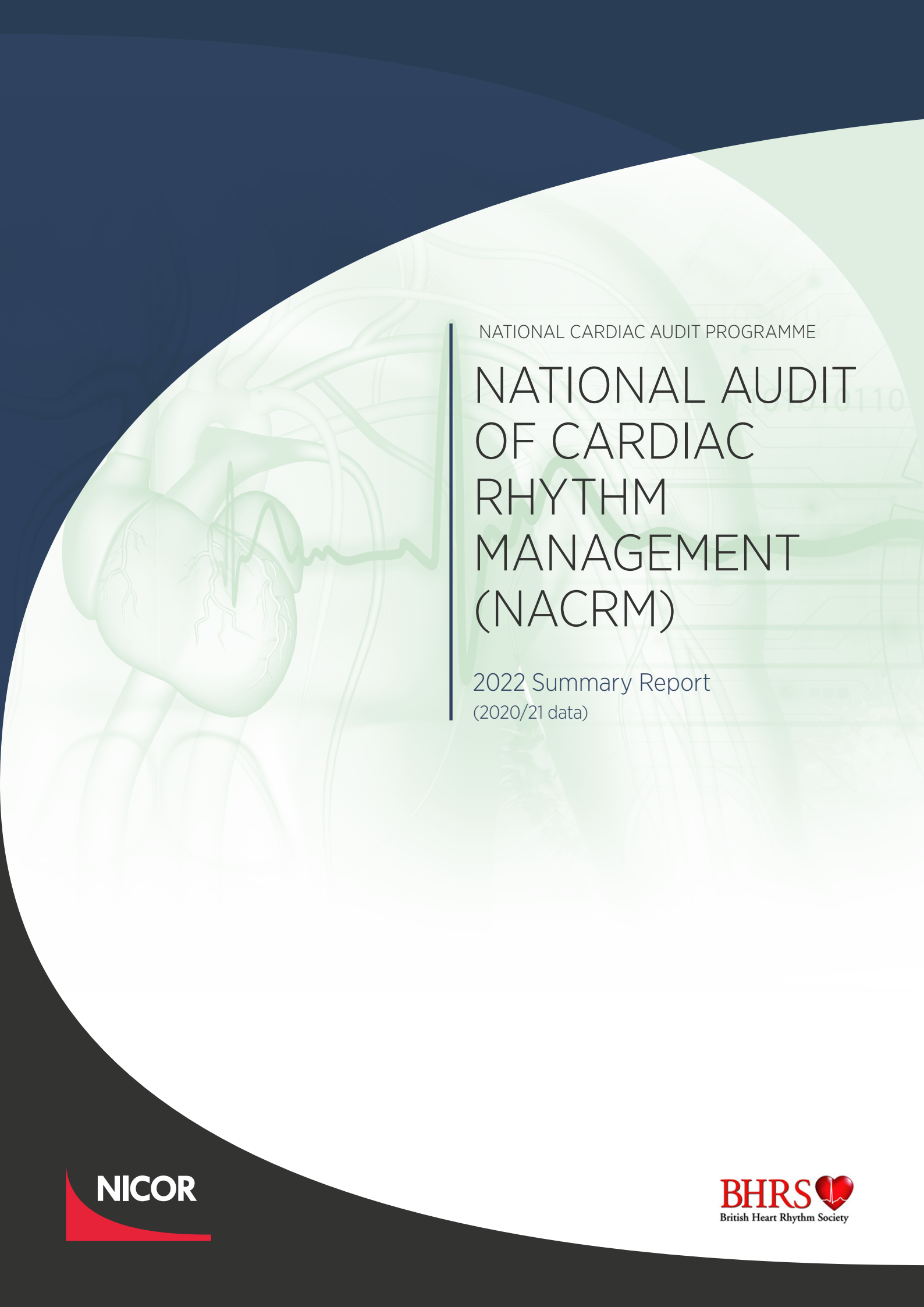




NATIONAL CARDIAC AUDIT PROGRAMME

NATIONAL AUDIT OF CARDIAC RHYTHM MANAGEMENT (NACRM)

2022 Summary Report
(2020/21 data)

NICOR

BHRS 
British Heart Rhythm Society



National Institute of Cardiovascular Outcomes Research (NICOR)

NICOR is a partnership of clinicians, IT experts, statisticians, cardiovascular clinical audits (the National Cardiac Audit Programme – NCAP) and a number of new health technology registries, including the UK TAVI registry. Hosted by Barts Health NHS Trust, NICOR collects, analyses and interprets vital cardiovascular data into relevant and meaningful information to promote sustainable improvements in patient well-being, safety and outcomes. It is commissioned by the Healthcare Quality Improvement Partnership (HQIP) with funding from NHS England and GIG Cymru/NHS Wales.

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British Heart Rhythm Society (BHRS)

The BHRS is an affiliated group of the British Cardiovascular Society. BHRS serves as a unifying focus for doctors and allied health professionals involved in arrhythmia care and electrical therapies in the UK. BHRS recommends standards for hospitals and individuals undertaking device and ablation procedures, and runs formal certification programmes for professionals.

www.bhrs.com



Barts Health NHS Trust

With a workforce of around 17,000 people, Barts Health is a leading healthcare provider in Britain and one of the largest NHS Trusts in the country. The Trust's five hospitals – St Bartholomew's Hospital in the City, including the Barts Heart Centre, The Royal London Hospital in Whitechapel, Newham Hospital in Plaistow, Whipps Cross Hospital in Leytonstone and Mile End Hospital – deliver high quality compassionate care to the 2.5 million people of east London and beyond.



The Healthcare Quality Improvement Partnership (HQIP)

HQIP is led by a consortium of the Academy of Medical Royal Colleges, the Royal College of Nursing and National Voices. Its aim is to promote quality improvement in patient outcomes, and in particular, to increase the impact that clinical audit, outcome review programmes and registries have on healthcare quality in England and Wales. HQIP holds the contract to commission, manage and develop the National Clinical Audit and Patient Outcomes Programme (NCAPOP), comprising around 40 projects covering care provided to people with a wide range of medical, surgical and mental health conditions. The programme is funded by NHS England, the Welsh Government and, with some individual projects, other devolved administrations and crown dependencies.

