



NCAP

NATIONAL CARDIAC AUDIT PROGRAMME

**NATIONAL ADULT
CARDIAC SURGERY
AUDIT
2014-17 SUMMARY
REPORT**

NICOR

The National Adult Cardiac Surgery Audit (NACSA) collects data on all major heart operations carried out in NHS hospitals and a selection of private hospitals throughout the UK.

WHAT IS ADULT CARDIAC SURGERY?

Adult Cardiac Surgery includes all procedures performed on patients aged 18 or over that involve the heart or structures attached to the heart. These operations involve opening the chest and the pericardium (the sac around the heart). The most common of these procedures are Coronary Artery Bypass Grafts (CABG), Valve surgery and Aortic surgery.

Coronary Artery Bypass Graft surgery treats patients who have angina (chest pain) as a result of a narrowing or blockage in their coronary arteries. This involves taking a healthy artery or vein from elsewhere in the body and grafting it to the affected artery, above and below the point of narrowing, allowing blood to flow around ("bypass") the blockage and reach the heart muscle without restriction.

The heart has four valves which open and close with every heart beat, to regulate the flow of blood through different parts of the heart, as well as ensuring that it only travels in one direction.

A condition called valvular heart disease can cause one or more of these valves to either become narrowed or leaky. Narrowing of a valve (stenosis) impedes blood flowing through it normally, whilst a leaky valve allows blood to flow back in the wrong direction. In both cases the result is that the heart's function is compromised. If surgery is required to restore the flow of blood through these valves a patient will either have one or more of the valves repaired or replaced.

The aorta is the major blood vessel that carries blood from the heart to the rest of the body. The most common medical condition to affect the aorta is an aneurysm (an enlarged blood vessel). As an aneurysm grows in size, it is increasingly likely to rupture resulting in severe bleeding that can be fatal. Surgery involves replacing the section of the aorta that has been weakened by the aneurysm.

Another condition affecting the aorta is aortic dissection. This occurs when a tear in the aorta's inner wall causes blood to flow between the layers of the wall, forcing those layers apart. This can block the blood vessels that branch off from the aorta, damage the aortic valve or even tear the aorta completely open. This results in a medical emergency that requires urgent surgical intervention.

Many patients will have more than one problem with their heart, for example with the coronary arteries and a heart valve. In these cases it is common to undergo a combination

of procedures. The commonest of these is a combined Valve replacement with a CABG.

NCAP 2018 AGGREGATE REPORT: ADULT CARDIAC SURGERY SUMMARY

This particular reporting period looked at all procedures undertaken in NHS cardiac surgery centres in the UK, as well as five private hospitals and one hospital from the Republic of Ireland, between **1st April 2014 and 31st March 2017**.

The total number of procedures submitted by the hospitals during this 3 year period was 106,189. However, in order to provide a more reliable analysis, patients undergoing a small number of unusual or highly specialised procedures were excluded. In addition, patients undergoing surgery as an emergency or salvage were excluded from the analysis, as these are difficult to risk stratify. The excluded procedures were patients undergoing cardiopulmonary transplantation, primary ventricular assist devices, surgery for trauma, pericardiectomy or those having procedures following pre-operative ventilation on intensive care. After excluding these procedures the total number of records used for analysis was **101,224**.

Data were collected in hospitals according to a pre-defined dataset and returned to NICOR using methods compliant with all data protection legislation and patient confidentiality principles. A predicted risk was calculated for each patient using a contemporary recalibration of the logistic EuroSCORE (European System for Cardiac Operative Risk Evaluation) and these were used to produce risk-adjusted outcomes. Random Effects models were used to adjust for residual variation in outcomes for hospitals and separately for surgeons in line with HQIP (Healthcare Quality Improvement Partnership) guidance.

Deviation from expected is defined at a 99.8% 2-tailed confidence limit and any hospital or consultant falling outside of these parameters would be identified as an Alarm outlier.

The Adult Cardiac Surgery Audit participates within the Clinical Outcomes Publication (COP) programme which publishes information on all hospitals and consultants undertaking adult surgery. It provides outcomes on in-hospital survival along with the total number of procedures performed. This information is published on the Society of Cardiothoracic Surgery website and is produced by NICOR after undergoing a thorough validation process.

The latest outcomes of individual hospitals and surgeons for the three years between 2014 and 2017 will be published on **December 4th 2018** and will be available online [here](#).

