

# NCAP

NATIONAL CARDIAC AUDIT PROGRAMME

NICOR

## National Congenital Heart Disease Audit (NCHDA)

Annual Report 2025  
(2024/25 and 2022/25 data)





12,225 congenital heart disease (CHD) procedures on adults and children

6% increase in overall procedures

14% more adult procedures

2% more procedures in children but 6% fewer in neonates

10% increase in interventional procedures

15% increase in electrophysiology and implantable device procedures

No increase in surgical procedures

98.7% survival for all paediatric surgical procedures

98.3% survival for all adult surgical procedures

53% antenatal detection of lesions requiring treatment in the first year



1. Hospitals undertaking antenatal screening to diagnose conditions requiring intervention in the first year should improve their success rates by working with congenital heart disease (CHD) networks to review staffing, infrastructure, education and training.
2. All hospitals should consistently enter data to the audit in line with the new definitions of post-procedure complications.



The National Congenital Heart Disease Audit (NCHDA) is part of the National Cardiac Audit Programme (NCAP) which is run by the National Institute for Cardiovascular Outcomes and Research (NICOR).

Congenital heart disease (CHD) is a heart condition or defect that develops before a baby is born. It is a chronic, life-long condition with a spectrum of severity from mild to life-threatening. Approximately 1 in 100 births are affected by CHD and between 20% to 30% of patients will require an intervention during infancy, often as a matter of urgency, with procedural risks highest for neonates who present in poor condition. Encouragingly, the majority survive to adulthood, and improved survival has led to a rapidly growing population of adults with congenital heart disease (ACHD). Both paediatric and adult patients typically require regular and often lifelong follow-up with specialist CHD professionals and tests of cardiac function are a cornerstone of follow-up.

The report focuses on the activity and trends in the treatment of paediatric and adult patients with congenital heart disease in the UK and Ireland (not including Scotland which now has its own Scottish Cardiac Audit Programme). It compares performance against several quality improvement (QI) metrics derived from national and/or international standards and guidelines. The goal of congenital heart disease services is to make a diagnose as early as possible, ideally before birth, referred to as antenatal diagnosis, and provide excellent continuity of care as patients progress through childhood and into adulthood.

**This report is of value to a wide range of stakeholders but more importantly it allows patients and their relatives to better understand CHD care and its outcomes in the UK. The slides in the report are interactive so you can select and explore the data that interests you.**

An [appendix to this report](#) contains more detailed data on activity and outcomes. Additional information on the design and running of the audit, including definitions and methodology, is available from the National Institute for Cardiovascular Research (NICOR) [website](#).

The audit relies on the active contribution of participating hospitals. Detailed information about more than 12,500 procedures has been diligently entered by local clinicians and audit teams, queried and cleaned before analysis is undertaken by the NICOR team. We are very grateful to all these staff for their contributions. We will continue to work closely with hospitals, patients, and other stakeholders to improve the quality of audit data and how these are used to improve the delivery of high-quality CHD care in the UK.

**The NCHDA NICOR Audit Team**

[The link to the new appendix will be added at the time of publication.](#)



## Number of procedures

Total submissions

Countable procedures by age

Countable procedures by category

Monthly countable procedures by category

Countable procedures by hospital over time

Countable procedures by hospital detail

## Mortality

Unadjusted child mortality

Child mortality - VLAD

Child mortality - PRAiS4.2

Child mortality - PRAiS4.2 outliers

Unadjusted adult mortality

Adult mortality - STAT

Adult mortality - STAT outliers

## Complications

Post-procedural complications

## Antenatal diagnosis

Antenatal diagnosis

Antenatal diagnosis by ICB/HB

Antenatal diagnosis - 4 lesions

## References

## Appendix (takes you to separate report)

[The link to the appendix can only be set up on publication.](#)

# The total number of procedures for patients with congenital heart disease has reached the level of the pre-pandemic year 2019/20 but is 6% lower than 2016/17



## Total congenital heart disease (CHD) procedures in NHS hospitals

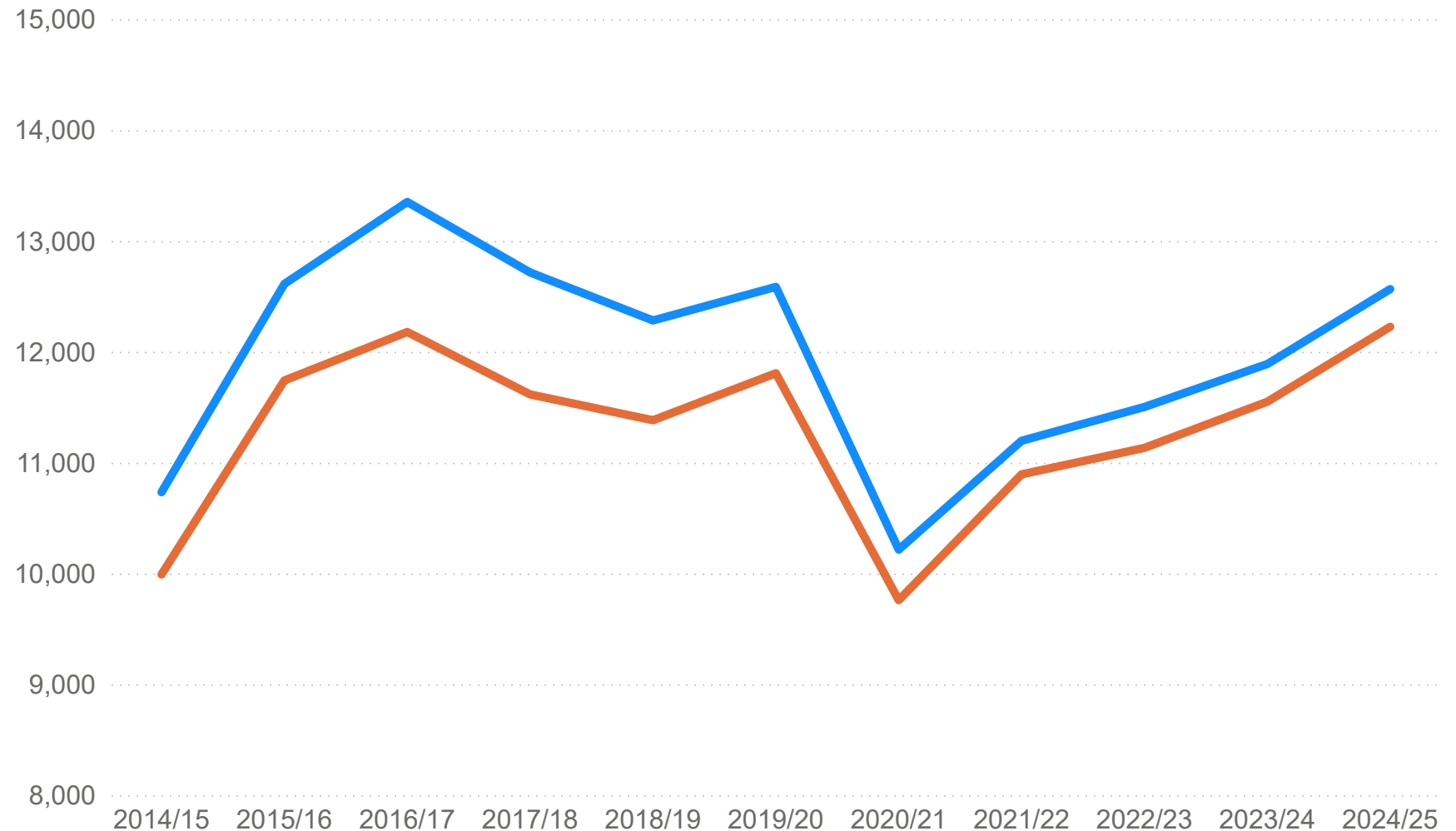
Procedure Type ● Total procedures ● Total countable procedures

**In 2024/25, records relating to a total of 12,565 congenital heart disease (CHD) procedures in children and adults were submitted to the audit where 12,225 are countable procedures (Surgical, Intervention, EP/PACING/ICD and diagnostic catheter).**

This is 6% higher than in 2023/24 and more than the number received in 2019/20, prior to the COVID-19 pandemic, but is still lower than the peak seen in 2016/17.

