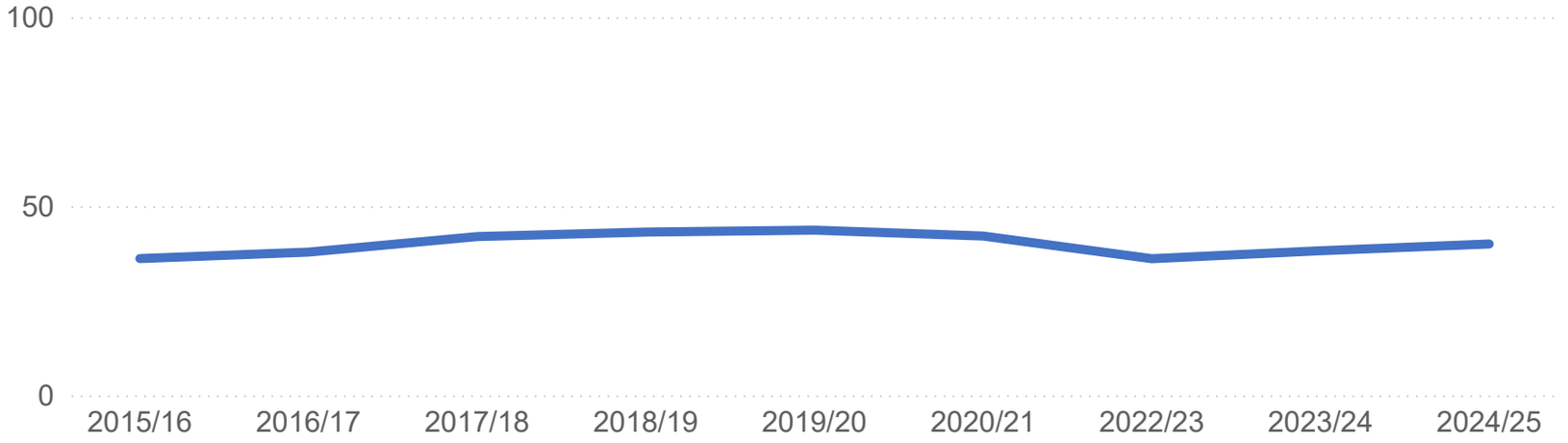
Select Cardiac Network

All

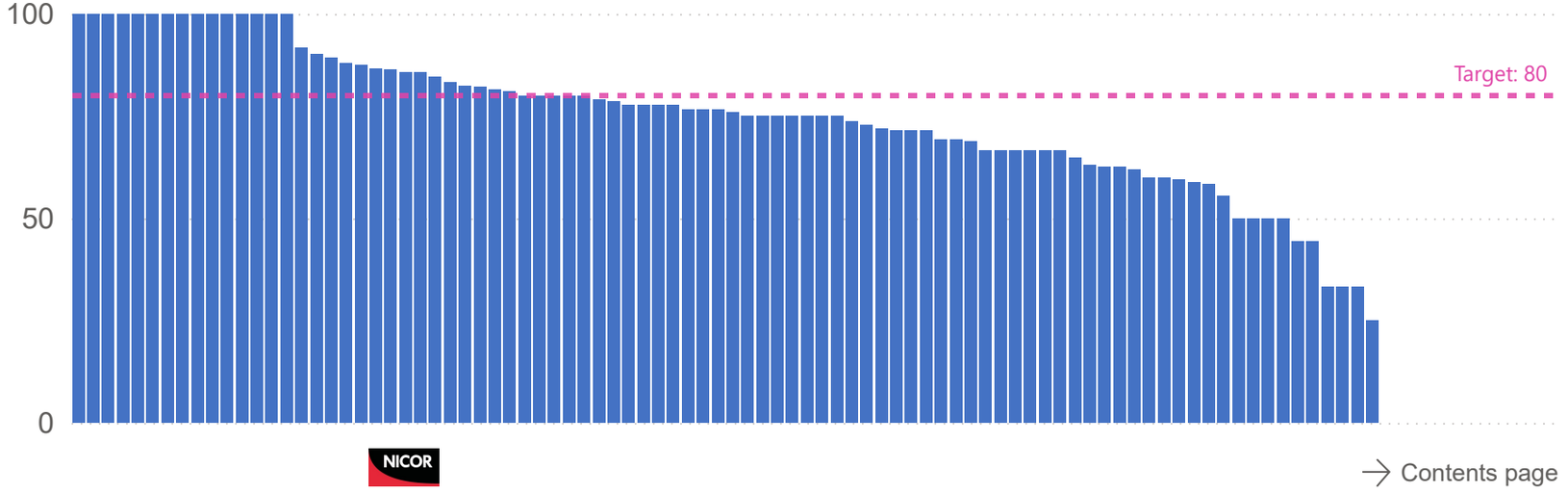
Select hospital

All

Percentage compliance with NICE guidance on use of ICD for secondary prevention



Percentage compliance with guidance on ICD use for secondary prevention by hospital (2024/25)



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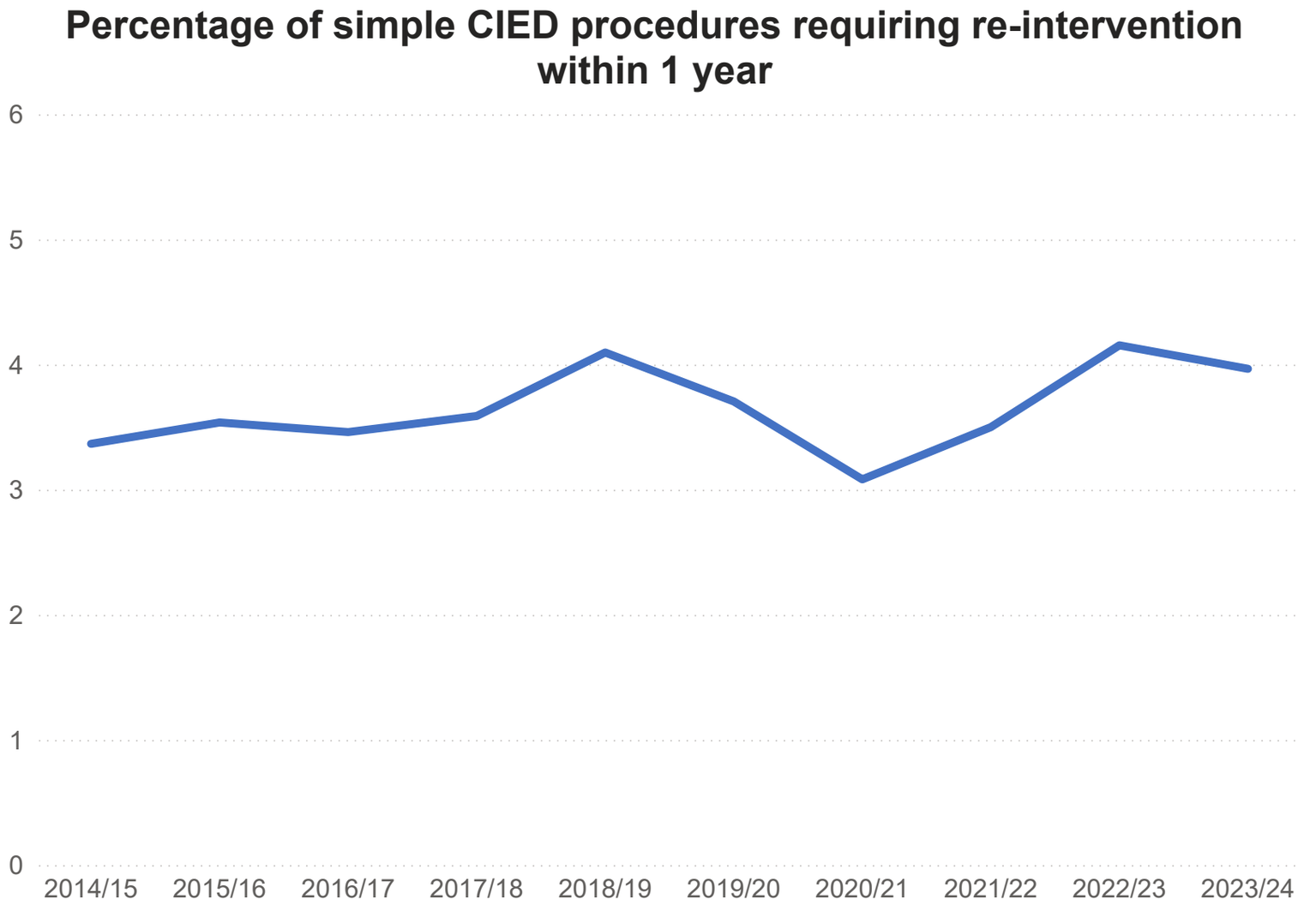
The 1-year re-intervention rate after simple CIED procedures remained at 4% in 2023/24

4.0% of patients who had a new simple CIED implant (either a single chamber or dual chamber pacemaker) in 2023/24 required a re-intervention within 1 calendar year.

This figure has remained broadly stable over time.

Note: The data are one year behind the rest of the audit to allow for a complete calendar year of follow-up. The latest data presented here are for implants between April 2022 and March 2023. Patients are tracked by NHS number such that if an initial procedure takes place in one hospital, a re-operation in another hospital will be tracked. Only the first re-intervention is counted, so multiple re-interventions on the same patient are not included. The data do not account for those who may have died during the calendar year. Re-admissions for any reason where a re-intervention is not required are not included. The data do not include the need for treatment for a pneumothorax.



The 1-year re-intervention rate after simple CIED implants ranged from near zero to 12% across different hospitals

There is significant variation in the rates of re-intervention after simple CIED implants across hospitals.

For 2023/24 implants, the re-intervention rate within hospitals performing more than 200 procedures ranged from 0.4% to 11.8%. Amongst hospitals undertaking a lower number of implants, there were several with re-intervention rates above 10%.

Select a Cardiac Network/hospital below or hover over the graphs to see specific data.

Note: In order to show the data for individual hospitals and/or Cardiac Networks, the lower chart is derived by averaging each hospital's re-intervention rate. The percentage shown in the bottom graph therefore differs slightly from the national figure shown in the previous slide.

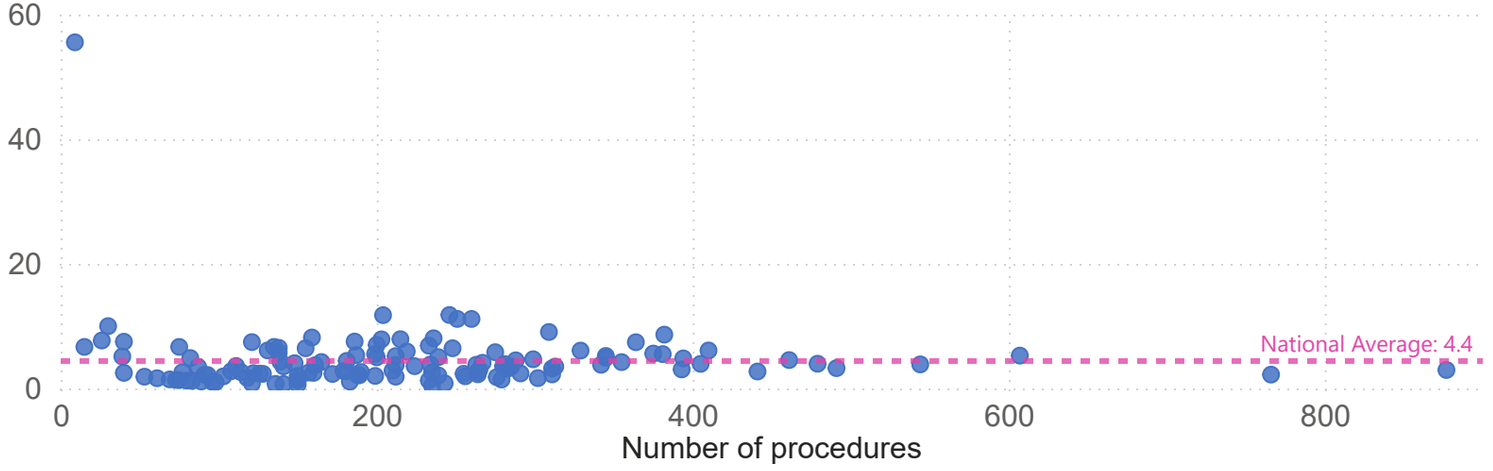
Select Cardiac Network

All

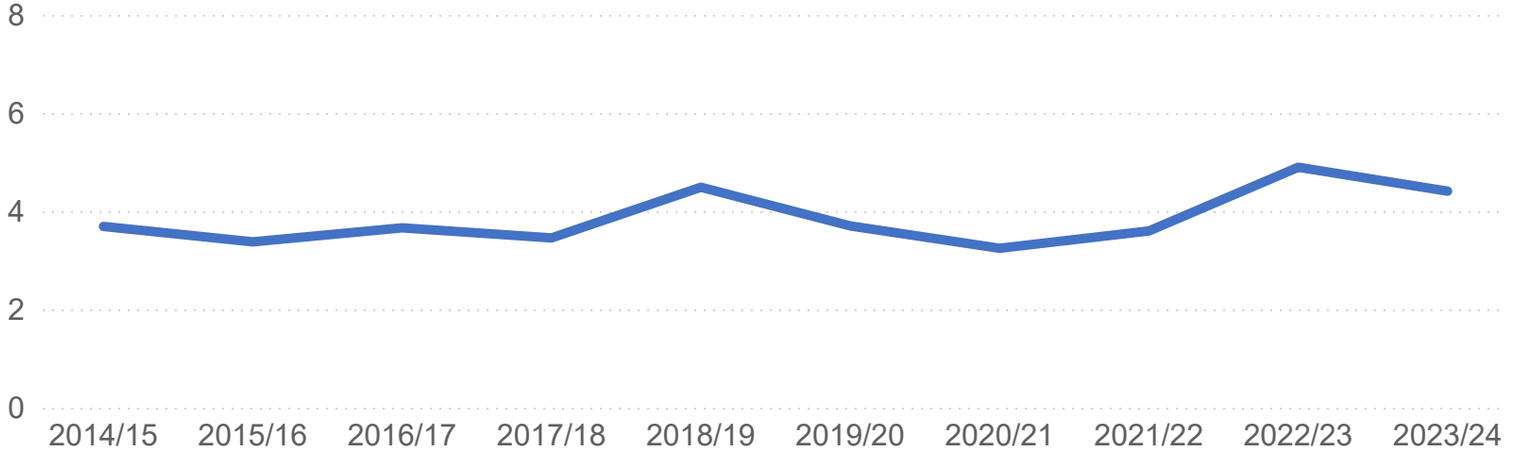
Select hospital

All

Percentage of simple CIED implants requiring re-intervention within 1 year by hospital (2023/24)



Percentage of simple CIED implants requiring re-intervention within 1 year



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The 1-year re-intervention rate after complex CIED implant was 6.2%

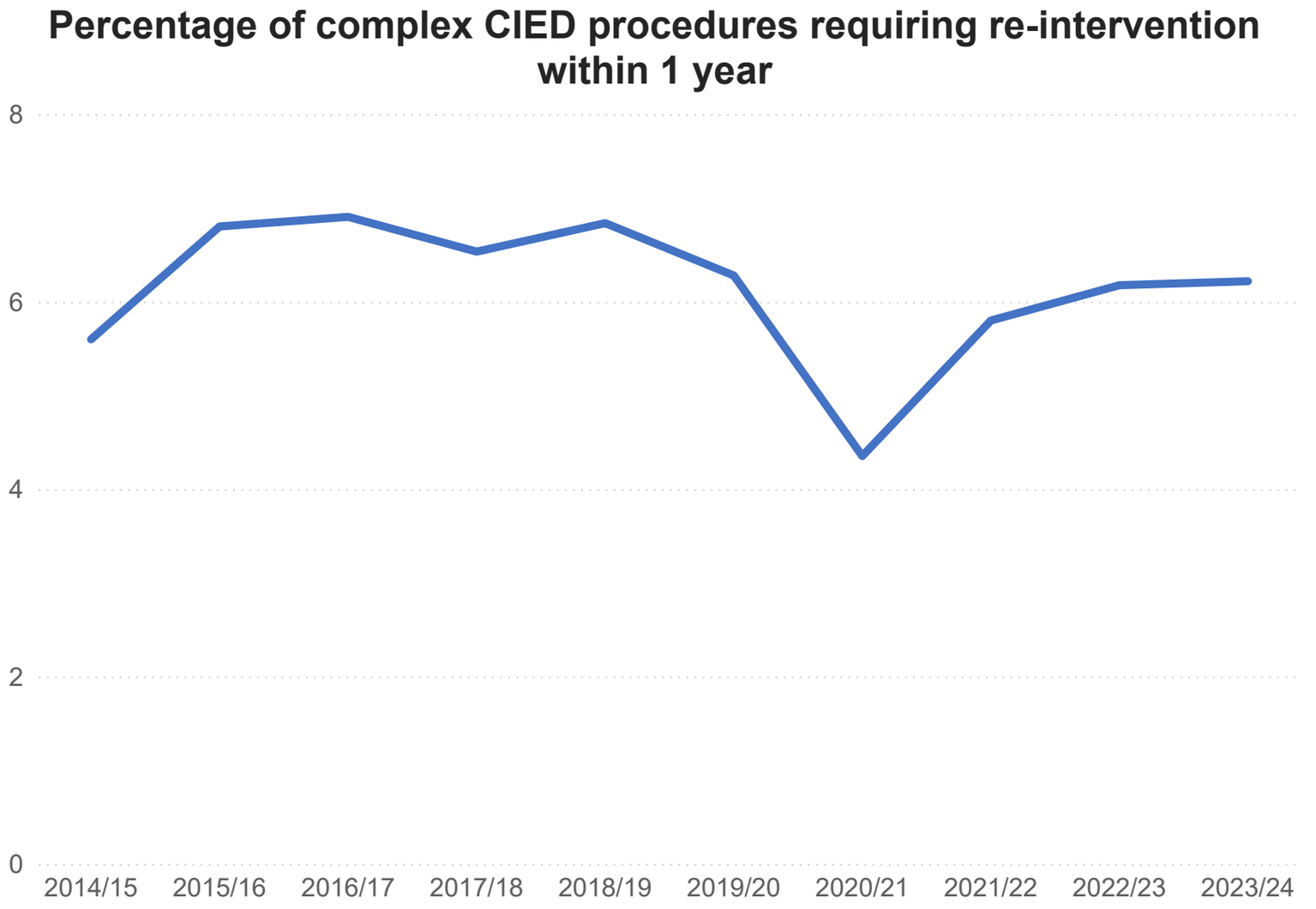
New complex CIED implants comprise:

- Implantable Cardioverter-Defibrillator (ICD)
- Cardiac Resynchronisation Therapy Defibrillator (CRT-D)
- Cardiac Resynchronisation Therapy Pacemaker (CRT-P).