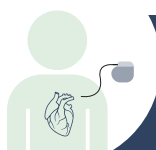
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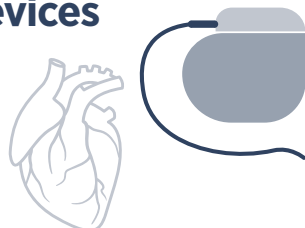
NACRM AT A GLANCE

Data from the period April 2020 to March 2021



Implants of pacemakers, defibrillators, and cardiac resynchronisation devices fell by 20-30% across England and Wales in 2020/21. Ablation was down by 35% over the whole year.

Devices



There was a 50% fall in procedures during the first wave of coronavirus disease (COVID-19) hospitalisations with a smaller but significant fall in the second wave, resulting in a 20-30% fall during the period.

Over 10,000 fewer patients than expected had device implants in England and Wales, which will have had a significant impact on mortality and quality of life.

Procedure volumes and training



Fewer specialists are doing sufficient procedures to maintain their skills.

- 60% of specialists met the minimum standards for pacemaker implants, with those performing 70 or more procedures down from 36% to 29%.
- Only 38% met the standards for complex devices, with those performing 60 or more procedures down from 16% to 9%.
- 66% met the standard for the number of ablation procedures (down from 77%), with 73% achieving the standard for complex ablations (down from 84%).
- Most specialists have been undertaking fewer device and ablation procedures, and for some this may have led to a degree of 'de-skilling'.

Fewer subspecialty trainees obtained the high volume experience required to prepare them for independent practice as consultants.

- Fewer than 10 trainees undertook high numbers of device implants or had exposure to high numbers of ablation procedures. Opportunities for the next generation of consultants to gain significant experience have diminished.

Ablation



Ablation activity almost ceased in the first COVID-19 lockdown and fell by 35% over the whole year with some hospitals seeing reductions of over 60%.

- 84% of hospitals met the national standards for ablation volumes (89% in 2019/20).
- 87% met standards for atrial fibrillation (AF) ablation (previously 89%).
- A 75% reduction in re-interventions for AF ablations indicates many patients with recurrent arrhythmias have been denied timely treatment, and waiting lists are substantial.

Device re-intervention and battery changes

There was a more positive picture during the pandemic for device interventions and necessary battery changes.

- Hospitals planned their services to avoid patients missing device changes for battery depletion. Hospitals may also have been able to treat late complications arising from device implants in the previous year.
- Levels of 1-year follow-up of patients implanted with devices remained at previous levels, indicating those suffering complications continued to be identified and treated appropriately.

Executive summary

This report summarises selected key findings from the National Audit of Cardiac Rhythm Management (NACRM) which is a part of the National Cardiac Audit Programme (NCAP). The NACRM report details activity in cardiac rhythm management (CRM) device and ablation procedures for England & Wales (Scotland has withdrawn from the audit although some Scottish centres were still submitting data in 2020/1. Additionally, minimal data supplied by Northern Ireland are not included in the report because of confidentiality and data protection issues).

The report covers the financial year 2020/21, during which the coronavirus disease (COVID-19) pandemic

has challenged the capacity of healthcare systems around the world, including substantial disruptions to cardiovascular care across key areas of healthcare delivery.

Because of this, the report is abbreviated compared with previous years and focuses on the impact of the pandemic on the delivery of pacemakers, implantable cardioverter defibrillators (ICDs), cardiac resynchronisation therapy (CRT) devices and catheter ablations. Hospitals are measured against standards related to the safety, effectiveness and outcomes of the care provided.

WHERE THINGS WORSENE / CAUSES FOR CONCERN

The COVID-19 pandemic has reduced activity substantially

Implants of pacemakers, defibrillators, and cardiac resynchronisation devices went down by 20–30% across England and Wales in 2020/21. 50% fall in procedures during the first wave of COVID-19 hospitalisations with a smaller but significant fall in the second wave.

Ablations suffered even larger fall in volumes

Activity almost ceased in the first lockdown and fell by 35% over the whole year.
Some hospitals saw reductions of over 60%.

Many patients did not get the life-saving or improving treatment they needed

Over 10,000 fewer patients than expected had device implants in England and Wales, which will have had a significant impact on mortality and quality of life.
Many patients will have suffered symptomatic and sometimes life-threatening arrhythmias, with the chance of a cure being postponed or missed altogether.

Large drop in re-interventions for ablation

75% reduction in re-interventions for AF ablations indicates many patients with recurrent arrhythmias have been denied timely treatment, and waiting lists are substantial.

More hospitals fell short of the standards for minimum numbers of device procedures

17% of hospitals failed to meet national standards for pacemaker volumes (up from 14% in 2019/20) and 36% were below the national standards for complex devices (up from 25%).

Fewer specialists are doing sufficient procedures to maintain their skills	60% of specialists met the minimum standards for pacemaker implants, with those performing 70 or more procedures down from 36% to 29%. Only 38% met the standards for complex devices, with those performing 60 or more procedures down from 16% to 9%. 66% met the standard for the number of ablation procedures (down from 77%), with 73% achieving the standard for complex ablations (down from 84%). Most specialists have been undertaking fewer device and ablation procedures, and for some this may have led to a degree of 'de-skilling'.
Fewer subspecialty trainees obtained the high volume experience required to prepare them for independent practice as consultants	Fewer than 10 trainees undertook high numbers of device implants. Fewer than 10 trainees had exposure to high numbers of ablation procedures. Opportunities for the next generation of consultants to gain significant experience have diminished.
WHERE LEVELS OF CARE WERE MAINTAINED OR REMAINED BROADLY STABLE	
Hospitals ensured device changes for battery depletion	Hospitals planned their services to avoid patients missing device changes for battery depletion. Hospitals may also have been able to treat late complications arising from device implants in the previous year.
The proportion of hospitals meeting minimum ablation procedure standards fell slightly	84% of hospitals met the national standards for ablation volumes (89% in 2019/20). 87% met standards for AF ablation (previously 89%).
Re-interventions have been unaffected	One year follow-up of patients implanted with devices remained at previous levels, indicating those suffering complications continued to be identified and treated appropriately.