*Note: 'Countable procedures' were delineated by an NHS England-led subcommittee of congenital heart disease specialists in 2017 (see [here](#)).*

*Note: The centres at Evelina and Royal Brompton Hospital have merged and are now reporting as a single unit (Guy's and St Thomas' Hospital NHS Foundation Trust or GSTT) so the data are from 10 paediatric centres. In subsequent slides showing ten year trends, their individual activity will be shown.*



# The number of adults undergoing CHD procedures is steadily increasing while cases across all paediatric age groups are below pre-pandemic levels



**The prevalence of adult congenital heart disease (ACHD) is rising as children with CHD transition from paediatric to adult services.**

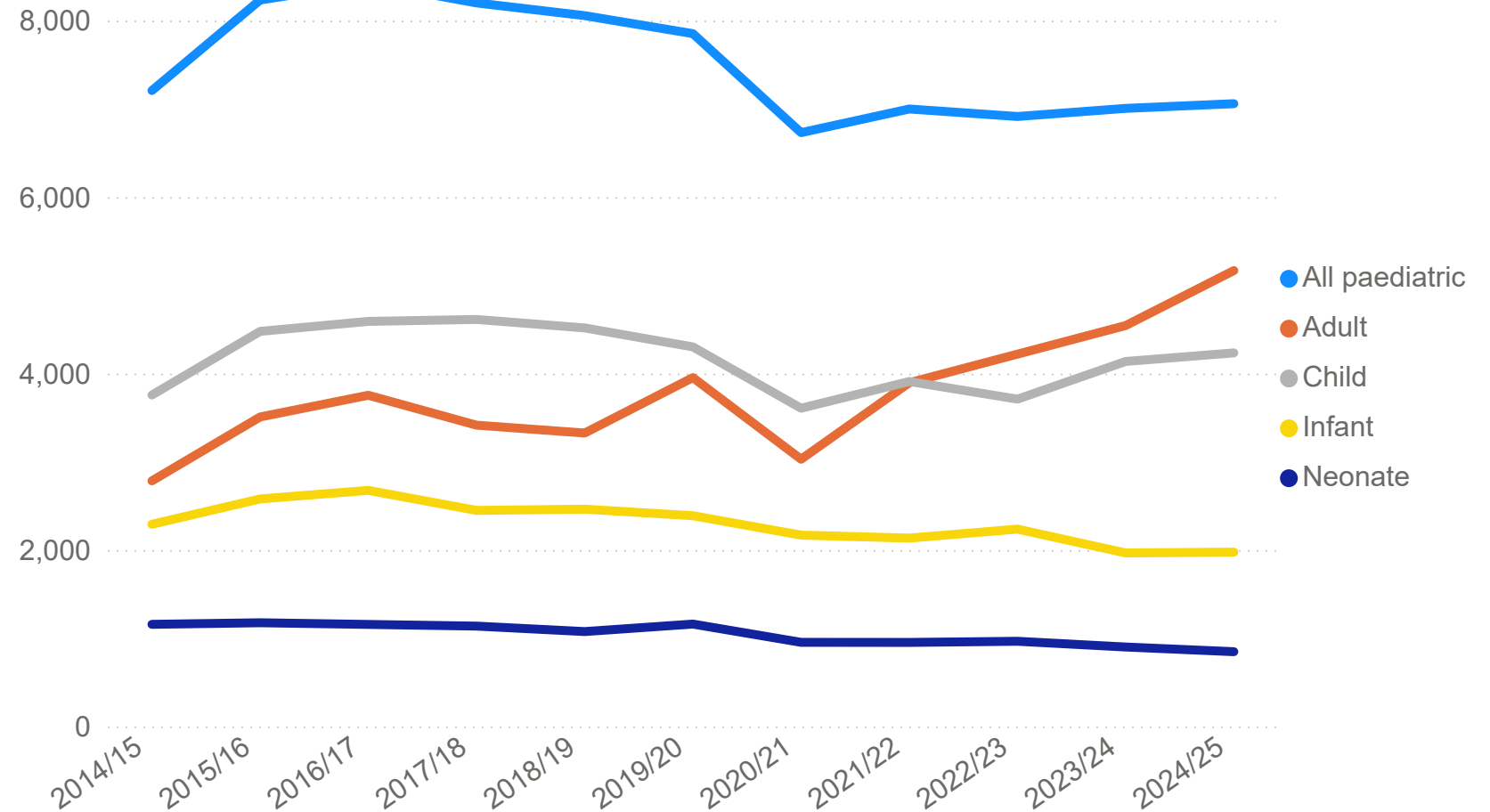
The number of CHD procedures in adults (16 years and above) was 31% higher in 2024/25 than 2019/20, prior to the COVID-19 pandemic.

**The number of CHD procedures for the neonatal, infant and child groups all remain below pre-pandemic levels.**

A number of factors may be driving the reduction in paediatric cases:

- Falling birth rate in the UK
- Change to the number of patients requiring procedures
- Shift in the mix of case by type, risk and other factors
- Use of different treatment strategies (e.g. undertaking a complex procedure earlier rather than having an initial simpler procedure followed by another later)
- The impact of developments in paediatric interventional practice which replaces the need for surgical procedures (e.g. percutaneous balloon dilation of valves).

## CHD procedures by age group



# There is a rise in CHD interventional procedures compared to 2023/24 and activity is 17% higher than prior to the pandemic



The number of interventional procedures increased by 10% compared to 2023/24 and was 17% higher than in 2019/20.

Surgical procedure numbers have not increased and remain below pre-pandemic levels.

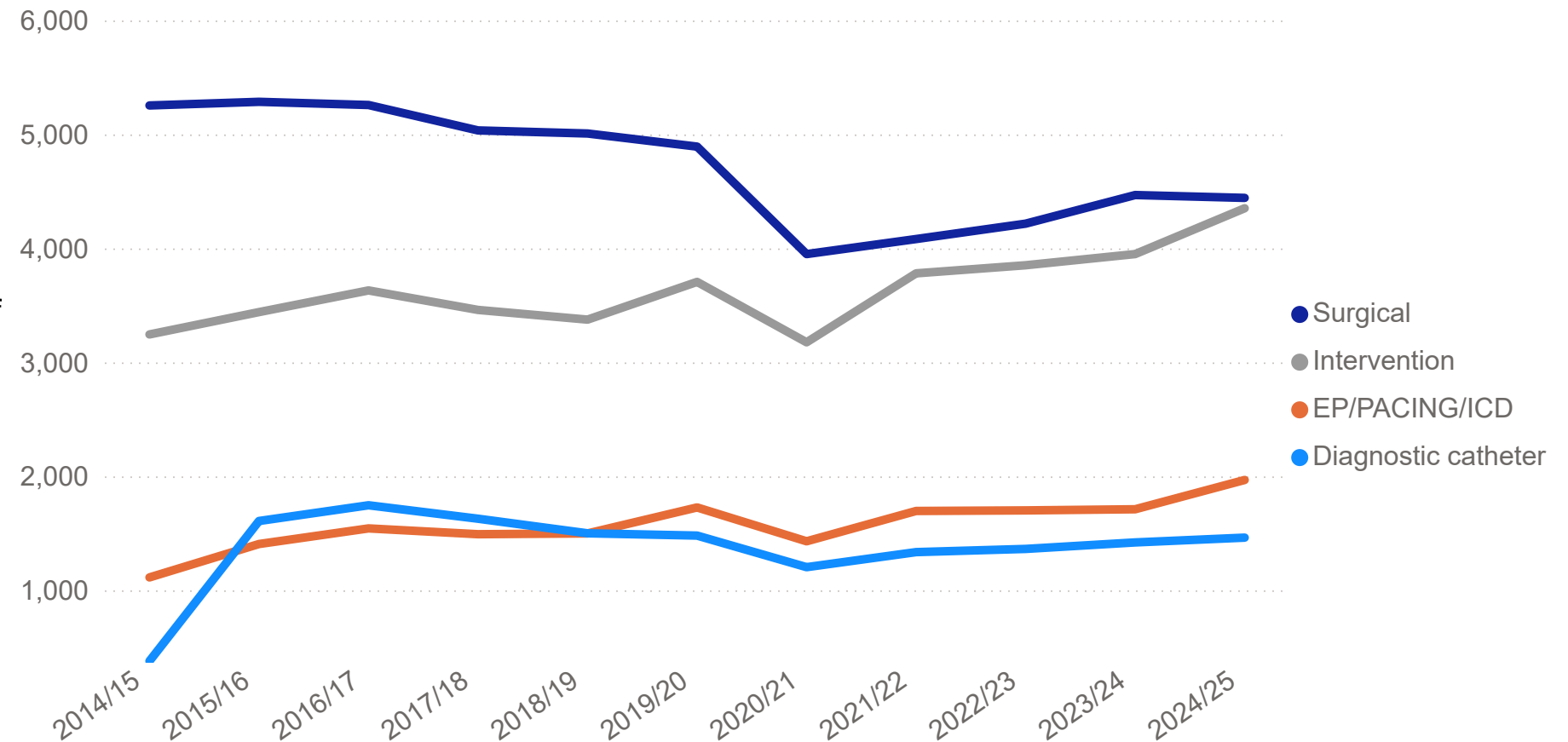
There was a 15% rise in heart rhythm management (EP/PACING/ICD) procedures from 2023/24 to 2024/25.

The changes seen may reflect a number of different factors including:

- Case mix and patient requirements
- Changing treatment strategies
- Infrastructure challenges and availability of resources following the pandemic (e.g. staffing issues).