The overall 1-year re-intervention rate for these devices was 6.2% for implants in 2023/24 (20% lower than 6.9% in 2016/17).

The factors driving this improvement require further investigation.

Note: The data are 1 year behind the rest of the audit to allow for a complete calendar year of follow-up. The latest data presented here are for implants between April 2022 and March 2023. Patients are tracked by NHS number such that if an initial procedure takes place in one hospital, a re-operation in another hospital will be tracked. Only the first re-intervention is counted, so multiple re-interventions on the same patient are not included. The data do not account for those who may have died during the calendar year. Re-admissions for any reason where a re-intervention is not required are not included. The data do not include the need for treatment for a pneumothorax.



There was significant variation in the 1-year re-intervention rates after complex CIED implants with rates above 10% found in some hospitals

There is significant variation in re-intervention rates between hospitals following complex CIED implants.

For 2023/24 implants, the re-intervention rate amongst hospitals performing over 100 procedures ranged from 0% to 15%.

Select a Cardiac Network/hospital below or hover over the graphs to see specific data.

Note: In order to show the data for individual hospitals and/or Cardiac Networks, the lower chart is derived by averaging each hospital's re-intervention rate. The percentage shown in the bottom graph therefore differs slightly from the national figure shown in the previous slide.

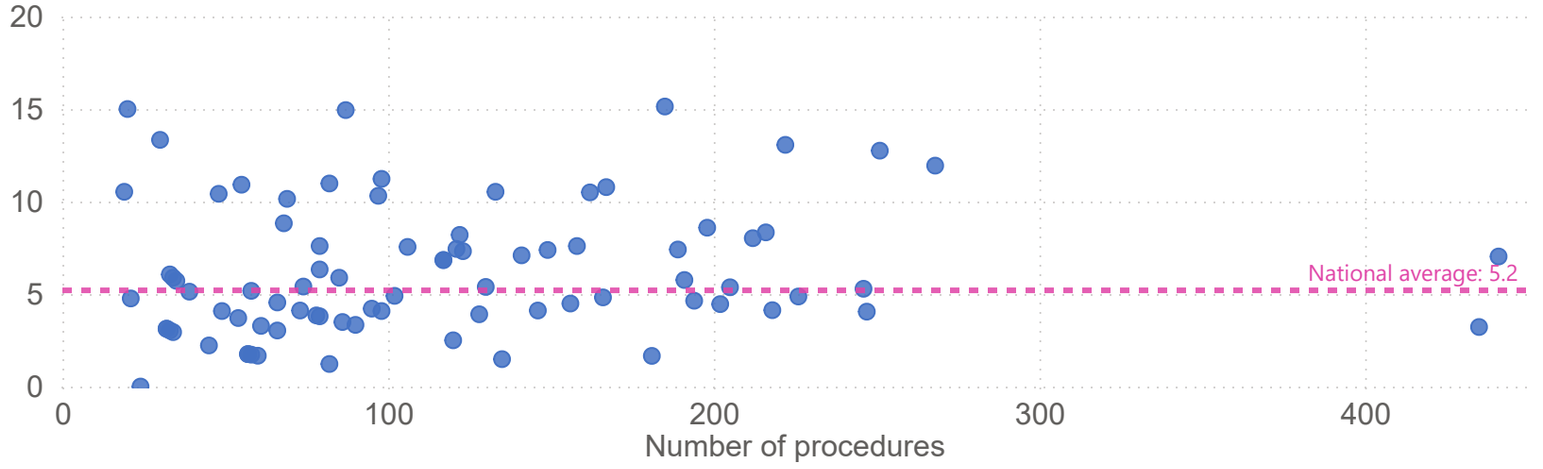
Select Cardiac Network

All

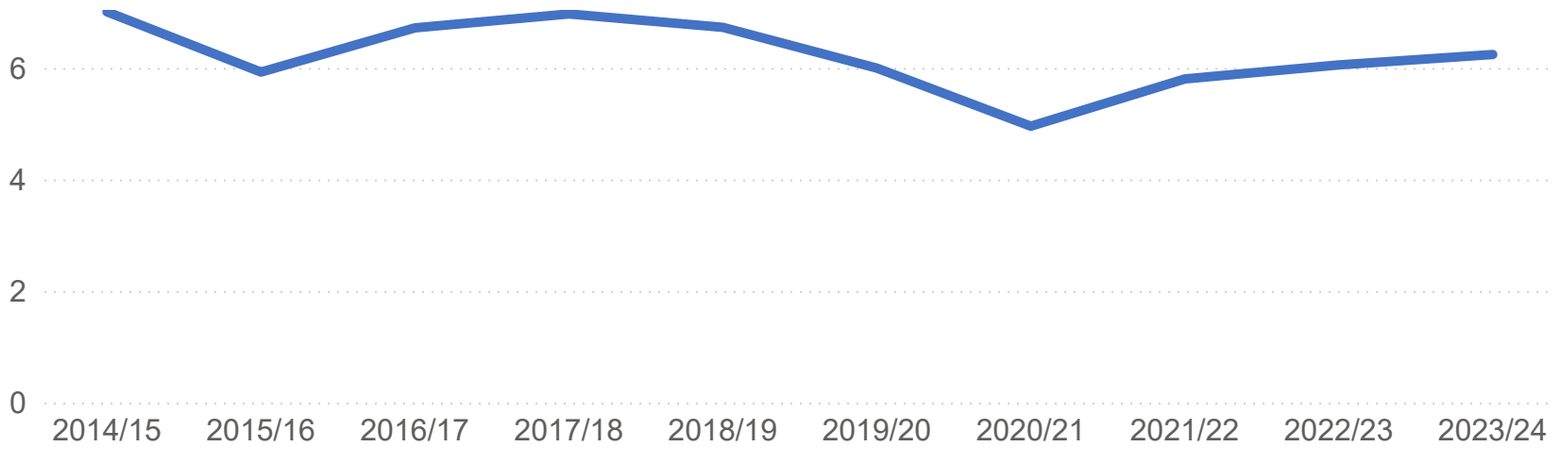
Select hospital

All

Percentage of complex CIED implants requiring re-intervention within one year by hospital (2023/24)



Percentage of complex CIED implants requiring re-intervention within one year



Ablation procedure volume continued to increase, driven by Atrial Fibrillation ablation

The were 24,323 ablation procedures undertaken in England during 2024/25, up 10% from 2023/24.

Most of the growth is in ablations for atrial fibrillation (AF), which rose 11% over 2023/24 and are up 54% since 2015/16. AF cases now account for almost 50% of all ablations. This shows the growing demand for rhythm control strategies and expansion of electrophysiology services.

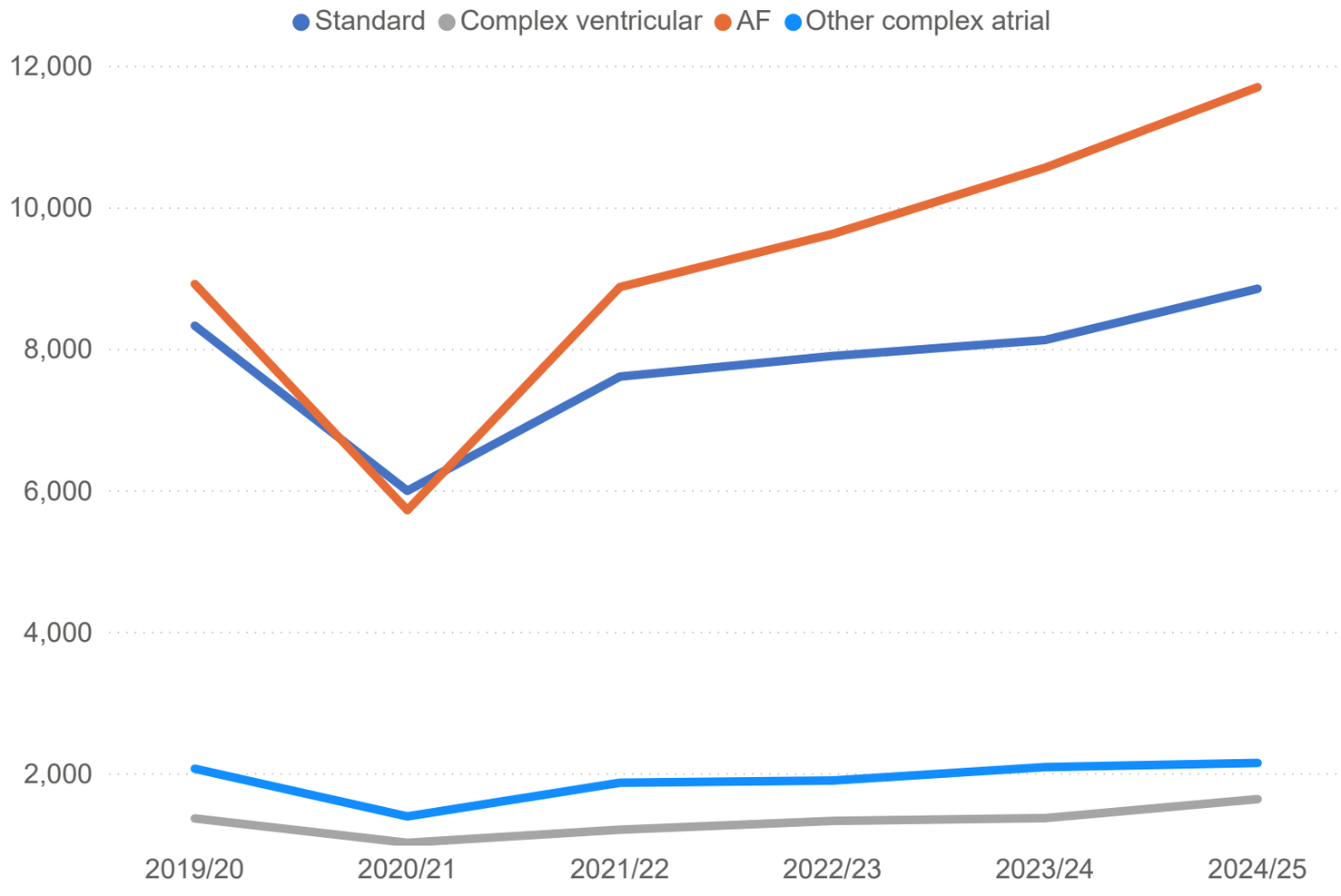
The number of standard atrial ablations (including AVNRT, accessory pathway, and typical flutter ablation) rose in 2023/24 but overall have declined since 2015/16 (from 9,412 to 8,848 cases).

Non-AF complex atrial ablations (e.g. left atrial tachycardia) remain relatively uncommon but stable, with 2,145 procedures in 2024/25.

Ventricular ablations continue to represent a small but important subset. The 1,633 procedures in 2024/25 represent a small increase over 2023/24 which has taken activity back to the pre-COVID-19 level.

See here for the categorisation of ablation procedures.

Number of ablation procedures by complexity

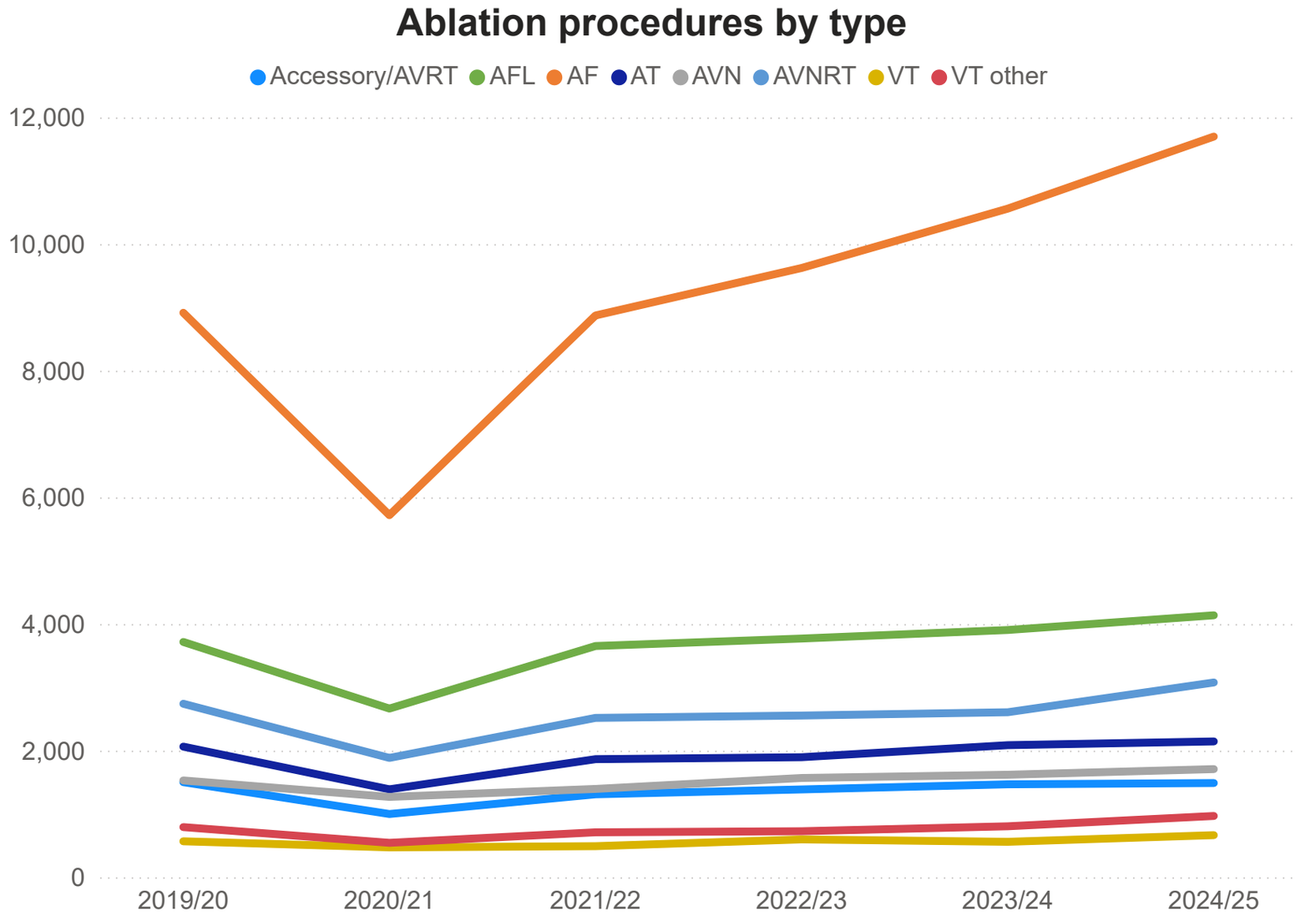


All types of ablation procedures have recovered to pre-pandemic levels

Ablation for atrial fibrillation (AF) has risen significantly, by 54% since 2015/16, with 11,697 procedures in 2024/25. Other ablation procedures have recovered to pre-pandemic levels.

The number of AV node ablations (1,708 in 2024/25) is stable. Ablations for AVNRT (3,076 in 2024/25) and accessory pathway ablations continue to increase since the COVID-19 pandemic, and are now higher than pre-pandemic levels (2,740 in 2019/20).

Key:
AF = Atrial fibrillation
AFL = Atrial flutter
AT/AVRT = Atrial tachycardia or Atrioventricular re-entrant tachycardia
EAT = Ectopic atrial tachycardia
IART = Atrial re-entry tachycardia
AVNA = Atrioventricular nodal ablation
VT = Ventricular Tachycardia
PVC = Premature Ventricular Contraction



The majority of hospital ablation services adhered to BHRS activity standards

The 2020 British Heart Rhythm Society (BHRS) standards recommend that adult ablation centres perform at least 100 ablation procedures per year. This benchmark aims to maintain procedural quality, operator proficiency, and service sustainability. No minimum volume is currently specified for paediatric electrophysiology services.

78% of the 46 NHS hospitals submitting data to NICOR exceeded this threshold in 2024/25. A small number of paediatric and private hospitals did not reach the 100-procedure benchmark.

