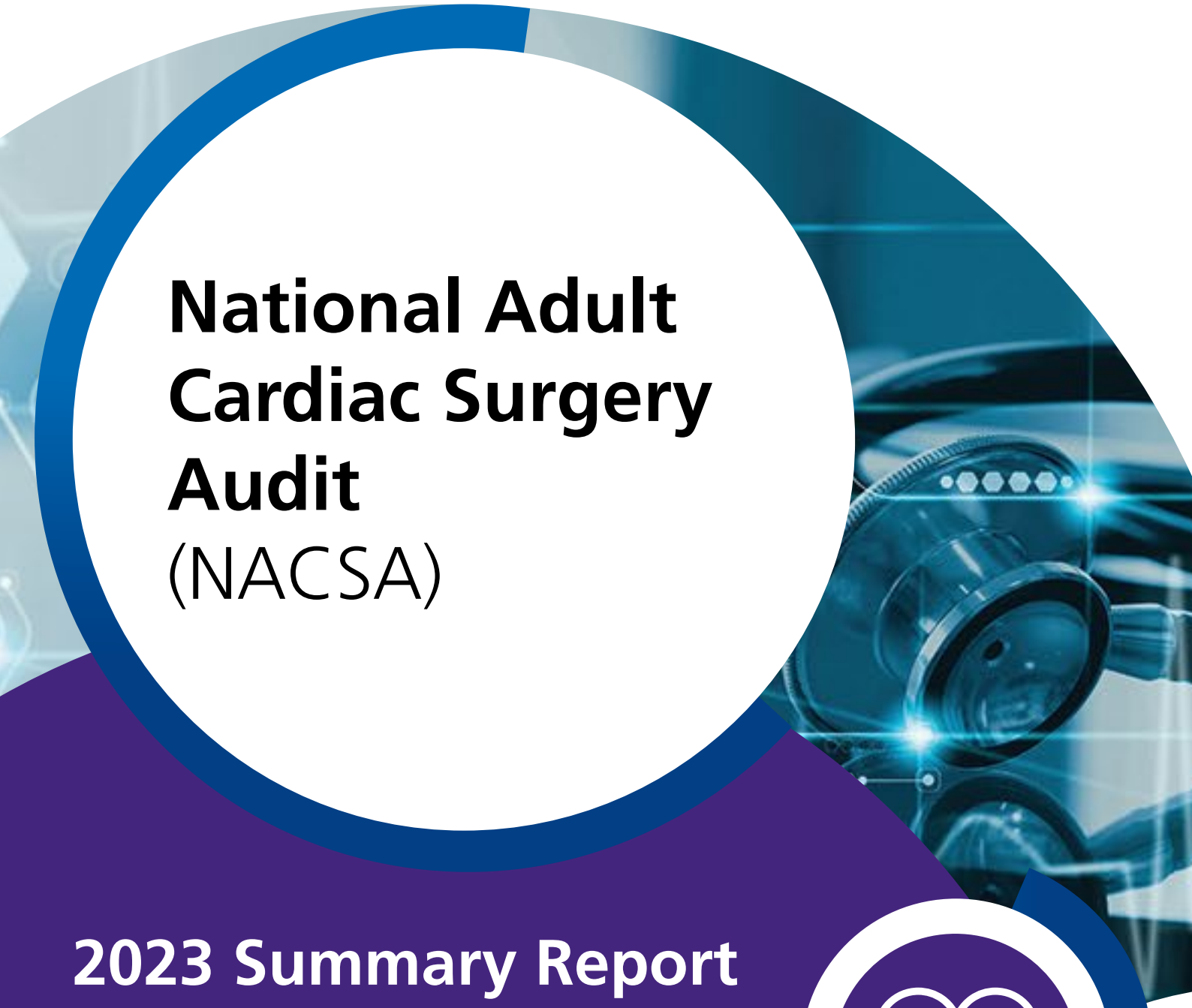
National Cardiac
Audit Programme

NICOR



National Adult Cardiac Surgery Audit (NACSA)

2023 Summary Report

(2019/20-2021/22 data)

Contents

Report at a glance

Data from the period April 2021 to March 2022

Recovery is slow for the number of operations in 2021/22 with 24,807 adult heart operations, a 16% drop compared to 2019/20. However, this is an improvement compared to last year, where only 19,333 operations were carried out. Adult surgery activity averaged around 84% of pre-pandemic levels. Around 5,000 patients across the UK did not have the heart surgery they should have done.

Valve Intervention

Surgery to the aortic valve can be carried out in isolation or as part of a combined procedure with coronary artery bypass graft (CABG) surgery. Transcatheter Aortic Valve Implantation (TAVI) is increasing year on year and preferred in older patients.

- **Total TAVI and AVR procedures** have almost recovered to pre-pandemic levels at **98%** in 2021/22. They fell by 17% in 2020/21.
- More patients were treated in 2021/22 with **TAVI** (7,111) rather than **AVR** (3,538).
- The ratio of **TAVI** to **AVR** rose from **1.2:1** in 2019/20 to **2.1** in 2021/22. TAVI is now very well established and is usually preferred in patients deemed at high risk for conventional AVR surgery.
- Overall **mortality rates** were **1.8%** after isolated AVR and **2.4%** after combined AVR & CABG in 2021/22 (including emergency cases).

Coronary Artery Bypass Grafts (CABG)

Waiting times for urgent coronary artery bypass graft (CABG) procedures are worse, with no hospital achieving the 7-day target

- The outcomes of isolated **CABG surgery** in the UK continue to be excellent. The mortality rate after an elective CABG was **0.43%** in 2021/22.
- 2021/22 saw **1,910** fewer CABGs, (a **15%** reduction) performed compared to pre-pandemic levels.
- **Coronary revascularisation** rates (i.e. CABG and PCI rates combined) remained below pre-pandemic levels last year, a **4%** reduction (over **4,000** less) compared to 2019/20.
- The average waiting for **elective surgery** was **114 days** in England for 2021/22. This is a reduction from **127** in 2020/21, but still an increase from 2019/20 (**104** days). Improvements have been seen in Wales from **130** days in 2020/21 to **109** days in 2021/22. However, in Northern Ireland the average waiting times continue to rise from **122** days pre-pandemic to **199** days in 2021/22.
- **Average Day of Surgery Admissions** (DOSAs) for elective CABG have improved slightly from **9%** in 2020/21 to **11%** in 2021/22, but only one hospital achieved the target of at least **50%** of elective patients should be admitted on the day of surgery.

Mitra valve procedures and outcomes

The numbers of mitral valve operations continue to fall since 2013.

The most common procedure is **mitral valve repair**, of which there were **1,061** in 2021/22. This figure was up from **902** during the first year in the pandemic but almost **27%** lower than the **1,447** cases in 2019/20.

Mortality rates for mitral operations with or without CABG operations have remained relatively constant during the pandemic. The mortality rate for mitral repair remains low at **1.1%** in 2021/22. For mitral repair and CABG it was **3.0%**, for mitral valve replacement (MVR) **5.1%** and for MVR and CABG **10.7%.**

Hospitals vary significantly in the number of **patients undergoing a valve repair** last year. The best performing hospitals achieved **86%** repair rates compared to only **26%** in the worst performing.

Emergency aortic procedures

More patients are receiving emergency aortic surgery.

There has been a **68%** increase in the number of these **operations performed as an emergency** since 2013/14, from fewer than **400** cases to almost **650**. This trend was not impacted by COVID-19. The diagnosis of aortic dissection (when a tear in the wall of this major vessel occurs) by primary care and emergency physicians, and the transfer of patients to specialist cardiac surgical centres for treatment has supported this rise in the number of cases, rather than a significant increase in the prevalence of the disease in the UK.

The **mortality rate** following emergency aortic surgery in the UK in 2021/22 was just over **17%**.

Case volumes and training

Case volumes are an important factor in maintaining good consultant performance and in training for new surgeons.

Since 2013, there has been a gradual **decline in the number of cases** individual cardiac surgeons are performing each year.

The average consultant performed only **94 operations** in 2021/22, down from **140** in 2013/14. This is an increase from **76** cases in 2020/21.

Overall, the proportion of **cases performed by trainees** in England has remained relatively stable at around **22-23%** over the last four years despite the pandemic. A lower proportion of cases were performed by trainees in Wales or Northern Ireland.

However, the total operation numbers have fallen with just over **5,000 operations performed in England by trainees**, compared with over 5,700 in 2019/20.

Executive Summary

Focus of attention	Audit finding
Cardiac surgical services have been dramatically impacted by the pandemic	Overall, about 10,000 heart operations were not performed in the first year of the pandemic. In 2021/22, nearly 5,000 fewer operations were performed than would be expected.
Fewer CABG operations were performed	Almost 2,000 fewer CABG procedures were performed compared to pre-pandemic (a 14.9% reduction).
There were fewer surgical aortic valve procedures but more TAVIs	Treatment levels for patients with aortic valve disease have nearly returned to pre-pandemic levels. Twice as many are now being treated with TAVI compared to conventional aortic valve (AVR) surgery.
More patients should be discussed at a Multi-Disciplinary Team (MDT) meeting	A pre-operative MDT discussion was documented for only 32% CABG, 32% AVR and 37% Mitral operations last year.
Overall unadjusted cardiac surgical mortality rose slightly during the pandemic, as surgical practice moved towards doing proportionately more urgent and emergency cases	In the first year of COVID-19, the crude mortality rate following heart surgery (all types combined, including emergencies) increased to 3.3%, having been falling over the past two decades to just over 2.5% in 2019/20. The mortality rate improved to 2.9% in 2021/22 but was still higher than prior to the pandemic.
Surgical mortality after elective CABG remained low	The risk of dying was 0.4% after elective CABG and just under 1.2% after urgent CABG.
Mortality rates after most aortic valve operations are low	Overall mortality rates were 1.8% after isolated AVR and 2.4% after combined AVR & CABG. For low-risk patients (EuroSCORE 2 predicted <4%) for isolated AVR (which comprises 95% of operations), mortality averaged 0.8% over the last three year period.
There were fewer mitral valve repair operations and very considerable variation in rates between hospitals	The rate of mitral valve repair was only 60% across the UK. The best performing hospital achieved over 86% and the worst recorded just under 26%.

Focus of attention	Audit finding
More emergency aortic operations performed	Emergency operations on the thoracic aorta increased from 382 cases in 2013/14 to 644 cases in 2021/22 (a 68% increase). The mortality rate was 17% last year.
Cardiac surgeon workloads did not recover to pre-pandemic levels	In 2013, consultant surgeons performed 140 operations per year on average. This dropped dramatically to only 76 cases in the first year of the pandemic before recovering to 94 cases in 2021/22.
Efforts to reduce waiting times for both elective and urgent CABG are required	Elective CABG waiting times are 11.7% longer than pre-pandemic with only 9 NHS hospitals achieving the 12 week target. Urgent CABG waiting times are 2 days longer than pre-pandemic with no hospital achieving the 7 day target.
Surgical trainee opportunities have been reduced by lower numbers of operations	Surgeons in training performed almost 5,100 cases in 2021/22 (23% of cases in England). This is an equivalent proportion to previous years. However, fewer operations were done, so this represents a reduction in training opportunity.
Overall, low re-operation rates for bleeding after isolated CABG but considerable inter-hospital variability in both this and transfusion rates	Last year 2.2% patients were reopened for bleeding following CABG surgery, with rates between centres varying from 0.5% to 7% Around 46% of patients undergoing CABG required a blood transfusion. Again, there was significant variation between centres (from less than 10% to 100%).

Summary of recommendations

1. Hospitals with prolonged waiting times for elective CABG surgery should review their processes and referral pathways to identify the causes of any delays. If necessary, advice should be sought from centres with evidence of the best performance. A QI action plan should be instigated to achieve this target.

   Units not achieving the target should consider ring-fencing level 3 intensive care unit (ICU) facilities and seek to make greater use of day-of-surgery admissions (DOSA) and enhanced recovery after surgery (ERAS) to improve patient flows and outcomes.

   Patients should be offered surgery in neighbouring hospitals with shorter waiting times if reductions in waiting times cannot be demonstrated.

2. Hospitals not reaching the 7-day target of urgent CABG performed after coronary angiography should undertake a review of their processes to identify where delays occur and how these can be avoided. If necessary, advice should be sought from centres with evidence of the best performance. A QI action plan should be instigated to reduce delays.

Hospitals should have agreed and uniform referral processes from all referring centres. Ideally this should be through a unified online referral portal. Regional protocols should be agreed between surgical and cardiology teams to stop anti-platelet agents pre-operatively to minimise delays once referred. A common surgical waiting list should be shared by all surgeons.

Units not achieving the target should consider ring-fencing level 3 ICU facilities and seek to make greater use of enhanced recovery after surgery (ERAS) to improve patient flows and outcomes.

3. Hospitals not reaching the 75% target of urgent CABG performed within seven days of coronary angiography should undertake a review of their processes to identify where delays occur and how these can be avoided. If necessary, advice should be sought from centres with evidence of the best performance. A QI action plan should be instigated to reduce delays.

Hospitals should have agreed and uniform referral processes from all referring centres. Ideally this should be through a unified online referral portal. Regional protocols should be agreed between surgical and cardiology teams to stop anti-platelet agents pre-operatively to minimise delays once referred. A common surgical waiting list should be shared by all surgeons.

Units not achieving the target should consider ring-fencing level 3 ICU facilities and seek to make greater use of enhanced recovery after surgery (ERAS) to improve patient flows and outcomes.

4. Hospitals not reaching the Day-of-Surgery-Admission (DOSA) target should undertake a review of their processes to identify the barriers to achieving this target (such as introducing pre-assessment clinics). If necessary, advice should be sought from centres demonstrating the best performance. A QI action plan should be instigated to achieve this target.

5. Hospitals should have uniform and protocolised care for pre-operative antiplatelet drug cessation agreed between referring cardiology teams and the cardiac surgeons.

Units should have agreed protocols for managing patients with pre-operative anaemia to optimise peri-operative care for patients having surgery.

Units should have agreed blood transfusion triggers for the treatment of bleeding or anaemia during or after surgery with the aim of minimising or reducing transfusion requirements.

Units not collecting blood transfusion data should collect and submit their data to NACSA for all patients.

6. Units should agree local and regional protocols for the conduct of multidisciplinary team (MDT) meetings in line with the Getting It Right First Time (GIRFT) (2021) recommendations.

Units should collect data for all patients on whether an MDT discussion has taken place and submit this to the NACSA audit.

1 Introduction

The National Adult Cardiac Surgery Audit (NACSA) has operated in one format or another since 1977, including reporting outcomes at both hospital and surgeon levels since 2005. Over the last two to three decades, the data collected have shown steadily improving outcomes for patients having heart surgery across the UK.

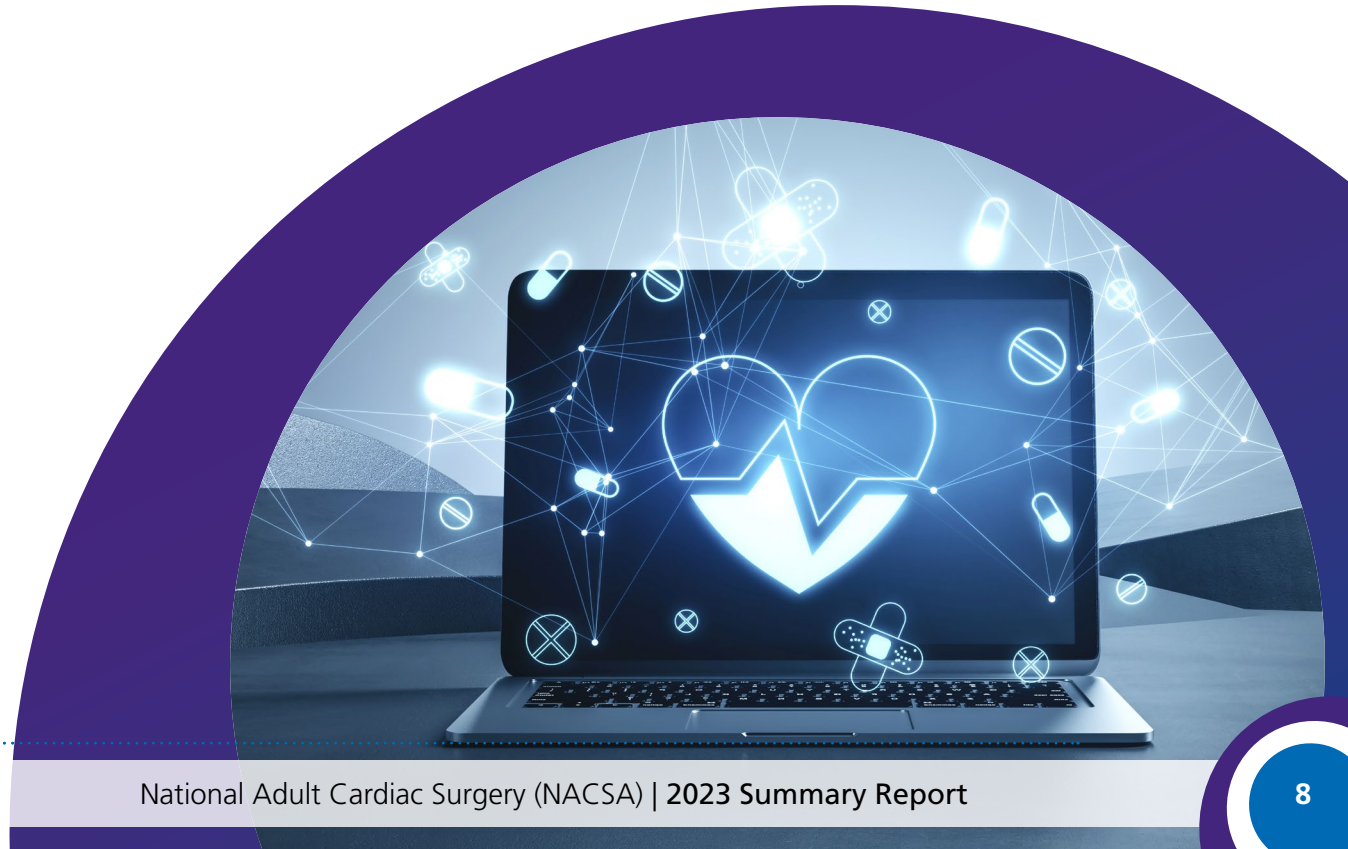
This progress was halted by the COVID-19 pandemic, which caused a major disruption to the provision of cardiac surgery. Consequently, the main focus of this summary report is on the impact of COVID-19, with two full years of data for cardiac surgery performed during the pandemic (from the start of April 2020 to the end of March 2022) to follow the pre-pandemic year of 2019/20. Earlier years are also included, where helpful in illustrating longer-term trends.

To avoid this document becoming overly long, other important and regularly reported outcome and quality improvement metrics and the complete range of supplementary tables and graphs can be found in the Appendix. These give a more comprehensive picture of UK cardiac surgery than can be summarised here.

Sadly, Scottish hospitals no longer participate in the audit (submitting data instead to the Scottish Cardiac Audit Programme). Consequently, the data labelled as 'UK' in this report represents England, Northern Ireland and Wales. To enable year-on-year comparisons, all UK data prior to April 2020 has been recalculated with Scotland removed from the totals.

The rest of this report is structured as follows:

- **Section 2** highlights the on-going impacts of the COVID-19 pandemic
- **Section 3** focuses on a selection of Quality Improvement (QI) metrics which should continue to be a priority, either for teams within hospital trusts or for those leading service commissioning and development at Integrated Care System (ICS) level
- **Section 4** provides some pointers towards the future direction of the audit.