*Note: Not all hospitals reported data on certain procedures (e.g. diagnostic catheters) from 2012/2013*

## CHD procedures by category



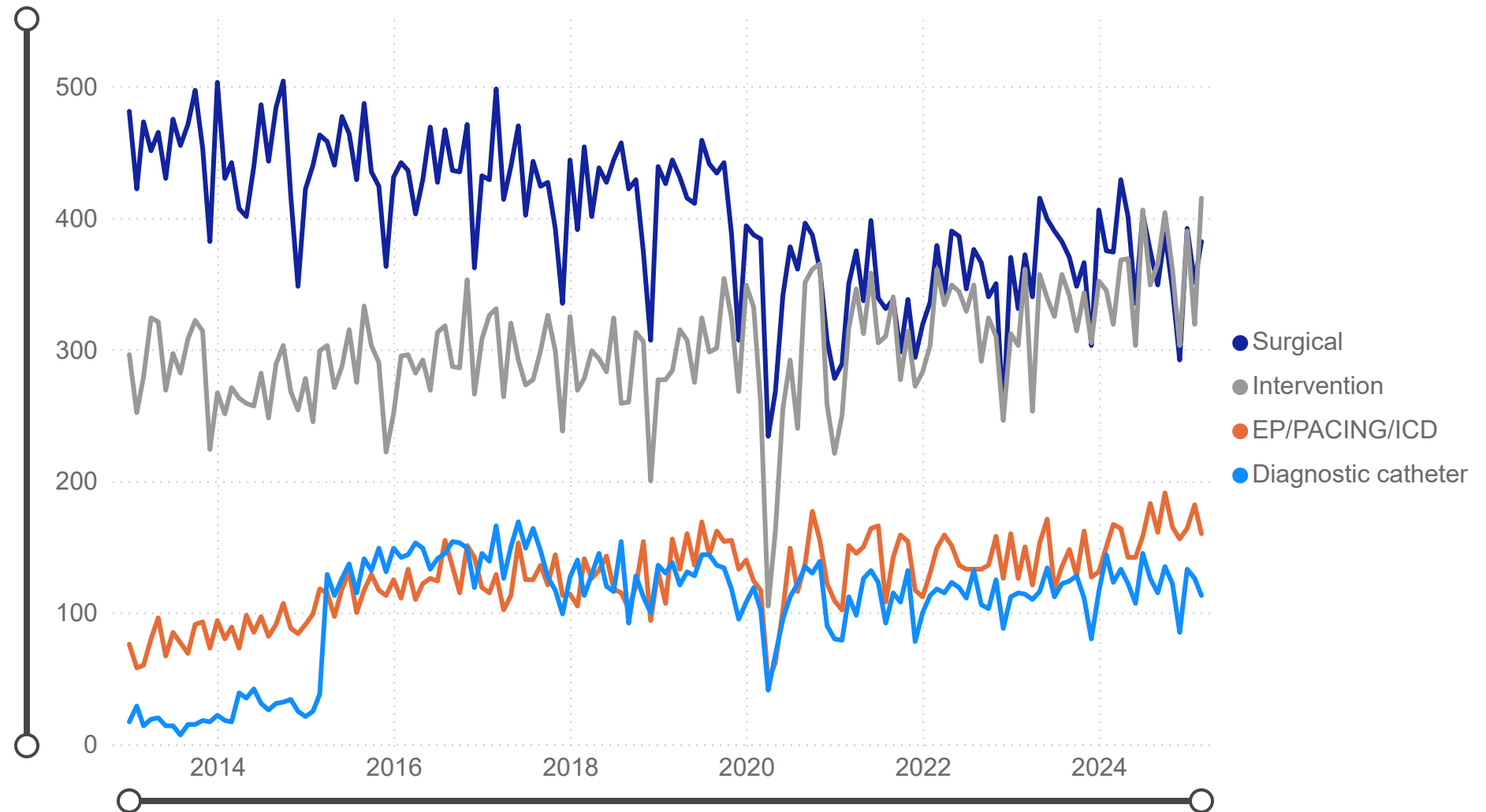
# Monthly activity data highlight trends and variation with a steady rise in catheter-based procedures



**The number of monthly interventional procedures is now about the same as that for surgical procedures.**

Continuous growth has been seen in non-surgical procedures over the last 10 years, with a steady rise in catheter-based procedures (both intervention and EP).

## Monthly CHD procedures by category



# There are marked differences between hospitals in the number of different CHD procedures performed over time



Select a hospital below to see the number of CHD procedures performed by category over time.

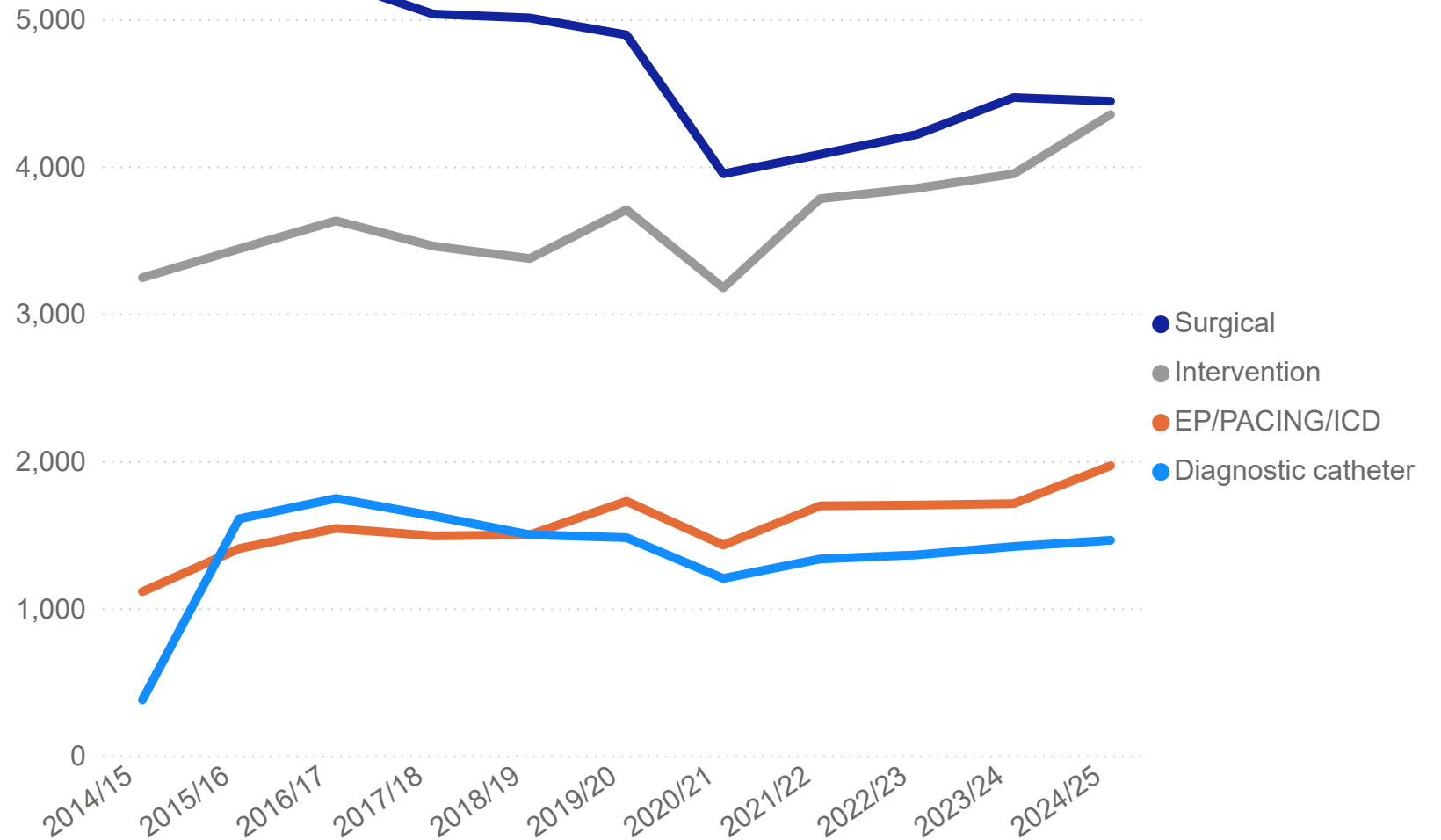
Note: Surgical procedures include patients requiring:

- Bypass
- Non-bypass including EP procedures undertaken by surgeons
- Primary ECMO (Extracorporeal Membranous Oxygenation) when this procedure is undertaken in isolation and not as a support operation after another congenital heart procedure (these are considered post-procedural complications)
- Lung transplant
- Ventricular assist devices (VADs)
- Hybrid procedures (those with a combination of surgical or transluminal catheter interventions undertaken at the same time in the operating theatre).