Summary of recommendations

The fall in procedure numbers has been largely a result of the pandemic, and not within the control of specialists. However, doctors who have become de-skilled should consider undertaking procedures jointly with colleagues, especially for complex or high-risk cases. Those persistently undertaking very small volumes of procedures should examine whether this is sustainable, as should their hospitals.

1 | Introduction

This report summarises selected key findings from the National Audit of Cardiac Rhythm Management (NACRM) which is a part of the National Cardiac Audit Programme (NCAP). The NACRM report details activity in cardiac rhythm management (CRM) device and ablation procedures for England & Wales (Scotland has withdrawn from the audit although some Scottish centres were still submitting data in 2020/1. Additionally, minimal data supplied by Northern Ireland are not included in the report because of confidentiality and data protection issues).

The audit reports on data relating to CRM procedures from April 2020 to March 2021 at 161 hospitals in England and Wales reporting device procedures, and 56 hospitals that reported ablations. All centres that had reported activity in 2019/20 continued to report in 2020/21.

The report covers the first year of the COVID-19 pandemic, which has challenged the capacity of healthcare systems around the world, including substantial disruptions to cardiovascular care across key areas of healthcare delivery. Because of this, the report is abbreviated compared with previous years and focuses on the impact of the pandemic on the delivery of pacemakers, implantable cardioverter defibrillators (ICDs), cardiac resynchronisation therapy (CRT) devices and catheter ablations. Explanations of these therapies, the applicable standards and the audit methodology can be found in the [2021 report](#) (2019/20 data).

We report the impact on total activity across England and Wales, on the patterns of hospital and operator volumes, re-intervention rates and quality improvement (QI) metrics related to the safety, effectiveness and outcomes of the care provided.

In view of these exceptional times, it was not considered appropriate to highlight individual hospital or operator volumes against standards with the 'red-amber-green' (RAG) system. However, each hospital's and operator's reported activity is included in a set of [appendices](#) which set out details of CRM device and ablation activity at each of the 161 implanting hospitals and 56 ablating hospitals in England & Wales, as well as those in Scotland and Northern Ireland that submitted data. They also describe geographical variation in the provision of CRM device therapy across England and Wales.

The rest of this report is structured as follows:

- **Section 2** highlights the principal impacts of the COVID-19 pandemic
- **Section 3** focuses on a small number of Quality Improvement (QI) metrics which should continue to be a priority, either for individual operators, teams within hospitals 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 COVID-19 pandemic

2.1 There was an unprecedented fall in all categories of cardiac implantable electronic devices

Implants of all categories of cardiac electronic devices fell 20–30% in 2020/21 compared to previous years. Table 1 details the absolute numbers of new implants, and implant rates per million population (pmp) in England and Wales. Annual trends for total implants and for implant pmp rates are shown in Figure 2.1 and Figure 2.2.

Note that although implant rates generally appear lower for Wales than England, a proportion of Welsh patients are treated in English centres (especially Liverpool).

Table 1: Total number of implants and number of implants per million population (pmp) in England and Wales, 2020/2021 [NACRM data]

ENGLAND AND WALES	PM First	ICD New and Upgrade	CRT New and Upgrade	HED New and Upgrade
2020/21 Total	25,994	4,062	6,296	6,945
% decline from 2019/20	-22%	-29%	-27%	-28%
England pmp	437	69	106	118
Wales pmp	403	49	98	91

HED = all high energy devices

Figure 2.1: Device implant totals in England and Wales, 2014/15 – 2020/21 [NACRM data]