Procedures per hospital varies widely. A number of large tertiary centres perform over 1,000 ablations a year while smaller units can operate close to the minimum threshold. This reflects the hub-and-spoke organisation of electrophysiology services in England, with higher-complexity ablations concentrated in tertiary referral centres while lower-complexity procedures may be delivered regionally.

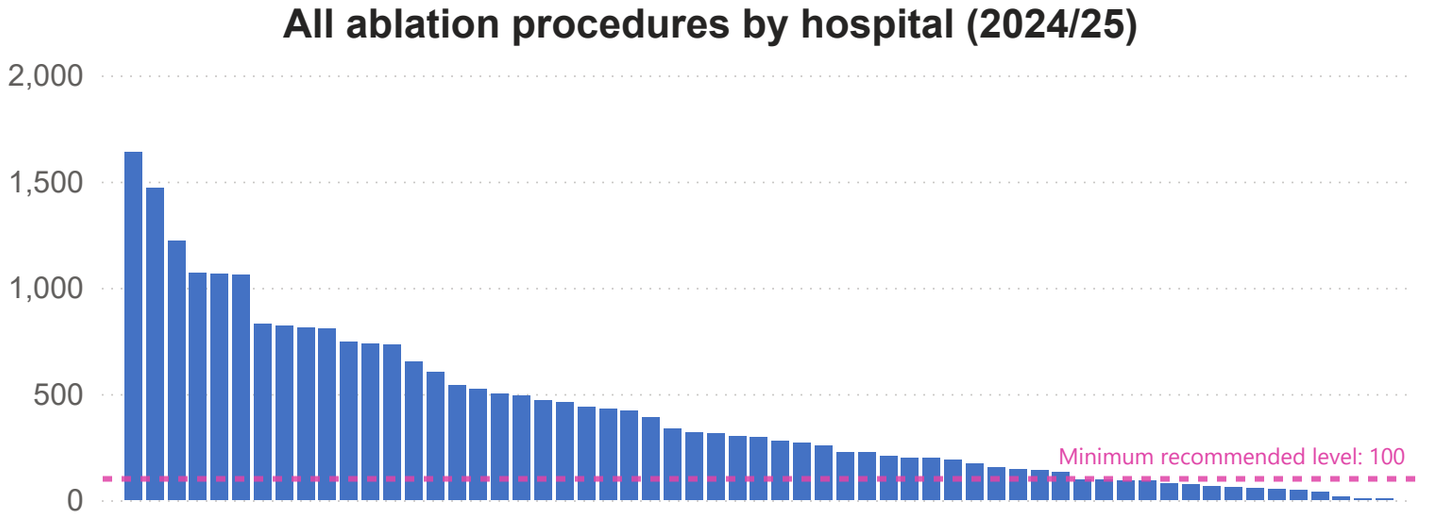
Select a hospital or Cardiac Network below to see specific data.

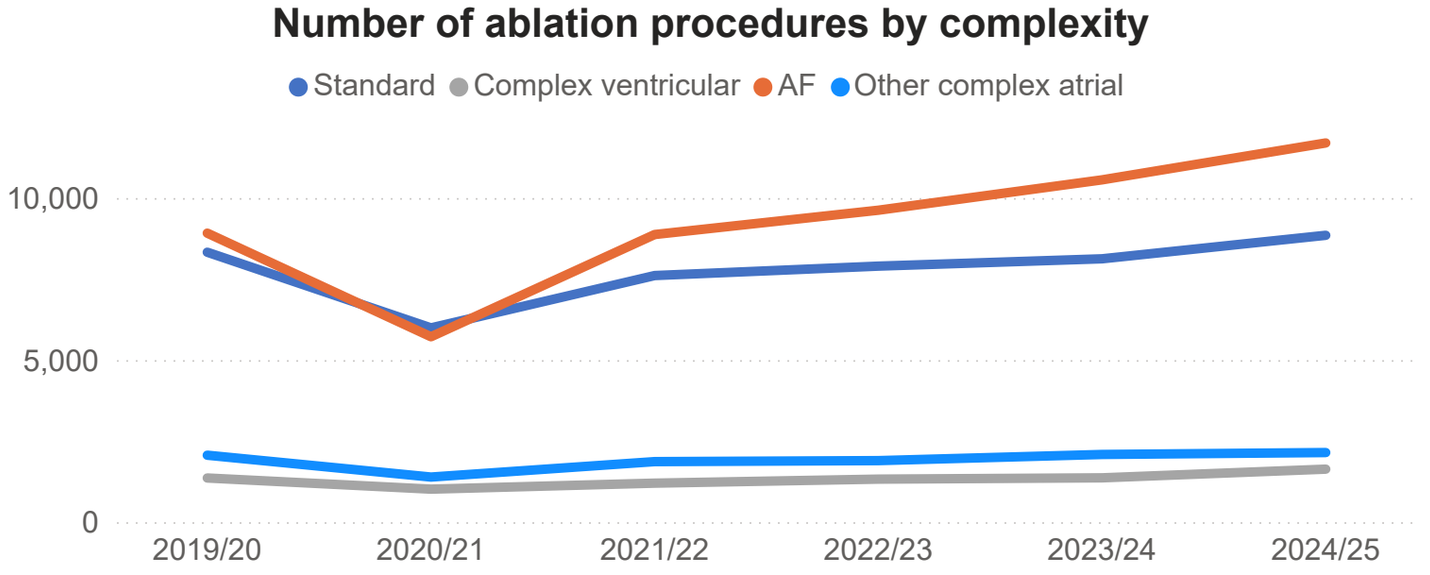
Select Cardiac Network

All

Select hospital

All





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Ablation rates varied 12-fold across ICBs and Health Boards in England and Wales

The maps show the rates of ablation procedures per million population (pmp) by Integrated Care Board (ICB) / Health Board (HB) and Cardiac Network (CN) for 2024/25.

Substantial regional variation exists in the rate of ablation procedures across England and Wales, with a 12-fold difference in total rates between areas.

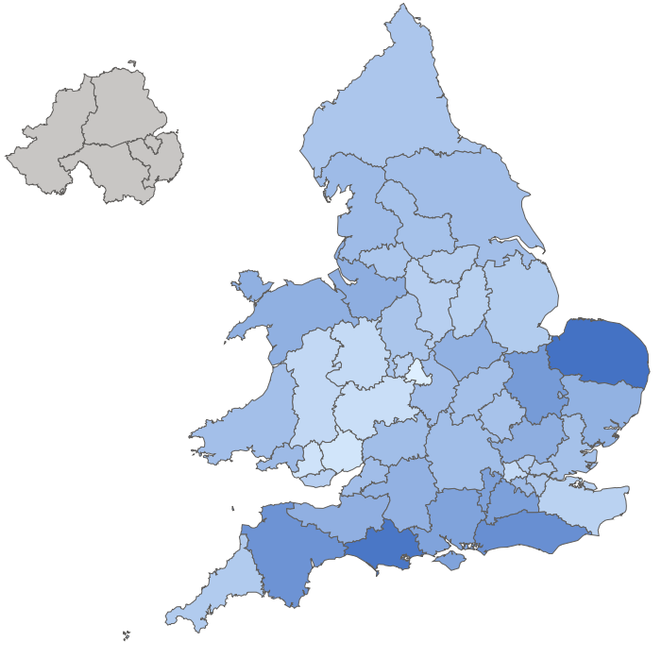
When mapped by patient home location, there is a clear gradient in ablation procedures, with higher rates in parts of London, the East of England, and the South East, and lower rates in northern and rural regions.

Mapping by Cardiac Network hospital location reveals concentration of ablation activity within major tertiary centres, reflecting the centralised model of complex electrophysiology service delivery within the NHS.

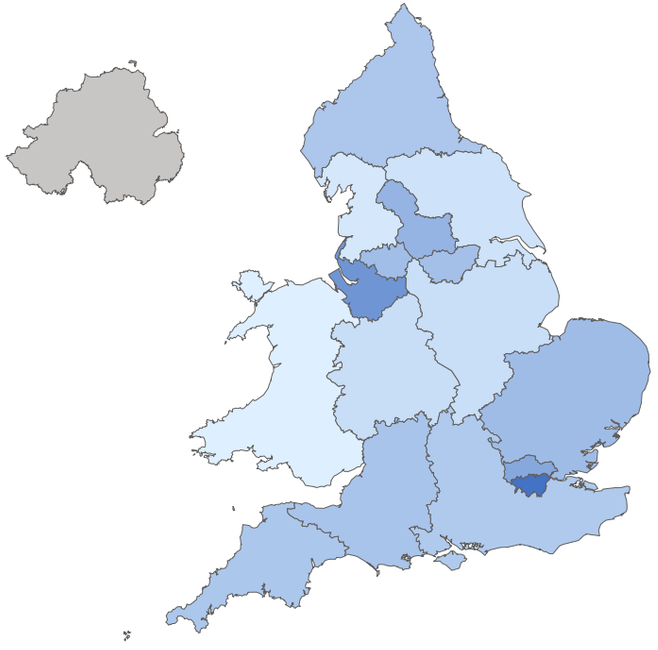
Select actual or age-standardised rate pmp and/or hover over the map to see specific data.

Note: Data for ICB/HBs are based on the patient home location. Data for CNs are based on the location of the hospitals undertaking the procedure in that area. No data on ablation procedures were received from hospitals in Northern Ireland.

Ablation procedures per million population by ICB/HB based on patient home location (2024/25)



Ablation procedures per million population by Cardiac Network based on hospital location (2024/25)



Select rate

Actual rate

Select ablation type

All

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Ablation technology for atrial fibrillation ablation mainly uses either only radiofrequency or only cryoablation techniques

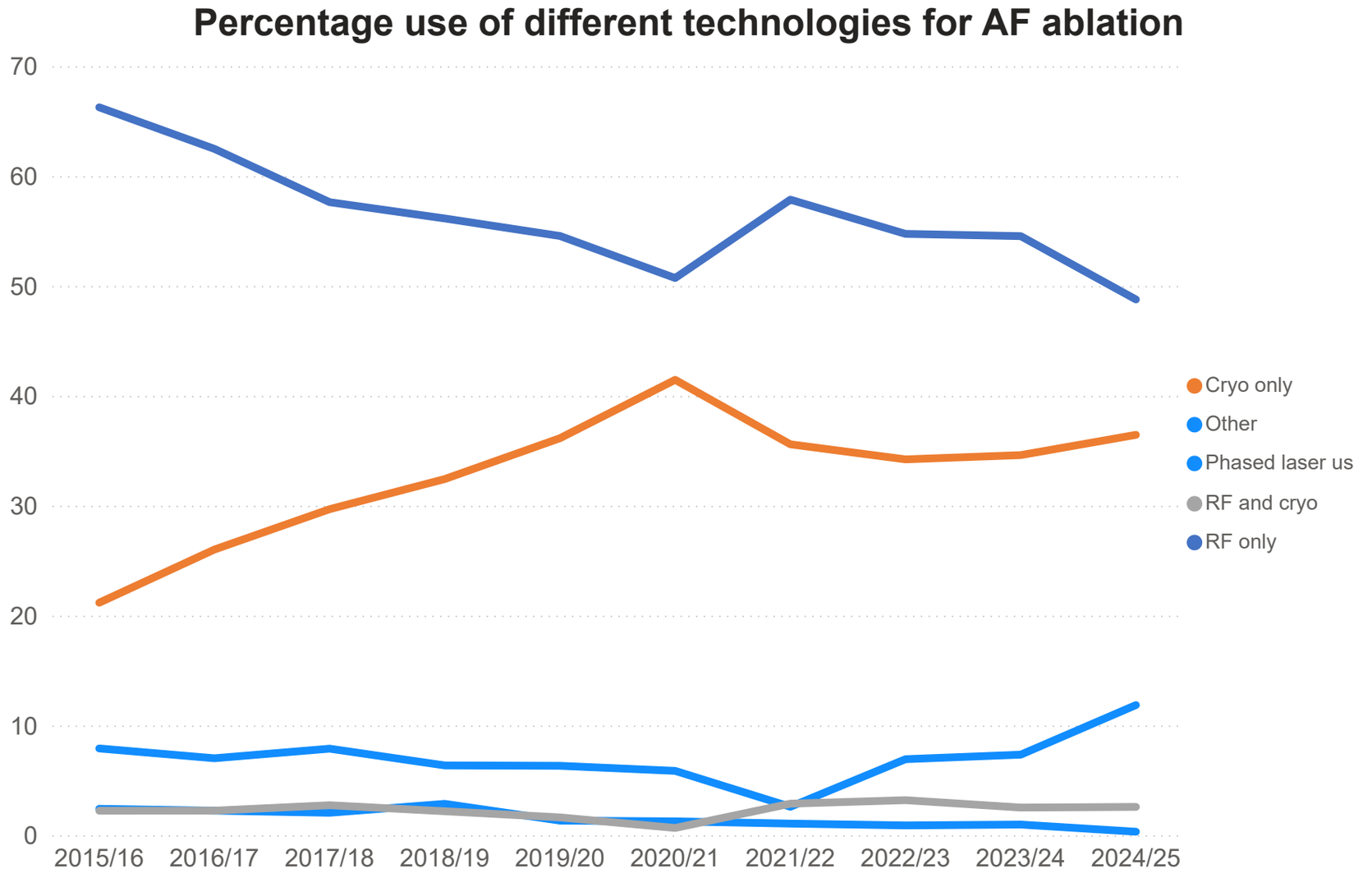
For patients with atrial fibrillation (AF), there are several technologies that can be used to perform ablation procedures.

The use of radiofrequency (RF) ablation fell from 55% in 2023/24 to 49% (having been used in 72% in 2014/15).

Cryoablation (Cryo) has almost trebled in use over the same period, peaking at 41% in 2020/21 and accounting for 36% of procedures in 2024/25.

New developments such as pulsed-field ablation may become more widely used going forward, although this is not formally currently captured in this report (it may be captured by the increase in the 'other' group). The dataset has now changed to capture pulsed-field ablation, see here.

There is very little experience in the use of other technologies, such as laser or ultrasound catheter ablation.



There was marked variation in the use of general anaesthesia by procedure type

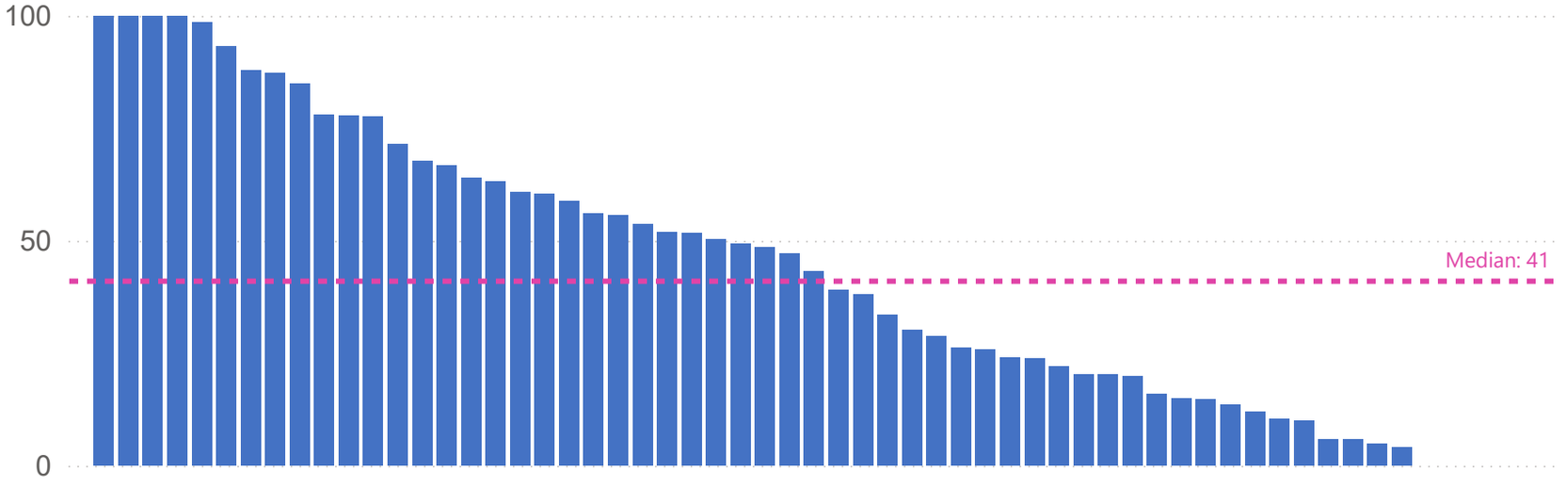
The use of general anaesthesia (GA) for adult ablation procedures varied from 0% to 100% across hospitals in England and Wales. The median proportion was 41%.

This variation reflects differences in practice, infrastructure, and procedural case mix. A small number of high-volume centres use GA routinely for complex cases, particularly for atrial fibrillation (AF) ablation.