Select hospital

All

## CHD procedures by category



# Overall procedural activity has increased in most centres, but there is important inter-centre variability by procedure type



12,225

Total

4,443

Surgical

4,352

Intervention

1,968

EP/PACING/ICD

1,462

Diagnostic catheter

↑16%

Change on previous year

Financial Year

2024/25

Hospital

All

Age Group

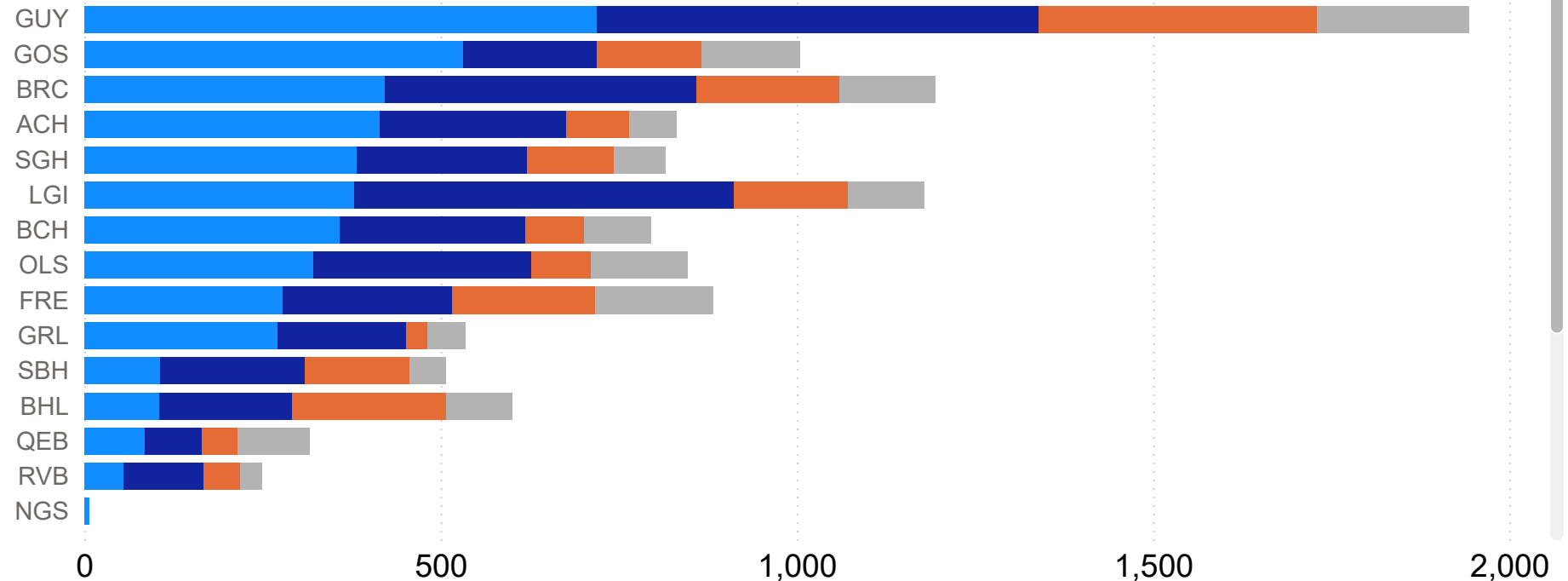
All

Procedure Type

All

## CHD procedures by category by hospital

● Surgical ● Intervention ● EP/PACING/ICD ● Diagnostic catheter



Note: Some hospitals with small volumes may perform fewer than three cases in some categories. To comply with small number suppression, numbers <3 are not shown and the totals for these centres will therefore be slightly lower than their actual activity. 'x' in totals means a number between 0 and 9 has been deleted.

# The unadjusted 30-day surgical mortality for cases involving children with congenital heart disease has fallen over the last 10 years

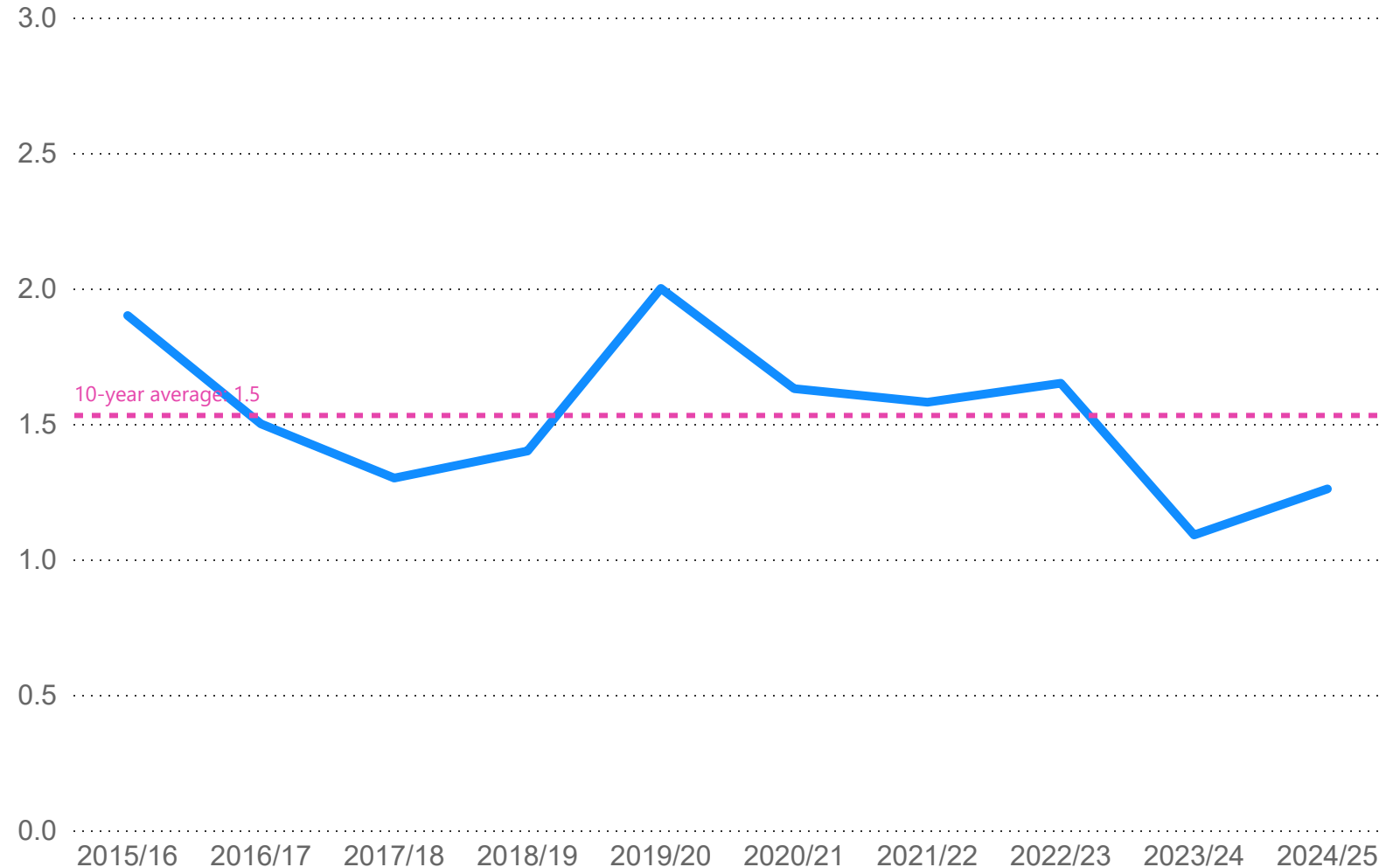


**In 2024/25, the overall unadjusted 30-day mortality was 1.26%.**

This is based on 3,176 surgical procedures undertaken in children under 18 years old.

The 10-year average is 1.5%.

## Unadjusted 30-day surgical mortality (%) in children under 16 years



# Risk-adjusted mortality based on VLAD charts shows that the outcomes for children with congenital heart disease are better than predicted