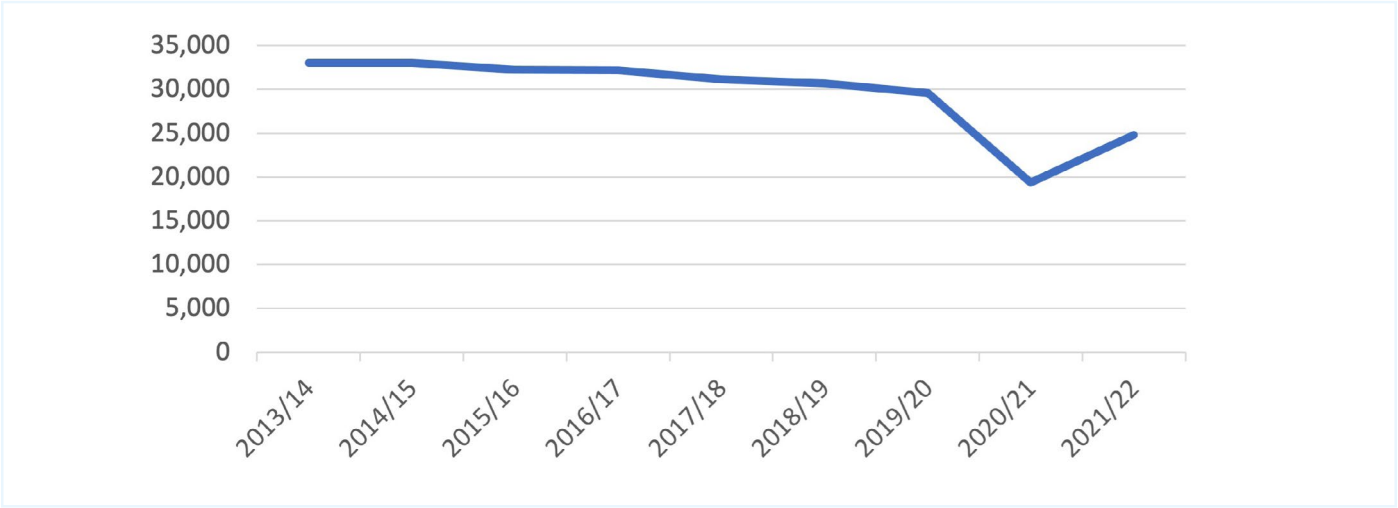
2. Principal impacts of the second year of the COVID-19 pandemic

2.1 Cardiac operation rates have recovered but are not back to pre-pandemic levels

Last year (2021/22), there was a 16% reduction in the number of cardiac surgical operations performed across the UK compared to 2019/20, the year prior to the COVID-19 pandemic [Figure 2.1]. The first year of the COVID-19 pandemic saw a 34% reduction in all operations.

Cardiac surgical operation numbers have been slowly falling for many years, from just over 33,000 in 2013/14 to a little over 29,500 in 2019/20. In 2020/21, 19,385 were performed, rising back to 24,807 last year.

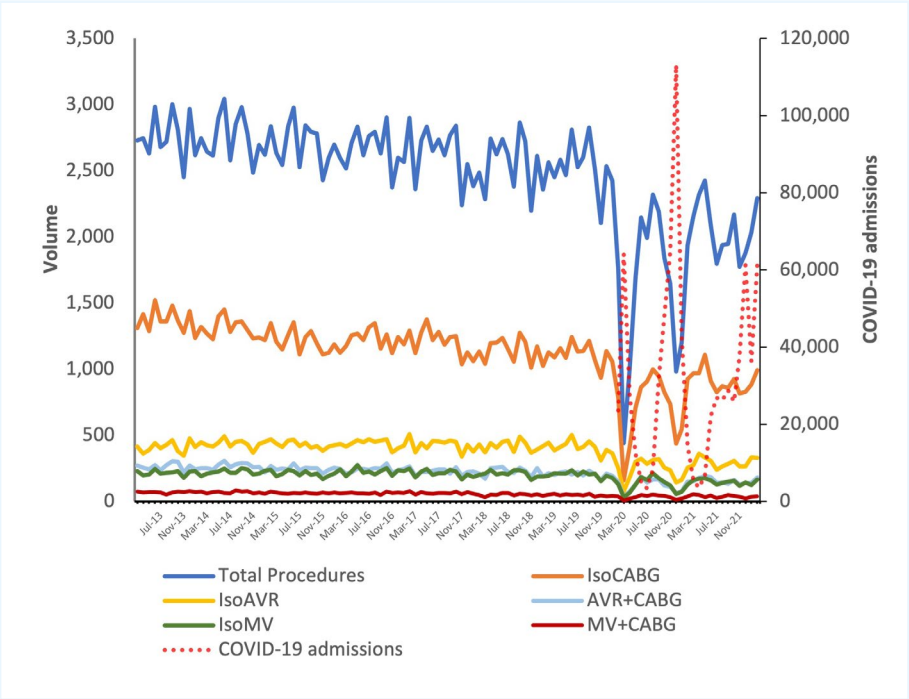
Figure 2.1: Total cardiac operations each year in the UK (not including Scotland), 2013/24 - 2021/22 [NACSA data]



Compared with the volumes that would have been expected, about 10,000 heart operations were not performed in the first year of the pandemic and nearly 5,000 fewer in 2021/22.

The monthly numbers of different types of heart operation are shown in Figure 2.2 along with the admissions to hospital of people with COVID-19 infections. During the first two waves of the pandemic, the drop in operations performed mirrors the rise in COVID-19 admissions. However, there was much less of an impact during the third wave of infection in 2021/22. In no month over the last two years have the numbers of surgical operations recovered to the level seen prior to the pandemic.

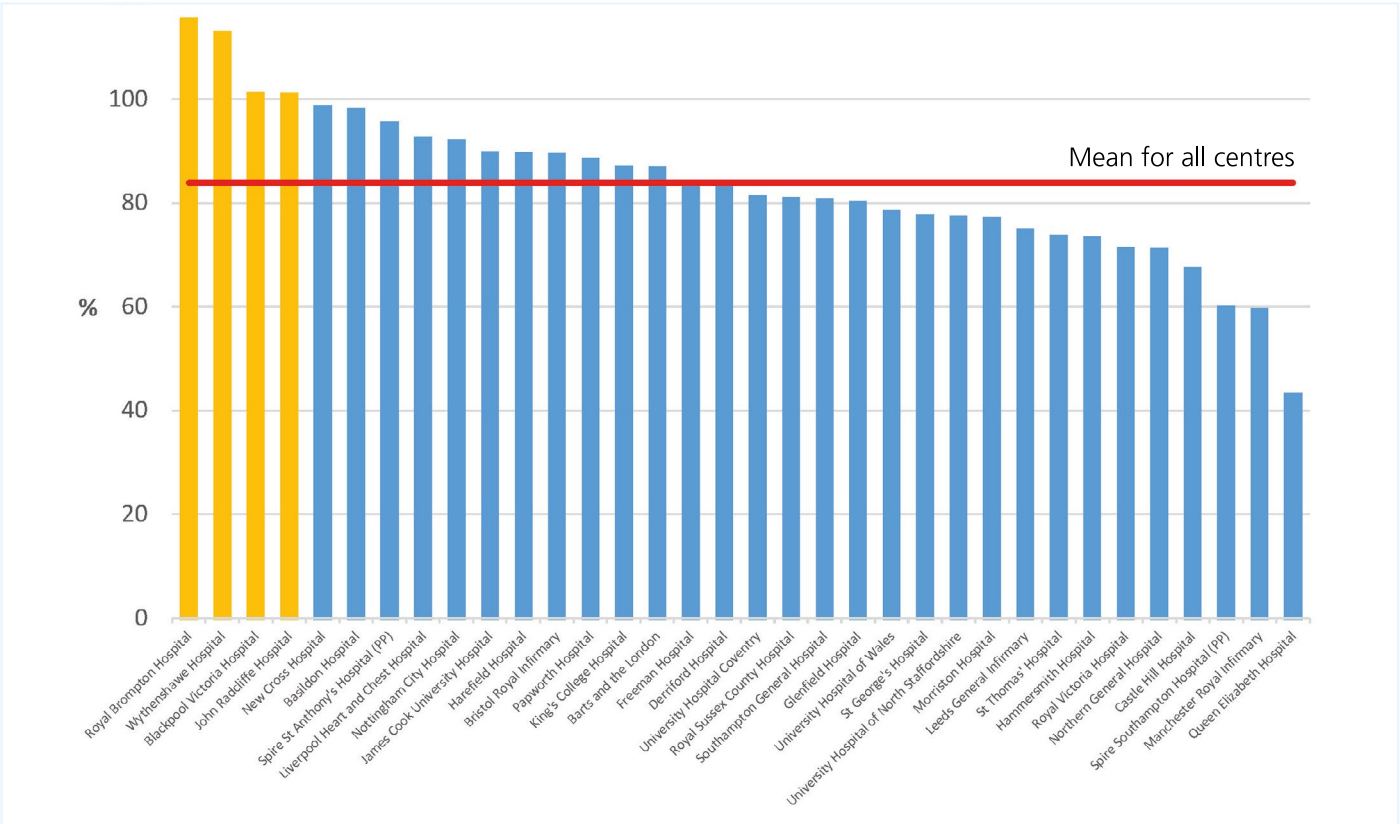
Figure 2.2: Trends in monthly cardiac surgical activity by procedure type, 2013/14 - 2021/22 [NACSA and UKHSA data[1]]



The impact of the pandemic on the number of operations that could be performed last year varied substantially between hospitals, from 115% in the best performing hospital to 43% in the worst [Figure 2.3]. Only four hospitals managed to achieve at least 100% of their 2019/20 workload. Nine hospitals performed less than 75% of their 2019/20 throughput. Across the UK, activity in 2021/22 averaged 84% of pre-pandemic levels.

IsoCABG isolated CABG; IsoAVR isolated aortic valve replacement; IsoMV isolated mitral valve operation.

Figure 2.3: Proportion (%) of 2021/22 volumes compared to pre-COVID year (2019/20), by hospital [NACSA data]



Hospitals with a yellow bar performed more cases than in 2020/21.

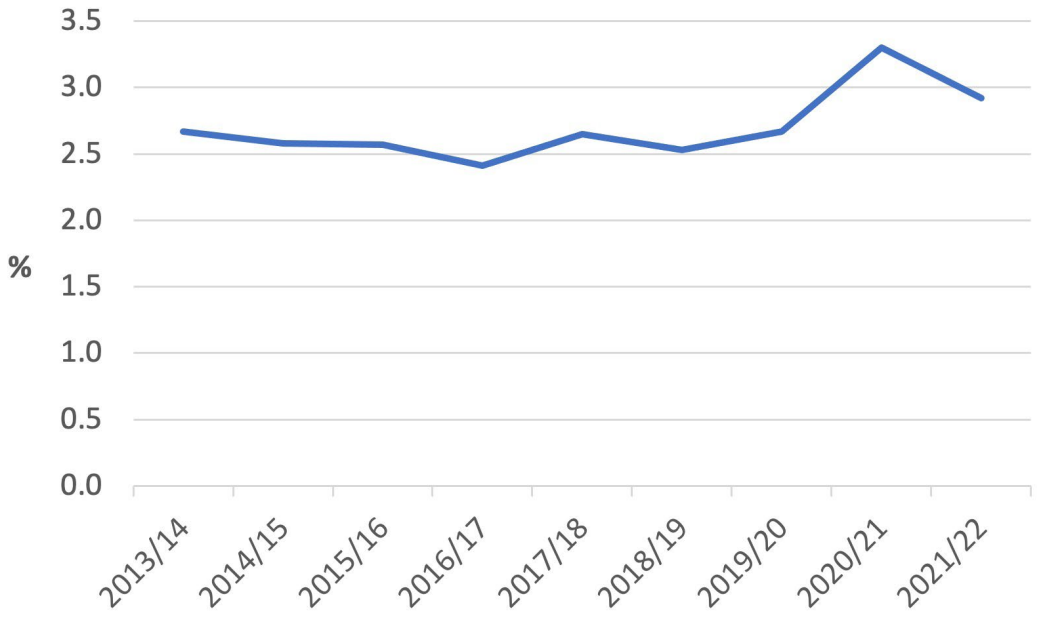
2.2 Crude mortality rates have increased but have improved since last year

The crude mortality rate following heart surgery (all types combined, including emergencies) had been falling over the past 2 decades in the UK, although it had plateaued in recent years at just over 2.5%. Previously we reported that during the first year of COVID-19 the mortality rate had increased to 3.3%. During the last 12 months, the mortality rate reduced to 2.9% but was still higher than prior to the pandemic [Figure 2.4].

There are likely to be several possible reasons for the increase in mortality seen. In the early weeks of the pandemic, several hospitals reported cases where patients had died on the intensive care unit (ICU) following surgery because of COVID-19 infection. However, the numbers were relatively small and are very unlikely to account for the changes seen. Over the last 12 months COVID-19, although common pre-operatively, especially in patients waiting in hospital for urgent surgery, has now become unusual as a cause of death following heart surgery.

It is more likely that changes in mortality rates result from the increase in the proportion of patients operated on urgently, or as an emergency. Operative risks are known to be higher in these patients compared to those done electively. There is also evidence that treatments have been delayed (both for elective and urgent patients). Delays in surgery are likely to lead to more deaths whilst waiting (although these are not recorded within the audit) and may lead to greater deterioration of patients pre-operatively and therefore poorer post-operative outcomes.

Figure 2.4: Crude mortality rate (%) following cardiac surgery for all procedures including emergencies, 2013/14 - 2021/22 [NACSA data]

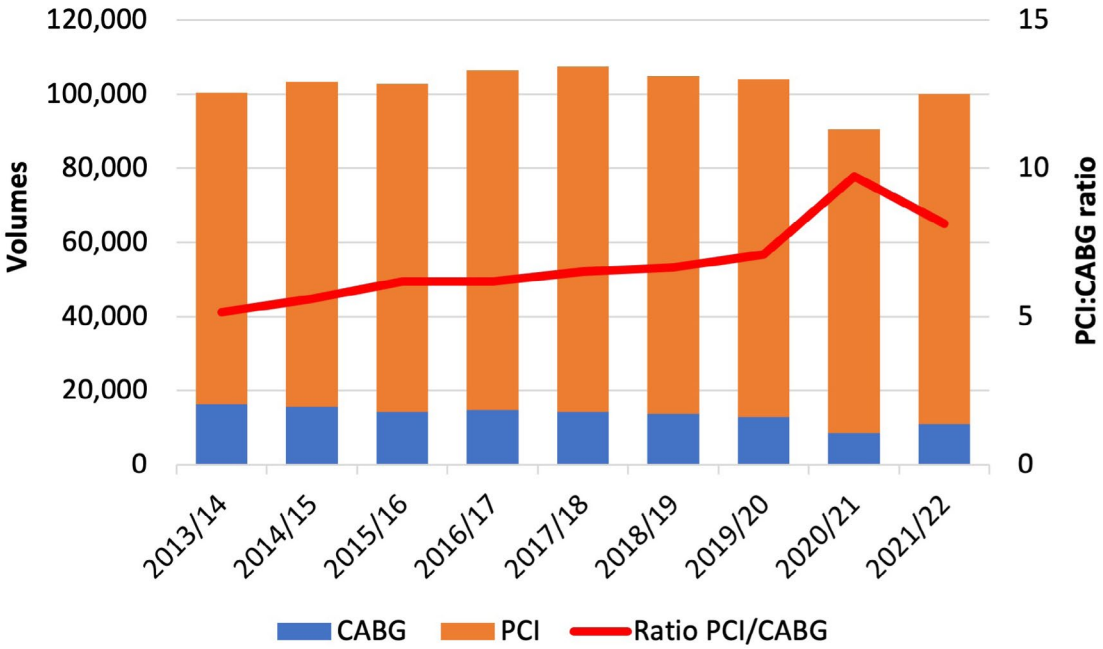


2.3 Coronary revascularisation rates overall have not returned to pre-pandemic levels

During the first year of the pandemic, the number of percutaneous coronary intervention (PCI) and coronary artery bypass graft (CABG) procedures fell by 10% and 34% respectively. The greater drop in CABG rates resulted in the ratio of PCI to CABG rising to almost 10:1 compared with 7:1 in 2019/20 [Figure 2.5].

Coronary revascularisation rates remained below pre-pandemic levels last year. Over 4,000 fewer procedures were performed, a 4% reduction compared to 2019/20. Again, this change was more marked for CABG than PCI and the ratio of PCI to CABG was 8:1 in 2021/22 [Figure 2.5].

Figure 2.5: CABG and PCI volumes in the UK (not including Scotland), 2013/14 - 2021/22 [NACSA data]

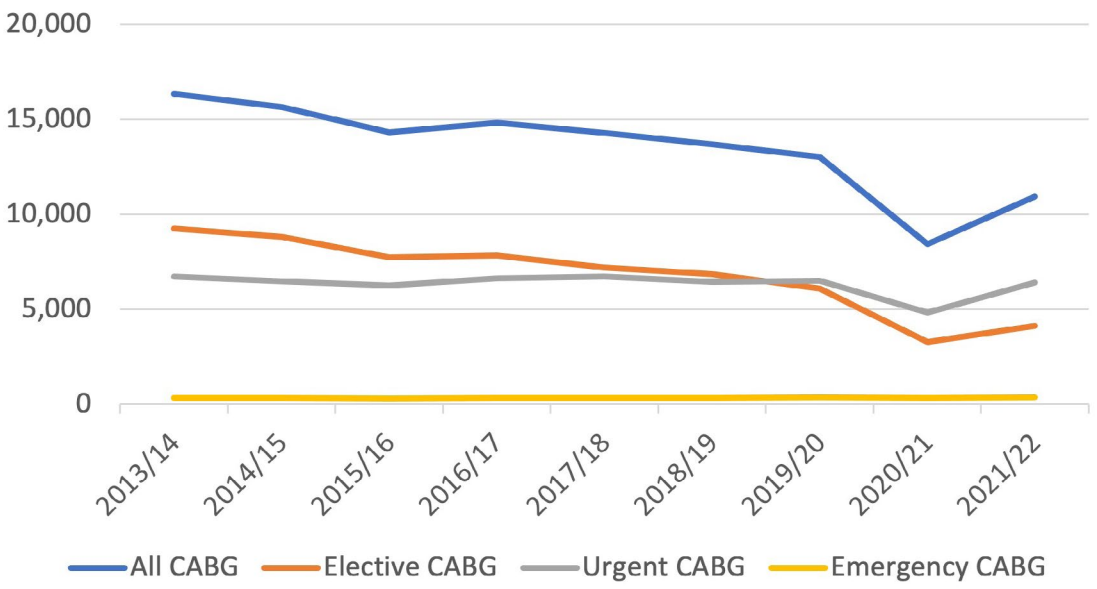


CABG coronary artery bypass grafting; PCI percutaneous coronary intervention

Figure 2.6 shows how the number of CABG procedures had been falling gradually since 2013 before a big dip in 2020/21. However, emergency CABG procedures have stayed largely the same over time (377 cases in 2021/22) even through the pandemic. The overall decline is entirely a result of the more than halving of elective CABG operations (from over 9,000 in 2013/14 to just under 4,200 in 2021/22). While urgent CABG rates dipped during the first COVID-19 year, they returned to pre-pandemic levels in 2021/22 (6,411 cases).

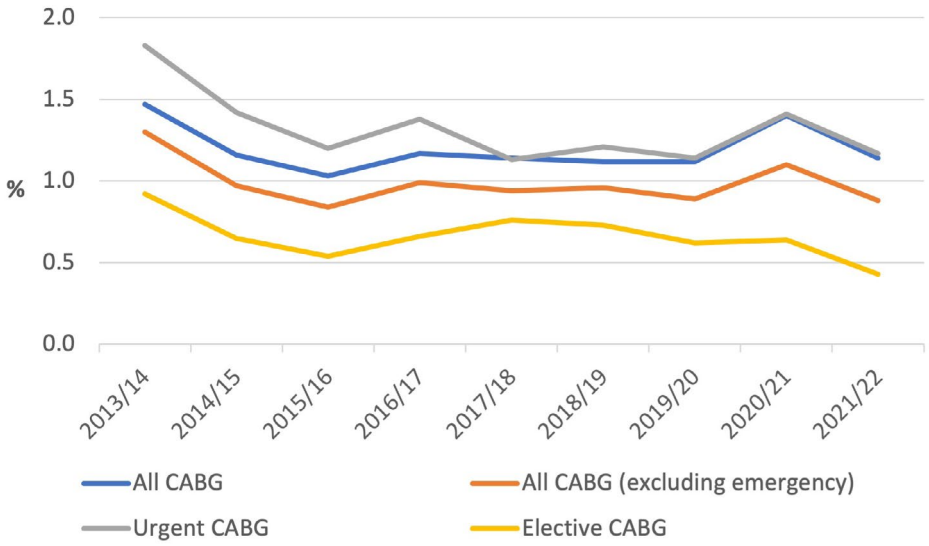
Increasing the use of PCI was advocated during the first year of COVID-19 to facilitate faster hospital discharges. This was obviously of benefit short-term during the crisis, but there are concerns about the longer-term effects of this on reinfarction rates and mortality. For certain subsets of patients, CABG continues to offer the best long-term results and efforts should therefore be made to restore pre-pandemic levels of surgical provision.