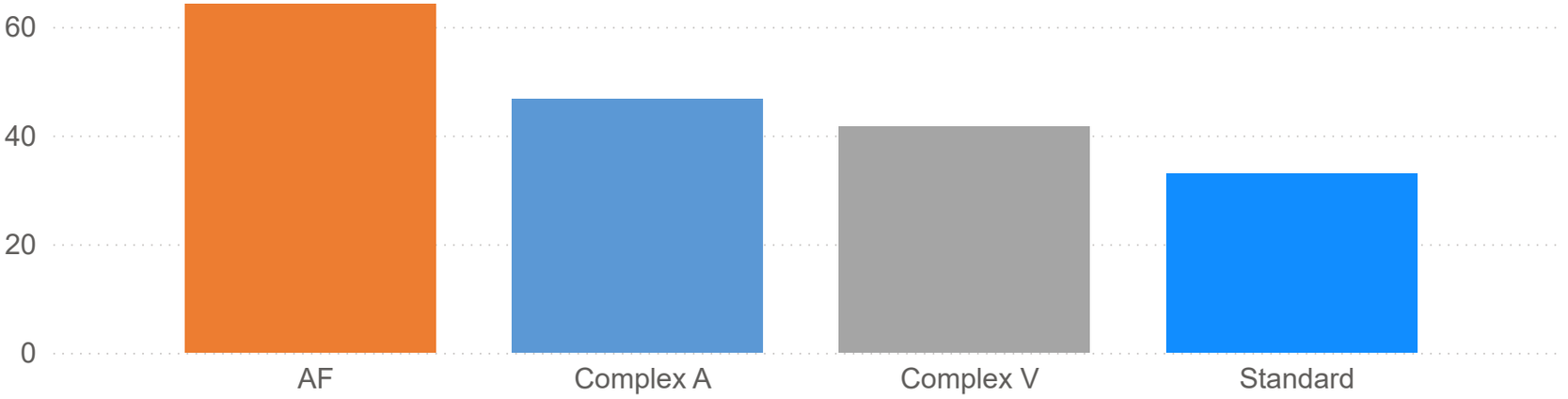
Select a Cardiac Network or hospital below or hover over the graphs to show specific data.

Note: The national average is calculated as the proportion of procedures for all centres performed under GA. This is slightly lower than the hospital average as it is influenced by skews within the data.

Percentage of ablation cases using GA by hospital (2024/25)



Percentage of cases using GA by ablation type



Select Cardiac Network

All

Select hospital

All

Show patient group

All patients

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General anaesthesia use for ablation procedures varied from 0 to 89% across the Integrated Care Boards / Health Boards in England and Wales

Nationally, 43% of all ablation procedures were performed under GA in 2024/25, continuing a gradual increase since 2019. This more use of pulse field ablation for complex atrial fibrillation (AF) cases, which more commonly requires GA.

The map shows the proportion of ablation procedures performed under anaesthetic (GA) for:

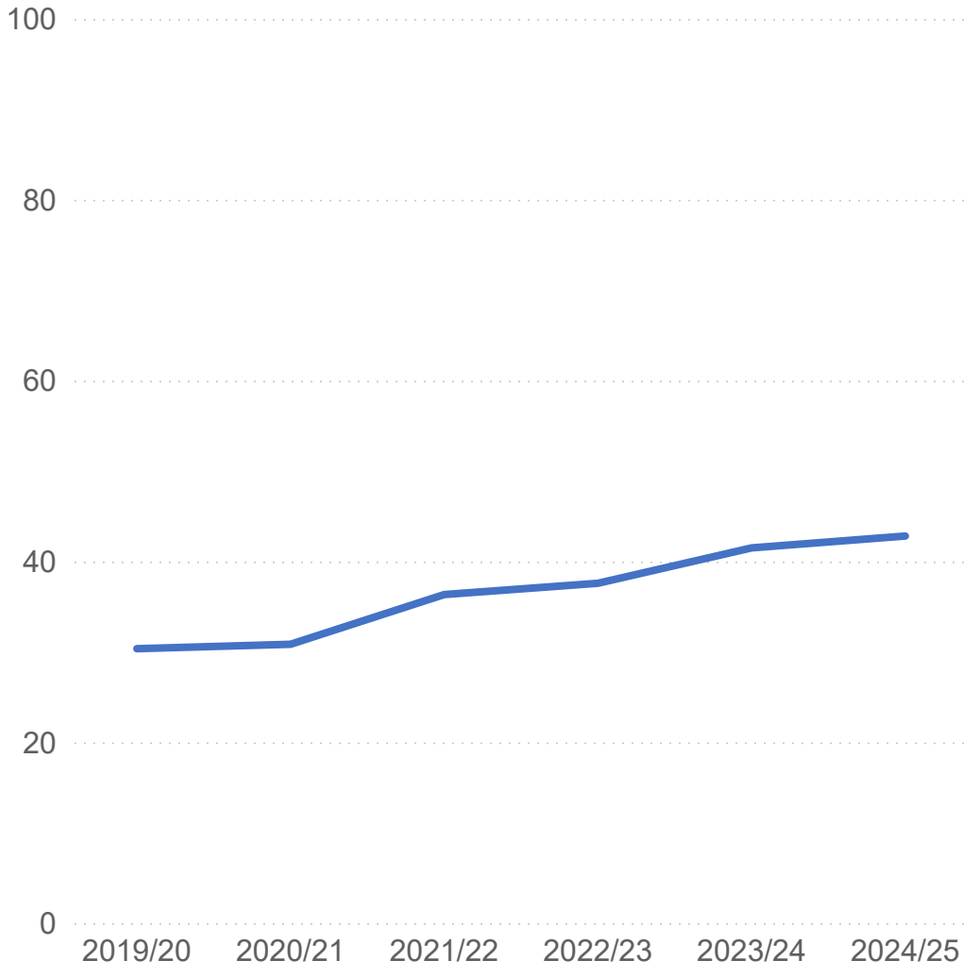
- 42 Integrated Care Boards (ICBs) in England / 7 Welsh Health Boards (HBs)
- 15 Cardiac Networks (CNs) in England and all of Wales.

There was wide variation in the use of GA for ablation procedures in 2024/25, from 0% in some areas to as high as 89% in North Central London ICB. This likely reflects local service configuration, procedure mix, and resource availability.

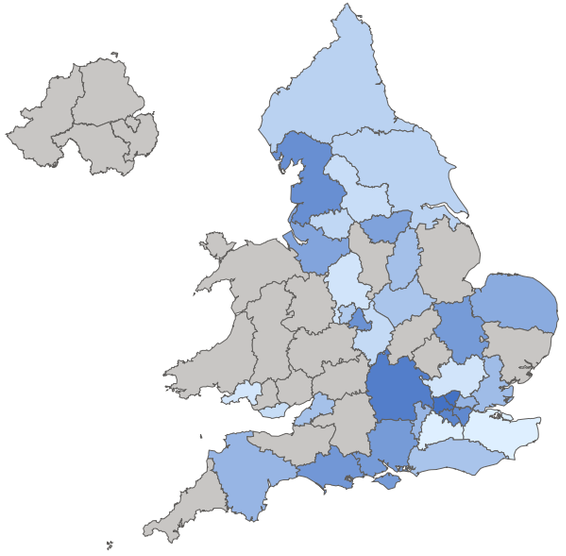
Hover over a region to see specific data.

Note: The national average is calculated as the proportion of procedures for all centres performed under general anaesthetic. This is slightly lower than the hospital average as it is influenced by skewness within the data. Grey areas = no procedures performed or no data submitted.

Percentage ablation cases performed under GA



Percentage of ablation cases performed under GA by ICB/HB (2024/25)



4.8% of standard ablation procedures require re-intervention with 2 years

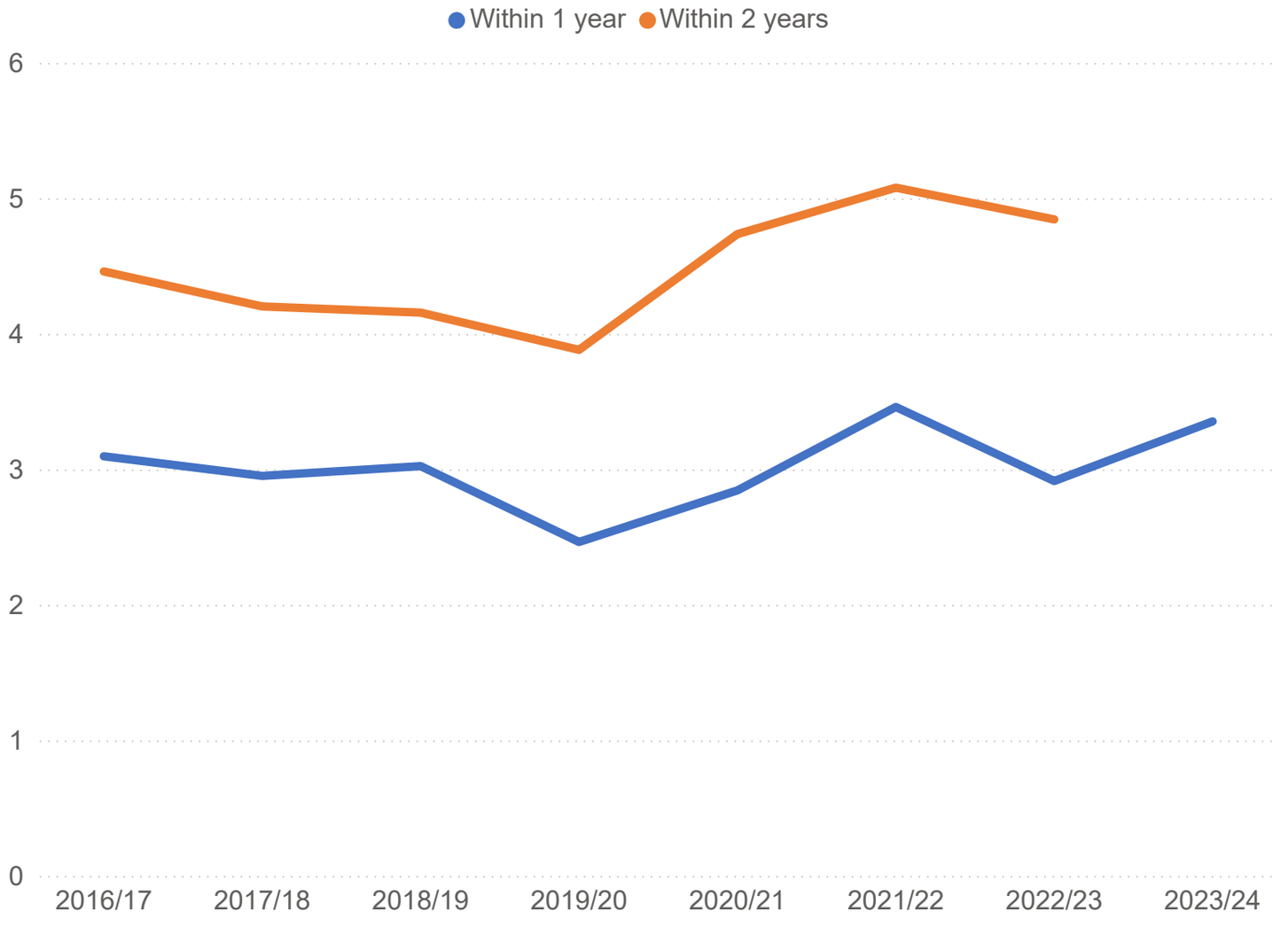
Re-intervention rates after an initial *standard* ablation procedure remain low and stable, consistent with expected outcomes for these well-established procedures:

- 3.4% of patients undergoing a first procedure in 2023/24 required re-intervention within 1 year
- 4.8% of patients treated in 2022/23 required re-intervention within 2 years.

Reported recurrence rates for arrhythmias in this group are typically between 2% and 10% in the long-term, depending on patient characteristics and follow-up duration, and the observed national data fall within this expected range.

Note: Standard procedures include ablations for accessory pathways and atrioventricular nodal re-entrant tachycardia (AVNRT), typical atrial flutter and atrioventricular node ablations (AVNA). These rates do not represent acute complications after an ablation procedure (which are not treated by further ablation). The re-intervention rate reflects a combination of the effectiveness of the original procedure (i.e. lack of arrhythmia/symptom recurrence), the enthusiasm of the patient and doctor to re-intervene, and the time for that decision and subsequent waiting list.

Percentage of standard ablation cases requiring re-intervention



The 1-year repeat ablation rates after a standard ablation varies by arrhythmia type

The 1-year re-intervention rate following standard ablation procedures varies depending on the type of arrhythmia treated. These differences reflect the inherent variation in procedural complexity and arrhythmia mechanisms.

Re-intervention rates in 2023/24 were:

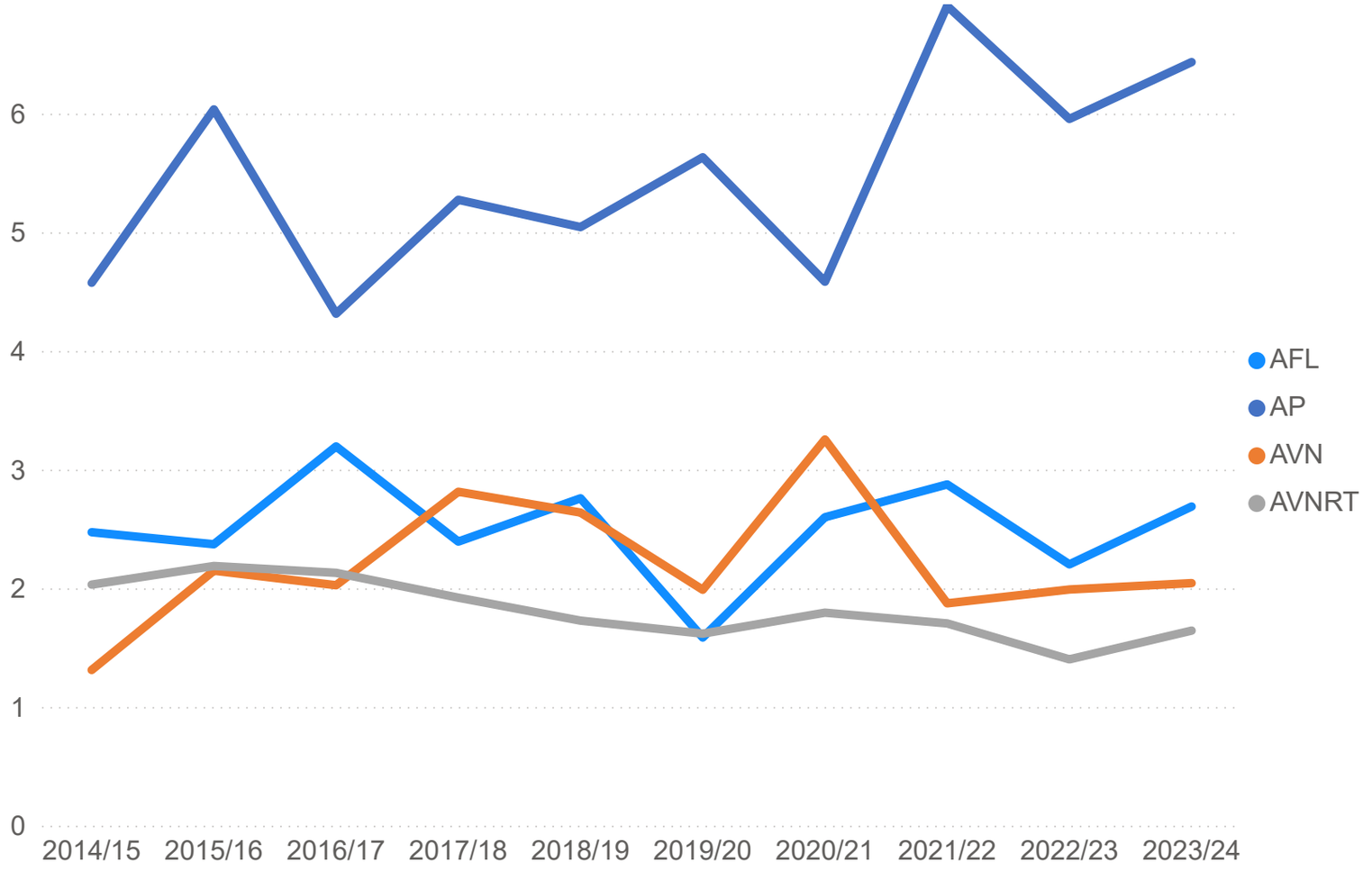
- **highest for accessory pathway (AP) ablations (6.4%)**
- **lowest for atrioventricular nodal re-entrant tachycardia (AVNRT) ablations (1.6%)**

Atrial flutter (AFL) and atrioventricular node ablation (AVN) cases had re-intervention rates ranging from 2.0% to 2.7%.

National re-intervention rates across all standard ablation categories remain low, indicating sustained procedural success and alignment with international benchmarks. The increased AP rate will be monitored with a separate report planned for this. Re-intervention rates for AVNRT, flutter and AV node ablation are in line with international benchmarks.

Key:
AFl – atrial flutter
AP – Accessory pathway
AVN – AV node
AVNRT – AV nodal re-entrant tachycardia

Percentage of ablation procedures for specific arrhythmias requiring re-intervention within 1 year by substrate



Re-intervention rates after standard ablations range between 0% and 6.7% across hospitals

A few hospitals reported re-intervention rates up to 6%, while many smaller centres recorded none. It is unlikely that no re-interventions were needed in all of these centres so the 0% responses likel reflects differences in waiting times or data reporting, rather than a true absence of recurrence.

Select a Cardiac Network or hospital below or hover over the top graph to see specific data.

Note: In order to show the data for individual hospitals and/or Cardiac Networks, the lower chart is derived by averaging each hospital's re-intervention rate. As many hospitals undertake small numbers of cases, with few or zero complications, this artificially lowers the overall average.