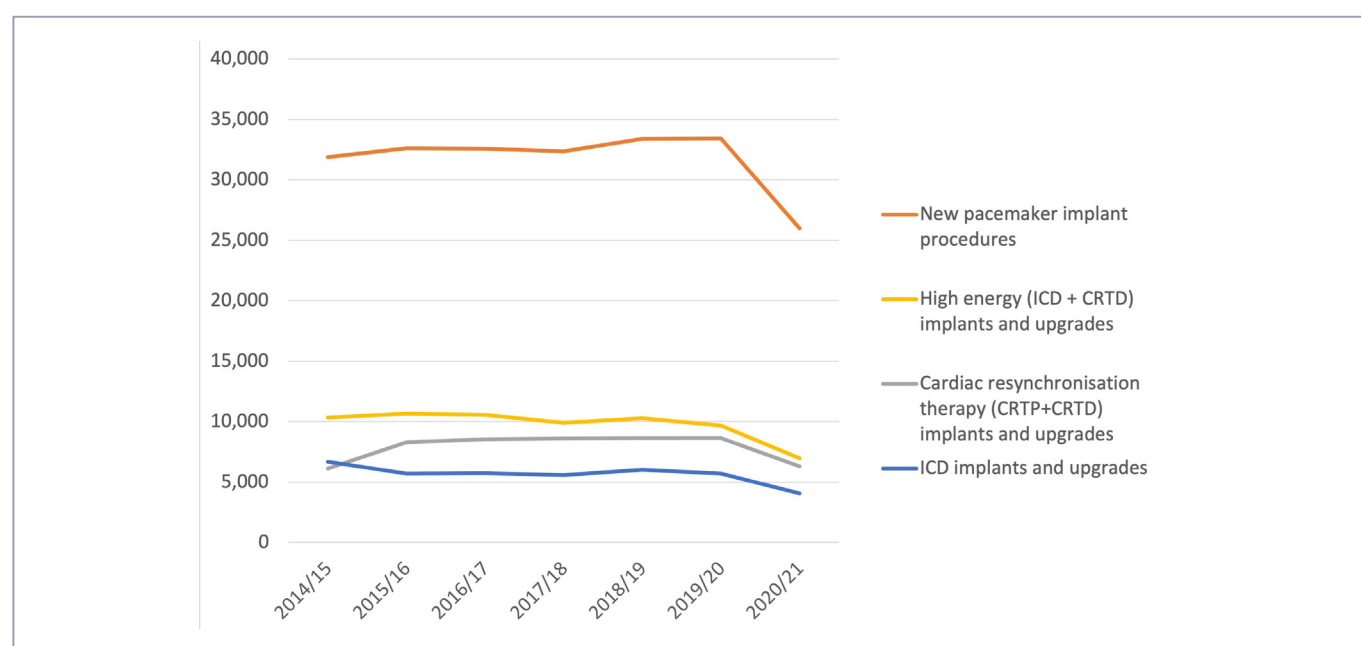
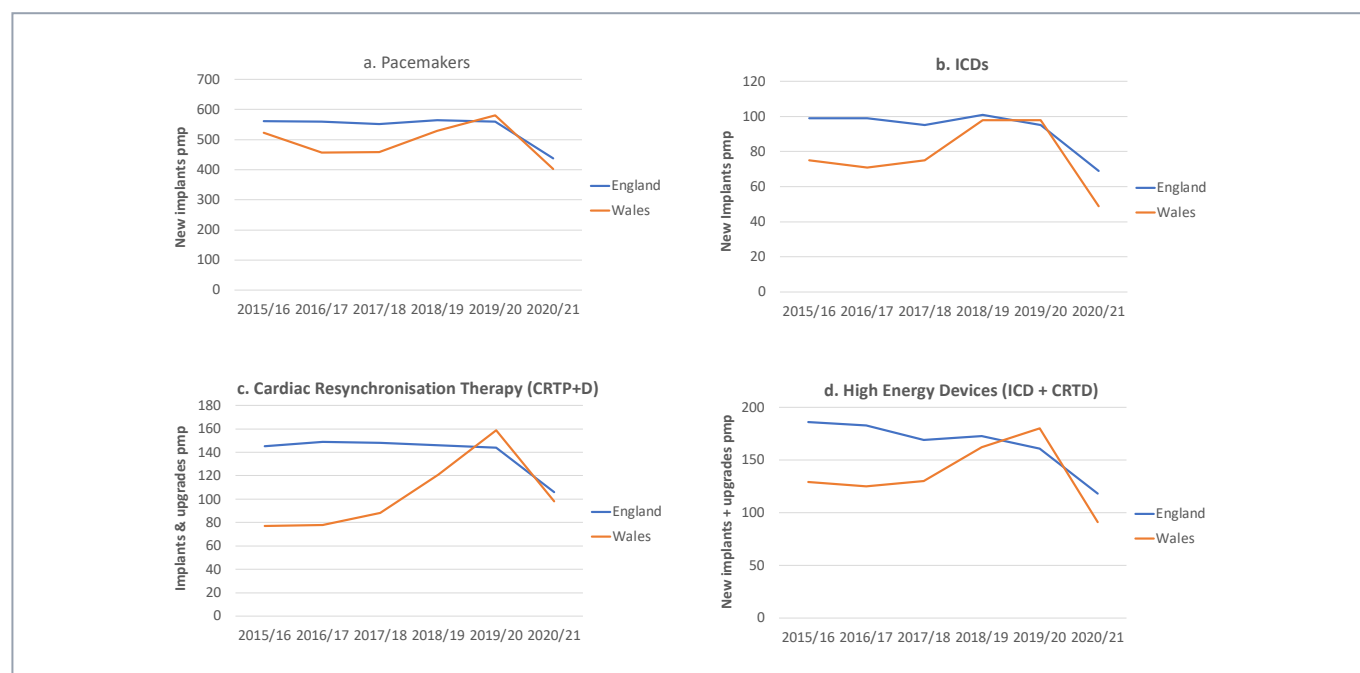


Figure 2.2: Device implantation rates per million population (pmp) in England and Wales, 2015/16 – 2020/21 [NACRM data]



Prior to the COVID-19 pandemic, device implantation rates had been broadly static in England for several years, with those in Welsh centres reaching the same rates as England by 2019/20.

However, the first COVID-19 wave, arriving in the UK at the end of March 2020, was accompanied by a

sharp drop in device implants of up to 50% in April 2020 [Figure 2.3]. A smaller drop in implant rates accompanied the second wave, which began in October 2020. In between, implant rates recovered, though not to pre-pandemic levels.

Figure 2.3: Number of implant and upgrade procedures against UK COVID-19 hospitalisations, 2016/17 – 2020/21 [NACRM data]

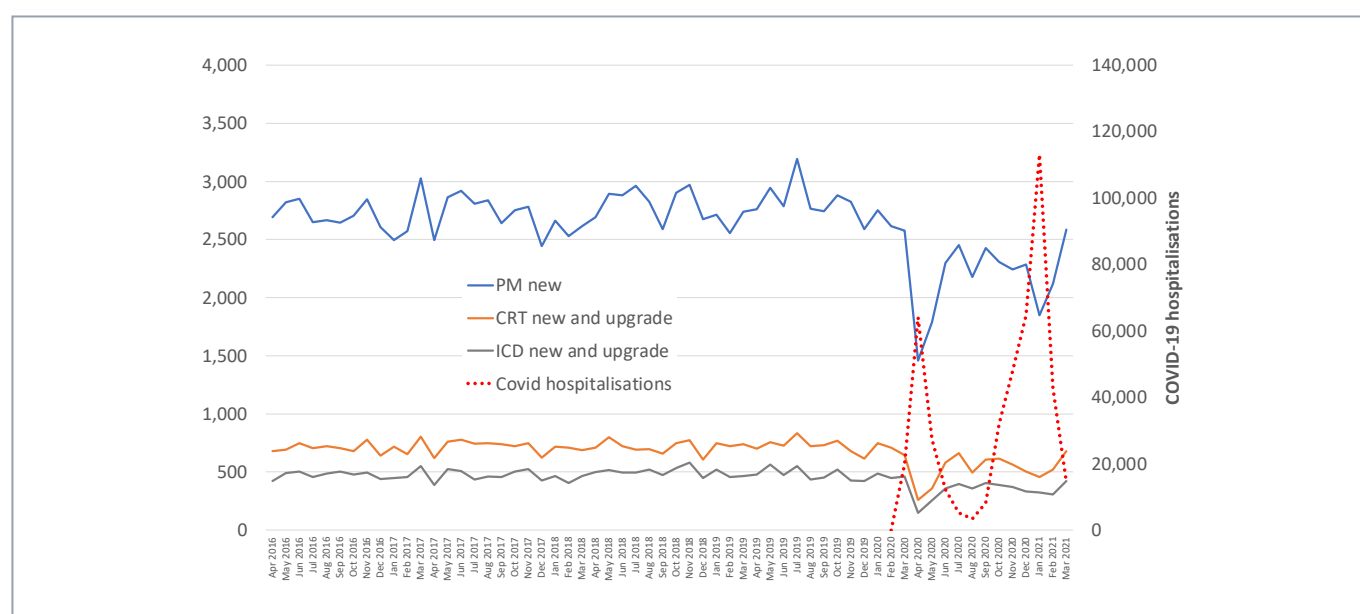


Figure 2.4: Number of implant and upgrade procedures versus other device procedures in England and Wales, 2016/17 – 2020/21 [NACRM data]