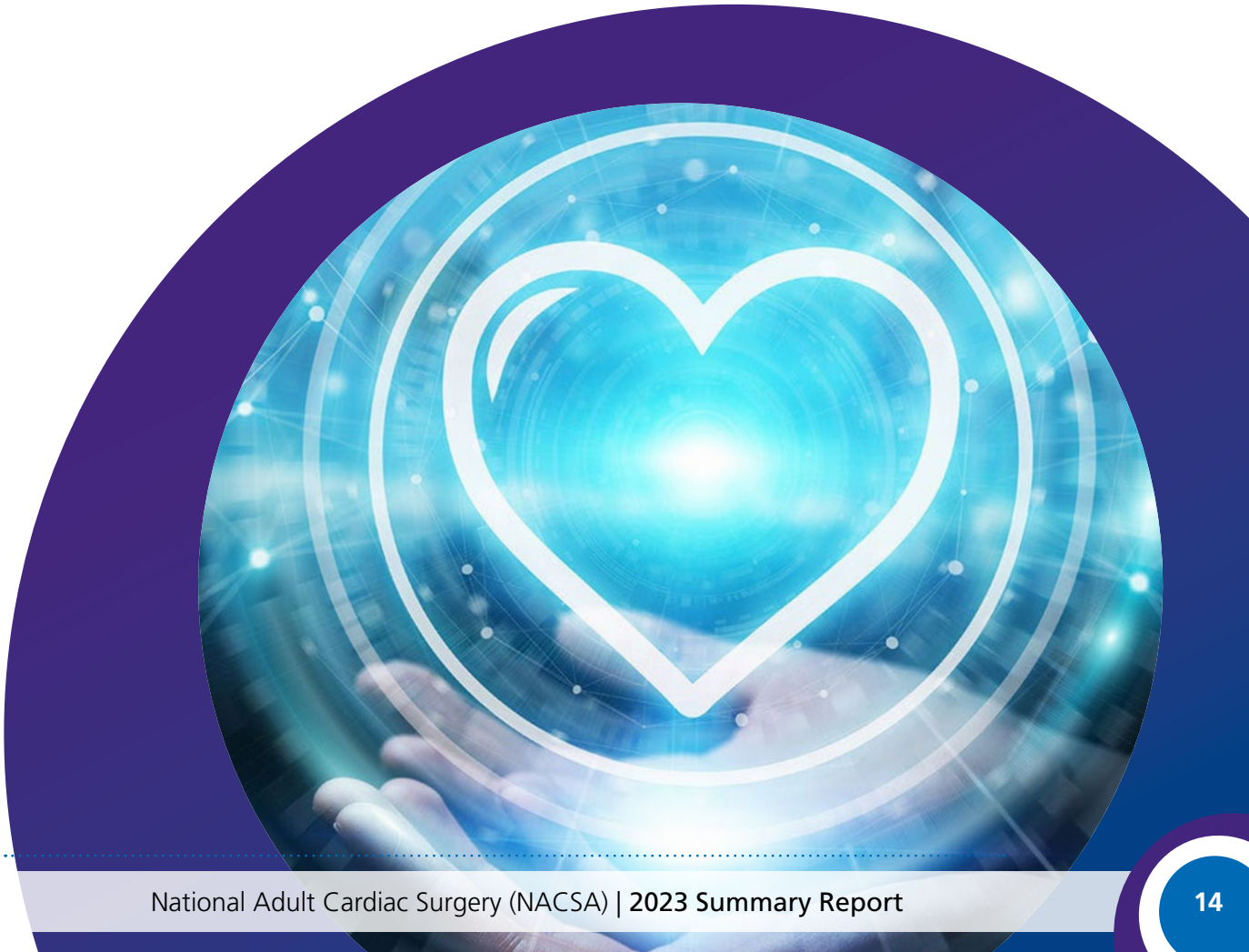
Figure 2.6: Numbers of isolated CABG operations performed in UK by operative urgency, 2013/14 - 2021/22 [NACSA data]



The outcomes of isolated CABG surgery in the UK continue to be excellent. The mortality rate after an elective CABG was only 0.43% in 2021/22 [Figure 2.7]. Mortality rates following CABG have been falling in the UK over the last 2 to 3 decades and there is some evidence that this is continuing for elective procedures. Overall and for urgent cases, the mortality rates have plateaued since around 2015/16. The risk of urgent CABG increased during the first year of the pandemic (from 1.1% to 1.4%) but improved to pre-pandemic levels in 2021/22.

Figure 2.7: Crude mortality rates (%) following isolated CABG operations in the UK (not including Scotland) by operative urgency, 2013/14 - 2021/22 [NACSA data]





2.4 Treatment of aortic valve disease has nearly returned to pre-pandemic levels but increasingly with TAVI rather than conventional aortic valve surgery

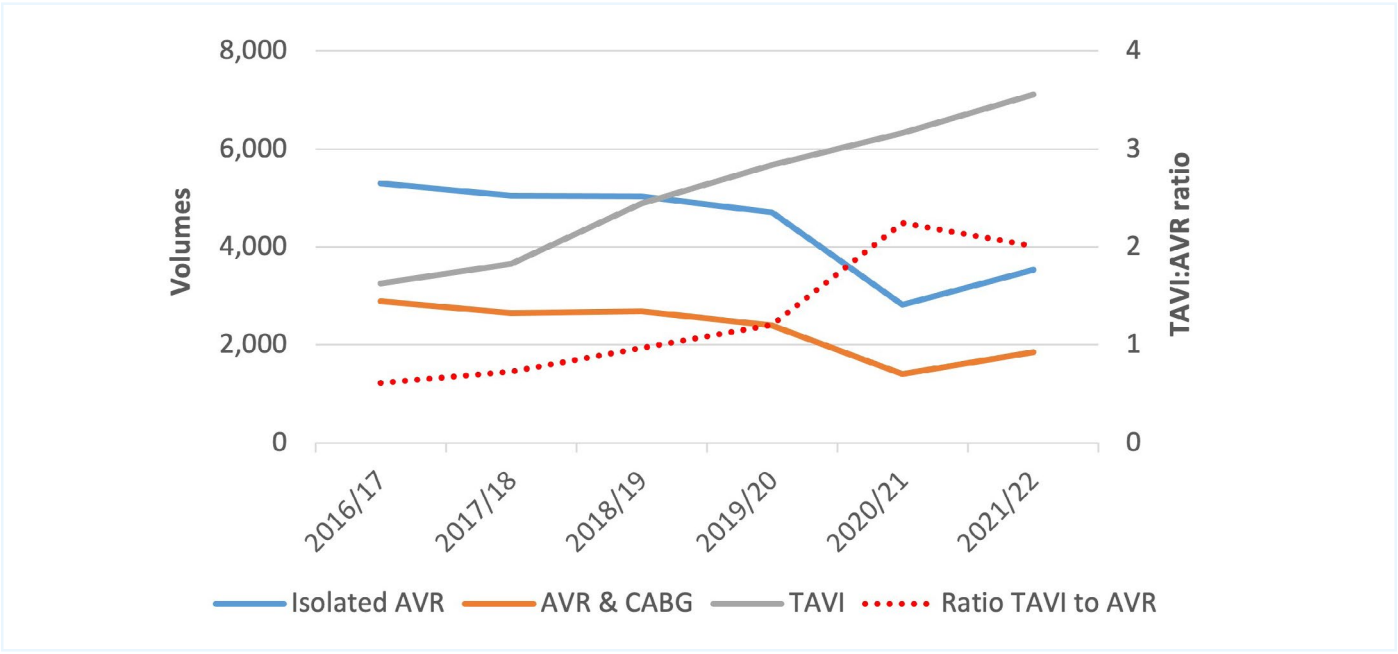
Patients who become symptomatic with severe aortic stenosis have a poor prognosis if this is not treated promptly with intervention by either conventional aortic valve replacement (AVR) or with transcatheter aortic valve implantation (TAVI). During the first year of the pandemic the number of patients with aortic valve disease treated fell by 17% [Figure 2.8]. This returned to almost 98% of pre-pandemic levels in 2021/22.

There has been a marked change in practice in the UK, with more patients last year treated with TAVI (7,111) rather than with AVR (3,538). This first happened in 2019/20 when the ratio was 1.2:1. This ratio has now risen to 2:1 last year [Figure 2.8].

As with PCI, TAVI was often advocated during the early stages of the pandemic to speed hospital throughput. TAVI is now very well established and is usually preferred in patients deemed at high risk for conventional AVR surgery. There continues to be debate about the long-term results of TAVI and the extra costs for the NHS associated with it. Conventional AVR should continue to be preferred, especially in younger patients. Results from this audit show that conventional surgical AVR continues to be an excellent and low-risk option.

The most recent NICE guidance from 2021 recommends that patients should have surgical AVR as first-line treatment in preference to TAVI if they are of low- or medium-risk.[2] Given that most patients receiving intervention (AVR or TAVI) would be in these two risk categories, it is likely that many patients are now receiving TAVI rather than AVR despite the NICE recommendation. To ensure optimum decision-making on how to treat, patients should be referred through a properly constituted MDT (and there is evidence in section 3.6 that MDT discussions are not occurring as frequently as would be desirable).

Figure 2.8: AVR and TAVI procedures in the UK, 2016/17 - 2021/22 [NACSA data]



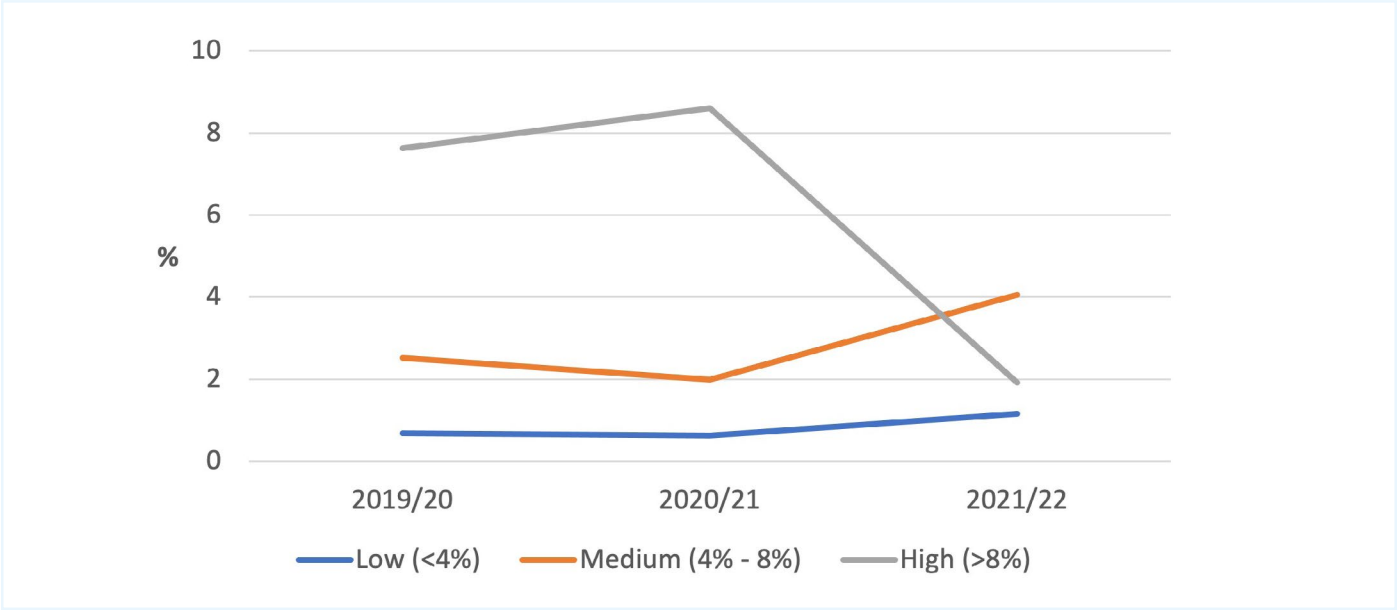
AVR aortic valve replacement; CABG coronary artery bypass grafting; TAVI transcatheter aortic valve implantation

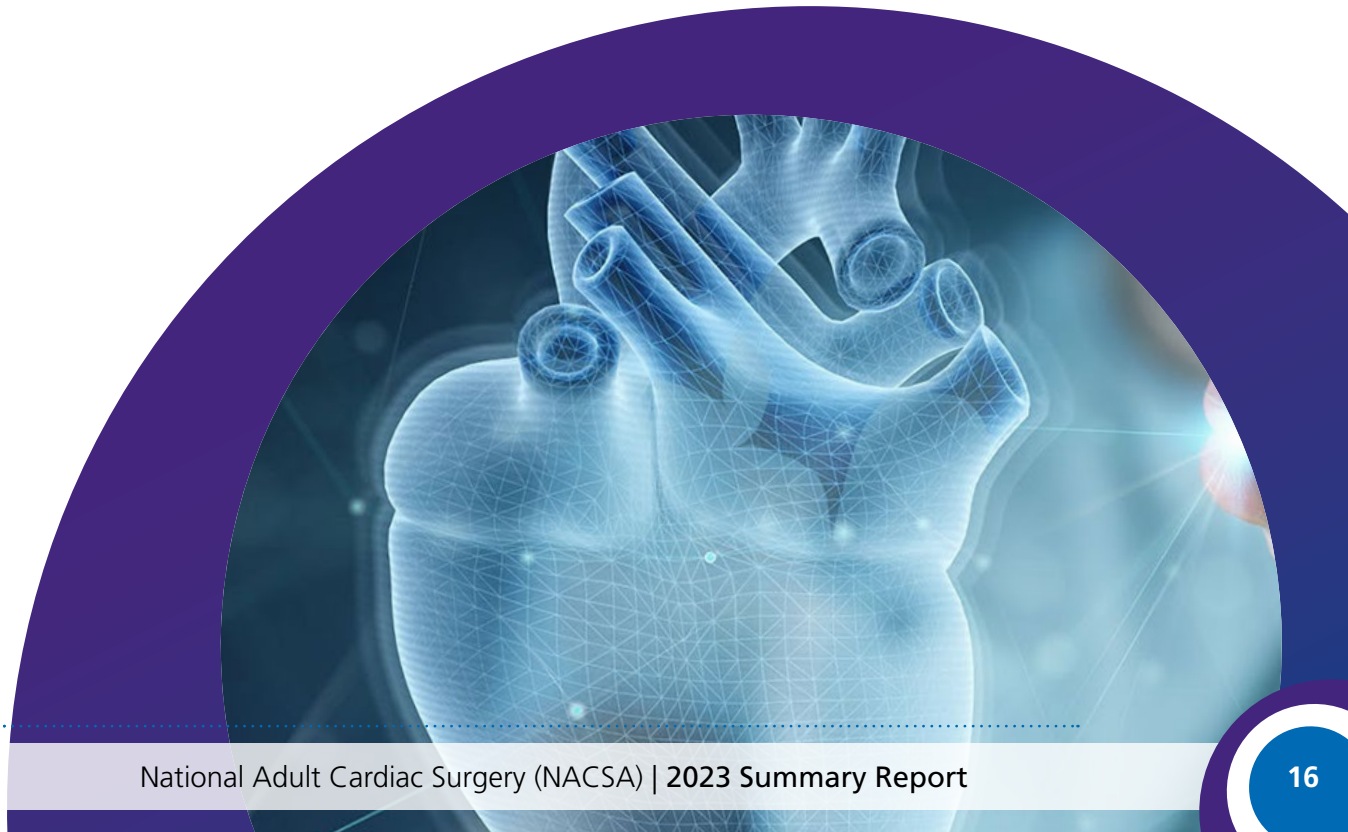
Mortality rates following isolated AVR in the UK are shown in Figure 2.9. Overall mortality rates were 1.8% after isolated AVR and 2.4% after combined AVR & CABG in 2021/22 (including emergency cases).

Almost 96% of isolated surgical AVRs were of low risk (preoperative EuroSCORE 2 risk score of <4%) with an overall mortality of 1.2%. In the previous two years, the mortality rates for this low-risk group were 0.7% and 0.6% respectively, giving a cumulative mortality over the last three years of 0.8%.

The low mortality rate in the high-risk group (EuroSCORE 2 risk score of >8%) of only 1.9% last year likely results from most of these high-risk cases being performed by TAVI. It does highlight, however, that high-risk patients can still undergo conventional AVR safely if this is felt to be appropriate by the treatment team.

Figure 2.9: Mortality rate (%) following isolated AVR by pre-operative risk category (Low, Medium, High using EuroSCORE 2) in UK, 2019/20 - 2021/22 [NACSA data]

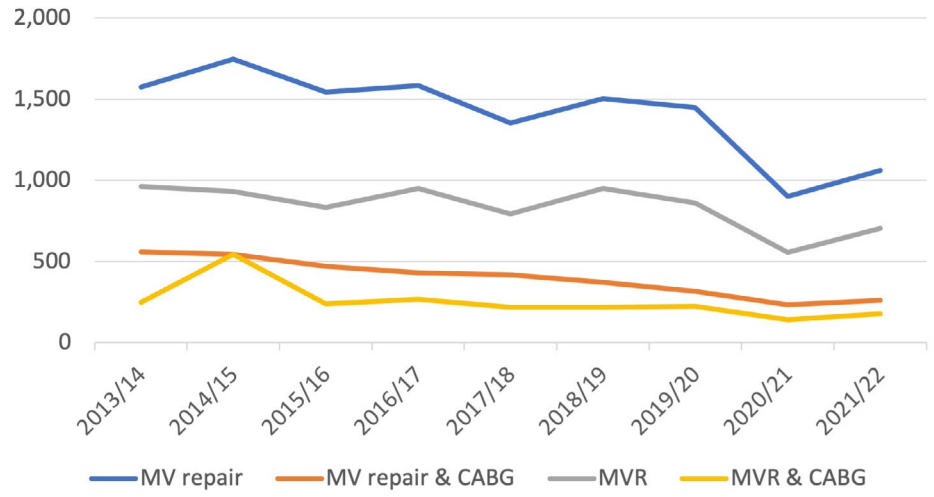




2.5 Mitral valve operations have not recovered post-pandemic and mitral valve repair rates should be better

The numbers of mitral valve operations have been falling since 2013 [Figure 2.10]. The commonest procedure is mitral valve repair, of which there were 1,061 in 2021/22. This figure was up from 902 during the first year in the pandemic but almost 27% lower than the 1,447 cases in 2019/20.