IN-HOSPITAL MORTALITY

In-hospital mortality data are collected on all patients who died before being discharged from hospital. This includes patients who die during their procedure or die after their operation before they have been discharged home. This may be as a result of complications of the surgery or may be as a result of a separate disease or disorder.

It is important to note that when reported in COP, in-hospital mortality is referred to as survival rates. For example, where in-hospital mortality is reported as 2.5%, this would also be reported as a 97.5% survival rate within COP.

The in-hospital mortality rate for all elective and urgent operation types combined has been steadily decreasing over the past 10 years. For the 2014-17 reporting period, the mortality rate is 1.84%, which is a decrease from 1.96% in 2013-16. Likewise, the mortality rates have been falling when all patients, including the higher risk emergency cases, are analysed with a rate of 2.45% in 2014-17.

For the first time this year, in addition to the COP data, the Adult Surgery Audit has produced data on a number of other outcome measures.

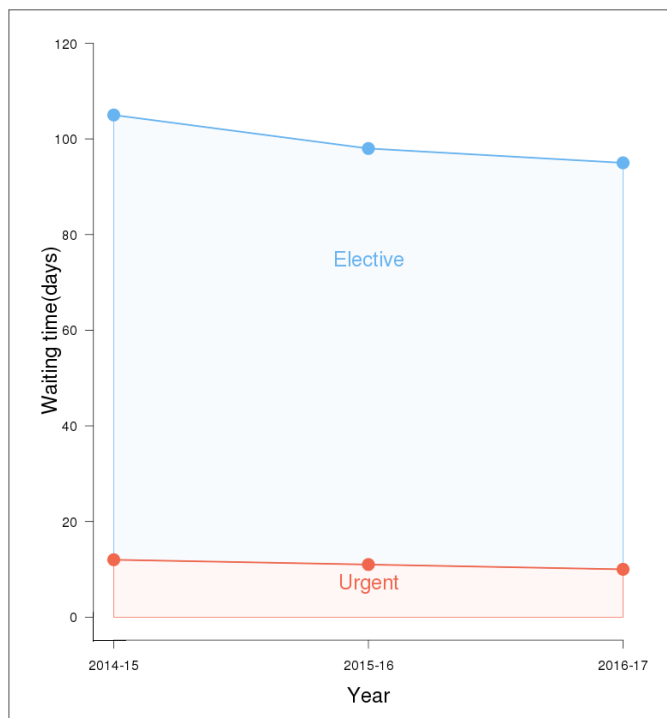
WAITING TIMES TO ELECTIVE AND URGENT FIRST TIME CABG (SEE FIGURE 1)

Patients admitted with an acute coronary syndrome (heart attack) requiring urgent CABG surgery are often kept in hospital (or 'in house') from the point of diagnosis until the time of their operation. It is essential that this time is minimised, for the benefit of patients and to make best use of scarce resources such as ward beds.

Patients in the UK usually undergo angiography for acute coronary syndromes having already received dual anti-platelet treatment – a combination of drugs that interfere with blood clotting. Their use optimises outcomes in cases where immediate angioplasty with stenting at the same session as the angiogram is the preferred treatment option. However, if CABG is deemed best, the use of this combination of drugs unfortunately, though unsurprisingly, increases the risk of bleeding during and after surgery. Given that these drugs take several days to wear off immediate surgery should be avoided if possible. One of the drugs is normally stopped and most patients are ready for surgery 5-7 days later.

It should be noted that data on this metric has not been fully submitted by all hospitals and this might affect overall trends.

Figure 1: Waiting times to Elective and Urgent First Time CABG



WAITING TIME FOR URGENT CABG IN THE UK

This is defined as the delay from performing a coronary angiogram (the essential diagnostic test preoperatively) to the day that surgery is performed. Whilst it does not include delays in diagnosis following a heart attack, it measures the portion of the patient's pathway over which the cardiac surgical teams have control. Data completeness for this outcome measure was 77% and **demonstrates a drop in waiting times** within the UK overall from 12 days in 2014-15 to 10 days in 2016-17. England saw a similar reduction from 12 to 10 days over the 3 years of the audit, although it has by far the highest proportion of hospitals performing the surgery. Scotland and Wales showed no improvement from 2014-15 to 2016-17 with waits of 12 and 13 days respectively. Northern Ireland had the worst performance of 30 days in 2014-15, but an improvement to 22 days in 2016-17, but this is still considerably worse than the other 3 nations.