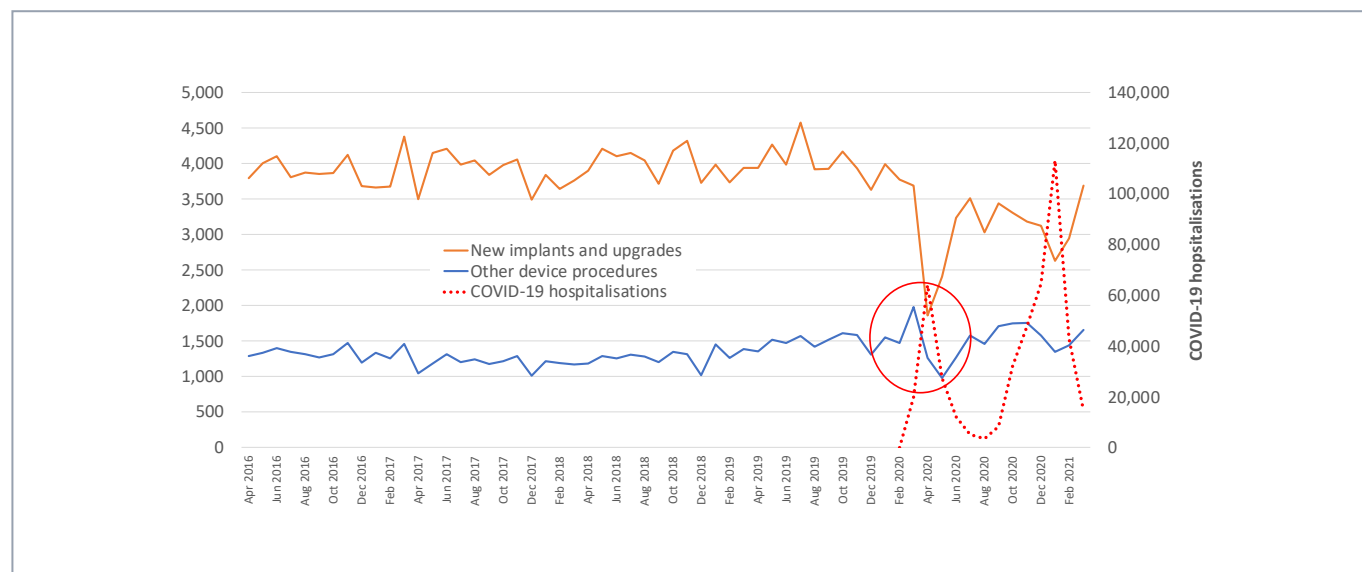
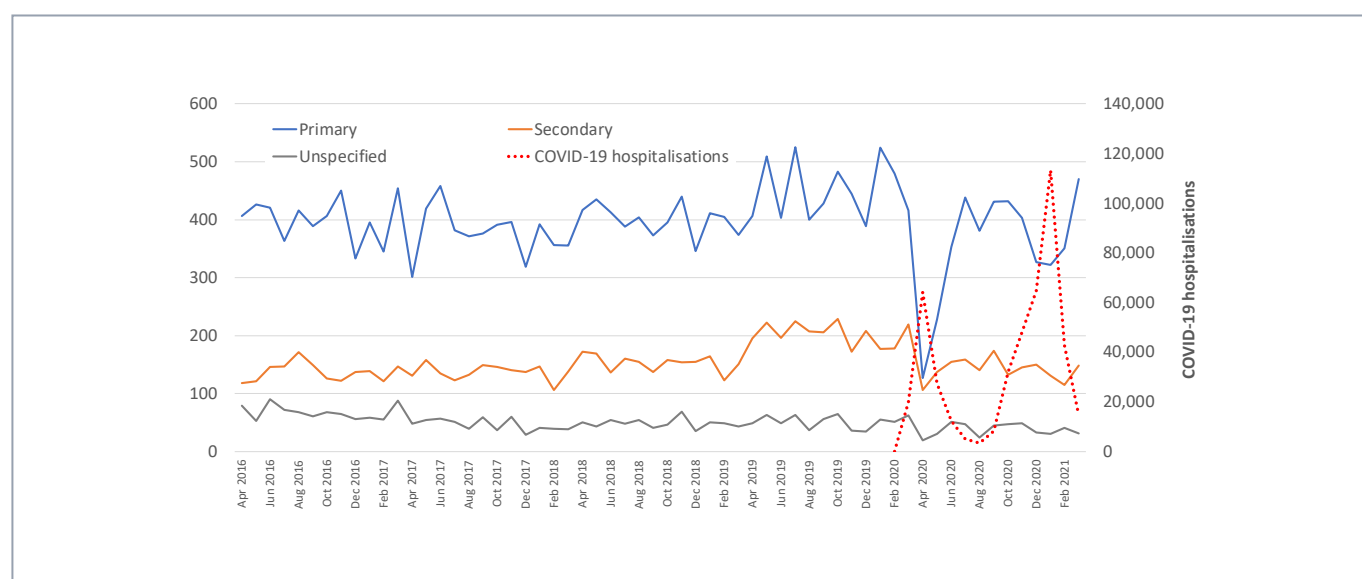


Figure 2.4 shows the monthly rates for all new device implants/upgrades compared with other device procedures. There was an increase in 'other' activity in March 2020, and to a lesser extent in the summer (circled). This reflects centres anticipating service disruption due to the pandemic by bringing forward device replacements for expected battery depletion. As a result, 'other' device procedures over the year were unchanged, and it can be inferred that forward thinking by centres avoided patients suffering due to battery depletion during the pandemic.