Figure 2.10: Mitral Valve operation rates (with and without CABG) in UK, 2013/14 - 2021/22 [NACSA data]

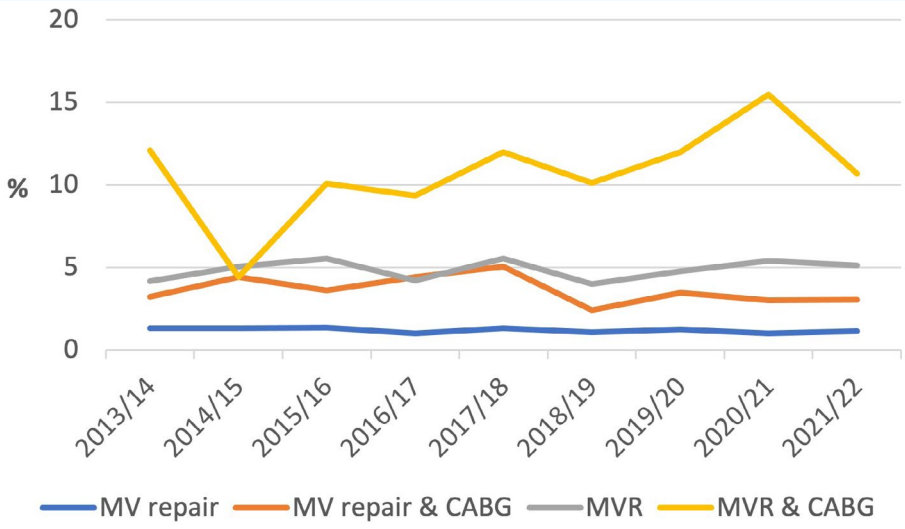


There are now options to perform a transcatheter procedure on the mitral valve, for example with Mitraclip. These are still in their infancy of being used in the UK, though, so it is unlikely that they are the cause of the drop in surgical cases seen to date.

MV Mitral valve; MVR Mitral valve replacement; CABG coronary artery bypass grafting

Mortality rates for mitral operations with or without CABG operations have remained relatively constant during the pandemic. The mortality rate for mitral repair remains low at 1.1% in 2021/22. For mitral repair and CABG it was 3.0%, for mitral valve replacement (MVR) 5.1% and for MVR and CABG 10.7% [Figure 2.11].

Figure 2.11: Crude mortality rates (%) following Mitral Valve operations (with and without CABG) in UK, 2013/14 - 2021/22 [NACSA data]



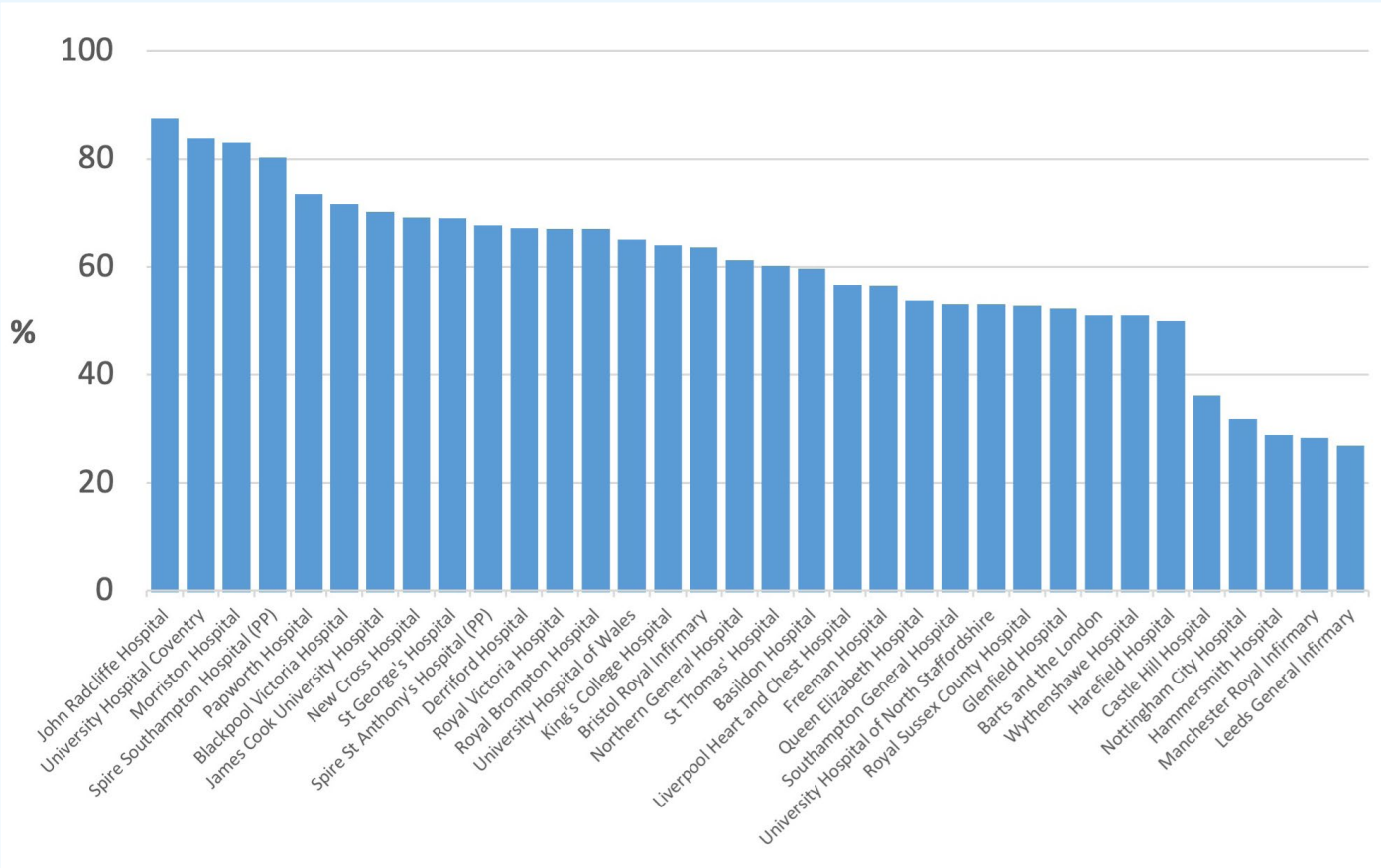
MV Mitral valve; MVR Mitral valve replacement; CABG coronary artery bypass grafting

For patients with degenerative mitral valve disease, by far the commonest pathology, the preferred treatment is surgical mitral valve repair, something that has not changed significantly over recent years. Overall, 60% of patients undergoing an isolated mitral procedure had a valve repair last year compared to 62% in 2013/14.

The proportion of patients undergoing a valve repair last year is shown by hospital in Figure 2.12. The best-performing hospitals achieved 86% compared to only 26% in the worst.

As these rates are calculated based on the proportion of all mitral valve operations, rather than just for patients with a degeneration pathology for their valve, they are lower than the rates that would be seen if only degenerative cases were counted. However, as the non-degenerative pathologies are all quite uncommon (mitral stenosis, endocarditis, etc) they give a realistic indication of the valve repair practices in most units. Even with these caveats, there is clearly considerable scope to significantly increase the use of mitral valve repair in the UK.

Figure 2.12: Mitral Valve repair rates as a proportion (%) of all isolated Mitral procedures, by hospital in 2020/21 [NACSA data]



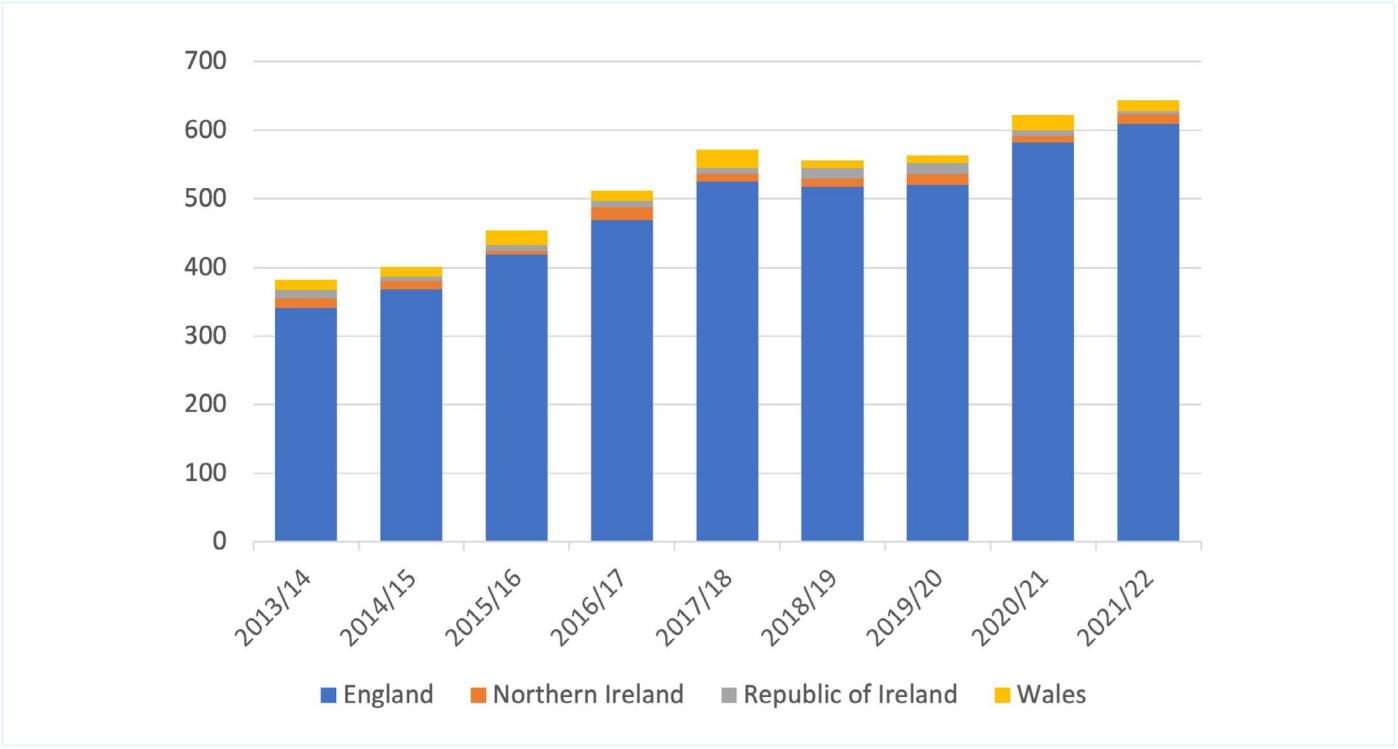
Isolated MV repair rate as proportion of all isolated mitral procedures (which includes pathologies such as mitral stenosis, endocarditis etc., where valve repair is unusual). Ranked by highest repair rate in 2021/22. PP private hospital

2.6 More patients are receiving emergency aortic surgery

Acute rupture or dissection of the thoracic aorta is a true surgical emergency. Although complex and high-risk procedures, without an operation half of patients will die within 2 days and more than 80% within 2 weeks. Figure 2.13 shows there has been a 68% increase in the number of these operations performed as an emergency since 2013/14, from fewer than 400 cases to almost 650. This trend was not impacted by COVID-19.

There has been concern that the diagnosis is often missed or delayed. As a result, several publicity campaigns (e.g., 'Think Aorta') have aimed to raise awareness of the diagnosis by primary care and emergency physicians such that more patients are transferred to specialist cardiac surgical centres for treatment. It seems likely that these have been successful in raising the number of cases (rather than there being a significant increase in the prevalence of the disease in the UK).

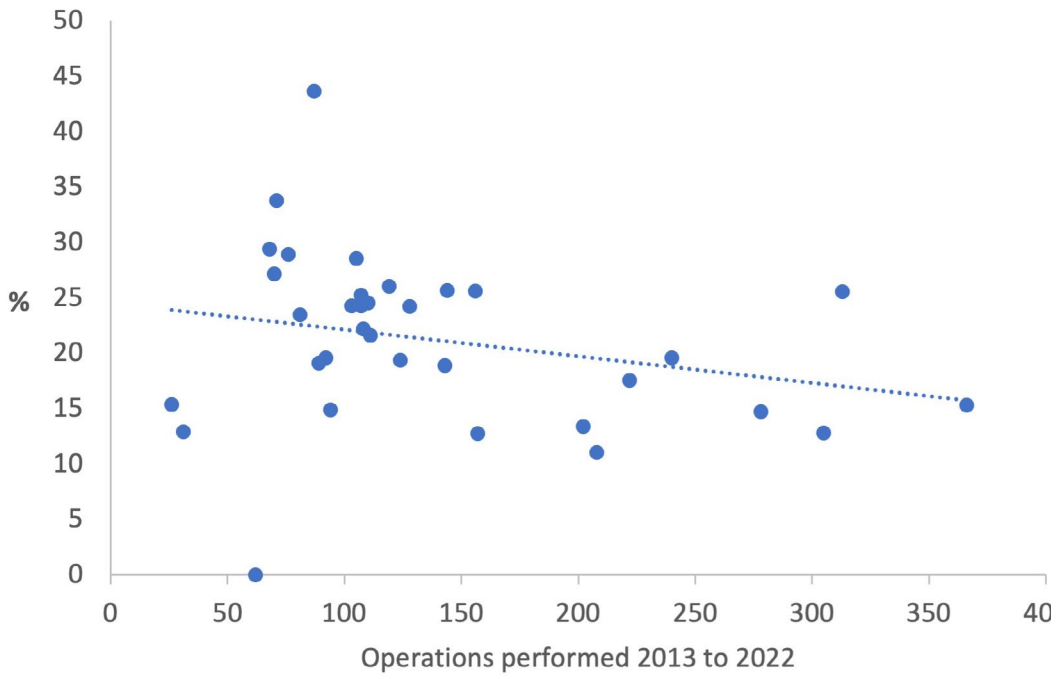
Figure 2.13: Emergency surgery on the Thoracic Aorta activity volumes by nation, 2013/14 - 2021/22 [NACSA data]



Any operation on a segment of the thoracic aorta performed as an emergency (includes both emergencies and salvage). The large majority (but not all) are for aortic dissection.

The mortality rate following emergency aortic surgery in the UK in 2021/22 was just over 17%. The mortality rate at each hospital averaged over the period 2013/14 to 2021/22 is shown in Figure 2.14. While the mortality rate has typically been nearer to 20% to 30% in many hospitals, there appears to be a link between higher case volumes and improved survival. This is especially seen in hospitals performing more than 24 cases per year, although several smaller units are also achieving similar results.

Figure 2.14: Scatter plot of cases of emergency Thoracic Aortic operations performed versus mortality rate (%) by NHS hospital, 2013/14 - 2021/22 [NACSA data]



Any operation on a segment of the thoracic aorta performed as an emergency (includes both emergencies and salvage). The large majority (but not all) are for aortic dissection.

2.7 Cardiac surgeons are performing fewer operations each year

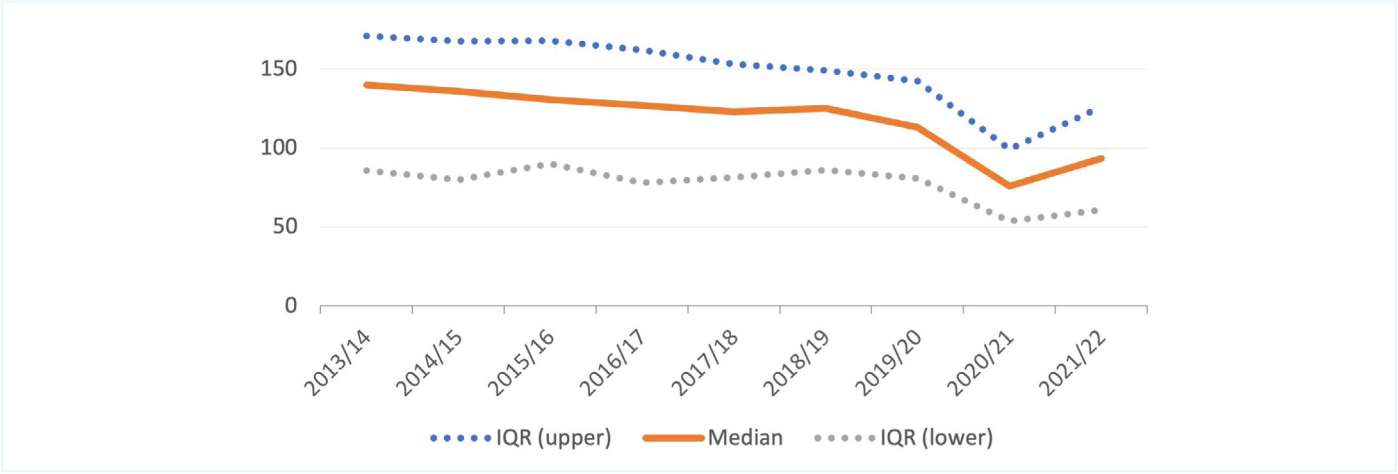
Since 2013, there has been a gradual decline in the number of cases individual cardiac surgeons are performing each year [Figure 2.15]. From a median figure of 140 operations per year in 2013/14, this dropped dramatically to only 76 cases in the first year of the pandemic, rising back up to 94 cases last year. One reason for this could be the greater complexity of surgical operations. Typically, a surgeon would perform two 'uncomplicated' procedures (such as an isolated CABG or AVR) per list. However, there has been an increase in the volume of more complex operations (such as those on the aorta, or multiple operations combined together in the same patient). This can make performing more than one operation per list more difficult.

There is also a greater emphasis on consultant surgeons contributing to patient care outside of the operating theatre (such as attending several MDT meetings each week or being 'surgeon of the week' on wards). This was far less common 10 years ago.

Other factors reducing the potential number of operations per surgeon each year include the competing demands for ICU beds at the peak of the pandemic. Hospitals with ring-fenced ward and ICU facilities for cardiac surgery are cancelling fewer operations.

There have also been concerns raised about 'burn-out' amongst anaesthetic, critical care and ICU nursing colleagues as a result of COVID-19 and the difficulties of working during those times. These effects are still being seen today.

Figure 2.15: Numbers of cardiac operations performed each year per consultant in the UK (not including Scotland), 2013/14 - 2021/22 [NACSA data]



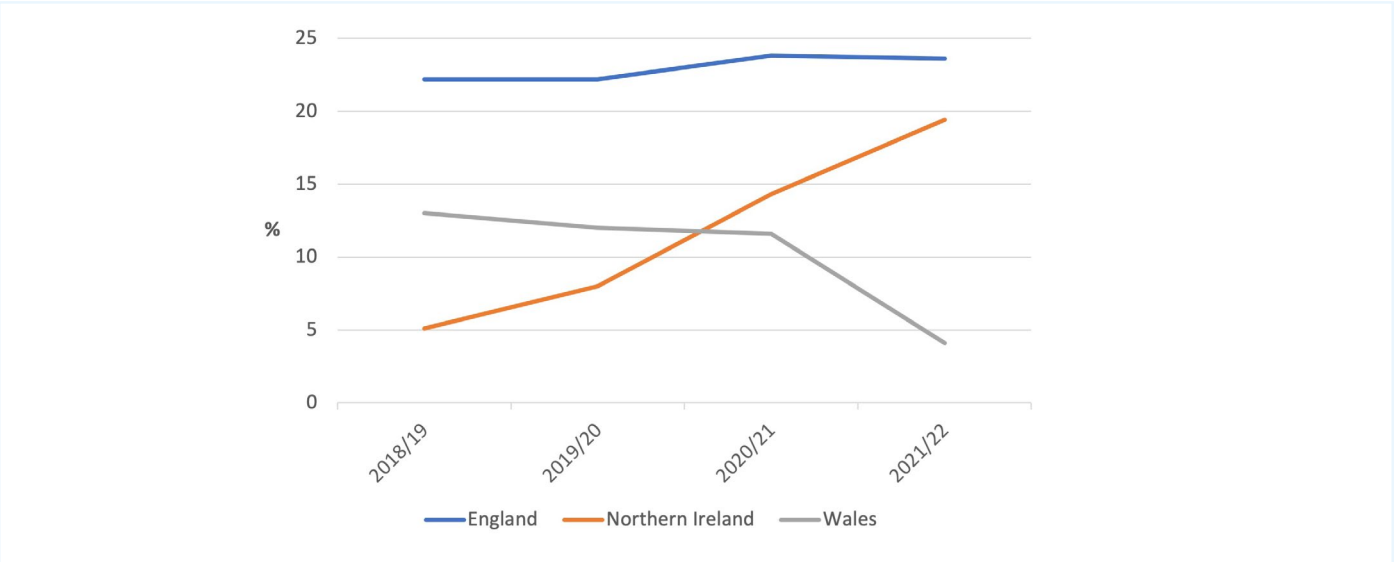
These counts include all cases for which an individual consultant is responsible - as per the Clinical Outcomes Publication (COP) whether performed by them or by a trainee. These counts also include emergencies (which are excluded from the COP analysis). Analysis of a surgeon's outcomes in COP requires >99 cases in 3 years. IQR = Inter-quartile range

2.8 Surgical training opportunities have been affected by the pandemic

The training of junior doctors to become consultant surgeons is vital to maintain the future of cardiac surgery. Overall, the proportion of cases performed by trainees in England has remained relatively stable at around 22-23% over the last four years despite the pandemic [Figure 2.16]. A lower proportion of cases were performed by trainees in Wales or Northern Ireland.