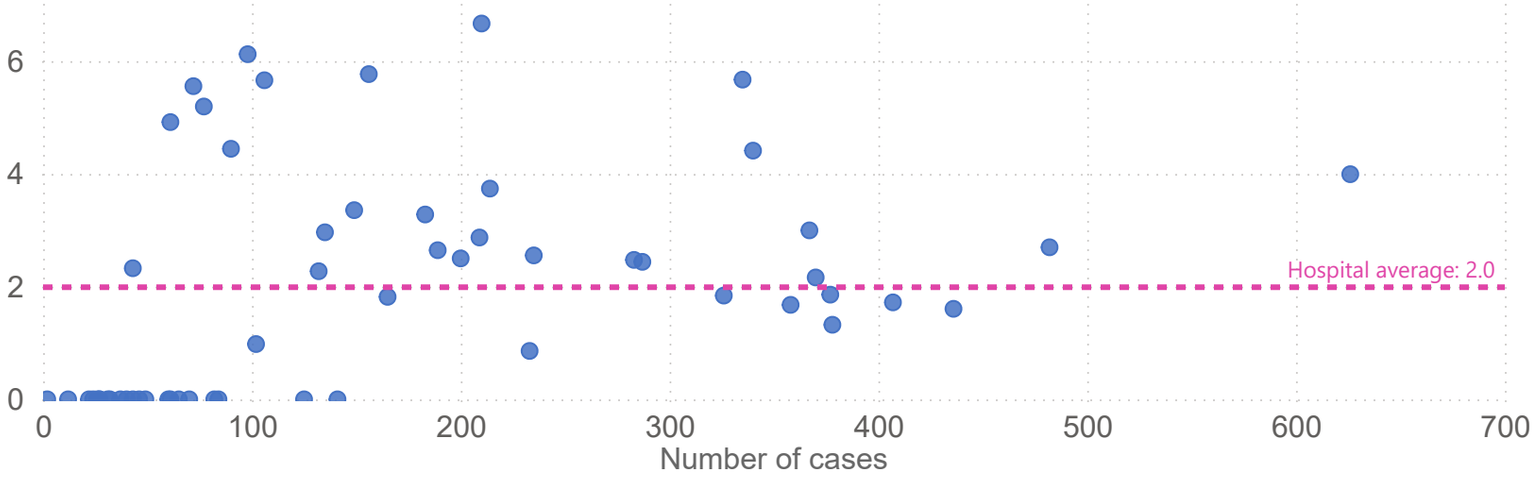
Select Cardiac Network

All

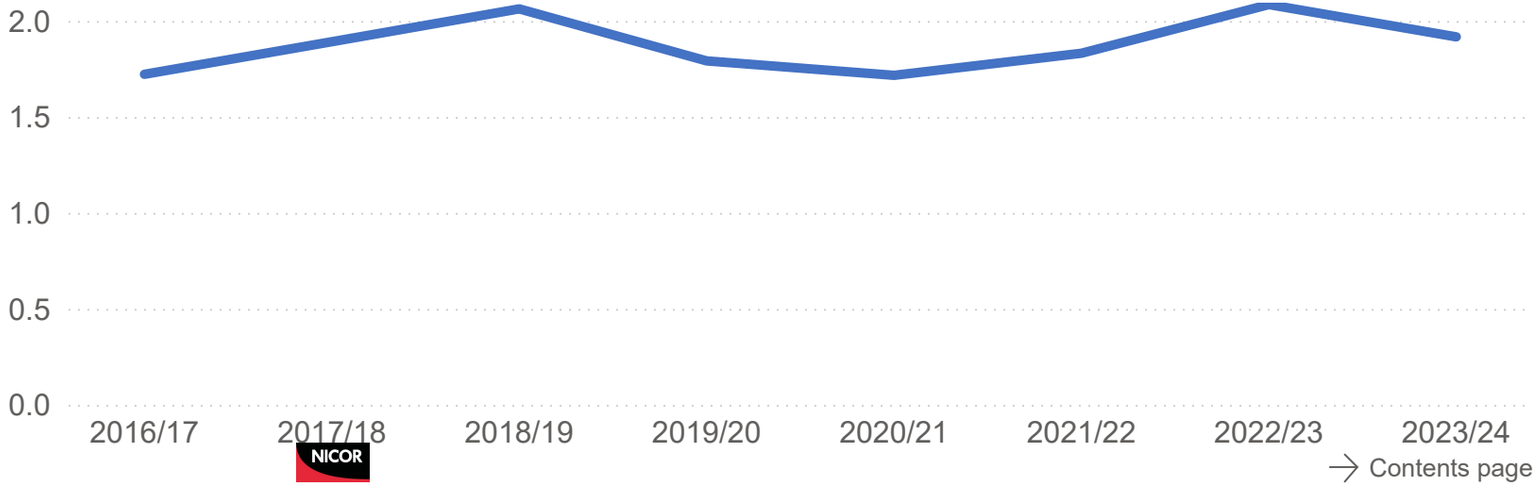
Select hospital

All

Number of procedures and percentage of standard ablations requiring re-intervention within 1 year by hospital (2023/24)



Percentage of standard ablations requiring re-intervention within 1 year



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Patients may not be receiving appropriate levels of care following complex atrial ablation procedures

The re-intervention rates for complex atrial ablations (predominantly atrial fibrillation ablations but also left atrial tachycardia and focal atrial tachycardia) have steadily declined over time.

1-year re-intervention rates were:
- 5.4% for procedures performed in 2023/24
- 5.9% for those treated in 2022/23
- 8.7% for those treated in 2015/16

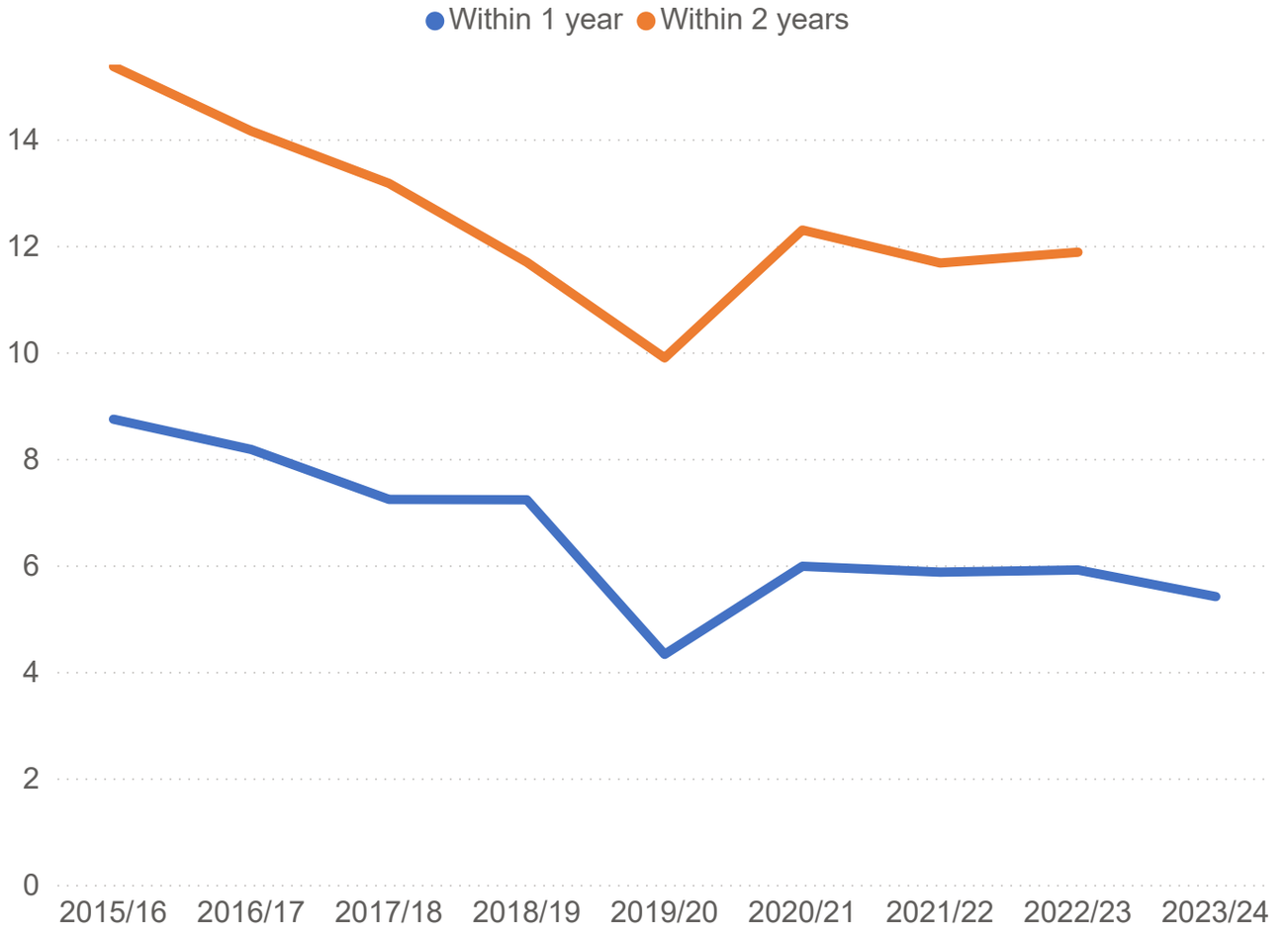
2-year re-intervention rates were:
- 11.9% for those treated in 2022/23
- 11.7% for those treated in 2021/22
- 15.4% for those treated in 2015/16

These compares with around 11% of patients in the USA and up to 17% in some international clinical studies who have repeat ablations within 1 year of their first procedure.

While lower re-intervention rates might superficially suggest improving outcomes, it may also reflect barriers to timely repeat procedures. Patients with symptomatic recurrence after complex atrial ablation should be considered for repeat procedures to optimise rhythm control and quality of life. Access to re-ablation can be influenced by regional service capacity, waiting times, and referral practices.

Note: Most complex atrial procedures are AF ablations, but left-sided and right-sided (not including typical atrial flutter) re-entrant atrial tachycardias (AT), and focal AT are included. Many arrhythmias develop as a result of an AF ablation.

Percentage of complex atrial ablations requiring re-intervention within 1 and 2 years



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1-year re-intervention rates after complex atrial ablations in 2022/23 ranged from 0% to over 10% but lower rates may represent poorer care

5.9% of complex atrial ablation procedures (predominantly atrial fibrillation ablations) undertaken in 2023/24 required re-intervention within 1 year (hospital average 5.5%). Individual hospitals reported rates from 0% to over 20%.

The hospital average is consistent with recent years and below those reported in international studies. Low re-intervention rates may reflect service or access limitations, not necessarily better procedural outcomes and higher re-intervention rates often indicate proactive patient follow-up and timely repeat treatment where needed. Ensuring equitable access to repeat ablation is important for optimising patient outcomes and quality of life.

Select a Cardiac Network or hospital below or hover over the upper graph to see specific data.

Note: In order to show the data for individual hospitals and/or Cardiac Networks, the lower chart is derived by averaging each hospital's re-intervention rate. As many hospitals undertake small numbers of cases, with few or zero complications, this artificially lowers the overall average.

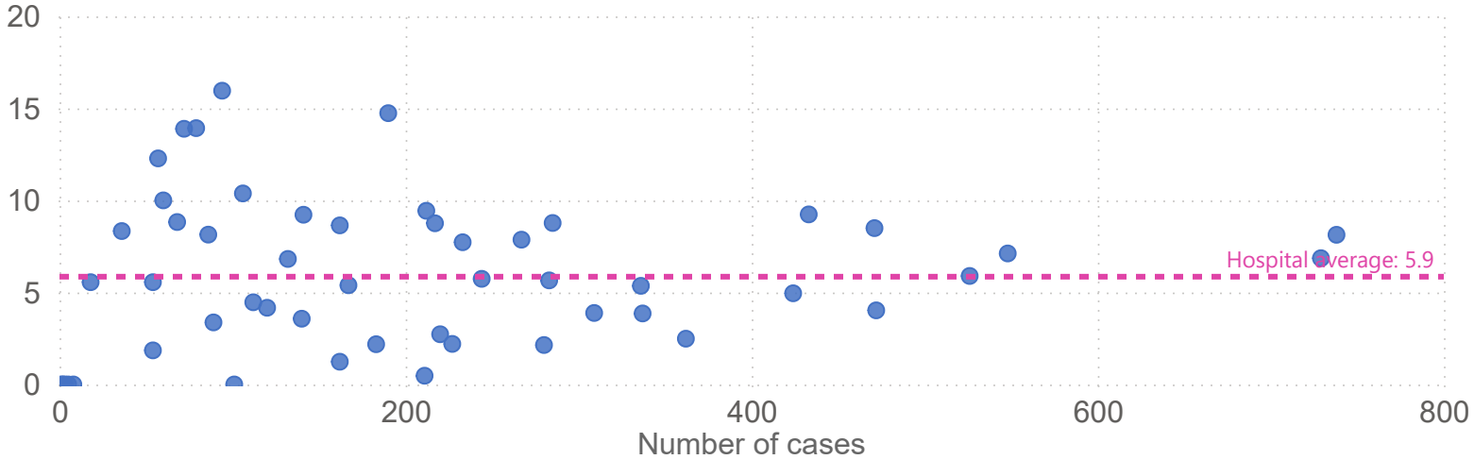
Select Cardiac Network

All

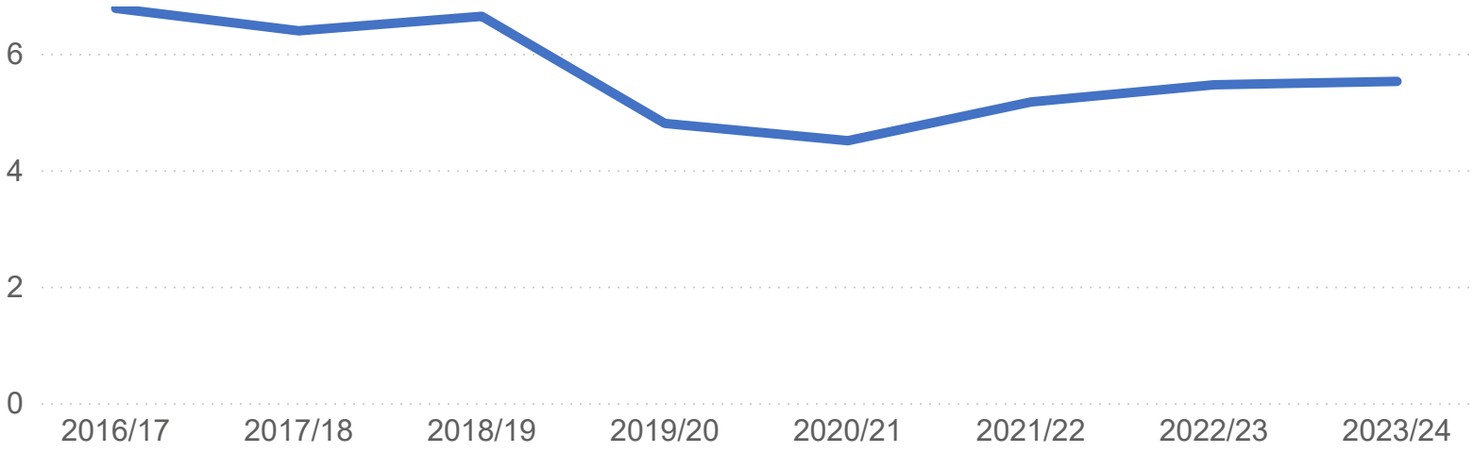
Select hospital

All

Percentage of complex atrial ablation procedures requiring re-intervention within 1 year by hospital (2023/24)



Percentage of complex atrial ablation procedures requiring re-intervention within 1 year



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Many factors have influenced repeat re-intervention rates after complex ventricular ablation procedures

Ventricular ablation procedures remain among the most technically challenging and resource-intensive electrophysiology interventions, performed in smaller numbers compared to atrial ablations and often in patients with advanced structural heart disease.