Figure 2.5 shows ICD implant rates according to the stated indication. 'Secondary prevention' ICDs are those implanted in survivors of cardiac arrest or after presenting with ventricular tachycardia (VT). 'Primary prevention' implants are those in patients at high risk of sudden arrhythmic death, but who have not yet suffered cardiac arrest or sustained VT. The impact of the first and second COVID-19 waves was greatest on primary prevention implants, as these are elective procedures.

Figure 2.5: New ICD implants by indication in England and Wales, by month, 2016/17 – 2020/21 [NACRM data]

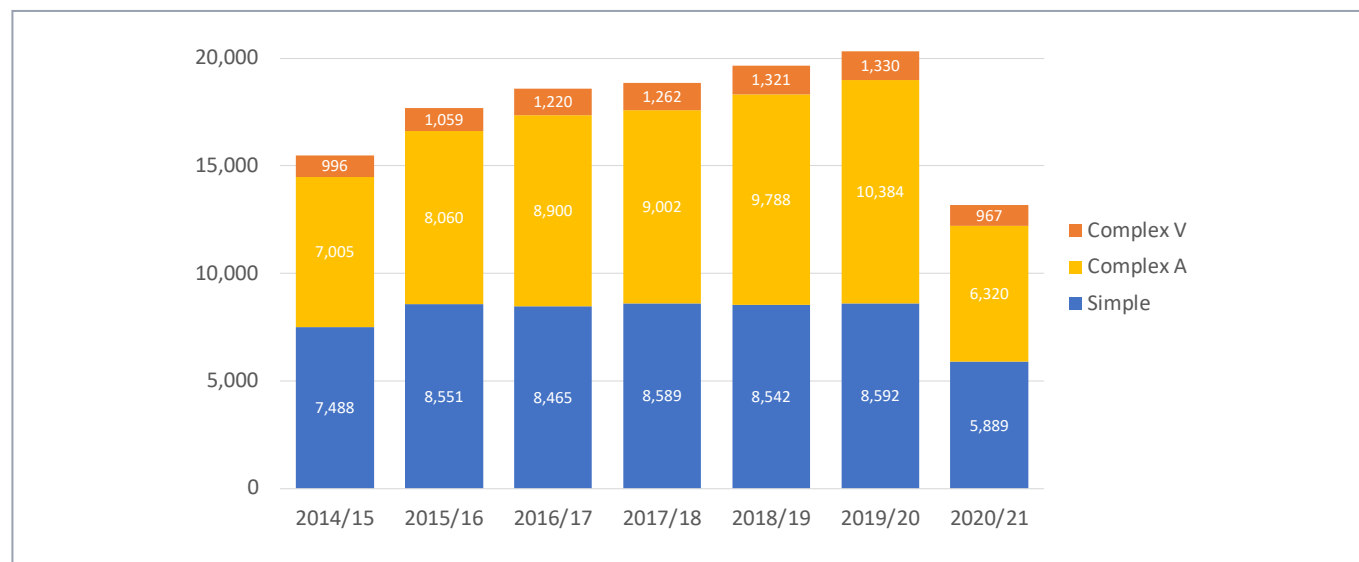


2.2 Catheter ablation of all types fell dramatically

Catheter ablation activity dropped 35% in 2020/21, with a total of 13,176 procedures compared to 20,306 in the previous year. Prior to this, total ablation numbers had been gradually increasing, driven largely by ablation for atrial fibrillation (AF) [Figure 2.6].

Table 2 details the breakdown of catheter ablation procedures over the last seven years. Most types of ablation were reduced by 35–40% overall in 2020/21 compared with the previous year. However, AV node ablation and scar VT ablation were impacted less,

Figure 2.6: Ablation procedures in England and Wales, 2014/15 – 2020/21 [NACRM data]



Complex V = complex ventricular ablations; Complex A = complex atrial ablations

Table 2: Reported catheter ablation volumes in England and Wales, 2014/15 – 2020/21 [NACRM data]

Financial Year	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
Simple ablation targets only							
Complete AV nodal	1,218	1,460	1,498	1,599	1,634	1,559	1,271
AV nodal re-entry	2,686	3,141	3,348	3,508	3,222	2,845	1,886
Accessory Pathway	1,418	1,632	1,656	1,548	1,458	1,520	956
CTI ("typical atrial flutter")	3,378	3,832	3,945	4,082	3,914	3,337	2,048
Total simple ablations	7,934	9,190	9,534	9,769	9,247	8,702	6,041
(>1 simple target)	45	40	54	45	45	43	23
Complex atrial ablations							
AF ablation ± other	6,477	7,331	8,197	8,807	9,153	8,679	5,184
Other complex atrial	865	1,063	1,237	1,137	1,099	1,089	709
Total complex atrial ablations	7,342	8,394	9,434	9,944	10,252	9,768	5,893
Ventricular ablations							
PVCs, focal VT only	711	666	815	839	844	760	524
VT – Scar ±	315	457	530	529	522	550	454
Total ventricular ablations	1,026	1,123	1,345	1,368	1,366	1,310	978
Total complex ablations	8,355	9,510	10,764	11,297	11,606	11,068	6,863
Total ablations	16,289	18,700	20,298	21,066	20,853	19,770	12,904
Ablation in congenital heart disease	203	276	311	291	314	313	230
No ablation/unknown target	3,230	3,388	3,177	3,036	2,726	2,641	1,698

PVCs = premature ventricular contractions; Focal VT = focal ventricular tachycardia

by 18% and 17% respectively. Both these procedures are often performed urgently in cases where dangerous arrhythmias are unresponsive to drugs.

The drastic impact of the first and second lockdowns can be seen on a month-by-month basis in Figure 2.7. This shows that elective activity virtually ceased in April 2020 and catheter ablations were reduced by approximately 90% compared to normal months. After the first wave, activity did not return to pre-pandemic levels. Activity fell again in the autumn of 2020, by 50% compared to normal. In the interim and since, catheter ablation activity did not return to normal, as other cardiac services were prioritised.