However, these rates disguise the fact that total operation numbers have fallen such that just over 5,000 operations were performed in England by trainees, compared with over 5,700 in 2019/20.

Figure 2.16: Proportion (%) of cardiac operations performed by a surgeon other than the responsible consultant (trainees) by country, 2018/19 - 2021/22 [NACSA data]

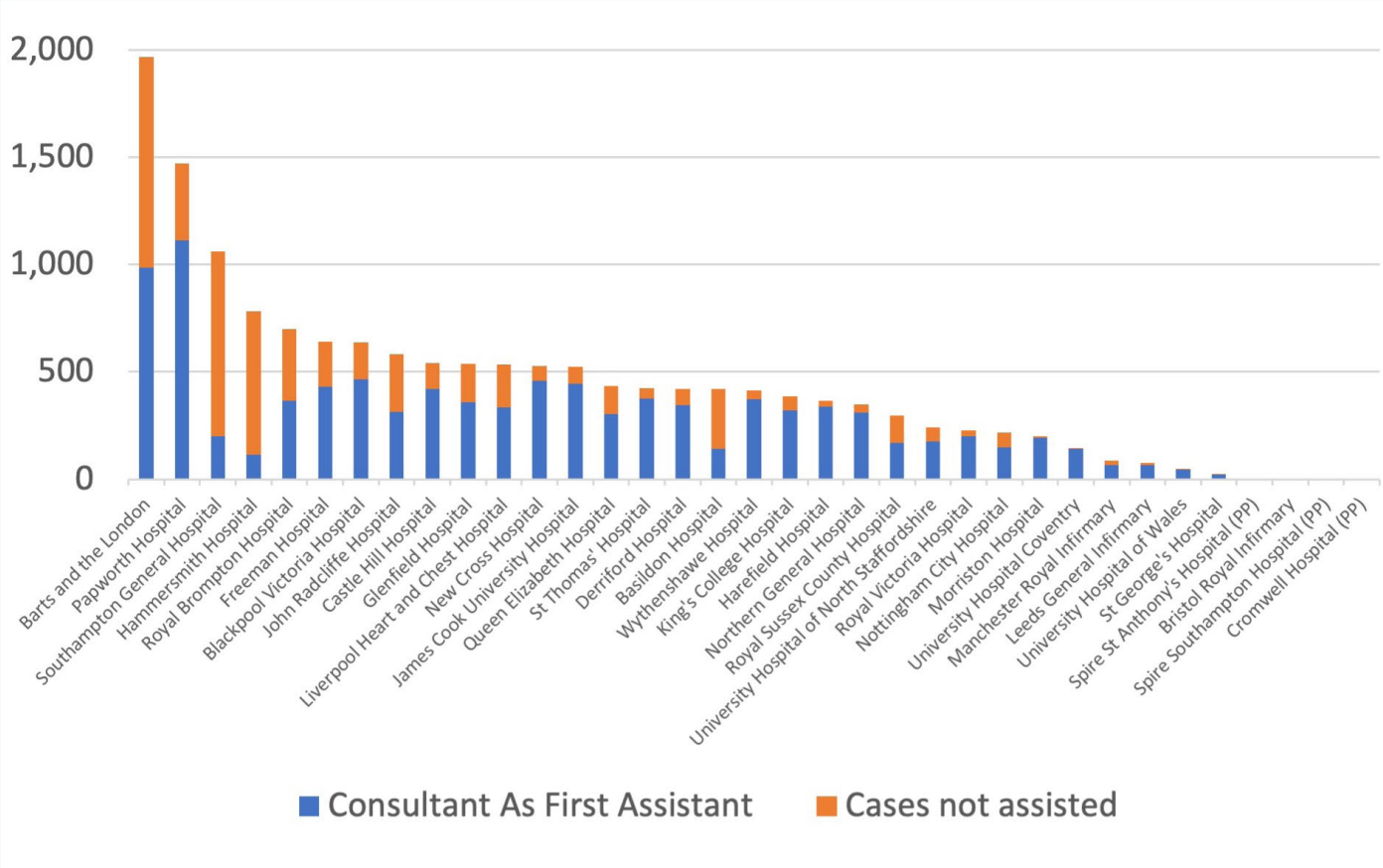


Defined as First Operator GMC number not the same as Responsible Consultant GMC number within the dataset. This will include both registrars with a national training number (NTN) and Trust Fellows etc. Cases where no GMC number has been recorded for the First Operator are excluded from these counts.

The levels of surgical training by hospital are shown in Figure 2.17. Hospitals with high numbers of cases performed without direct consultant supervision (scrubbed and assisting with the operation directly) are likely to have very senior trainees close to the end of their training, or in some cases that have fully completed training and are ready for consultant practice.

Hospitals and consultants that train junior surgeons are creating the surgeons and innovators of the future. Those that do so should be recognised and championed for their time and effort. Any attempts to deter surgeons from taking on training as a result of pressures on time and theatre throughput should be resisted.

Figure 2.17: Number of cardiac operations performed over three years by a surgeon other than a consultant (trainees), with and without consultant assistance, by hospital, 2019/20 - 2021/22 [NACSA data]



Defined as First Operator GMC number not the same as Responsible Consultant GMC number within the dataset. This will include both registrars with a national training number (NTN) and Trust Fellows etc. Cases where no GMC number has been recorded for the First Operator are excluded from these counts.

3 Selected quality improvement metrics

3.1 Elective CABG waiting times are longer than pre-pandemic with only nine NHS hospitals achieving the 12-week target

3.1.1 Overview of QI metric

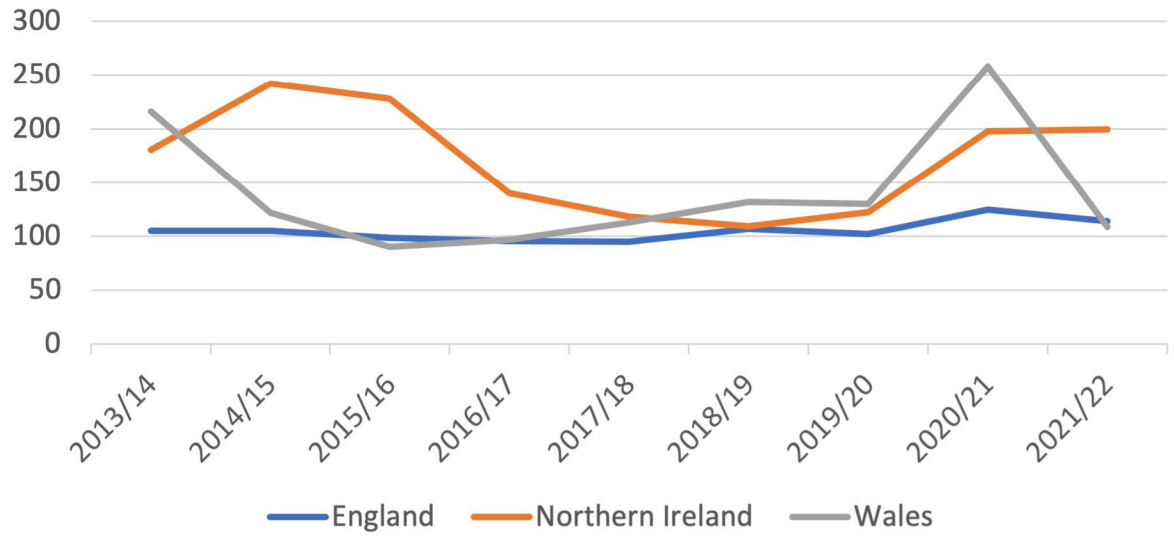
QI Metric Description/Name	Elective CABG waiting time – from angio to operation date
Why is this important?	Patients should not wait any longer than necessary for elective coronary artery surgery that is expected to improve both symptoms and/or life expectancy.
QI theme	Safety and Effectiveness.
What is the standard to be met?	NHS England target is 18 weeks (126 days) from GP referral to treatment. This includes several other steps in the pathway prior to final referral for surgery, meaning that the portion from the performance of diagnostic investigations to the treatment should be considerably less than 18 weeks. The finding of an abnormality on the coronary angiogram is usually the point that triggers the consideration of a referral for cardiac surgery. This time (from angiogram to operation) is the portion of the patient pathway that surgical teams can influence. A target of 84 days means that the surgical team has taken 67% (12 weeks) of the referral-to-treatment time.
Key references to support the metric	NHS England Commissioning target.
Numerator	All patients undergoing elective first time CABG.

QI Metric Description/Name	Data Completeness and Validity (1-2)
Denominator	N/A.
Trend	See Figure 3.1. After increasing during 2020/21 elective waiting times in England fell last year but not back to pre-pandemic levels (114 days compared to 102). In Wales the wait is now 109 days (compared to 130 days). Waits in Northern Ireland have continued to worsen and are now 199 days, up from 122 days pre-pandemic.
Variance	Figure 3.2. There is huge variation between the best and worst performing NHS hospitals with elective waits varying from 60 to 245 days.

3.1.2 Audit results

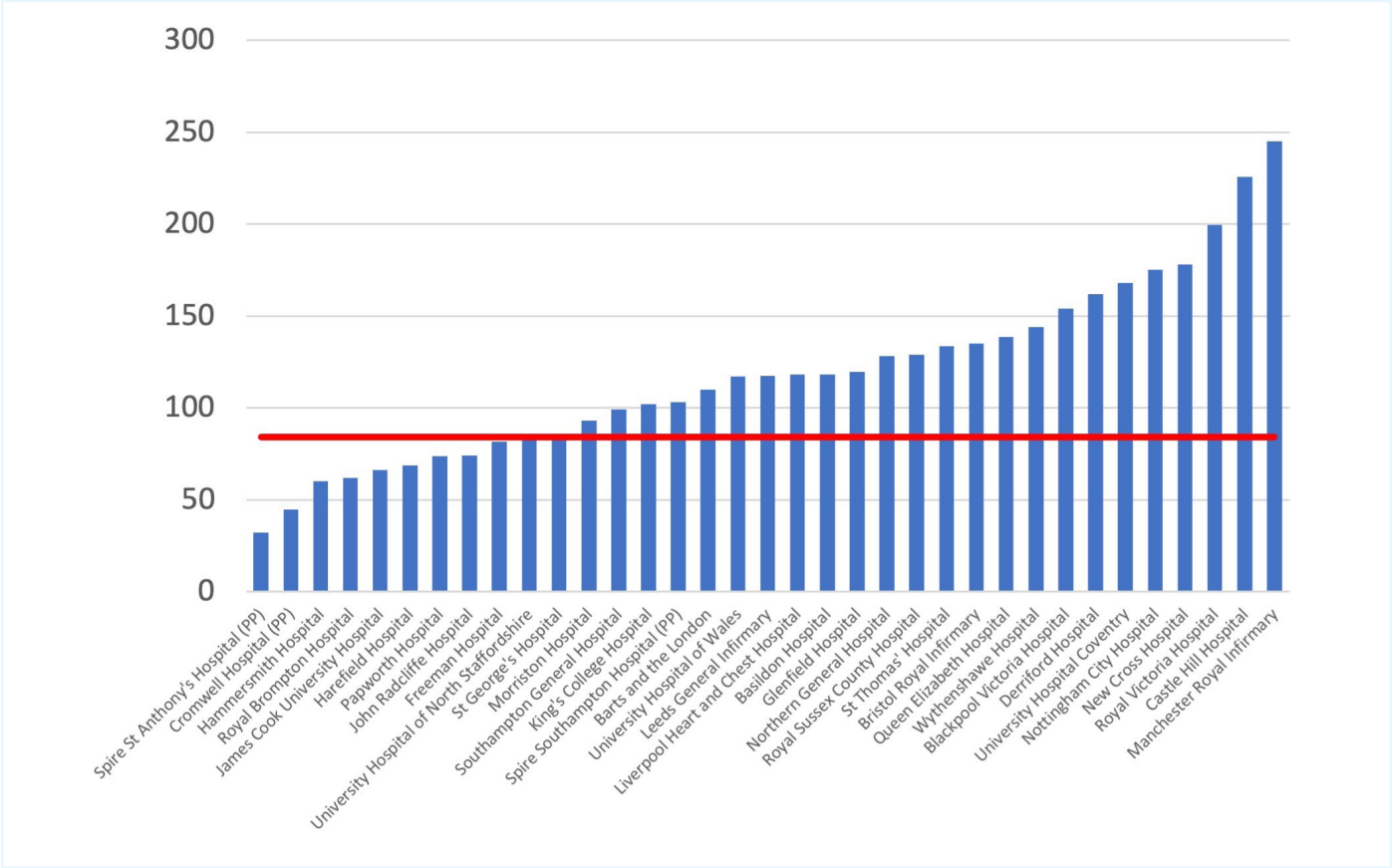
Over the last year, the mean waiting time for elective CABG following angiography in NHS hospitals in England improved by 11 days, from 125 to 114 days [Figure 3.1]. This was still 12 days longer than two years ago prior to the COVID pandemic (12% worse). Elective waiting times increased last year by 2 days in Northern Ireland (to 199 days, 63% worse than pre-COVID), but dramatically improved by 149 days in Wales (to 109 days, 16% better than pre-COVID).

Figure 3.1: Waiting time (mean days) for elective CABG (days from angiogram to operation date) by country, 2013/14 - 2021/22 [NACSA data]

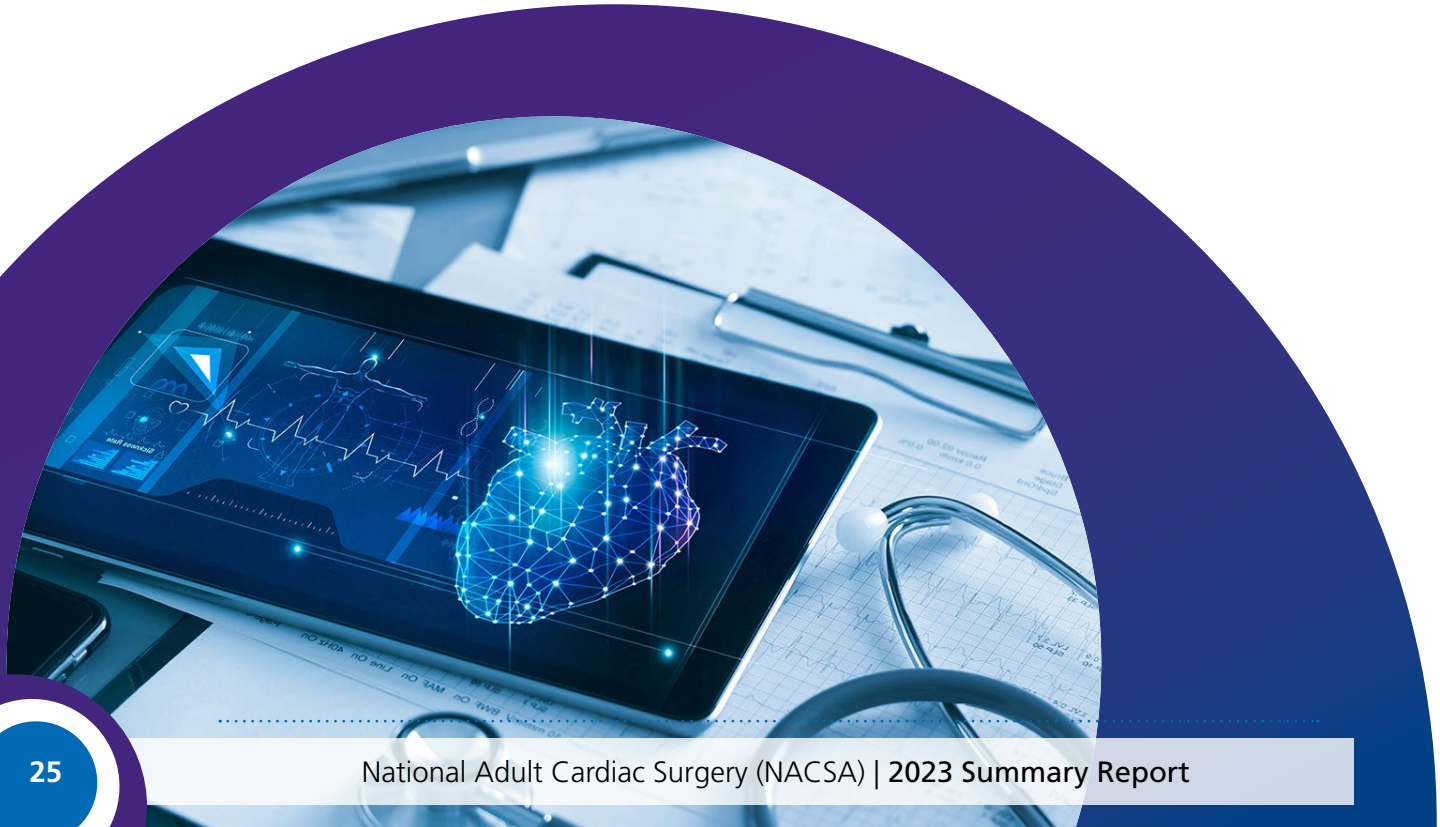


Only nine NHS and two private hospitals achieved the 12-week target in 2020/21 [Figure 3.2]. There were considerable differences in elective waiting times between NHS hospitals, ranging from 60 to 245 days. This large variation suggests that considerable improvements could be made by the poorer performing hospitals.

Figure 3.2: Waiting time (mean days) for elective CABG by hospital, 2021/22 [NACSA data]



Red bar = target of <84 days. (PP = private hospital).

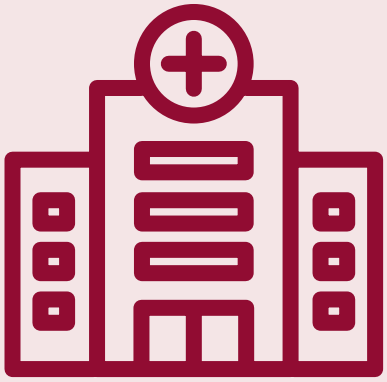


3.1.3 Recommendations for those not achieving the standard

Hospitals with prolonged waiting times for elective CABG surgery should review their processes and referral pathways to identify the causes of any delays. If necessary, advice should be sought from centres with evidence of the best performance. A QI action plan should be instigated to achieve this target.

Units not achieving the target should consider ring-fencing level 3 ICU facilities and seek to make greater use of day-of-surgery admissions (DOSA) and enhanced recovery after surgery (ERAS) to improve patient flows and outcomes.

Patients should be offered surgery in neighbouring hospitals with shorter waiting times if reductions in waiting times cannot be demonstrated.



3.2 The time to urgent CABG following coronary angiography deteriorated, with no hospital achieving 7-day target

3.2.1 Overview of QI metric

QI Metric Description/Name	Waiting time for urgent CABG within 7 days of referral
Why is this important?	Most patients with Non-ST Elevation Myocardial Infarction (NSTEMI) requiring revascularisation with CABG should be operated on during the same hospital admission (ESC/EACTS Revascularisation Guidelines 2018).[3] Patients usually require five days antiplatelet therapy cessation prior to surgery to reduce the risks of bleeding at surgery. The optimal window for surgery is between five to seven days following diagnosis (and referral). Longer waits for surgery as an inpatient uses considerable hospital resources and blocks ward beds from allowing other admissions.
QI theme	Safety and Effectiveness.