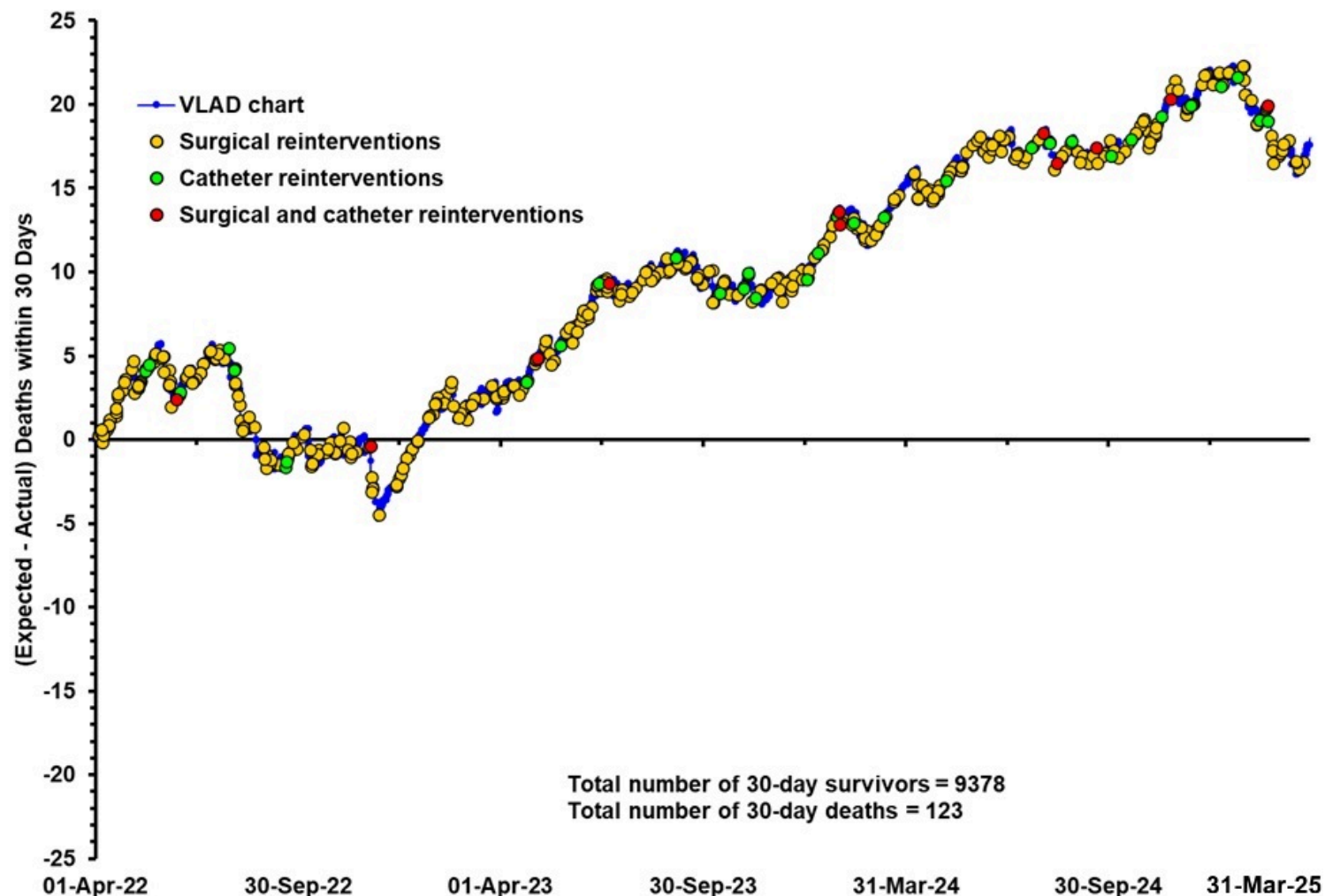


Specialist centres monitor the outcomes of their own services using Variable Life Adjusted Display (VLAD) plots.

These show the predicted number of deaths minus the actual number at 30 days post-surgery, along with the number of re-interventions.

**Over the 3 years from April 2022 to March 2025, there was a continuing improving trend in outcomes for all centres compared with the predictions from the PRAiS v4.2 risk model.**

This underlines how surgical teams continue to deliver high quality outcomes for children undergoing CHD procedures.



# Overall risk-adjusted 3-year results for children under 18 years of age showed better than predicted survival rates



To compare mortality outcomes across centres, it is necessary to adjust for the relative complexity of the cases that are being undertaken.

This is done using the PRAiS v4.2 model which reports the ratio of the actual versus the predicted survival of patients (calculated over the **9,502** paediatric patients operated upon during the 3-year 2022/25 period).

**Over the last 3 years, the overall survival ratio of 98.7% was slightly higher than the survival predicted by the PRAiS v4.2 model (98.5%).**

**The total number of deaths has fallen as a result of a significant drop in mortality at some centres and all centres had survival rates that were equal to or better than predicted.**

There is though noticeable variance between centres in the average predicted mortality per case, from 1.1% for London Evelina and Glenfield Hospital, Leicester to 2.0% for Dublin, highlighting their different CHD risk profiles and case-mixes.

*Note: A description of the PRAiS v4.2 model can be found [here](#) along with the relevant alert and alarm control limits to warn where performance may be of concern.*

Key:  
GSTT = Guy's and St Thomas' NHS Foundation Trust

## Actual and predicted average survival rates for paediatric CHD cases using the PRAiS4.2 model (2022/23 to 2024/25)

Hospital	Code	Surgical Episodes	Survivors	Deaths	Actual Survival	Predicted Survival
Birmingham Children's Hospital	BCH	1031	1013	18	98.3%	98.5%
Dublin Our Lady's Children's Hospital	OLS	920	910	10	98.9%	98.5%
Leeds General Infirmary	LGI	813	797	16	98.0%	98.5%
Leicester Glenfield Hospital	GRL	615	609	6	99.0%	98.5%
Liverpool Alder Hey Hospital	ACH	984	962	22	97.8%	98.5%
London Evelina London Children's Hospital	GUY/GSTT	1571	1552	19	98.8%	98.5%
London Great Ormond Street Hospital for Children	GOS	1507	1499	8	99.5%	98.5%
Newcastle Freeman Hospital	FRE	494	484	10	98.0%	98.5%
Southampton Wessex Cardiothoracic Centre	SGH	800	795	5	99.4%	98.5%
Bristol Royal Hospital for Children and Bristol Heart Institute	BRC	767	758	9	98.8%	98.5%
Total		9502	9379	123	98.7%	98.5%

# Survival rates for children undergoing congenital heart disease procedures are as good as, or better than, predicted



The results from the PRAiS v4.2 risk-adjustment model can also identify 'outliers' by showing whether the survival outcomes achieved were as predicted, much higher or much lower.

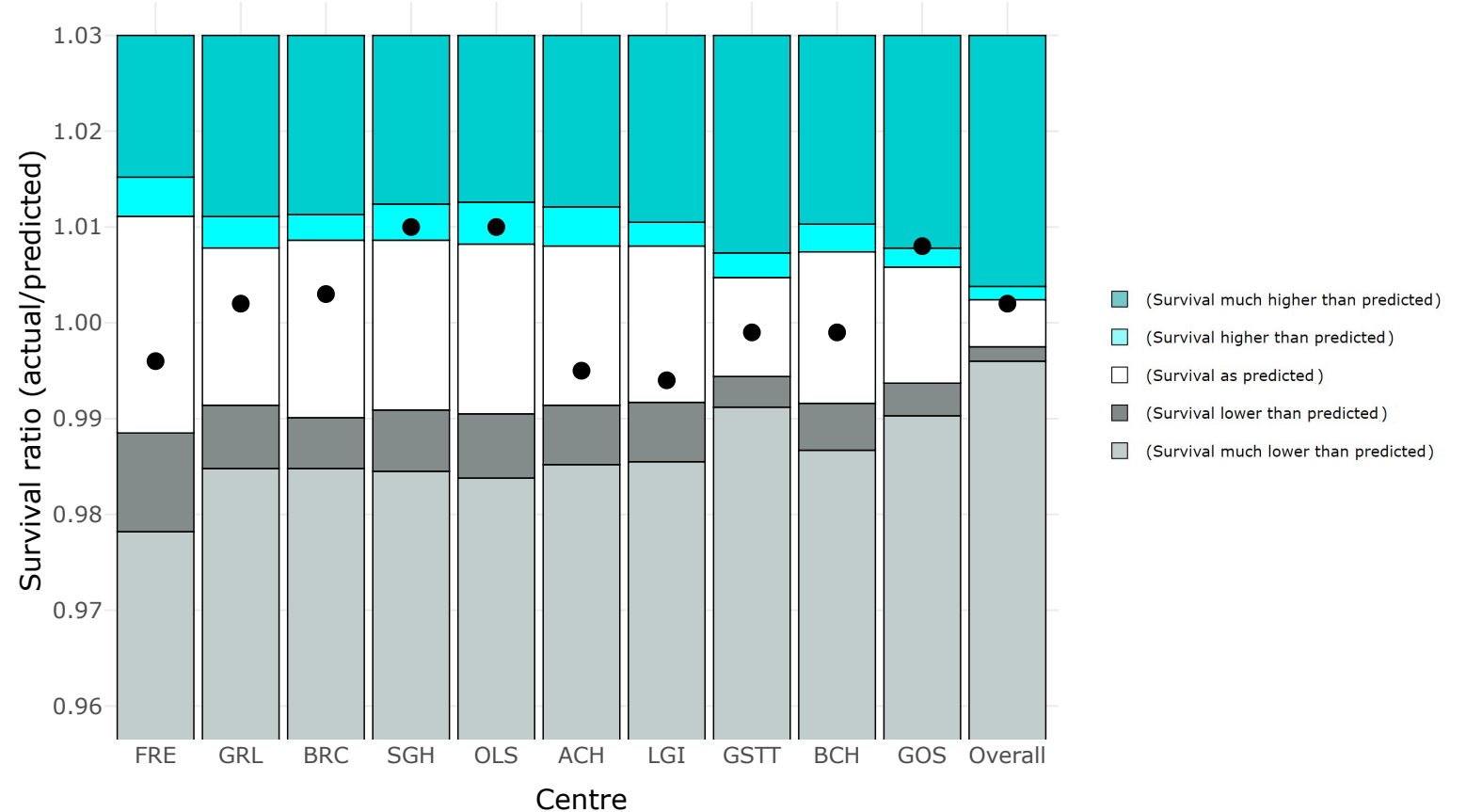
**For the 3-year period 2022/23 to 2024/25:**

- 7 hospitals performed as predicted
- 3 hospitals achieved results that were higher than expected (London Great Ormond Street Hospital, Southampton Wessex Cardiothoracic Centre and Our Lady's Children's Hospital, Dublin)