There was significant variation in the impact of the pandemic on ablation activity across the country

[Figure 2.8], with hospitals in London and the North East seeing overall reductions of more than 40%, while the impact in the South West and East of England regions was less than 20%.

There was no significant difference between the fall in total activity in the six tertiary-only centres (-31%) and those co-located with emergency departments (-32%), based on figures from adult NHS hospitals performing 50 or more cases in 2019/20.

These aggregated figures mask significant variations in activity at larger centres in different regions. For example, in the North West region the reduction was 25% in Liverpool and 51% in Blackpool; in London, ablations were reduced by 20% at Barts and by 63% at Guys and St Thomas' Hospital.

Figure 2.7: Ablation procedures in England and Wales, by month, 2016/17 – 2020/21 [NACRM data]

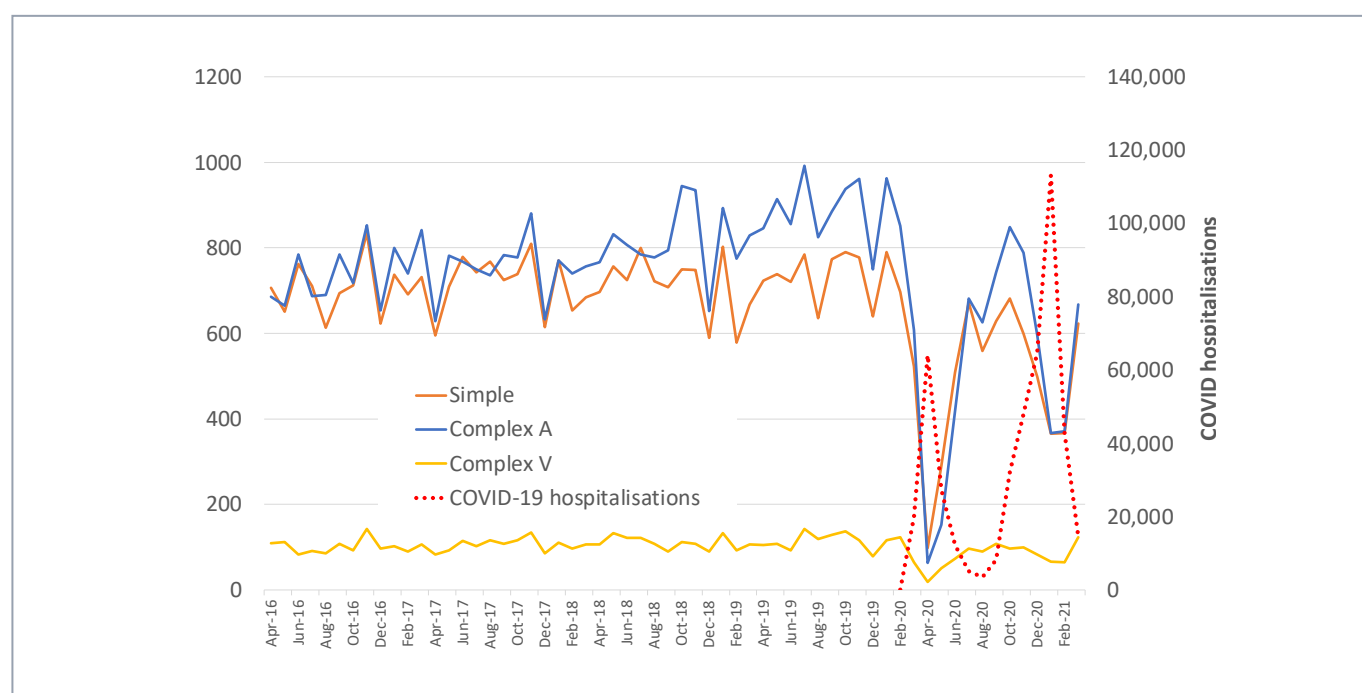
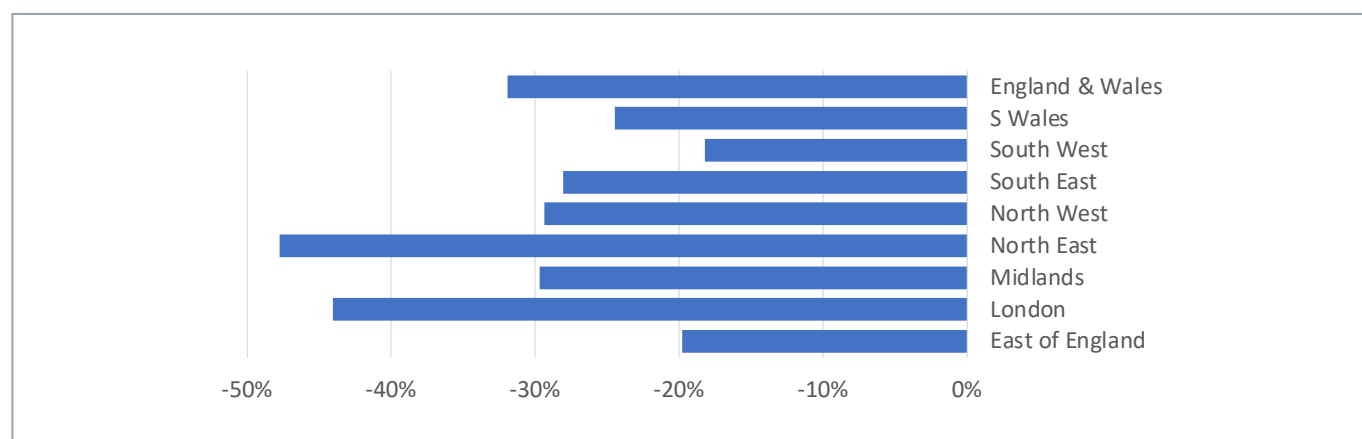


Figure 2.8: Change in ablation volumes by region for NHS adult centres performing 50 or more ablations in England and Wales, 2020/21 [NACRM data]



2.3 The COVID-19 pandemic has resulted in greater patient morbidity and preventable deaths

Pacemakers and ICDs protect against injury and save lives by preventing dangerously slow heart rhythms and automatically treating cardiac arrest. The substantial reduction in implants was multifactorial. In the first pandemic wave, it is clear that many patients did not seek emergency hospital treatment (because of fear), or did not receive it in a timely way (as a result of overwhelmed ambulance and emergency department services), or were not referred appropriately.