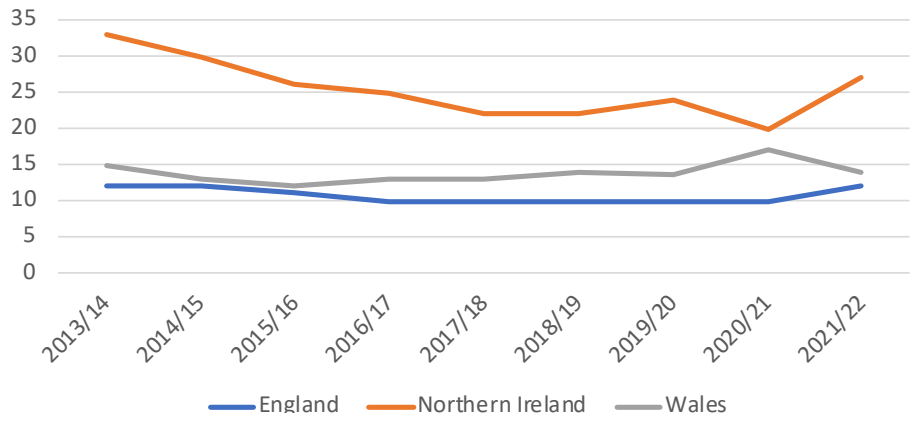
QI Metric Description/ Name	Waiting time for urgent CABG within 7 days of referral
What is the standard to be met?	The Commissioning for Quality and Innovation framework (CQUIN) target in 2016 recommended that 100% of patients should meet the target of undergoing urgent CABG within seven days of angiography.[4]
Key references to support the metric	ESC/EACTS Revascularisation Guidelines[3] CQUIN target[4]
Numerator	All patients requiring urgent first time CABG
Denominator	N/A.
Trend	See Figure 3.3. Urgent waiting times have increased by two days in the last year in England (to 12 days). In Northern Ireland waiting times have also increased by seven days (to 27 days), whereas in Wales waits have improved by three days (to 14 days).
Variance	See Figure 3.4. There is considerable variation between NHS hospitals (from eight days to 27 days). No hospital achieved the target last year (compared to three hospitals in 2020/21).

3.2.2 Audit results

The waiting time for urgent CABG following angiography has worsened in the last year in both England (12 days, up two days) and Northern Ireland (27 days, up seven days). In Wales, the waiting time was reduced by three days to 14 days, albeit still a worse performance than in England. No country achieved the 7-day target.

By comparison, in last year's report there was evidence that average waiting times for urgent CABG had reduced during the first year of the pandemic (2020/21) from 11 to 10 days. The reduction in elective work at the time is likely to have facilitated faster throughput of more urgent cases. The re-emergence of elective cases last year created a tension between maintaining tertiary specialist services and managing acute medical admissions, with particular pressures on bed utilisation.

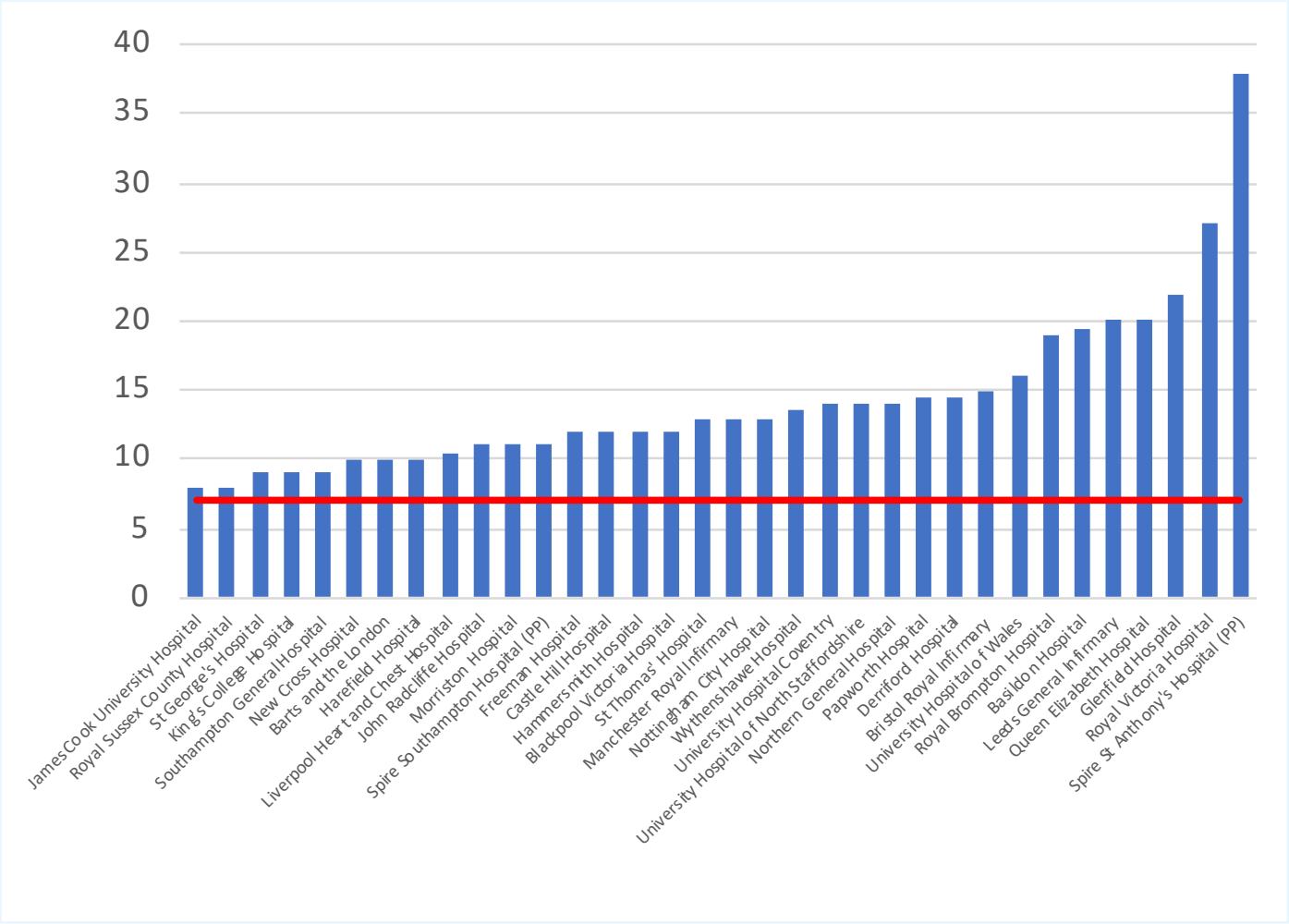
Figure 3.3: Time (mean days) to urgent CABG after diagnostic angiography, by UK country, 2013/14 - 2021/22 [NACSA data]



In 2021/22, no hospital achieved the target of operating on urgent CABG patients within seven days of their diagnosis with angiography. In comparison, three hospitals achieved the target in 2020/21. There is considerable variation between the best and worst performing NHS hospitals (from eight days to 27 days), which suggests that major improvements are possible by those that are poorly performing.

Patients waiting in hospital for up to three or four weeks on average, in poorly performing hospitals, block beds that could be used for elective admissions. It also puts patients at increased risk of dying from their heart disease, as well as the risks of hospital acquired infections (such as COVID-19) and deep vein thrombosis.

Figure 3.4: Time (mean days) to urgent CABG after diagnostic angiography, by hospital, 2021/22 [NACSA data]



Red bar = target of 7 days.

3.2.3 Recommendations for those not achieving the standard

Hospitals not reaching the 7-day target of urgent CABG performed after coronary angiography should undertake a review of their processes to identify where delays occur and how these can be avoided. If necessary, advice should be sought from centres with evidence of the best performance. A QI action plan should be instigated to reduce delays.

Hospitals should have agreed and uniform referral processes from all referring centres. Ideally this should be through a unified online referral portal. Regional protocols should be agreed between surgical and cardiology teams to stop anti-platelet agents pre-operatively to minimise delays once referred. A common surgical waiting list should be shared by all surgeons.

Units not achieving the target should consider ring-fencing level 3 ICU facilities and seek to make greater use of enhanced recovery after surgery (ERAS) to improve patient flows and outcomes.

3.3 Fewer urgent CABG procedures were performed within seven days of coronary angiography last year, with no hospital achieving the 75% target

3.3.1 Overview of QI metric

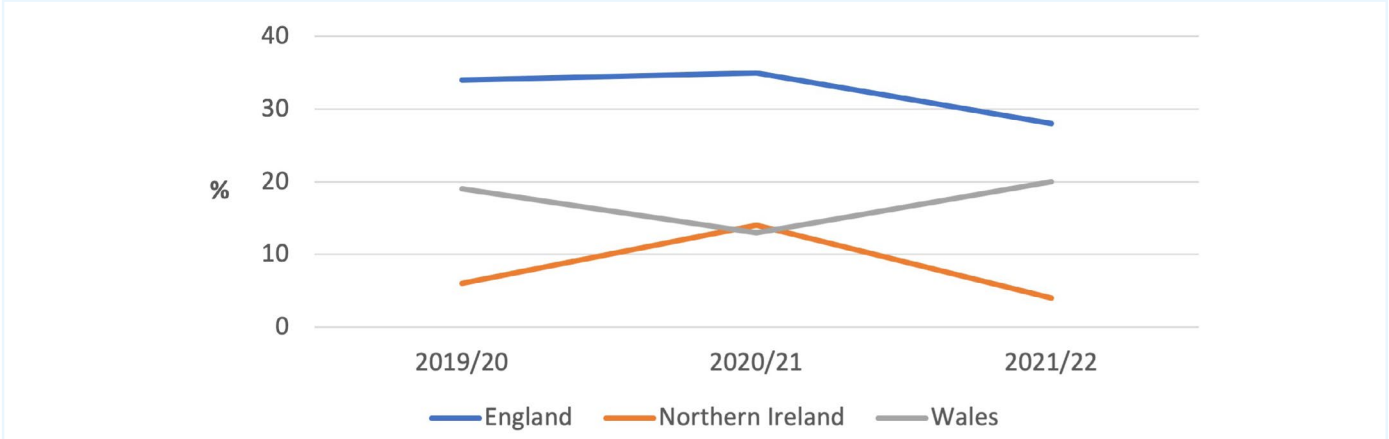
QI Metric Description/Name	Proportion of urgent CABG performed within seven days of coronary angiography
Why is this important?	Most patients with NSTEMI requiring revascularisation with CABG should be operated on during the same hospital admission (ESC/EACTS Revascularisation Guidelines 2018).[3] This is because the highest risk of a further MI or death is in the first month following the initial presentation. Timely surgery is therefore associated with better patient outcomes. Patients usually require five days antiplatelet therapy cessation prior to surgery to reduce the risks of bleeding at surgery. The optimal window for surgery is between five to seven days following diagnosis (and referral). Longer waits for surgery as an inpatient uses considerable hospital resources and blocks ward beds from allowing other admissions.
QI theme	Safety and Effectiveness.

QI Metric Description/Name	Hospital Activity Volumes (3-6)
What is the standard to be met?	The Commissioning for Quality and Innovation framework (CQUIN) target (2016) recommended that 100% of patients should meet the target of undergoing urgent CABG within seven days of angiography.[4] In the 2022 NACSA report no NHS centre met this target. A revised target of 75% was set for this audit cycle.
Key references to support the metric	ESC/EACTS Revascularisation Guidelines[3] CQUIN target[4]
Numerator	All patients requiring urgent first time CABG receiving this within seven days of the diagnostic angiogram.
Denominator	All patients requiring urgent first time CABG.
Trend	See Figure 3.5. The best performance was in England with 28% of patients being treated within target in 2021/22, down from 35% in 2020/21. This is a long way below the expected 75% target set. Wales achieved 20% (versus 13% in 2020/21) with Northern Ireland only achieving 4%.
Variance	See Figure 3.6. No hospital achieved the 75% target, and none achieved even 50% (whereas three hospitals did in 2020/21). There is a huge variance between the best and worst hospitals, from 43% to 4%.

3.3.2 Audit results

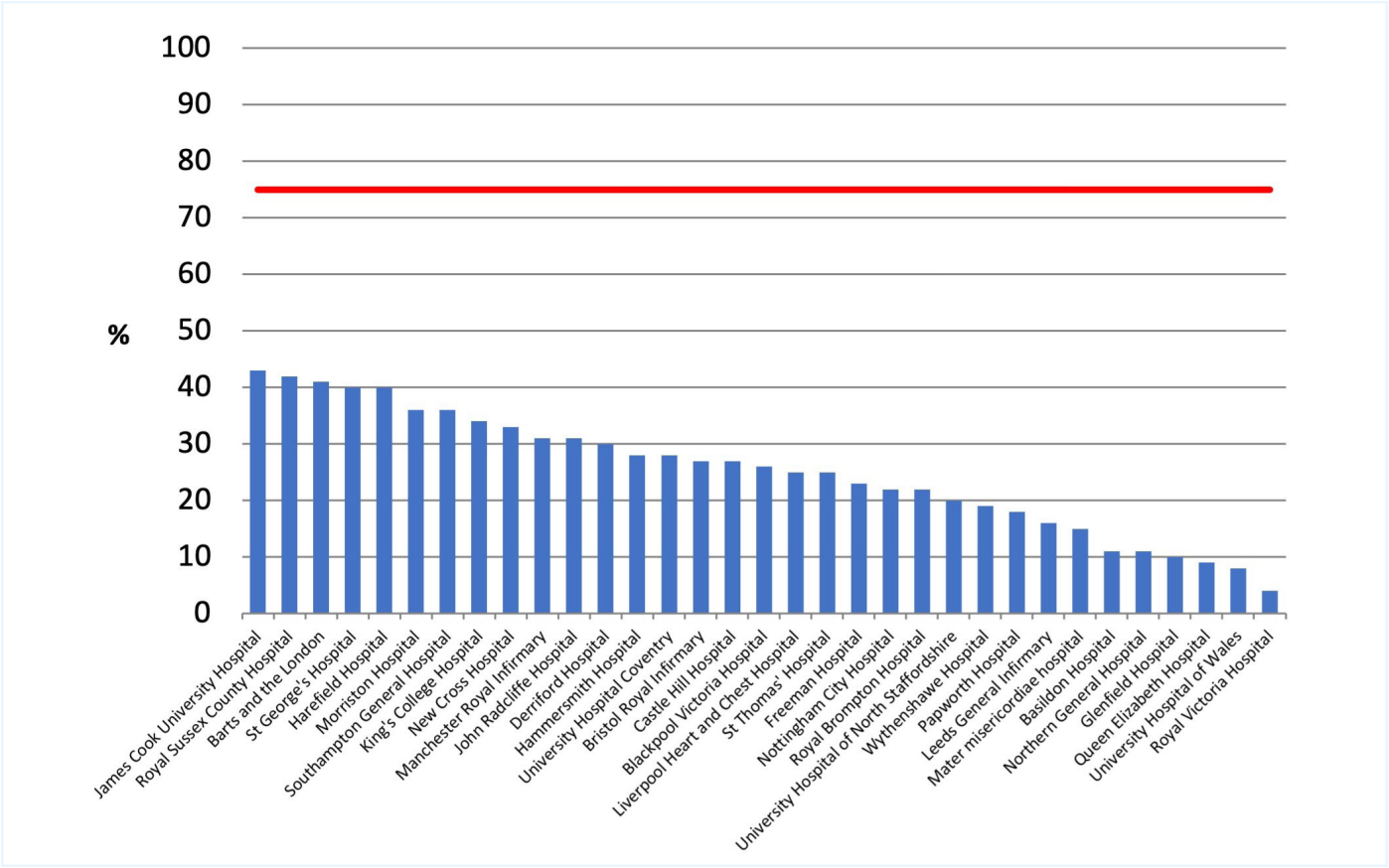
Following admission to hospital with a higher-risk NSTEMI heart attack, patients requiring CABG should have their operation within seven days of the diagnostic coronary angiogram. Prolonged inpatient waiting times are very costly to the NHS and are associated with poorer outcomes for patients. In England, only 28% of patients achieved the target in 2021/22, down from 35% the previous year [Figure 3.5].

Figure 3.5: Proportion of urgent CABG performed within seven days of coronary angiography, by country, 2019/20 - 2021/22 [NACSA data]



No UK hospital achieved the target of performing 75% of urgent CABG within seven days [Figure 3.6]. The best hospital met the target in 43% of cases (compared with 58% the previous year) and the worst performing hospital achieved only 4% of cases in this time. Again, this points to the potential for very significant improvements.

Figure 3.6: Proportion (%) of urgent CABG performed within 7 days of coronary angiography, by NHS hospital, 2021/22 [NACSA data]



Red bar = target of 75% for 2021/22.

3.3.3 Recommendations for those not achieving the standard

Hospitals not reaching the 75% target of urgent CABG performed within seven days of coronary angiography should undertake a review of their processes to identify where delays occur and how these can be avoided. If necessary, advice should be sought from centres with evidence of the best performance. A QI action plan should be instigated to reduce delays.

Hospitals should have agreed and uniform referral processes from all referring centres. Ideally this should be through a unified online referral portal. Regional protocols should be agreed between surgical and cardiology teams to stop anti-platelet agents pre-operatively to minimise delays once referred. A common surgical waiting list should be shared by all surgeons.

Units not achieving the target should consider ring-fencing level 3 ICU facilities and seek to make greater use of enhanced recovery after surgery (ERAS) to improve patient flows and outcomes.

3.3.4 **Case study**

"The Brighton experience of minimising the time from angiography to surgery for urgent CABG

In Brighton we are fortunate to have a unit with both a dedicated cardiac intensive care and a ring-fenced cardiac surgical step-down ward. This provides us a high level of control over managing our elective admissions and inter-hospital transfers.

All urgent transfers are discussed with the Senior Registrar at the time of referral which helps to identify any issues that need to be addressed prior to transfer (e.g., all pre-operative investigations completed, anti-platelet agents to be stopped). We encourage referring cardiology services to use ticagrelor wherever possible as their 2nd anti-platelet agent in the management of PCI due to its shorter washout period prior to surgery. Patients accepted for urgent surgery are admitted directly to our surgical ward, rather than to cardiology, giving us direct control over their pre-operative workup.

We have developed a well-established Enhanced Recovery after Surgery (ERAS) programme and have recently introduced a 'Golden Discharge' programme that together promote early mobilisation and hospital discharge. These measures free up bed space early in the day and allow us to prioritise the admission of inter-hospital transfers so that they arrive in our unit within daylight hours. On admission, all transfers are reviewed by the on-call consultant to ensure their fitness for surgery and prioritise any pre-operative work up that may still be required. Where possible, patients will be allocated to an operating slot at this initial review.

We run a weekly meeting of the consultant surgeons at 9am every Friday in which we review the current list of inpatients awaiting surgery. Any patients not already scheduled will be allocated to slots for the following week. A proportion of the scheduled elective activity for the following week will be cancelled at this point if necessary. Elective patients previously cancelled or identified as having a worsening clinical state are prioritised. A consensus agreement between all operating surgeons is reached to avoid future changes to the operating schedule at short notice.

Through the collegiate working of the consultants, juniors, nurses and advanced care practitioners, we have been successful in streamlining the throughput of patients requiring urgent surgery by focusing on efficiencies in pre-operative work up, enhanced recovery, and early discharge".