1-year re-intervention rates were:

- **7.1% for procedures performed in 2023/24**
- **7.7% for those treated in 2022/23**
- **10.2% for those treated in 2016/17**

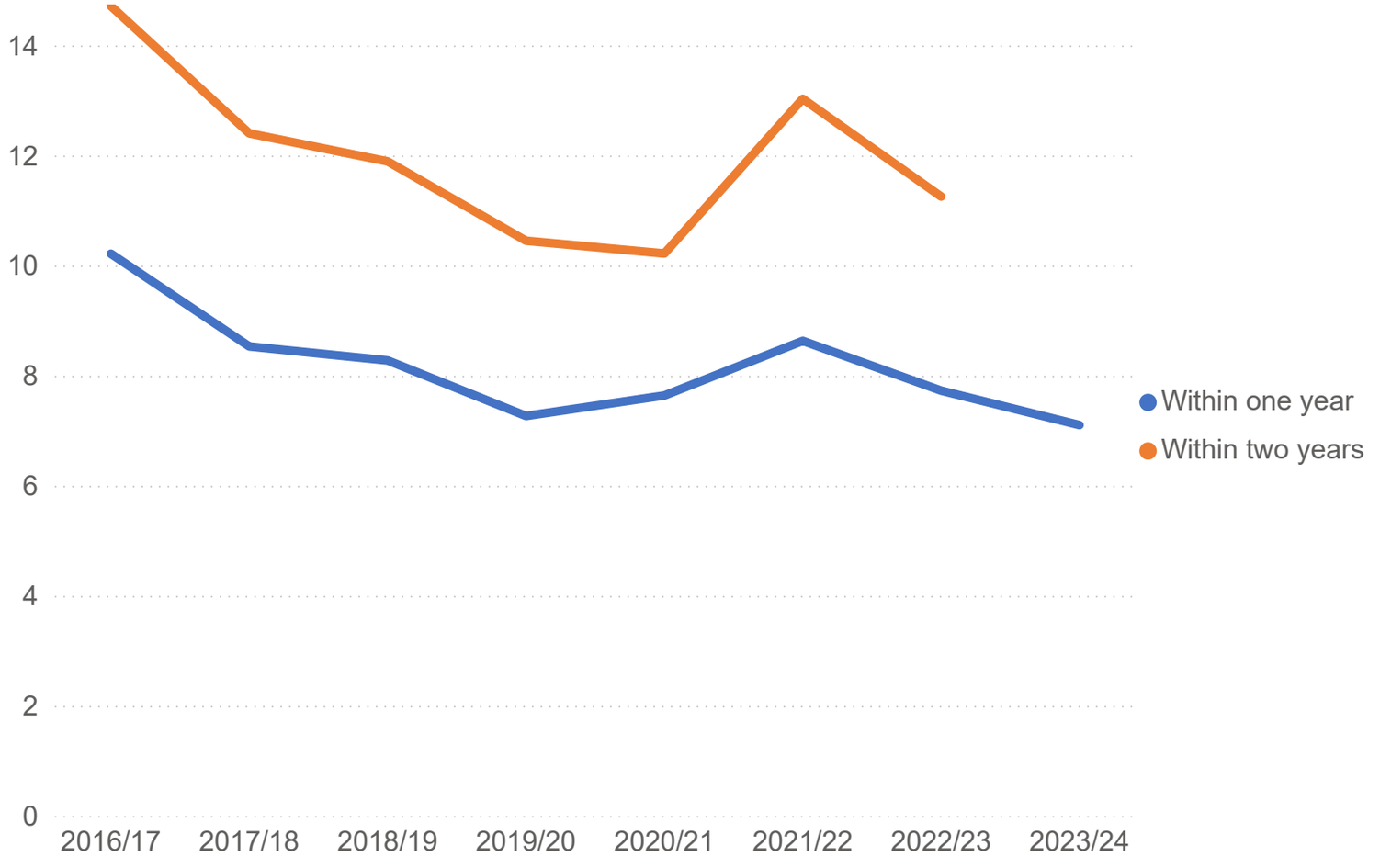
2-year re-intervention rates were:

- **11.3% for those treated in 2022/23**
- **13.0% for those treated in 2021/22**
- **14.7% for those treated in 2015/16**

This downward trend likely reflects improvements in ablation technology, mapping systems, and operator experience, as well as better patient selection and the increased use of adjunctive imaging and substrate-based ablation strategies.

Re-intervention rates remain higher than for other ablation procedures, reflecting greater patient and disease complexity.

Percentage of complex ventricular ablation procedures requiring re-intervention within one and two years



10% of complex ventricular ablations require re-intervention within 1 year, with a large but expected variation in this rate between hospitals

10.2% of ventricular ablation procedures undertaken in 2023/24 required re-intervention within 1 year. Individual hospitals reported rates from 0% to >50%.

This range is expected given the small case volumes per centre and the heterogeneity of underlying pathology and procedural approach. Differences between hospitals should be interpreted with caution given the small number of procedures nationally and the influence of patient complexity alongside differences in case mix, procedural volume, and patient selection rather than variation in care.

The national average re-intervention rate has declined modestly, suggesting incremental improvements in mapping technology, ablation tools, and pre-procedural imaging.

Select a Cardiac Network or hospital below or hover over the graphs to see specific data.

Note: In order to show the data for individual hospitals and/or Cardiac Networks, the lower chart is derived by averaging each hospital's re-intervention rate. As many hospitals undertake small numbers of cases, with few or zero complications, this artificially lowers the overall average.

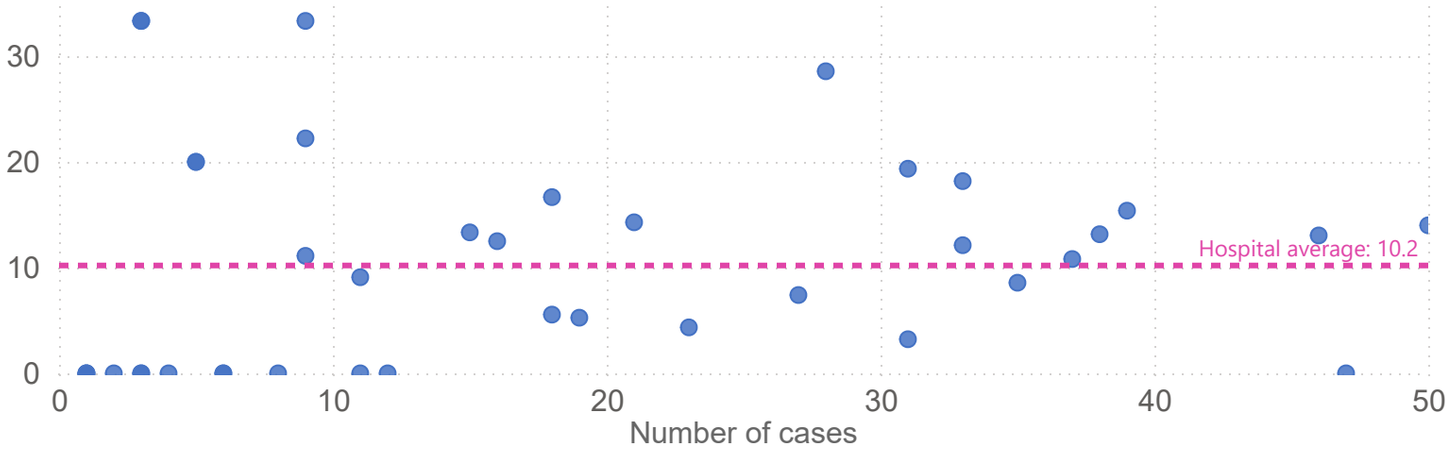
Select Cardiac Network

All

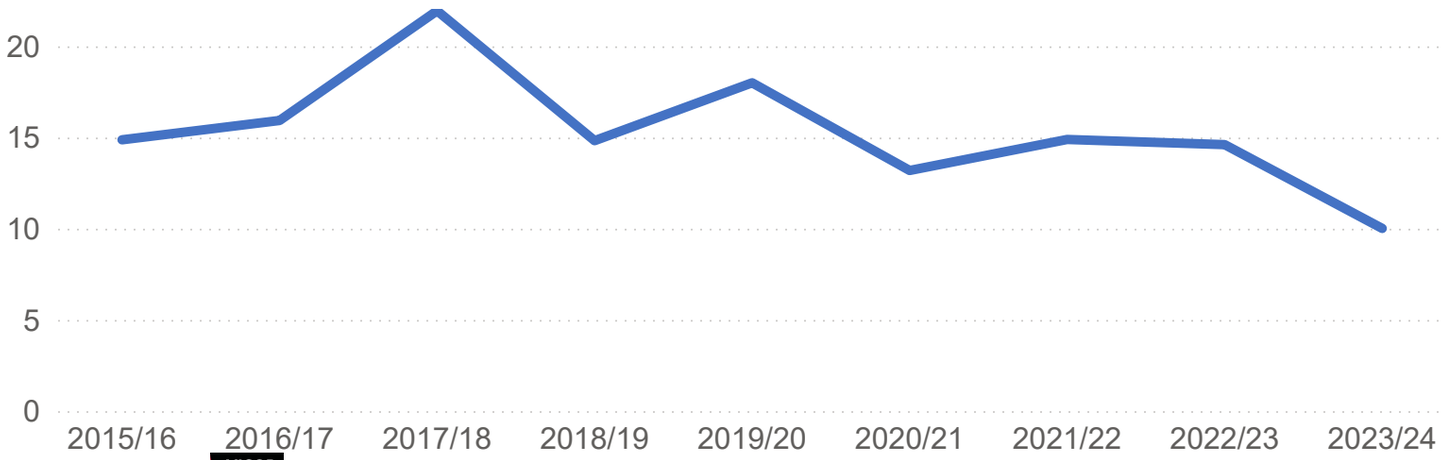
Select hospital

All

Number of procedures and percentage of ventricular ablation procedures requiring re-intervention within 1 year by hospital (2023/24)



Percentage of ventricular ablation procedures requiring re-intervention after 1 year



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There has been a steady increase in the number of leadless pacemakers implants but overall volumes are low

Pacemakers are now sufficiently small to be directly attached to the inside of the right ventricle. This avoids the need for leads placed within the heart. The techniques for implantation are evolving, and at present, they are only available in certain UK centres.

In 2024/25, there were 328 total procedures for leadless pacemakers, down from 517 in 2023/2024. This represents a 37% fall compared to 2023/24. The median age of all patients receiving leadless pacemakers was 69 years and 33% were female.

The proportion of generator changes fell in 2024/25 (21% of total procedures) compared to 2022/2023 (29% of total procedures).

Select a Cardiac Network/hospital/year below or

Select financial year

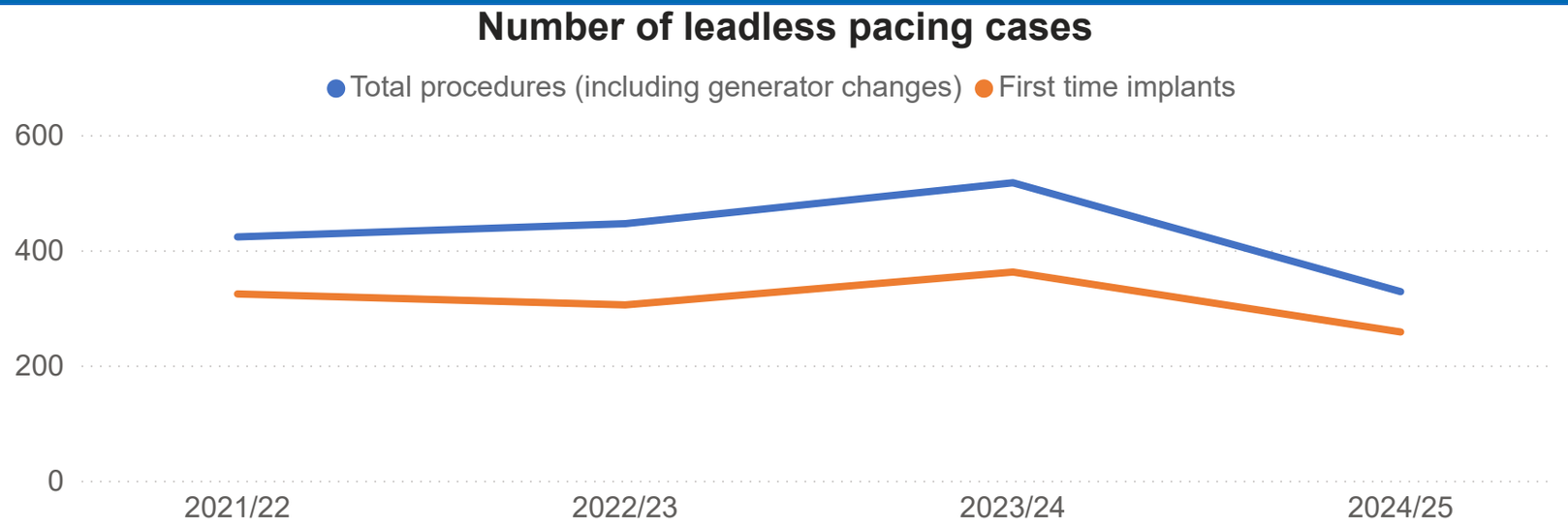
All

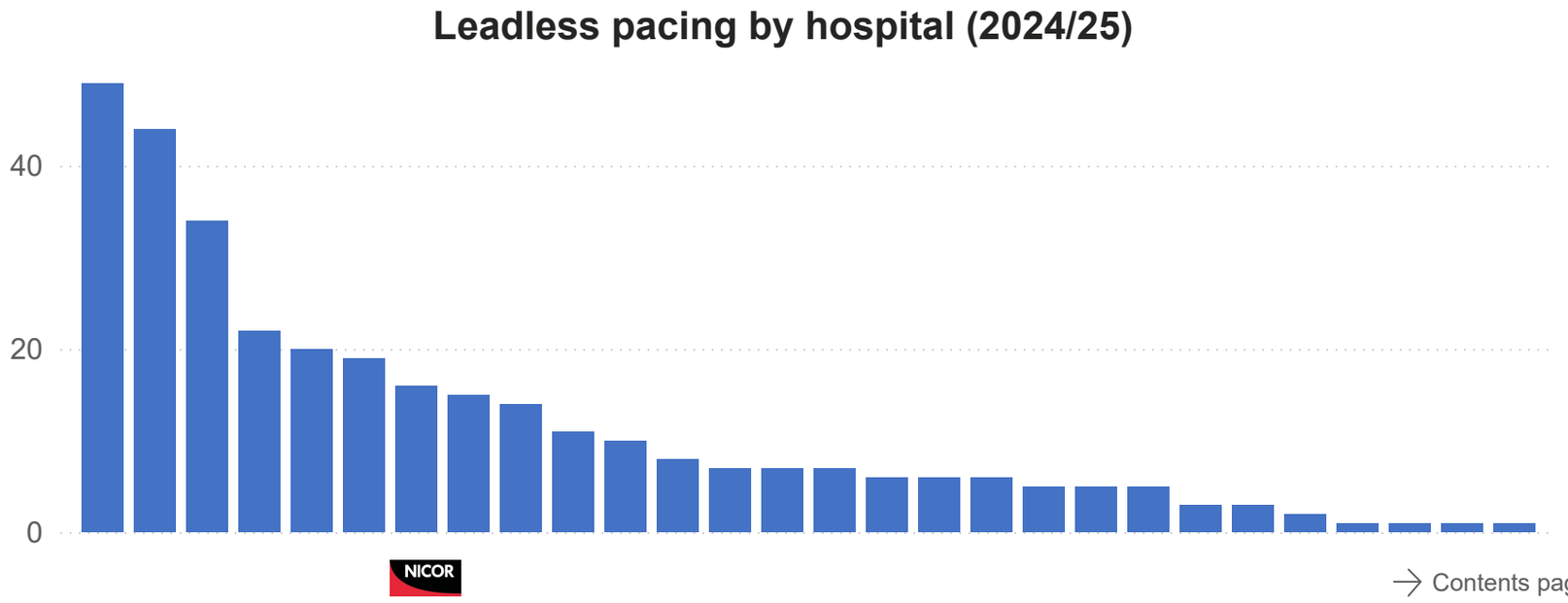
Select hospital

All

Select Cardiac Network

All





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Leadless pacing: access is variable across Integrated Care Boards / Health Boards in England and Wales

The maps show the rate of procedures per million population (pmp) for the:

- 42 Integrated Care Boards (ICBs) in England and 7 Welsh Health Boards (HBs).
- 16 Cardiac Networks (CNs) in England and Wales.

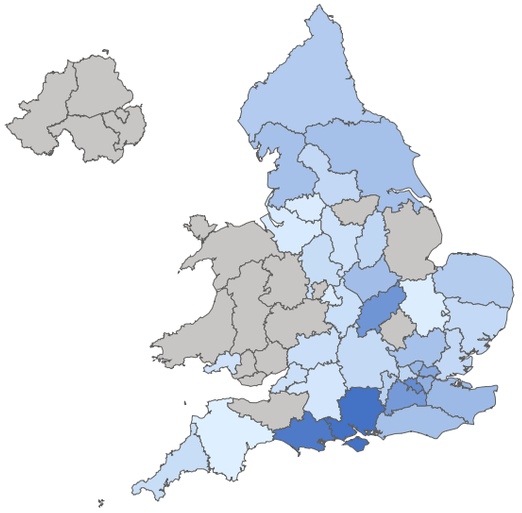
The maps show variation in patient procedures (left) and hospital activity grouped by different areas (middle/right).

As expected with newer technologies, there will be geographic variation. This shows that there are currently many regions without access to leadless pacing, which may change with time.

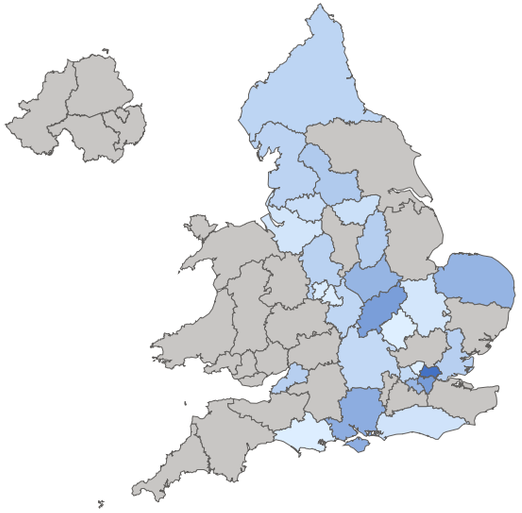
By hospital location, the highest rate is 112 pmp in NHS North East London ICB, and the lowest rate is 1 in 2 ICBs.

Note: Grey regions represents no procedures performed in that region or no data submitted.