**Key:**

- FRE Freeman Road Hospital, Newcastle
- GRL Glenfield Hospital, Leicester
- BRC Bristol Royal Hospital for Children
- SGH Southampton General Hospital
- OLS Our Lady's Children's Hospital, Dublin
- ACH Alder Hey Children's Hospital, Liverpool
- LGI Leeds General Infirmary
- GSTT Guy's and St Thomas' NHS Foundation Trust
- BCH Birmingham Children's Hospital
- GOS Great Ormond Street Hospital for Children

## Average survival rates relative to prediction for paediatric CHD cases using PRAiS v4.2 model (2022/23 to 2024/25)



[Click here to Interactive PRAiS4.2 Spine Chart](#)



# The overall 30-day surgical mortality in adults with congenital heart lesions remains low

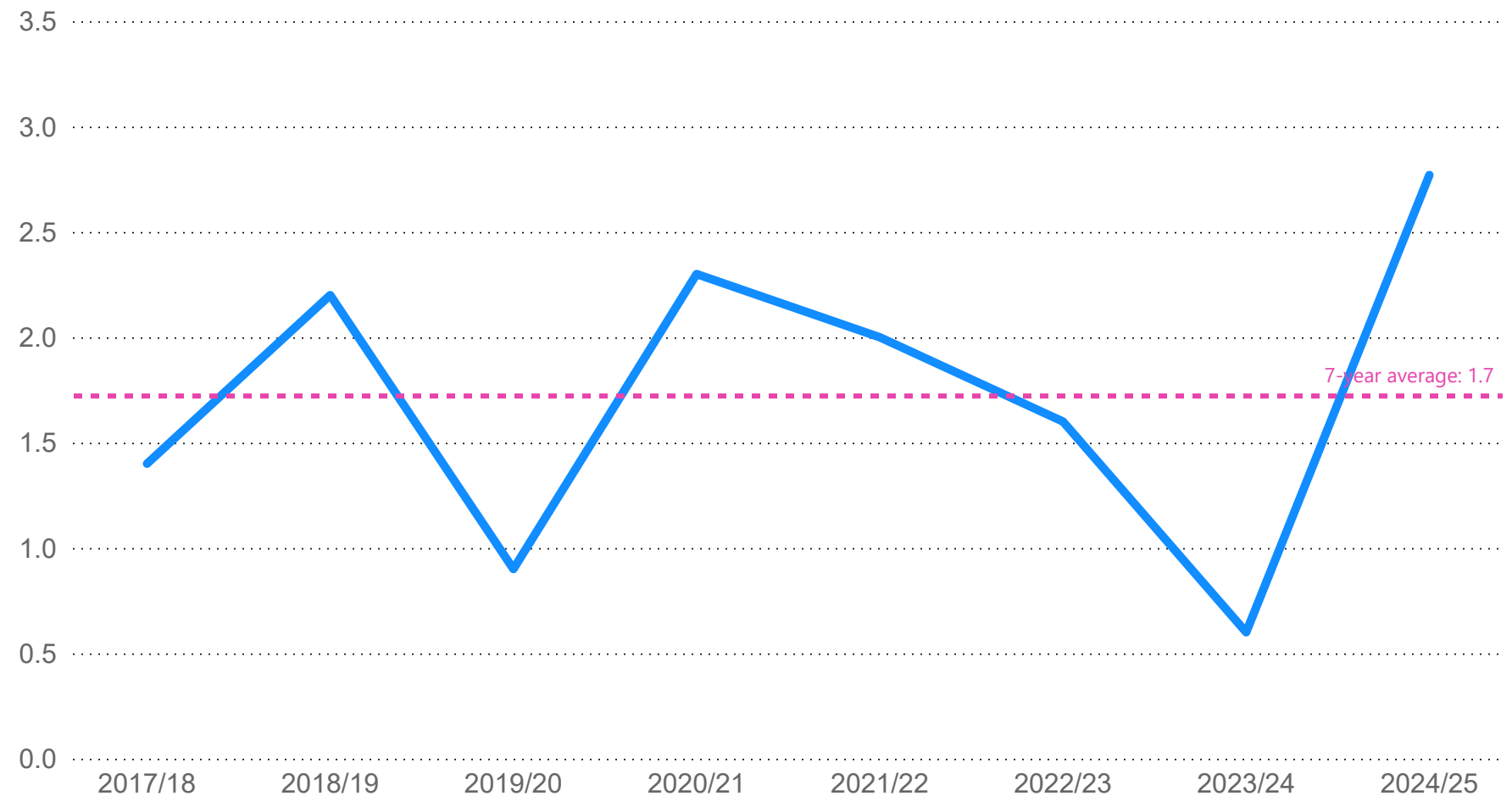


In 2024/25, the overall unadjusted mortality rate (30 days after the date of the operation) for patients aged 16 years and over was 2.77%, higher than it was in 2023/24. This may relate to a complex case mix in some centres. See next slide for risk-adjusted outcomes.

This is based on a total of 938 surgical procedures in adults over 16 years old.

*Note: The Society of Thoracic Surgeons–European Association for Cardio-thoracic Surgery (STAT) mortality score was implemented for use as an aggregated assessment of 30-day survival for adults with congenital heart disease operated upon in the UK since 2017/18.*

## Unadjusted 30-day surgical mortality (%) in patients aged 16 years and over



# Surgical survival rates for patients with congenital heart disease aged 16 years or more are in line with predicted levels, even with very different case mixes



A total of 2,696 patients aged 16 years or over underwent congenital heart disease (CHD) surgical procedures between 2022/23 and 2024/25. To compare mortality outcomes across the 10 centres, the STAT score risk model adjusts for the relative complexity of the cases that are being undertaken.

**The overall actual survival rate in 2022/23 to 2024/25 was 98.3%, as predicted. The average risk-adjusted predicted mortality ranged from 1.4% to 2.9% across hospitals.**

While this demonstrates the very different case-mix undertaken by individual hospitals, the results show that survival after surgery at each centre was within the predicted limits (all centres undertook more than 30 adult surgical procedures)

**Note:**

A description of the STAT score risk model can be found [here](#) along with the relevant alert and alarm control limits to warn where performance may be of concern. To comply with small number suppression, numbers <3 are not shown and the totals for these centres will therefore be slightly lower than their actual activity. 'x' in totals means a number between 0 and 9 has been deleted.

## Actual and predicted average survival rates for adult CHD cases using STAT score risk model (2022/23 to 2024/25)

Hospital	Surgical Episodes	Survivors	Deaths	Actual Survival
Leeds General Infirmary	267	261	6	97.8%
Belfast Royal Victoria Hospital	208	205	3	98.6%
Bristol Royal Hospital for Children and Bristol Heart Institute	305	299	6	98.0%
Liverpool Heart and Chest Hospital	276	273	3	98.9%
London Evelina London Children's Hospital	551	542	9	98.4%
Birmingham Queen Elizabeth Hospital	306	302	4	98.7%
Leicester Glenfield Hospital	141	138	3	97.9%
Southampton Wessex Cardiothoracic Centre	266	261	5	98.1%
London Barts Heart Centre	134	13x	<3	98.5%
Newcastle Freeman Hospital	242	238	4	98.4%
Total	2696	265x	4x	98.3%

# All hospitals achieved survival outcomes as good as or better than predicted for adults undergoing congenital heart disease surgical procedures