Damian Balmforth - Consultant Cardiac Surgeon, Royal Sussex County Hospital, Brighton

3.4 Day-of-Surgery Admission (DOSA) rates for elective cardiac surgery remain below pre-pandemic levels and only one hospital achieved the 50% target

3.4.1 Overview of QI metric

QI Metric Description/Name	Proportion of patients with DOSA (day-of-surgery admission) for elective CABG
Why is this important?	Admission to hospital 24 hours prior to elective surgery is inefficient, unnecessary and an expensive use of ward beds. Units should have processes and protocols in place to allow thorough pre-operative assessment (including for anaesthesia) without the need for admission the day before an operation. These processes may also reduce the need for last minute theatre cancellations (due to picking up other comorbidities in a more timely way).
QI theme	Effectiveness.
What is the standard to be met?	At least 50% of elective patients should be admitted on the day of surgery.
Key references to support the metric	Getting it Right First Time (GIRFT) report 2018.[5]
Numerator	All patients undergoing elective CABG who were admitted on the same day as the day of surgery.
Denominator	All patients undergoing elective first time CABG.
Trend	See Figure 3.7. After three years of improvements particularly in England following the GIRFT report in 2018, the rate fell to the lowest ever in 2020/21. Last year saw some improvement in England to 11%, but still not to the level seen before the pandemic.
Variance	See Figure 3.8. There was very considerable variation amongst NHS hospitals in 2021/22 (from 0% to 55%). One hospital achieved the target of better than 50% last year, whereas 4 achieved it in 2019/20 (the year prior to COVID). In Wales and Northern Ireland, hospitals do not yet appear to have developed effective DOSA programs, even before the pandemic.

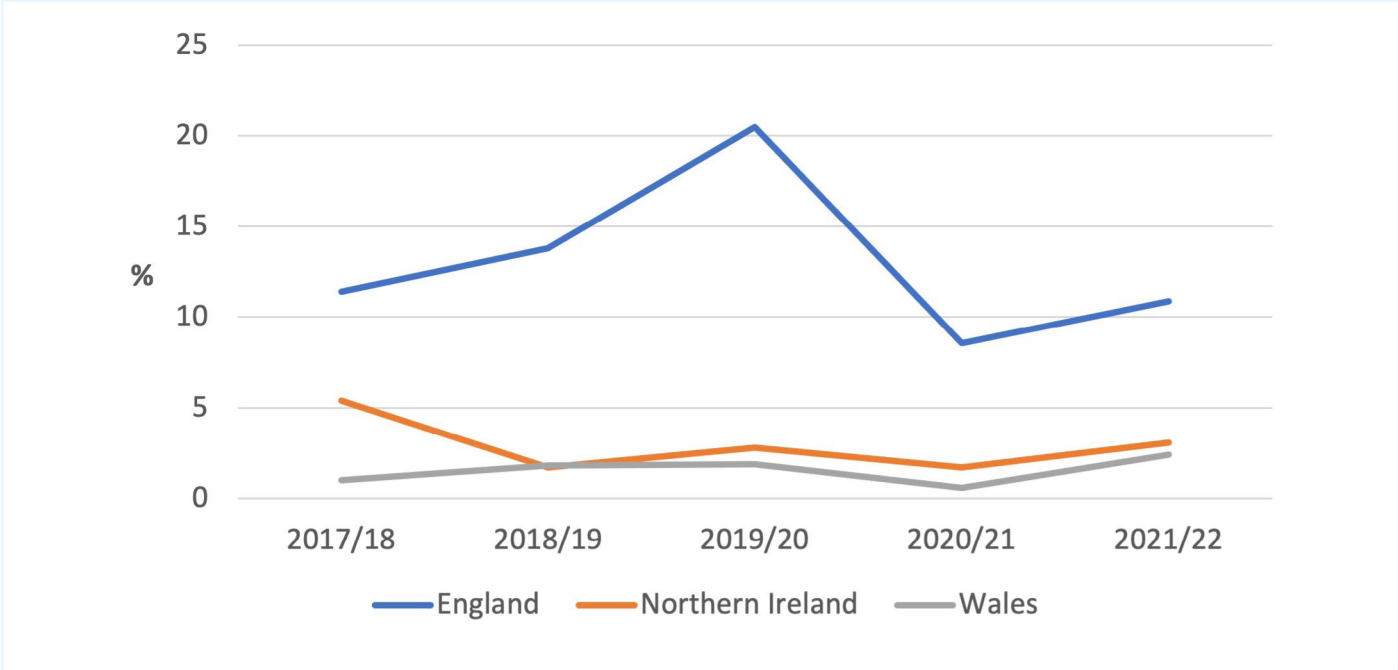
3.4.2 **Audit results**

Following the 2018 GIRFT report, SCTS has promoted the use of day-of-surgery admissions (DOSA) for elective cardiac surgery.[5] This provides a better patient experience and aids efficiency for the hospital. It is a marker of well-functioning pre-operative assessment clinics as these are required for it to run smoothly. It is also likely that fewer patients will require cancellation for medical reasons if they have been carefully assessed prior to admission.

A 50% target was set for the audit (equivalent to one of the two likely operations on a typical theatre list). In the first 3 years of auditing this metric, the proportion having DOSA for elective surgery almost doubled, from 11% to just under 21% across England.

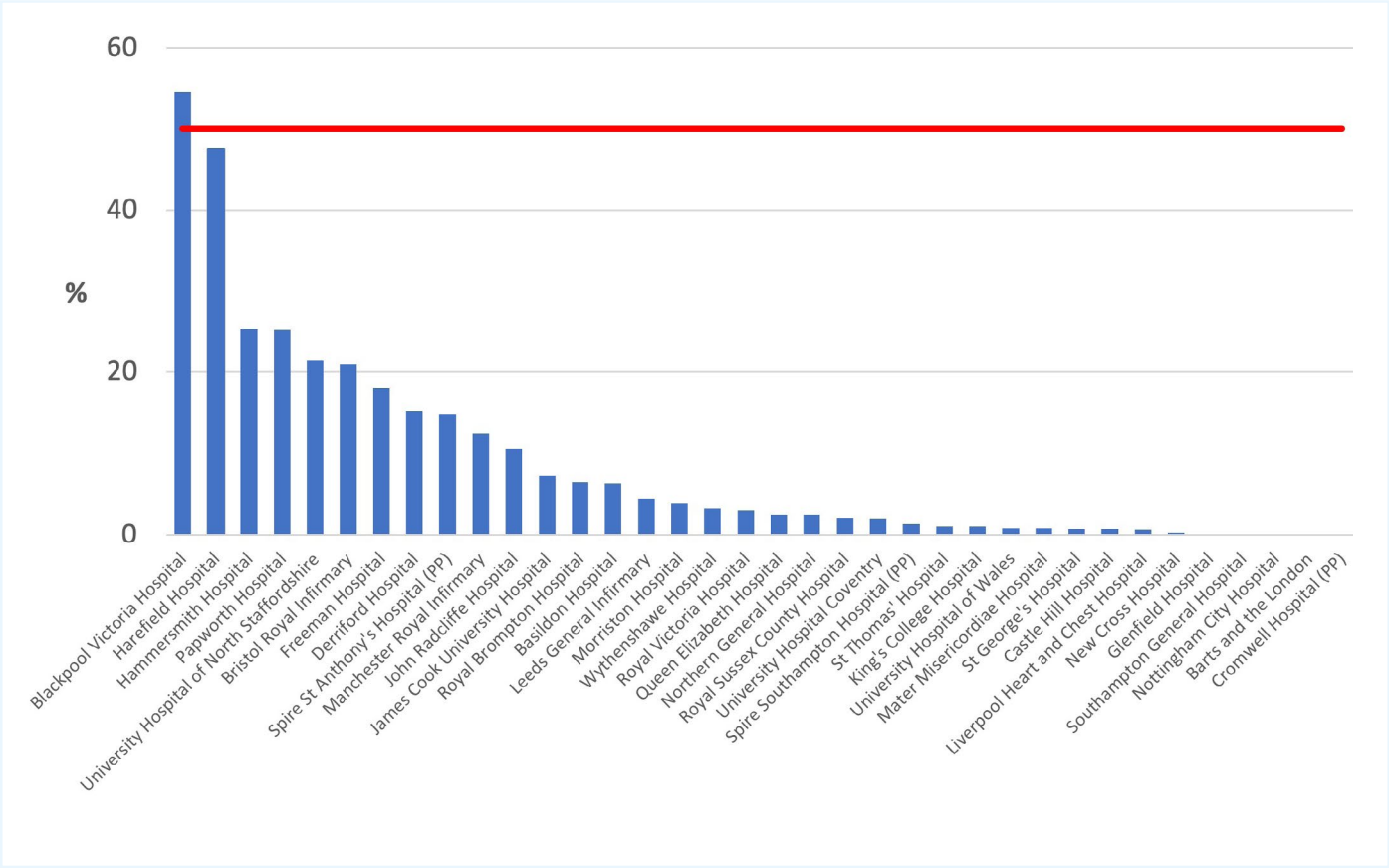
The COVID-19 pandemic made running face-to-face pre-assessment clinics very challenging and so, unsurprisingly, the rate of DOSA dropped. Since then, it appears that it has continued to be a challenge to reinstate or improve on what was happening prior to 2020. DOSA numbers fell in 2020/21 across England to under 9% and have improved a little in the last year, but only back to 11%. The figures were much lower for Northern Ireland (1.7%) and Wales (0.6%).

Figure 3.7: Proportion (%) of patients undergoing elective CABG with day-of-surgery admission (DOSA), by country, 2017/18 - 2021/22 [NACSA data]



DOSA rates vary hugely between NHS hospitals, from 0% and 55% [Figure 3.8]. Clearly, hospitals not performing DOSA for their patients could learn from those hospitals that are. Greater use of DOSA enable greater throughput of elective cardiac surgical programmes and will aid the recovery of services after the challenges of the last two years. Hospitals should therefore seek to establish (or re-establish) DOSA programs in line with the GIRFT recommendations.

Figure 3.8: Proportion (%) of patients with day-of-surgery admission (DOSA) for elective CABG, by NHS hospital, 2021/22 [NACSA data]



Red bar = target of more than 50%.

3.4.3 Recommendations for those not achieving the standard

Hospitals not reaching the DOSA target should undertake a review of their processes to identify the barriers to achieving this target (such as introducing pre-assessment clinics).

If necessary, advice should be sought from centres demonstrating the best performance. A QI action plan should be instigated to achieve this target.

3.5 Re-opening for bleeding rates and blood transfusion after CABG

3.5.1 Overview of QI metric

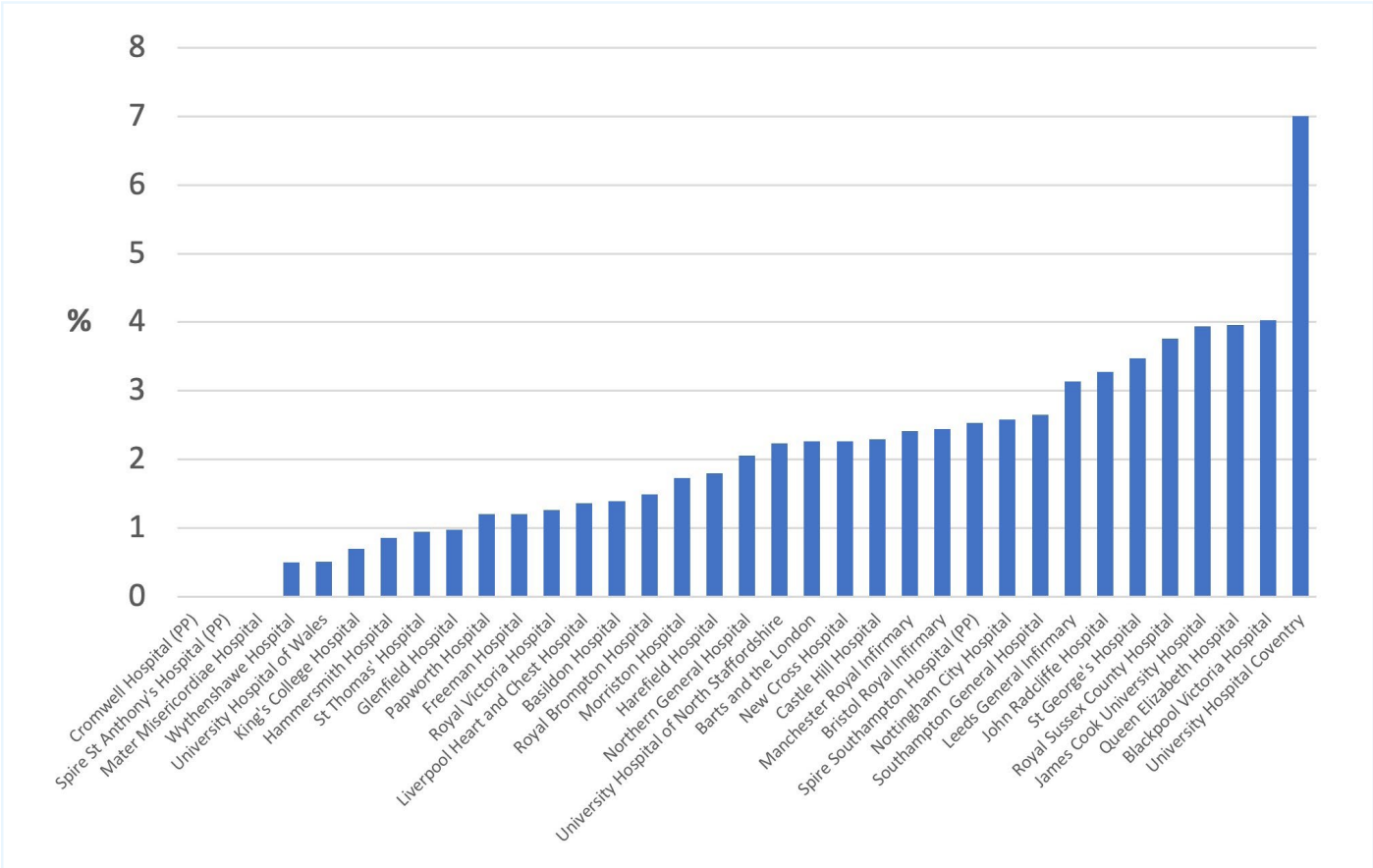
QI Metric Description/Name	Reopening for Bleeding and Blood Transfusion rates after CABG
Why is this important?	Bleeding during and after cardiac surgery is common. Usually this is relatively minor and controlled by the surgeon with the aid of drugs given by the anaesthetic team during the procedure. In more serious cases it can lead to a patient needing to return to theatre after an operation for re-exploration to control the bleeding and remove any blood clots that have accumulated. Blood transfusions may be required to treat anaemia or to replace excess blood loss due to bleeding (using red blood cells), or to help treat blood clotting abnormalities (by promoting blood clotting with blood plasma or platelets).
QI theme	Safety and Effectiveness.
What is the standard to be met?	Based on the data from the last three years, the best units (top quartile) have re-opening rates for bleeding of less than 1%. The bottom quartile has re-opening rates of more than 2.7%. This is the first year that blood transfusion rates have been collected. No target has been set, but the data presented aim to indicate current practice in the UK.
Key references to support the metric	The Getting it Right First Time (GIRFT) report 2018 recommended blood transfusion rates were collected within the audit.[5]
Numerator	All patients undergoing first time CABG requiring reopening for bleeding or a blood transfusion.
Denominator	All patients undergoing first time CABG.

QI Metric Description/Name	Reopening for Bleeding and Blood Transfusion rates after CABG
Trend	In the UK, 2.2% patients were re-opened for bleeding following their CABG surgery in 2021/22. The rate was 2.3% in England, 1.3% in Northern Ireland and 1.1% in Wales [Figure 3.9]. Across the UK around 46% of patients undergoing CABG in 2021/22 required a blood transfusion of any type. The figures are remarkably similar across the three nations (England 46%, Northern Ireland 43% and Wales 46%) [Figure 3.10].
Variance	There was a wide variation both in reopening rates (from 0% to 7%) [Figure 3.9] and transfusion rates (from 9% to 100%) [Figure 3.11]. Eleven hospitals submitted no data.

3.5.2 **Audit results**

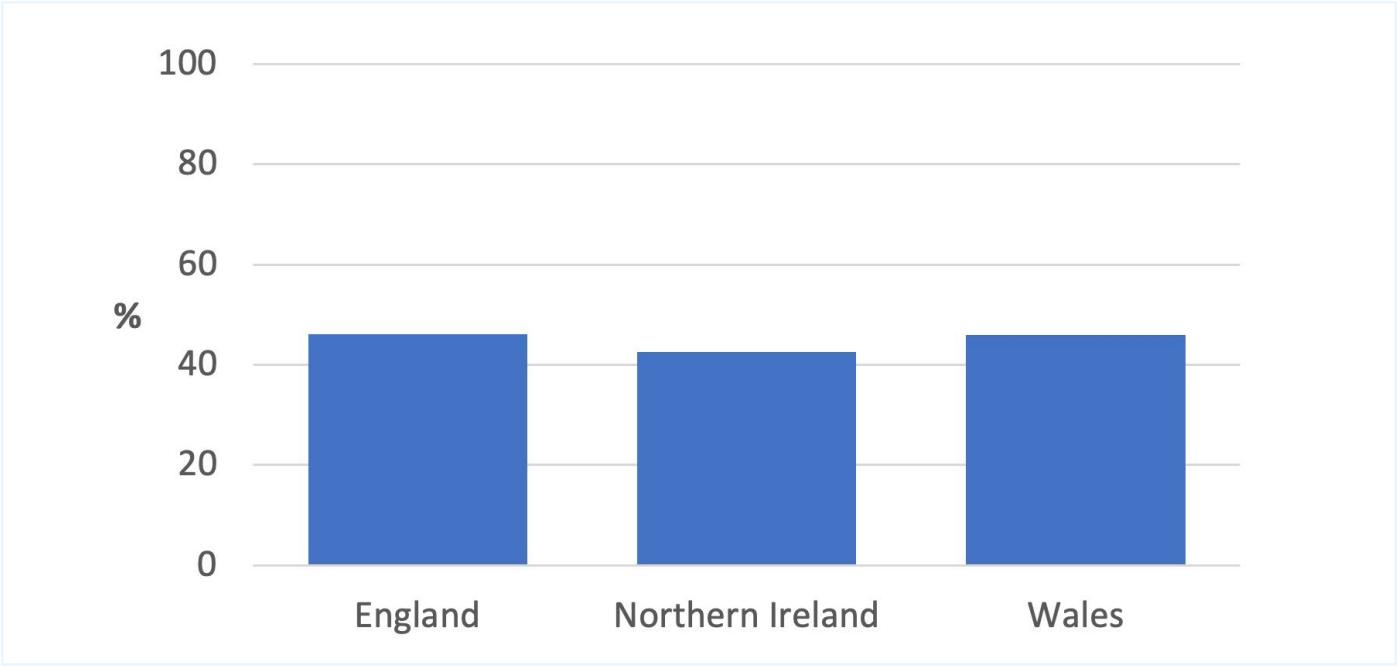
Data quality was very good for reopening rates (100% for most and over 90% from all bar one hospital).