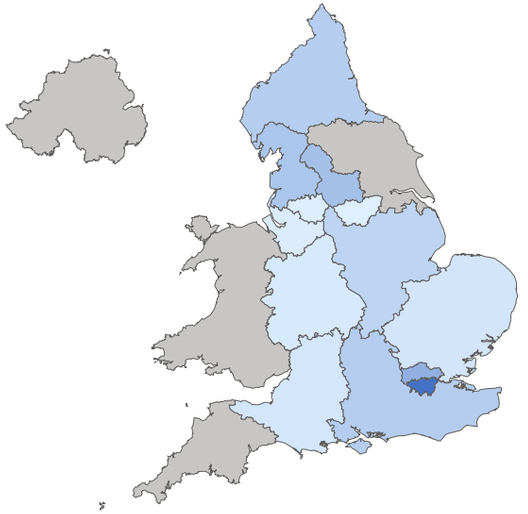
Leadless pacing rates (pmp) by ICB/HB based on patient home location (2024/25)



Leadless pacing rates (pmp) by ICB/HB based on hospital location (2024/25)



Leadless pacing rates (pmp) by Cardiac Network based on hospital location (2024/25)



There was a four-fold increase in conduction system pacemaker implantation from 2023/24 but overall volumes are still low

Conduction System Pacemakers (CSPs) involve targeting a right ventricular lead to sites in the natural conduction system of the heart rather than in conventional anatomical sites. It is hypothesised that such pacing may result in better outcomes than anatomical pacing and possibly cardiac resynchronisation therapy.

In 2024/25, there were 1261 CSP procedures, up from 339 in 2023/2024, a 4-fold increase.

Select a Cardiac Network/hospital/year below or hover over the graphs to see specific data.

Select financial year

All

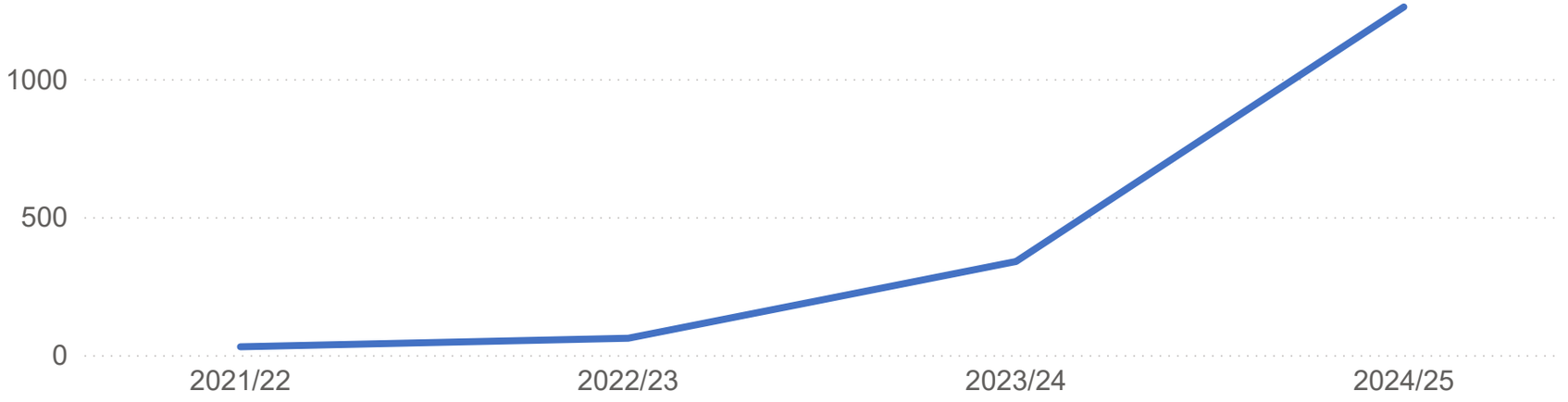
Select Cardiac Network

All

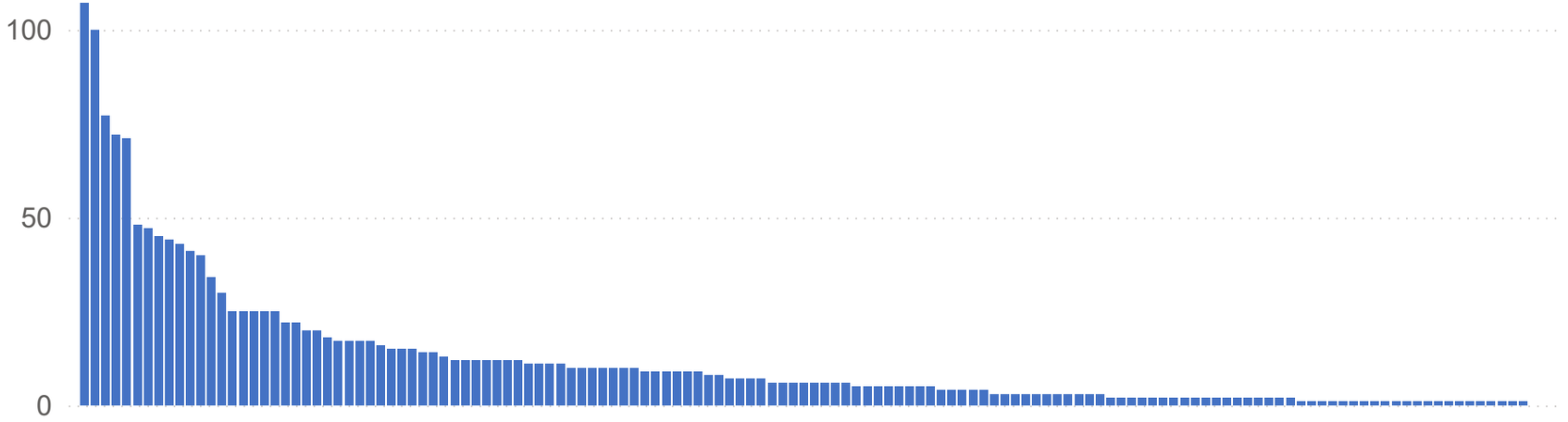
Select hospital

All

Conduction System Pacing procedures



Conduction System Pacing procedures by hospital (2024/25)



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Conduction system pacemakers are a small proportion of total pacemaker implants but are increasingly used in some centres

In 2024/25, the hospital average for the proportion of conduction system pacemakers (CSPs) was 6.7% and the national average was 2.7%. This difference is due to some centres with a high proportion but many centres with few or no procedures.

For those centres implanting CSP devices, the proportion of total pacemaker implants ranged from less than 1% to 32%.

The median age of all patients receiving a CSP was 74 years and 32% were female.

Select a Cardiac Network/hospital/year below or hover over the graphs to see specific data.

Select financial year

All

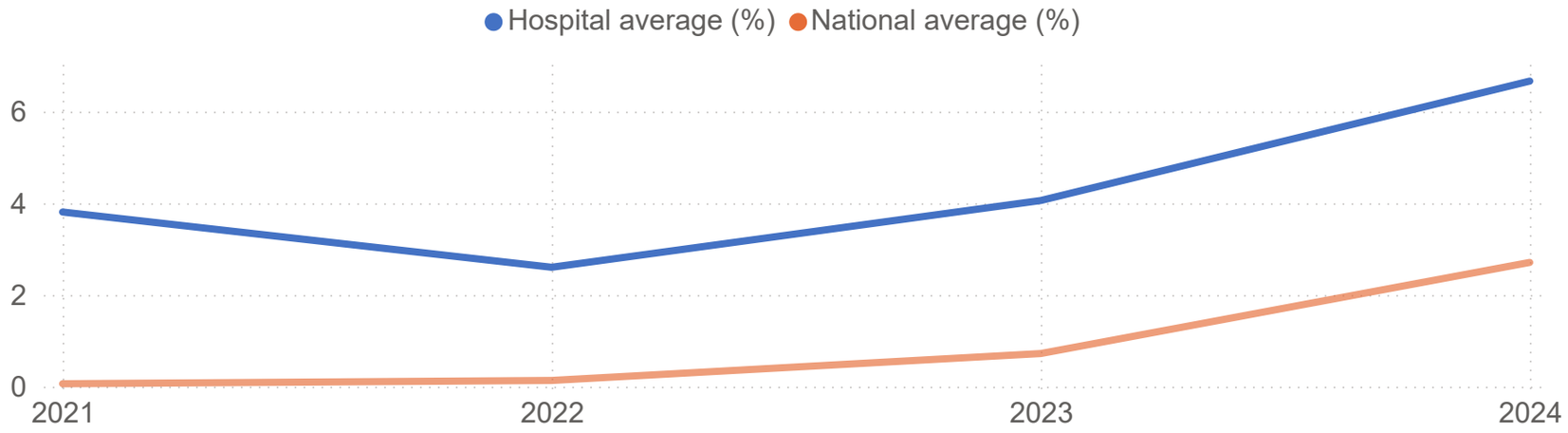
Select Cardiac Network

All

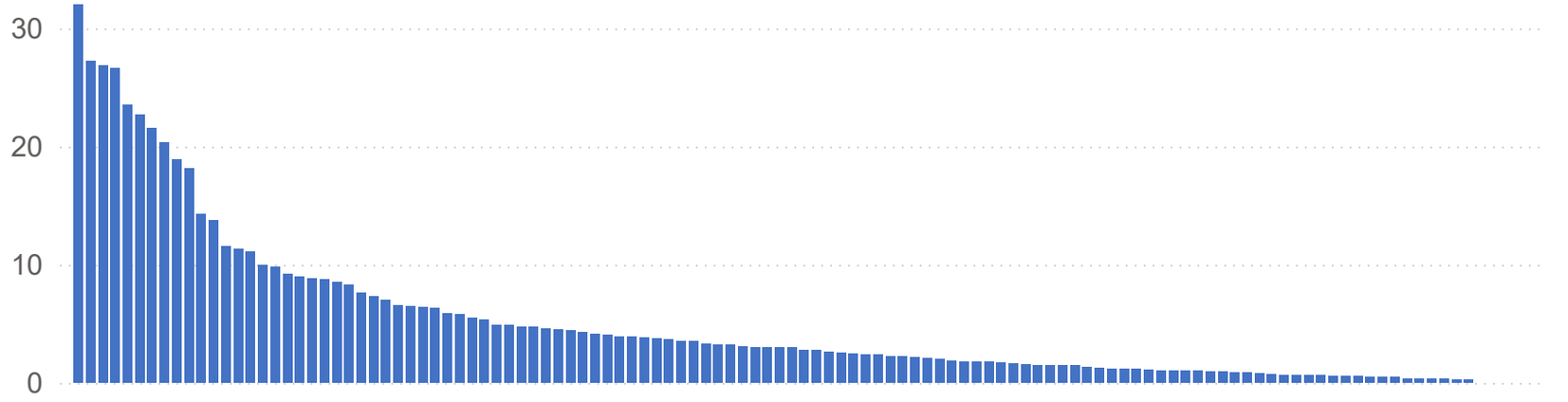
Select hospital name

All

Percentage of all PM implants that use Conduction System Pacing by year



Percentage of all PM implants that use Conduction System Pacing by hospital (2024/25)



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Conduction system pacemakers: access is variable across Integrated Care Boards / Health Boards in England and Wales

The maps show the rate of Conduction System Pacemaker (CSP) procedures per million population (pmp) for the:

- 42 Integrated Care Boards (ICBs) in England and 7 Welsh Health Boards (HBs)
- 16 Cardiac Networks (CNs) in England and Wales.

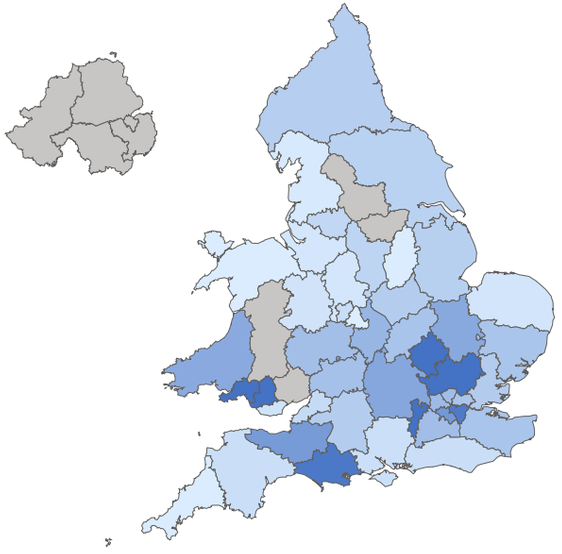
The maps show variation in patient procedures (left) and hospital activity grouped by different areas (middle/right).

As expected with newer technologies, these show that there are currently many regions without access to CSP technology, something which may change with time.

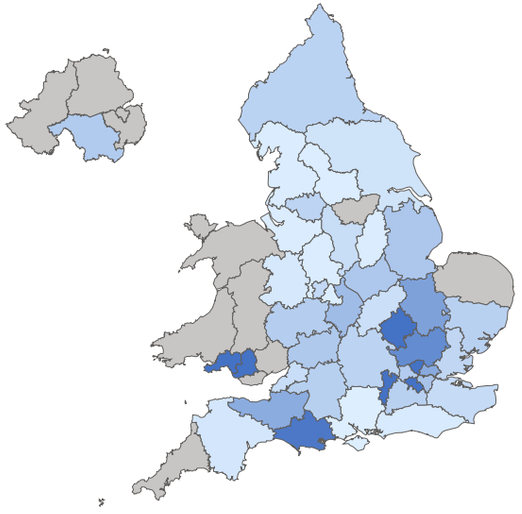
In 2024/25, the highest rate was 92 pmp in Frimley ICB, and the lowest rate was 1 in several ICB/HBs.

Note: Grey regions represents no procedures performed in that region or no data submitted.

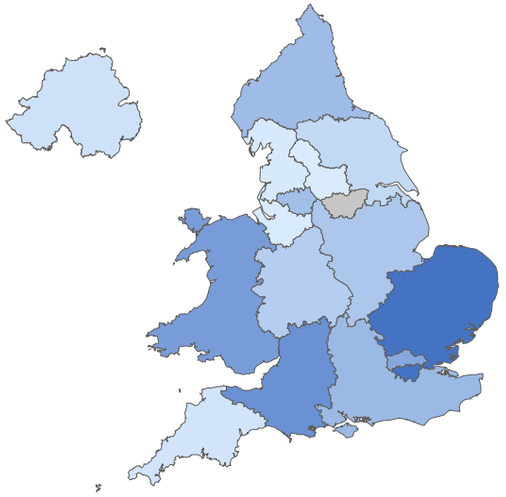
Rate of CSP procedures (pmp) by ICB/HB based on patient home location (2024/25)



Rate of CSP procedures (pmp) by ICB/HB based on hospital location (2024/25)



Rate of CSP procedures by Cardiac Network based on hospital location (2024/25)



The number of non-transvenous defibrillator implants was largely unchanged though there is variability across hospitals

Most implantable cardioverter-defibrillators (ICDs) can also act as pacemakers, though a newer type (termed non-transvenous ICD) has no leads in the heart and cannot pace, except briefly after delivering a shock.

Non-transvenous ICDs have been used for over 10 years. The BHRS recommends they are considered in selected patients needing defibrillators.

There were 732 non-transvenous ICD implants in 2024/2025, a level that has been stable since 2021/22. New models are being recorded and advances may change practice.

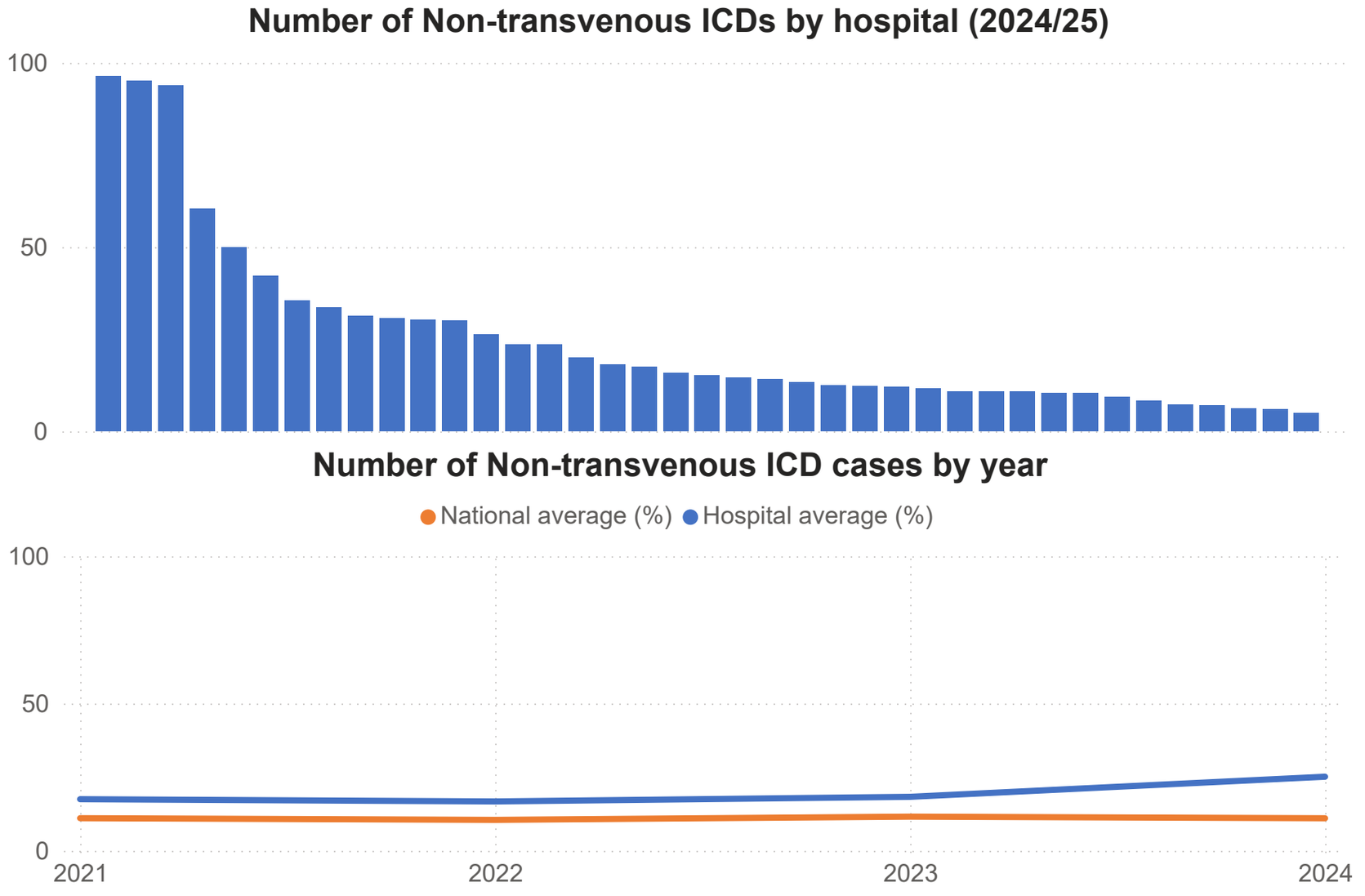
Select a Cardiac Network/hospital below or hover over the graphs to see specific data.