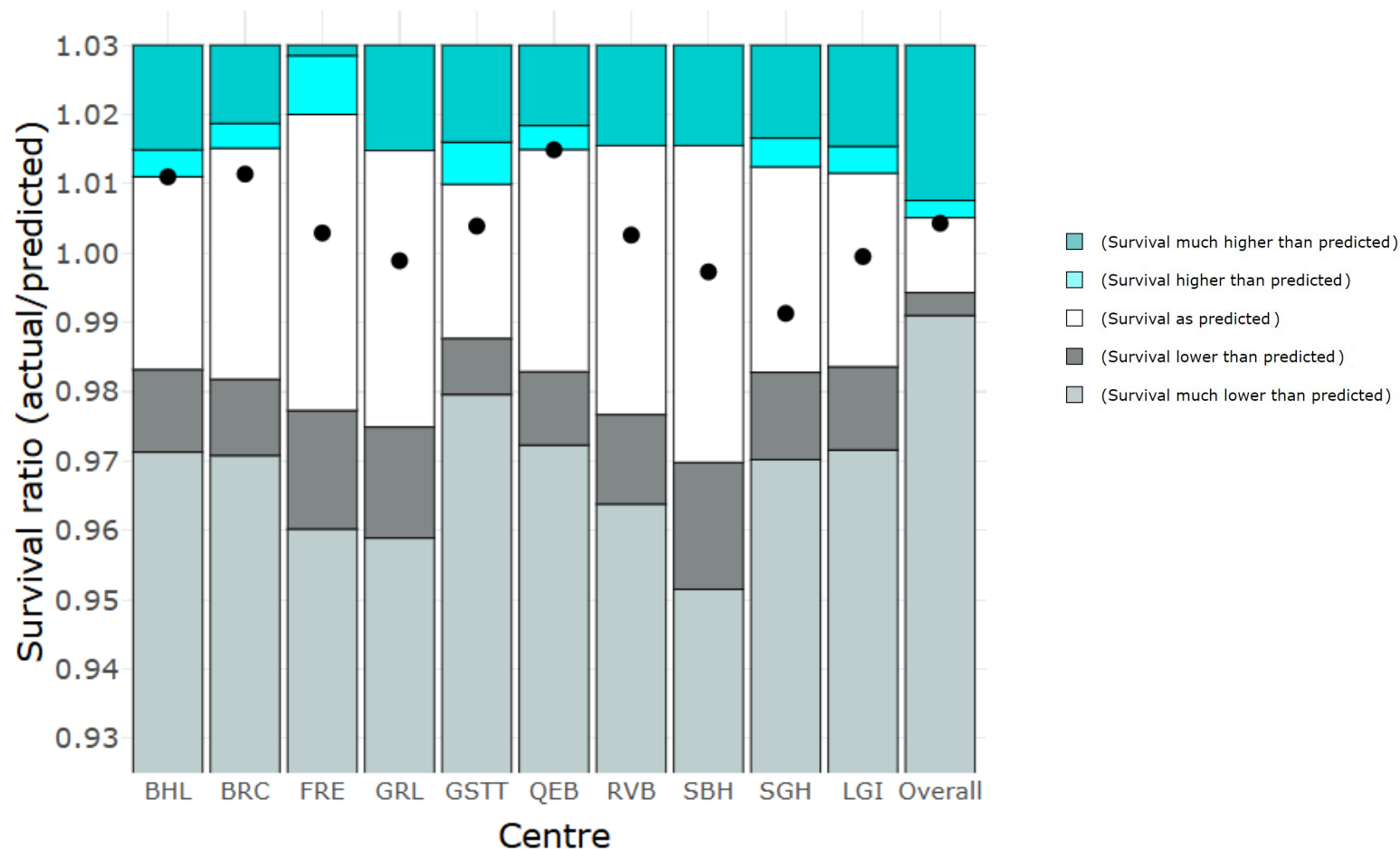
The results from the STAT score risk model can also identify 'outliers' by showing whether the overall survival outcomes for each hospital were as predicted or were much higher or much lower.

In addition, individual analysis of the 44 specific CHD surgical procedures showed that none of the hospitals were 'alarm' outliers for 30-day mortality (i.e. their outcomes were not outside the statistically acceptable limits of the STAT score risk model).

**Key:**

- BHL Liverpool Heart and Chest Hospital
- BRC Bristol Royal Hospital for Children
- FRE Newcastle Freeman Hospital
- GRL Leicester Glenfield Hospital
- GSTT Guy's and St Thomas' NHS Foundation Trust
- QEB Birmingham Queen Elizabeth Hospital
- RVB Belfast Royal Victoria Hospital
- SBH London Barts Heart Centre
- SGH Southampton General Hospital
- LGI Leeds General Infirmary

## Average survival rates relative to prediction for adult CHD cases using the STAT score risk model (2022/23 to 2024/25)



[Click here to Interactive STAT Score Spine Chart](#)

# Variability in post-procedural complication rates between hospitals may be accounted for in part by different case mixes



Although surgical mortality is a key indicator of performance, the rates of different complications after an operation are also important.

To reflect this, the audit captures data on 6 complications<sup>7</sup> following CHD procedures from 2022/23 to 2024/25:

- 4 are surgical-related (across 9,763 procedures)
- 2 relate to interventional catheter procedures (across 6,380 transcatheter interventions and 1,961 electrophysiology procedures).

Some significant variations can be seen between centres, though making direct comparisons is challenging given their differences in case mix.

The table on the right shows the percent of 6 post-procedural complications for 2022/23 to 2024/25.

## Percentage of post-procedure complications by hospital (2022/23 to 2024/25)

Hospital	ECMO	Renal support	Unplanned pacemaker	Prolonged pleural drainage	Transcatheter intervention
Liverpool Alder Hey Hospital	3.88	1.42	1.61	0.66	0.66
Birmingham Children's Hospital	2.19	1.91	1.53	1.33	1.33
Leeds General Infirmary	2.05	6.76	2.05	0.97	0.97
London Evelina London Children's Hospital	0.93	3.11	0.50	0.62	0.62
Total	2.18	2.62	1.17	0.62	0.62
Southampton Wessex Cardiothoracic Centre	2.14	1.19	1.54	0.71	0.71
Newcastle Freeman Hospital	5.58	5.98	1.20	0.60	0.60
Dublin Our Lady's Children's Hospital	1.70	0.45	1.36	0.79	0.79
Bristol Royal Hospital For Children	1.62	6.85	1.37	0.37	0.37
London Great Ormond Street Hospital for Children	1.99	1.03	0.90	0.19	0.19
Leicester Glenfield Hospital	1.90	0.00	0.00	0.00	0.00

# Over half of all procedures in infancy have a successful prenatal diagnosis



The audit collects data for babies diagnosed antenatally with a cardiac defect who then undergo an intervention in the first year of life.

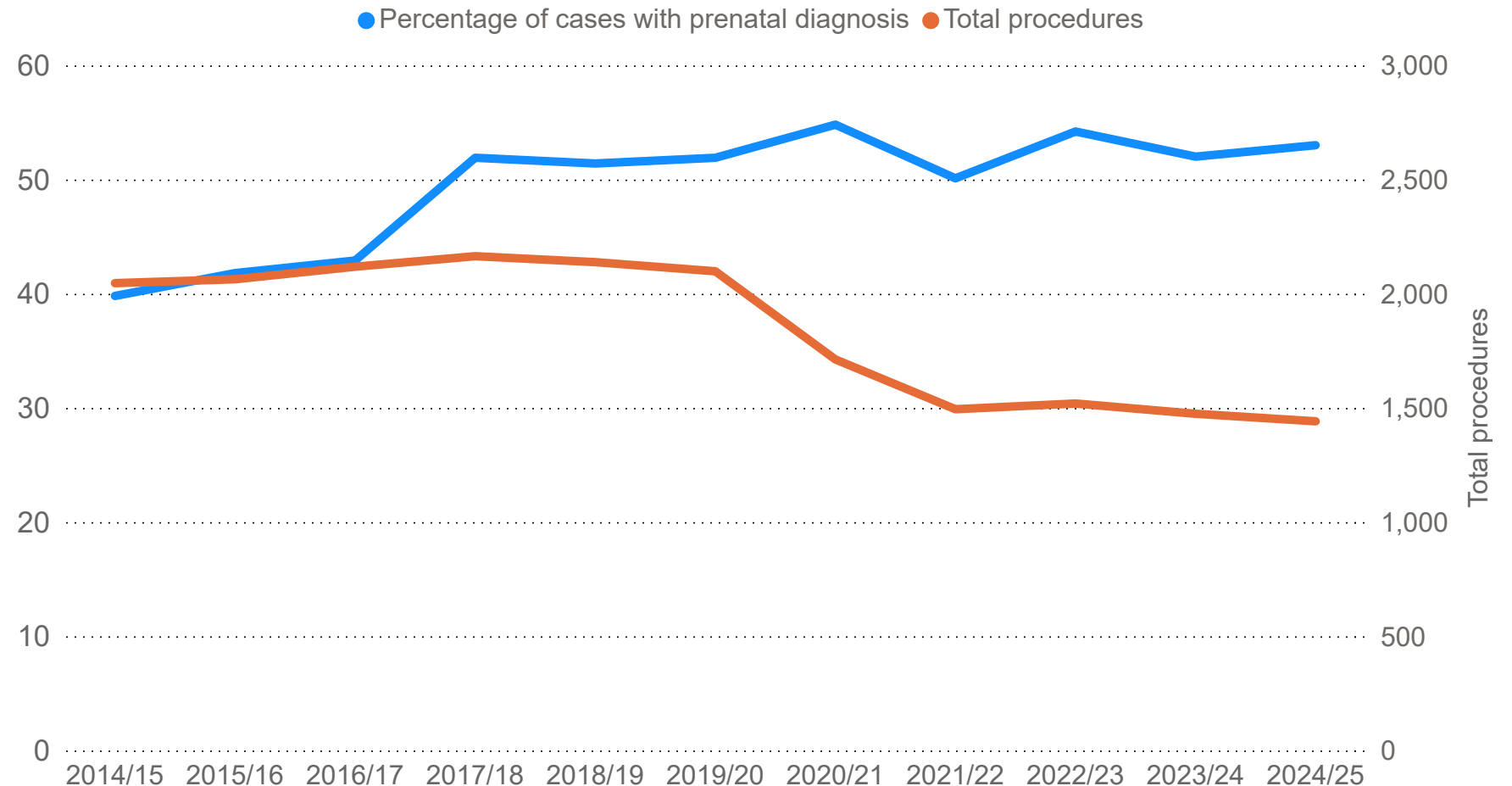
**In 2024/25, the detection rate was 53% for all infants requiring a procedure in the first year of life.**

**Over the last 7 years, the rate of antenatal diagnosis has plateaued at just over 50%.**

*Note: The data exclude spontaneous intrauterine deaths, termination of pregnancy, non-intervention after birth and unrecognised death in community or non-tertiary centre. For additional information, see [here](#).*

[This link will be added at the publication stage](#)