Figure 3.9: : Proportion (%) of patients re-opened for bleeding following isolated CABG, by hospital, 2021/22 [NACSA data]



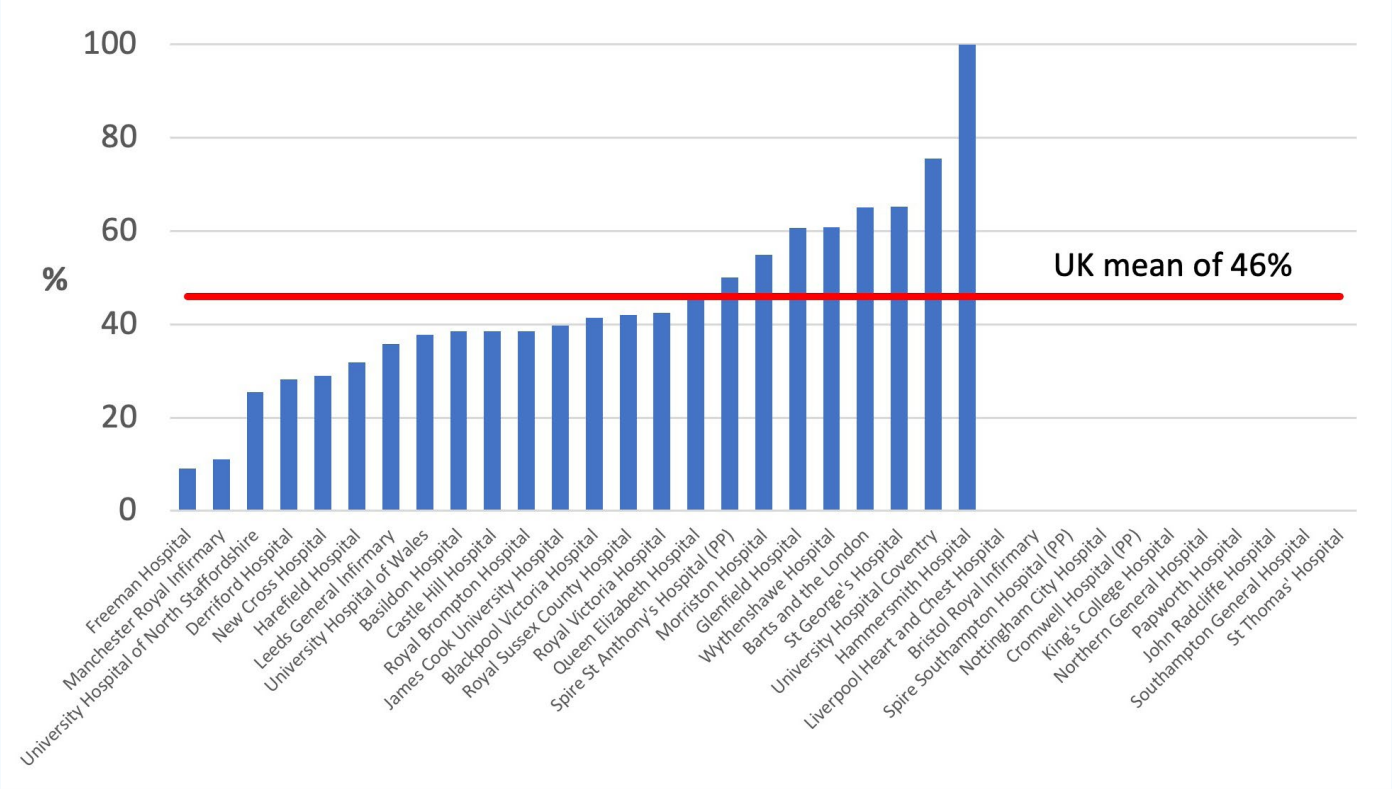
Across the UK around 46% of patients undergoing CABG in 2021/22 required a blood transfusion of any type [Figure 3.10]. The GIRFT report from 2018 also reported exactly the same rate in 2015/16 (based on hospital questionnaires).[5] Disappointingly it appears that there has been no improvement in performance across the UK despite the recommendations that were made in the report.

Figure 3.10: Proportion (%) of patients receiving a blood transfusion (of any type) following isolated CABG, by country, 2021/22 [NACSA data]



There is very considerable variation in blood transfusion rates between hospitals from 9% to 100% [Figure 3.11]. The GIRFT report in 2018 reported transfusion rates between 23% and 85%. This is the first time that blood transfusion data have been collected within the NACSA dataset, so some care is needed with the interpretation. Eleven hospitals have submitted no data. Overall, for 2021/22, data were missing for blood transfusion usage in 44% of patients (a breakdown of these data is available in the Appendix). Only eleven hospitals provided data for 100% of their operations.

Figure 3.11: Proportion (%) of patients receiving a blood transfusion (of any type) following isolated CABG, by hospital, 2021/22 [NACSA data]



Hospitals with no data recorded shown as 0%

3.5.3 Recommendations for those not achieving the standard

Hospitals should have uniform and protocolised care for pre-operative antiplatelet drug cessation agreed between referring cardiology teams and the cardiac surgeons.

Units should have agreed protocols for managing patients with pre-operative anaemia to optimise peri-operative care for patients having surgery.

Units should have agreed blood transfusion triggers for the treatment of bleeding or anaemia during or after surgery with the aim of minimising or reducing transfusion requirements.

Units not collecting blood transfusion data should collect and submit their data to NACSA for all patients.

3.6 Not all patients are being discussed by a Multi-Disciplinary Team (MDT) prior to valve surgery

3.6.1 Overview of QI metric

QI Metric Description/Name	Proportion of patients discussed pre-operatively at a quorate Multi-Disciplinary Team (MDT) meeting
Why is this important?	Treatment of patients with cardiac disease is complex and there are often several treatment options available (for example tablets, PCI or CABG for the treatment of coronary disease). The role of the MDT is to assess each patient and to provide a consensus on the best treatment options. This requires the collective experience of a quorate team of specialists across cardiology, cardiac surgery and other related specialties in order to optimise care.
QI theme	Safety and Effectiveness.
What is the standard to be met?	All non-emergency patients in whom either PCI or CABG is an option should be referred through a quorate MDT. All non-emergency patients undergoing Valve surgery should be referred through a disease-specific quorate MDT.
Key references to support the metric	Getting it Right First Time (GIRFT) report for Cardiology (2021)[6] Joint BCS/SCTS Consensus guidance for cardiac MDT meetings[7]
Numerator	Proportion of CABG, AVR and Mitral operations discussed at a quorate MDT.
Denominator	All non-emergency cardiac operations.
Trend	There are no previous data for comparison. Across the UK in 2021/22 MDT rates were 32% CABG, 32% AVR and 37% Mitral.
Variance	In England 31% CABG, 30% AVR and 36% Mitral operations were recorded as having been discussed at an MDT [Figure 3.12]. Rates were similar in Wales (39% CABG, 33% AVR and 35% Mitral). However, in Northern Ireland MDT rates were much higher (80% CABG, 80% AVR and 77% Mitral).

3.6.2 **Audit results**

The Cardiology GIRFT report from 2021 recommends all patients requiring non-emergency cardiac surgery should be referred via a disease-specific quorate MDT prior to undergoing their operation.[6] The British Cardiovascular Society (BCS) and SCTS have also endorsed and promoted the use of MDTs in surgical decision making.[7] Not every patient will need detailed discussion, but they should still go through a unified and protocolised MDT pathway before being allocated to a treatment. This is the first year that data on this have been collected within the NACSA dataset.

In England 31% of CABG, 30% of AVR and 36% of Mitral operations were recorded as having been discussed at an MDT [Figure 3.12]. MDT discussion rates were similar in Wales (39%, 33% and 35% respectively). However, in Northern Ireland MDT rates were much higher (80% for CABG, 80% for AVR and 77% for Mitral) and closer to the levels that would be expected if units are following the latest guidance.

Figure 3.12: Proportion (%) of patients discussed pre-operatively at a quorate MDT meeting, by procedure and nation, 2021/22 [NACSA data]

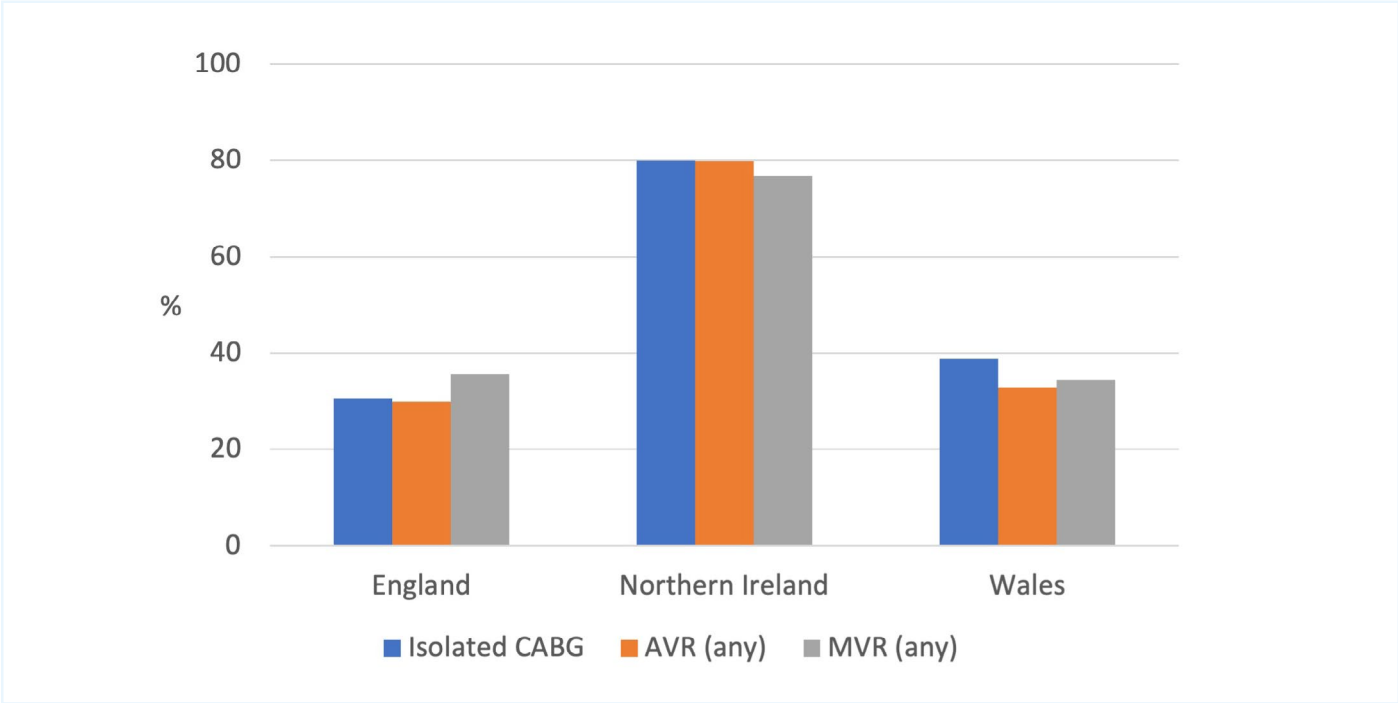
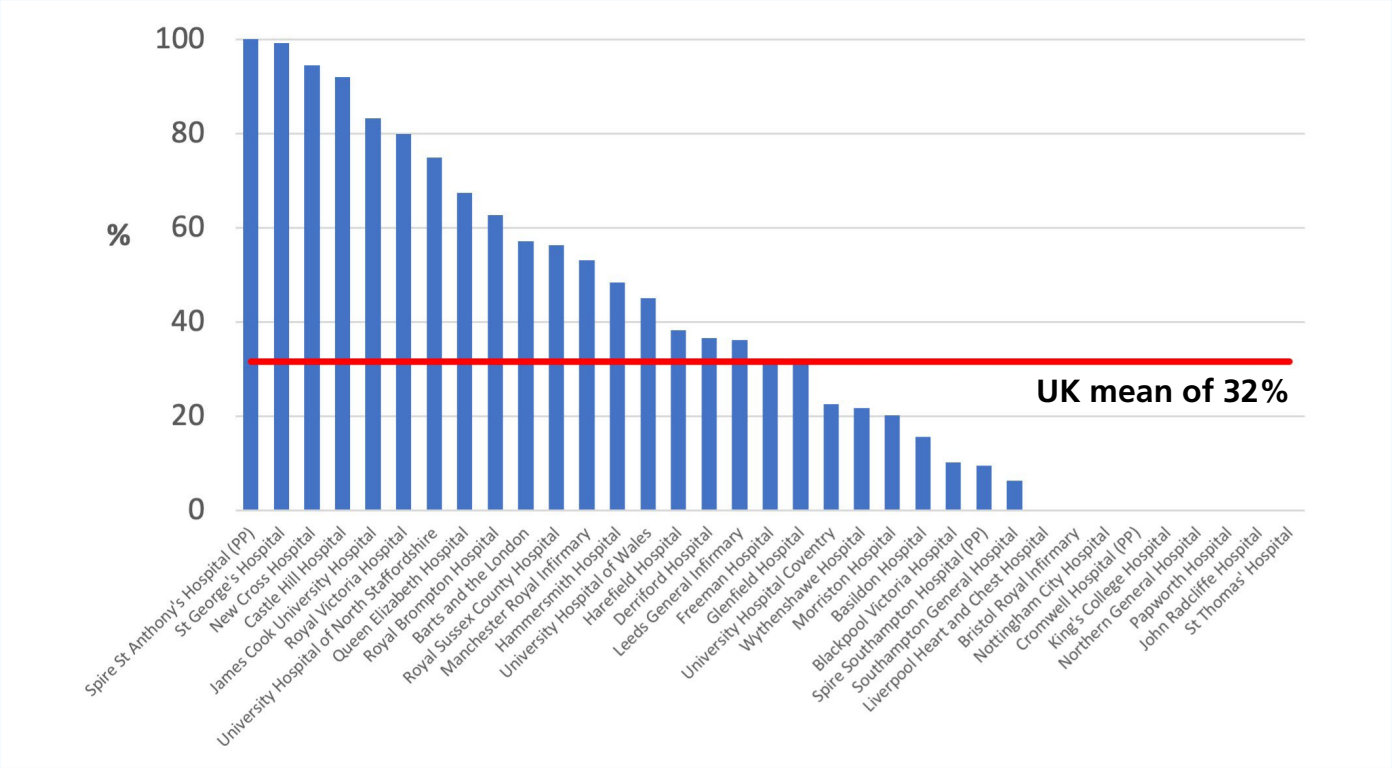


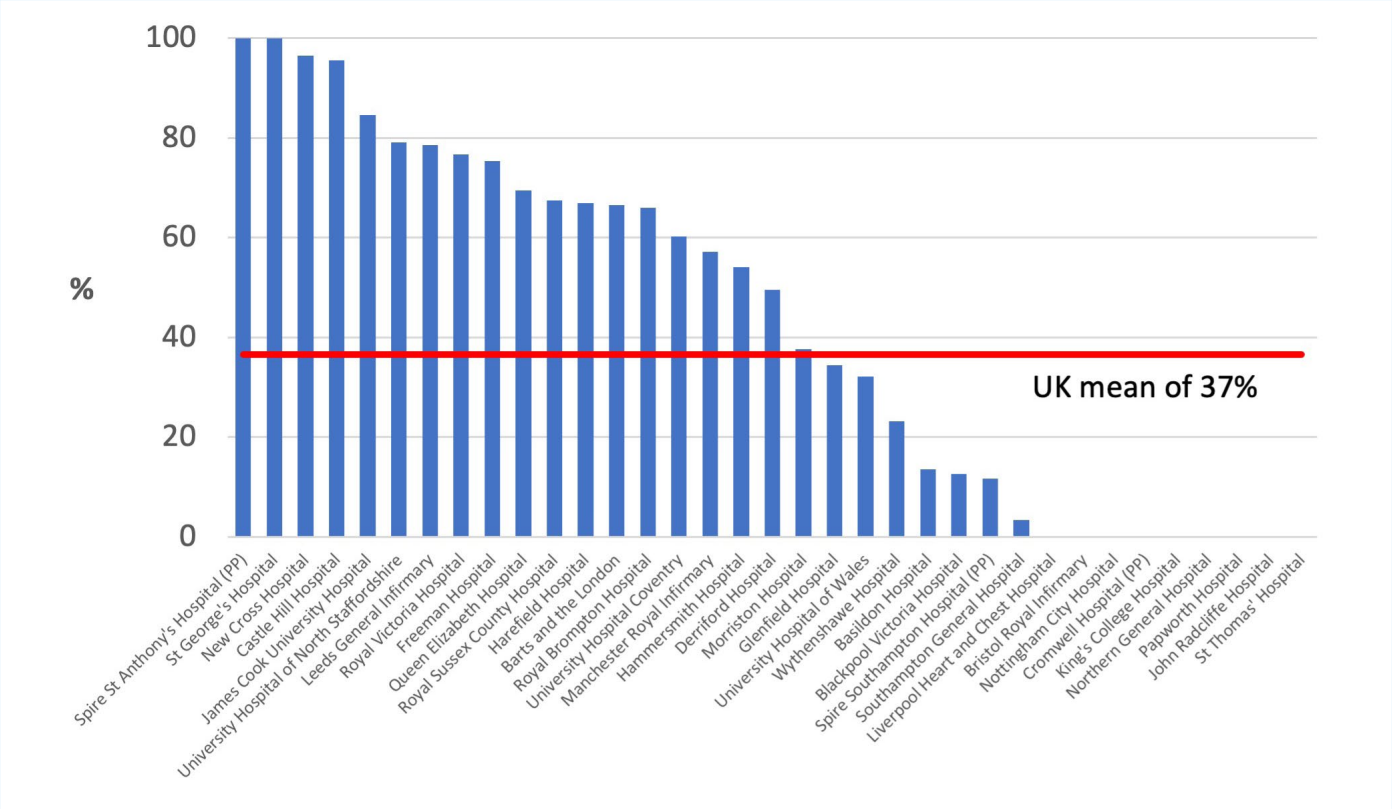
Figure 3.13 and Figure 3.14 show the proportions of AVR and Mitral surgery patients undergoing MDT discussion prior to valve operations in each hospital. There is huge variation reported – from 99% at the best units to only 6% at the worst. Data were missing from 36% of patients undergoing surgery across the UK as a whole and nine hospitals submitted no data. Seven hospitals submitted data on 100% of their patients, with MDT rates in these hospitals reported between 31% and 99%. A breakdown of the data quality is to be found in the Appendix to this report.

Figure 3.13: Proportion (%) of AVR cases (isolated and combined procedures) discussed pre-operatively at MDT meeting, by hospital, 2021/22 [NACSA data]



Hospitals with no data recorded shown as 0%.

Figure 3.14: Proportion (%) of MVR (replacement or repair, with or without concomitant procedures) discussed pre-operatively at MDT meeting, by hospital, 2021/22 [NACSA data]



Hospitals with no data recorded shown as 0%.

3.6.3 Recommendations for those not achieving the standard

Units should agree local and regional protocols for the conduct of MDTs in line with the GIRFT (2021) recommendations.

Units should collect data for all patients on whether an MDT discussion has taken place and submit this to the NACSA audit.

3.7 Other QI metrics

For the reasons of space, it is not possible to report all metrics within this main report. For those interested, far more hospital level data are available within the Appendix to this report. This includes analyses of hospital mortality rates, length of hospital stays, information on Dual Consultant operating, as well as the common complications such as bleeding, stroke, renal failure and deep sternal wound infection.

4 Future directions

This report has concentrated on the acute effects of the pandemic on the provision of cardiac surgical provision in the UK over the last two years.

Overall, the results of cardiac surgery are very good in the UK with low mortality rates for non-emergency surgery. However, it will be important to maintain monitoring of performance with regards to mortality and morbidity after surgery and how units continue to recover in terms of throughput and waiting time metrics.

In assessing mortality and morbidity impacts, it will also be a priority to measure the longer-term effects of COVID such as people having had to wait longer for treatment and the use of alternative interventional procedures to surgery. It is likely that results of surgery in future may be worse for patients that have had surgery delayed (e.g. because of a higher risk of complications) and this could feed through to long-term survival rates. Likewise, patients that were treated with PCI rather than CABG, or TAVI instead of AVR, may experience poorer long-term outcomes such as earlier death or the need for further surgery or intervention.

The treatment of cardiac conditions is rapidly evolving. Future reports will compare AVR outcomes with TAVI, and mitral surgery with percutaneous treatments (such as Mitraclip). They will also track how other recent surgical developments follow new guidelines (such as Left Atrial Appendage Occlusion in patients with atrial fibrillation at the time of surgery).

Finally, the recently extended NACSA dataset means that there are now better measures available to assess whether hospitals are providing a high quality service for patients, including:

- short waiting times (elective and urgent)
- effective pre-operative assessment and optimisation (allowing DOSA)
- engagement with MDT assessments for all appropriate patients, and
- reductions in serious complications such as bleeding (reopening rates and blood transfusion need) and serious wound infections.

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Please go to www.nicor.org.uk for more information.

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NICOR is a partnership of clinicians, IT experts, statisticians, academics and managers who, together, are responsible for the National Cardiac Audit Programme (NCAP) and a number of health technology registries, including the UK TAVI registry. Hosted by Arden & GEM CSU, NICOR collects, analyses and interprets vital cardiovascular data into relevant and meaningful information to promote sustainable improvements in patient well-being, safety and outcomes. NICOR is funded by NHS England and the GIG Cymru (NHS Wales).

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Society for Cardiothoracic Surgery in Great Britain & Ireland

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