Select Cardiac Network

All

Select hospital

All



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Non-transvenous defibrillators: access varies across Integrated Care Boards / Health Boards in England and Wales

The maps show the rate of non-transvenous defibrillator procedures per million population (pmp) for the:

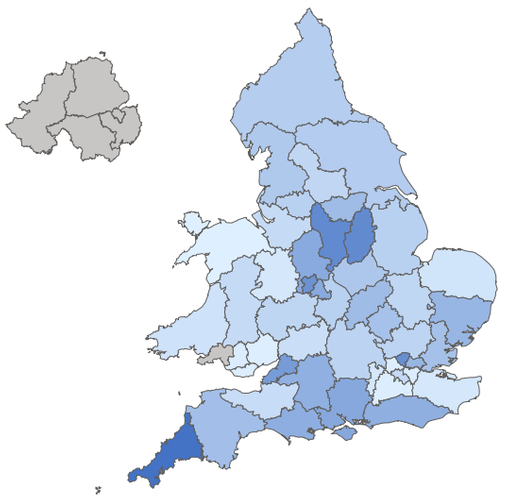
- 42 Integrated Care Boards (ICBs) in England and 7 Welsh Health Boards (HBs)
- 16 of the Cardiac Networks (CNs) in England and Wales.

The maps show variation in patient procedures (left), hospital availability/delivery, and regional availability/delivery. These show that most regions have access to non-transvenous ICD technology. There is greater access to this technology compared to leadless or conduction system pacing. This may be due to a more established evidence base, more mature referral networks and greater procedural training.

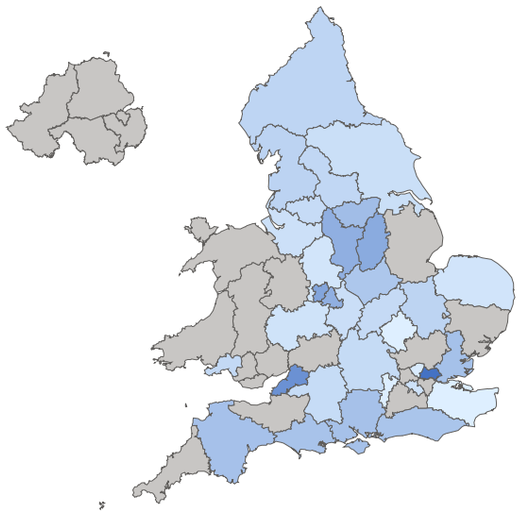
The highest rate is 38 pmp in NHS Cornwall and the Isles of Scilly ICB, and the lowest rate is 0 in Swansea Bay Health Board.

Note: Grey regions represents no procedures performed in that region or no data submitted.

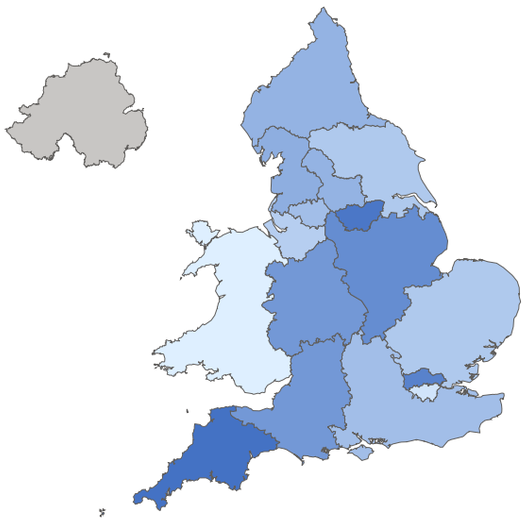
Rate of non-Transvenous ICD procedures (pmp) by ICB/HB based on patient home location (2024/25)



Rate of non-Transvenous ICD procedures (pmp) by ICB/HB based on hospital location (2024/25)



Rate of non-Transvenous ICD procedures by Cardiac Network based on hospital location (2024/25)



Device procedure volume is variable across all categories of operator

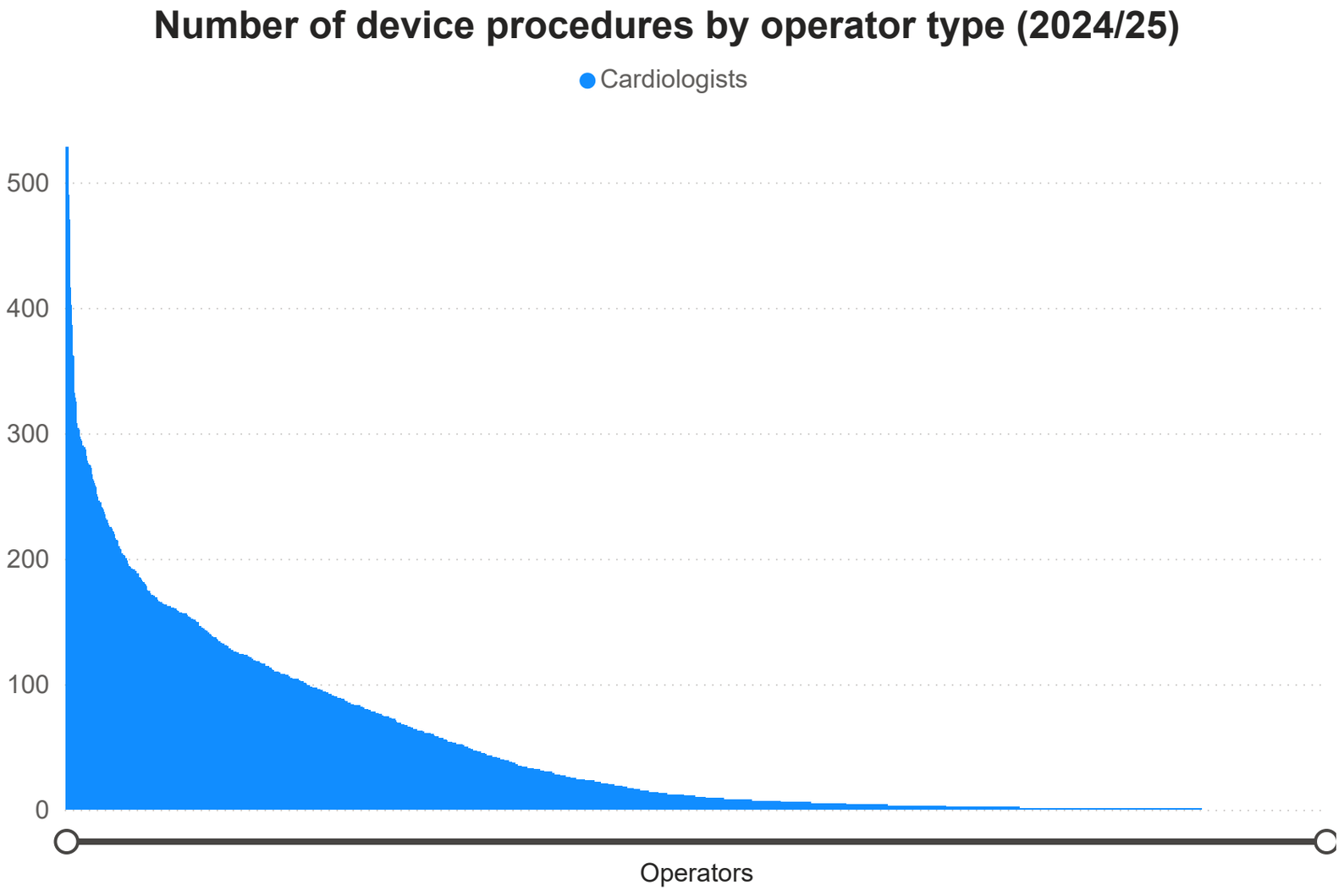
An ablation procedure is assigned to each doctor entered as 1st or 2nd scrubbed operator, or as responsible consultant (hence each procedure can contribute to the totals for more than one doctor).

Doctors have been identified solely using GMC Number and names/registered specialties have been derived from the GMC List of Registered Medical Practitioners (LRMP).

Note: Operator volumes include:

- Consultant Cardiologists (n=1619, range of procedure volumes from 1 - 528)
- Trainees (n=138, range of procedure volumes from 1 - 58)
- Paediatric Cardiologists (n=16, range of procedure volumes from 1-28)
- Unknown (n=189, range of procedure volumes from 1 - 235)

The occasional appearance of unexpected specialties (Other) is generally due to the entry of a valid but incorrect GMC Number. It is therefore important to ensure this is correct. Blanks may indicate fellows not in formal training posts, staff grades, etc. 'Unknown' may refer to unknown GMC number, no GMC number, or non-medical practitioners (e.g. for ILR monitors).



Select operator type

Cardiologists

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69% of doctors met the standard of performing at least 50 catheter ablation procedures per year

Each procedure can contribute to the total procedures undertaken by more than one doctor (each doctor is entered as 1st or 2nd scrubbed operator, or as responsible consultant).

Doctors have been identified solely using GMC Number and names/registered specialties have been derived from the GMC List of Registered Medical Practitioners (LRMP).

69% of consultants met the 2020 BHRS standard for all interventional electrophysiologists to perform at least 50 catheter ablation procedures per year as an 'operator' (as defined above).

Select an operator type below to see specific data.
Note: Operator volumes include:

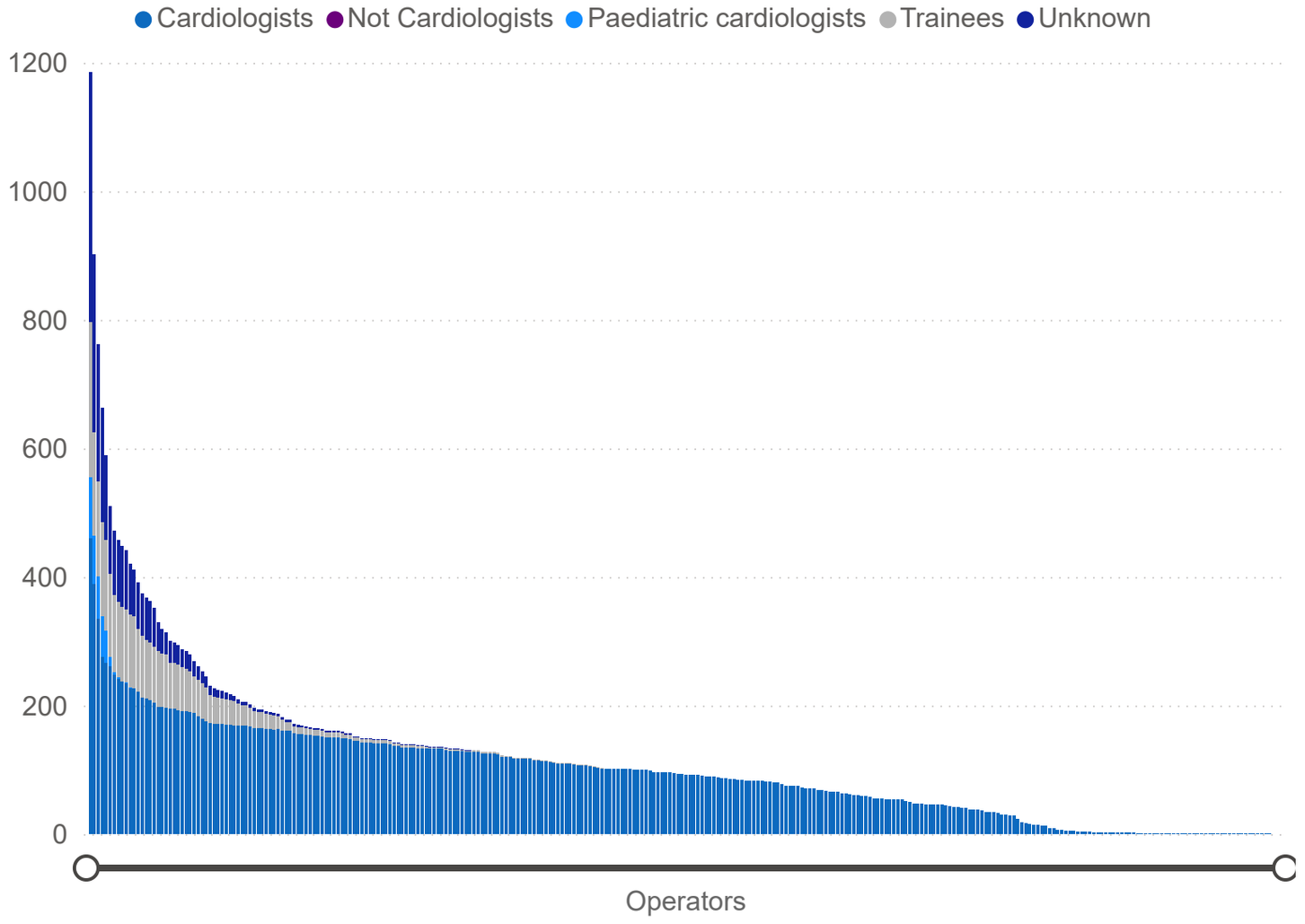
- Consultant Cardiologists (n=1007, range of procedure volume from 1 - 382)
- Trainees (n=89, range of procedure volumes from 1 - 114)
- Paediatric Cardiologists (n=17, range of procedure volumes from 1 - 67)
- Unknown (n=59, range of procedure volumes from 1 - 183).

The occasional appearance of unexpected specialties (Other) is generally due to the entry of a valid but incorrect GMC Number. It is therefore important to ensure this is correct. Blanks may indicate fellows not in formal training posts, staff grades, etc. Unknown may refer to unknown GMC number, no GMC number, or non-medical practitioners.

Select operator type

All

Number of ablation cases by operator type (2024/25)



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https://www.escardio.org/Research/ESC-Atlas-of-cardiology

2023 ESC General Atlas survey

ESC National Cardiac Societies , European Society of Cardiology: the 2023 Atlas of Cardiovascular Disease Statistics, *European Heart Journal*, Volume 45, Issue 38, 7 October 2024, Pages 4019–4062, https://doi.org/10.1093/eurheartj/ehae466

Dual-chamber pacemaker guidance
The National Institute for Health and Care Excellence (NICE) Technology Appraisal (TA324) guidance states that: "*Dual-chamber pacemakers are recommended as an **option** for treating symptomatic bradycardia due to sick sinus syndrome without atrioventricular block".*
The National Institute for Health and Care Excellence (NICE) Technology Appraisal (TA88) states that *"for most people who have sick sinus syndrome with atrioventricular (AV) block, and for those with atrioventricular block without continuous atrial fibrillation, dual-chamber pacing is preferred to single-chamber pacing"*. In previous NACRM reports, this was referred to as Quality Standard 13.

ICD for primary prevention
NICE guidance recommends that an implantable cardioverter defibrillator (ICD) should be implanted for primary prevention when a patient is deemed at risk but has not yet suffered had an aborted sudden cardiac death. Those criteria include:

- Left ventricular dysfunction, with an ejection fraction of ≤35%, despite optimal medical therapy and who are not in NYHA functional class IV.
- A familial cardiac condition with a high risk of sudden death.
- Prior surgical repair of congenital heart disease.

In previous NACRM reports, this was referred to as Quality Standard 14.

ICD for secondary prevention
The National Institute for Health and Care Excellence (NICE) has set criteria for when an implantable cardioverter defibrillator (ICD) should be implanted for secondary prevention. These include patients who, without a treatable cause:

- have survived a cardiac arrest caused by either ventricular tachycardia (VT) or ventricular fibrillation **or**
- have spontaneous sustained VT causing syncope or significant haemodynamic compromise **or**
- have sustained VT without syncope or cardiac arrest, and also have an associated reduction in left ventricular ejection fraction (LVEF) of 35% or less but their symptoms are no worse than class III of the New York Heart Association (NYHA) functional classification of heart failure.

Minimum number of ablations
This was referred to as Quality Standard 5 in previous reports. The British Heart Rhythm Society 2020 recommendations are here.

Re-intervention rates in complex atrial ablation