## Percentage of CHD procedures in the first year of life for infants who had a prenatal diagnosis



# Considerable variation is seen in the rate of prenatal diagnosis across Integrated Care Boards and University Health Boards



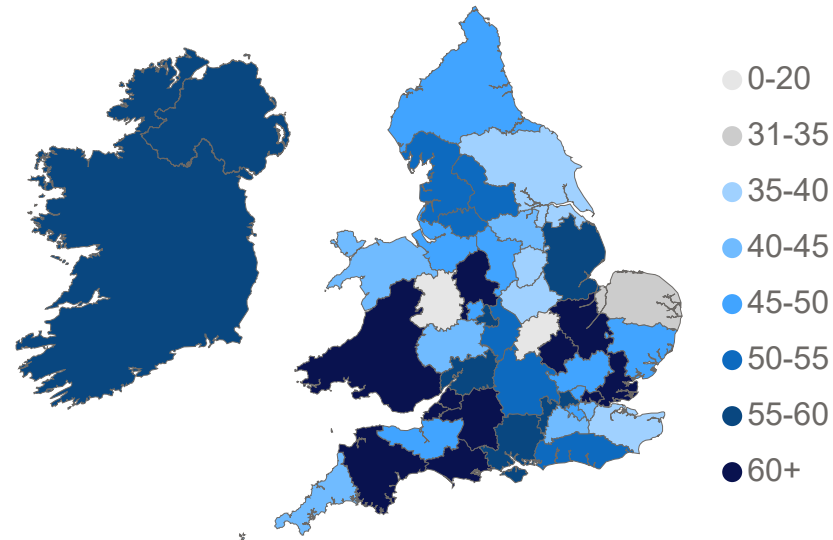
The maps show the variation in prenatal diagnosis rates for infants who underwent a procedure in the first year of life between Intergrated Care Boards (ICBs) in England and Health Boards (HBs) in Wales.

**In 2024/25, the highest rate of antenatal diagnosis was 76% in Mid and South Essex.**

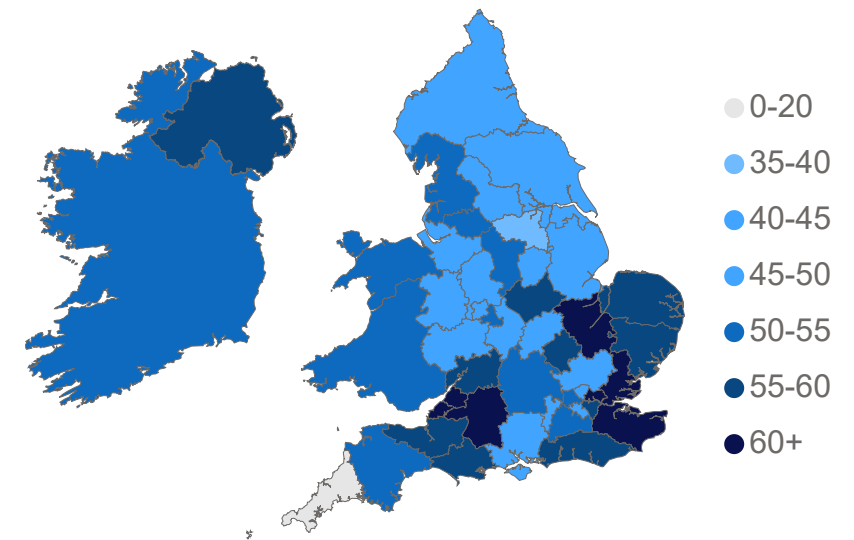
There is also a noticeable change in intra-regional rates of prenatal diagnosis between the two financial years 2023/24 and 2024/25. For example in:

- Cornwall and the Isles of Scilly the figure rose to 44% in 2024/25 from 15% the year before
- Norfolk and Waveney the figure dropped to 33% in 2024/25 from 60% the year before.

**Percentage of CHD procedures in the first year of life for infants who had a prenatal diagnosis in 2024/25**



**Percentage of CHD procedures in the first year of life for infants who had a prenatal diagnosis in 2023/24**



# Antenatal diagnosis of 4 reported lesions remains good with anticipated cyclical variations in rates of prenatal detection



The figure shows the prenatal detection rate of four individual cardiac lesions where a procedure is performed in the first year of life:

- Hypoplastic Left Heart Syndrome (HLHS)
- Tetralogy of Fallot
- Transposition of the Great Arteries with intact ventricular septum (TGA-IVS)
- Atrio-ventricular septal defect (AVSD)

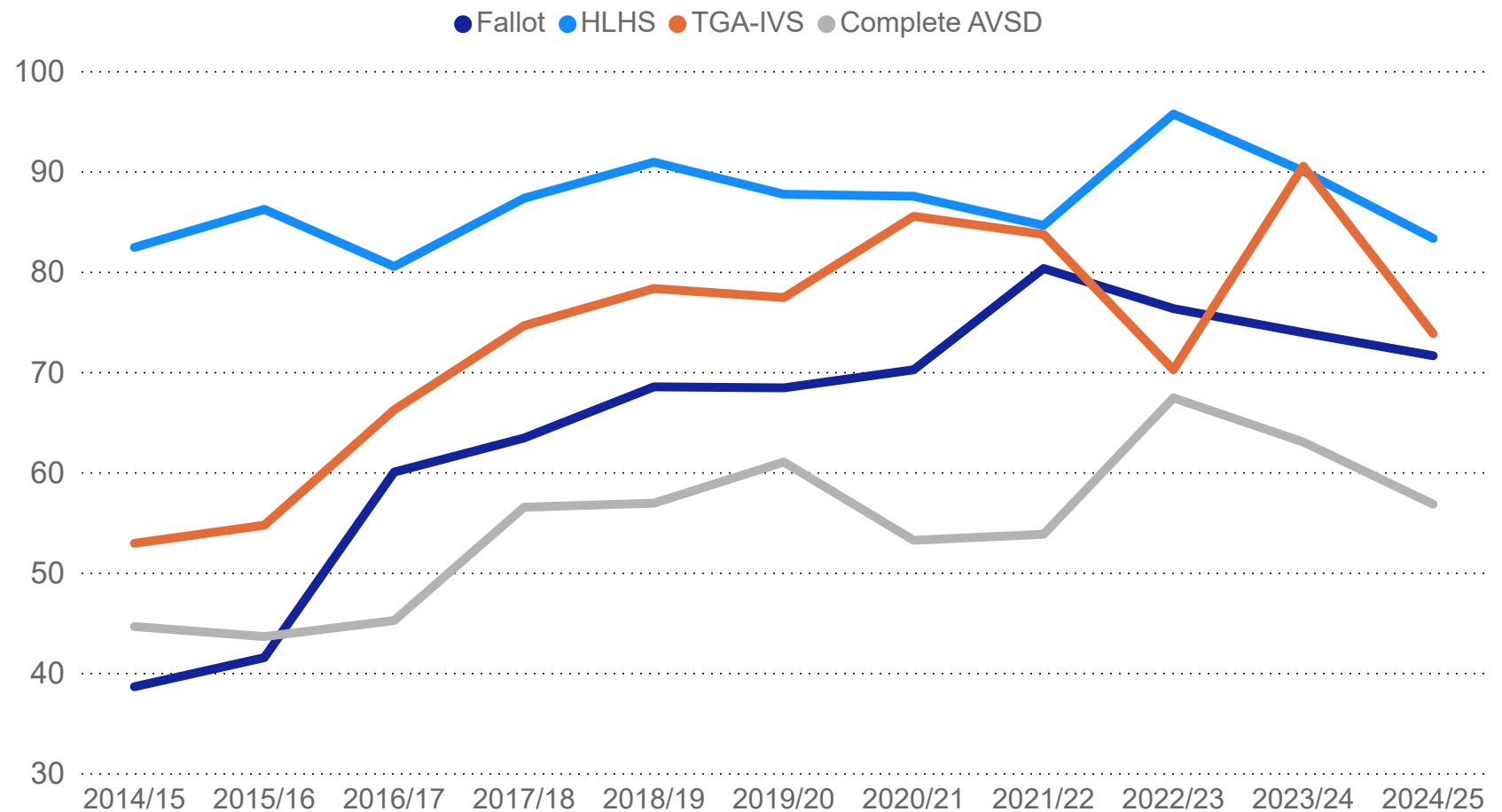
**Antenatal detection rates of those requiring a procedure in the first year have fallen for all four lesions. This coincides with the drop in total neonatal procedures in the same period.**

Detection rates for all the remaining lesions were lower than the previous year. While this could be due to cyclical variation, the data could reflect:

- a genuine fall in detection
- an increase in the termination of pregnancy for these diagnoses
- differences in screening timing and methods used by sonographers.

Note: A full table of results is available [here](#)  
This link will be added at the publication stage.

## Percentage of procedures in first year of life for infants with prenatal diagnosis by specific lesion





1. le Hoffman J. The global burden of congenital heart disease. *Cardiovasc J Afr.* 2013 May;24(4):141-5. doi: 10.5830/CVJA-2013-028. PMID: 24217047; PMCID: PMC3721933.
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