WAITING TIME FOR ELECTIVE CABG IN THE UK

Elective patients are admitted from home for their operation. These patients have not usually suffered from a recent heart attack and so are at lower risk whilst waiting for an operation. Data completeness for elective CABG across the UK is only 72%, but the **analysis** demonstrates that waiting times are decreasing in the UK from a mean of 105 to 96 days between 2014-15 and 2016-17. However, when broken down into the 4 individual countries, every country showed improvements between 2014-15 and 2016-17, although Northern Ireland had the worst performance. Of note, Wales and Scotland both had worse performance in 2016-17 when compared to the previous year.

Although both of these outcome measures generally show improvements over the 3 years of the audit, until data completeness runs at a higher percentage these results cannot be recognised as a completely accurate reflection. This is particularly relevant once you break data completeness down into individual hospitals with the best hospitals running at over 90% and one hospital running at zero data completeness. For future audits hospitals should aim to submit >90% data completeness for this metric (which depends on the date of the angiogram being accurately recorded).

OTHER OUTCOME MEASURES

Whilst mortality rates (or survival rates) following major surgery are an important measure, they do not give a complete picture of the quality of care that patients receive. For the first time in the UK, this report has included data on other important outcomes, including postoperative stroke, the need for return to theatre (for bleeding or other causes), rates of kidney failure (requiring renal support therapy) and of serious sternal (breastbone) wound infection.

INCIDENCE OF A NEW POST-OPERATIVE STROKE FOLLOWING CABG SURGERY

In the UK as a whole, for 2014-17, [the risk of a stroke](#) (including both permanent and transient strokes) postoperatively following first time CABG was 0.78%. The risk of a permanent stroke was 0.43%. Strokes can present in many ways and with a very wide variation of symptoms and severity, which can make deciding whether a stroke has occurred postoperatively not as straightforward as it may seem. For this audit a transient stroke is defined as a stroke where the symptoms fully resolve with 24 hours of their onset.

There are some concerns about the data accuracy, as several units are reporting very low rates, and in some cases zero percent for a year. Units with high reported rates may not necessarily be performing less well, but may possibly be collecting more accurately all cases of neurological injury and may be including patients with more minor symptoms.

As this is the first year the data has been analysed, it is important that units look to identify cases of stroke as accurately as possible and to enter and crosscheck data carefully for future years.

NEED FOR A RETURN TO THEATRE (RE-OPERATION) FOLLOWING A FIRST-TIME CABG OPERATION

The proportion of patients [needing to return to theatre](#) (for bleeding or other causes) following a first time CABG was 3.12% in the UK for 2014-17, of which the [rate of return to theatre for bleeding](#) was 2.6%. Data completeness was good at 92%, but two units provided less than 80%. The identification of the patients returning to theatre for any reason is easy to define,

identify and to collect, so reported rates should be fairly accurate for most hospitals. However, some hospitals reporting zero percent or very low rates may be under-reporting complications, or are only performing relatively small case numbers.

Hospitals with low data completeness may look worse than is actually the case as data are presented as a proportion of patients in whom the data field was completed (so failure to record that a patient did not undergo reoperation will not be counted). For future audits, hospitals should aim to achieve data completeness rates of more than 95% for re-operations.

KIDNEY FAILURE (THE NEED FOR RENAL DIALYSIS OR HAEMOFILTRATION) FOLLOWING A FIRST-TIME CABG OPERATION

Kidney failure is a major complication after heart surgery and may result from pre-existing reduced kidney function, or reduced cardiac output in the perioperative period. [The overall rate of kidney failure](#) (patients requiring renal support therapy on intensive care following first time CABG) in UK for 2014-17 was 1.5%. The data overall are reasonably complete at 89%, but six units had less than 80% data completeness. Renal support therapy – the need for dialysis or haemofiltration – following operation is easy to define and collect, so the rates should be accurate, although this cannot be verified from the current data returns.

Overall for the UK, the rate of renal support required is at the level that would be expected from previous studies.

SERIOUS WOUND INFECTION FOLLOWING A FIRST-TIME CABG OPERATION

Wound infection following cardiac surgery has been identified in surveys as a complication about which patients are particularly concerned. Failure of the sternum (breastbone) to heal due to a serious infection within the mediastinum (tissues around the heart) may require surgery to remove the infected tissue and to repair the wound. This is usually a major procedure and often involves input from plastic surgeons.

The rate of [deep sternal wound infection](#) during the initial hospital stay following CABG surgery (when most such infections arise) was 0.32% for 2014-17.