Cardiac resynchronisation therapy devices have a substantial impact on heart failure symptoms, hospitalisations, and mortality. Inevitably, the one third overall reduction in device implants during the first pandemic year will have resulted in greater morbidity and, almost certainly, many preventable deaths.

Static overall levels of activity for device replacement and re-interventions indicate that device centres managed to continue their services through the

pandemic, and that the fall in new implant numbers reflects the cessation of elective work and patients not reaching those services, whether because they were unwilling to attend, were not referred, or died.

The substantial reduction in catheter ablations was probably also multifactorial. Ablation is not usually life-saving and consumes resources that were scarce during the pandemic, especially anaesthetists. It was understandably given low priority compared to other cardiac procedures. As a consequence, waiting lists for catheter ablation have grown substantially. At the same time, patients have continued to suffer symptoms, and sometimes life-threatening effects of recurrent arrhythmias.

Finally, catheter ablation becomes less effective if a patient remains in persistent atrial fibrillation for months or longer. Many patients will therefore have missed the opportunity to have a definitive treatment to abolish their arrhythmia.

2.4 COVID-19 had a marked effect on trainee activity

The number of trainees (identified as such by GMC number) reported to be scrubbed operators in device procedures has remained around 360 in the last five years. However, each year approximately a third performs fewer than 10 implants, and these trainees are presumed to be in their early years of training, when only limited experience is required. Those specialising in electrophysiology/devices in the last two years are expected to undertake substantially more implants (the curriculum recommends at least 100 pacemakers, for example).

Although the trend is not clear, and reporting to NICOR of trainee participation is thought to be imperfect, it appears that few trainees are undertaking high volumes of device procedures [Figure 2.9, Figure 2.10]. Although there was no clear change due to the pandemic in 2020/21, the trend is if anything downward. Anecdotally, many trainees have been excluded from large volume experience due to redeployment and reduced overall procedure numbers.

Figure 2.9: Numbers of trainees scrubbed for more than 30 implants (any device type) in England and Wales, 2017/18 – 2020/21 [NACRM data]

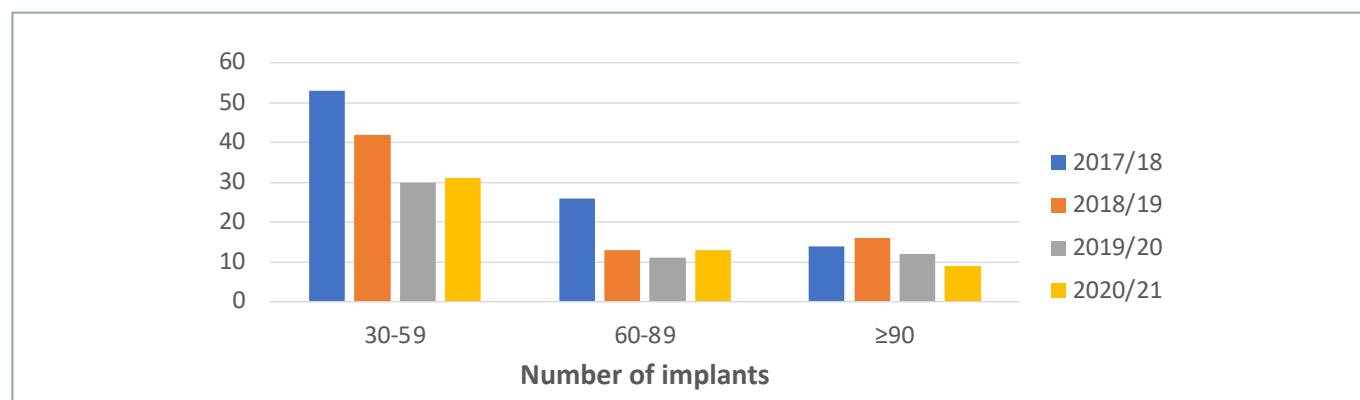
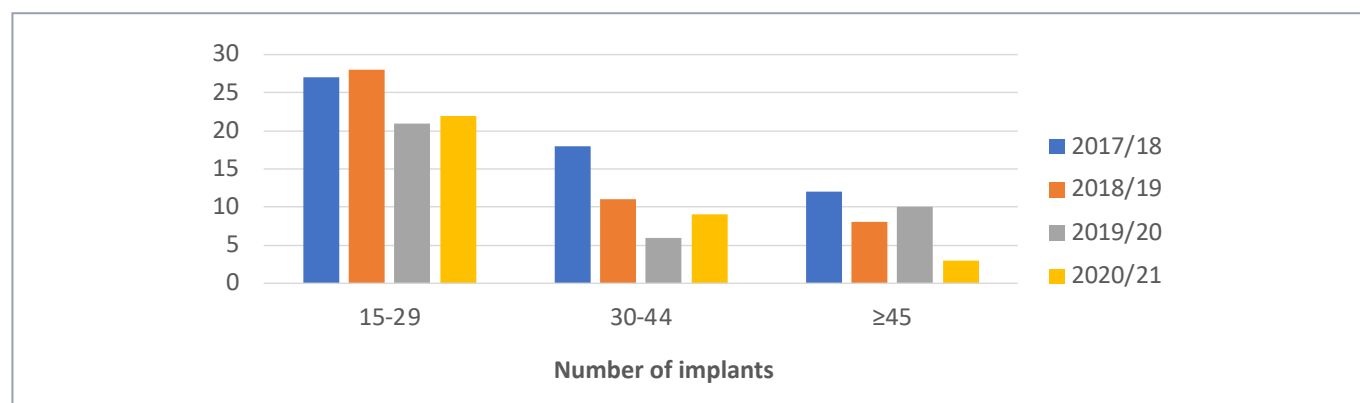


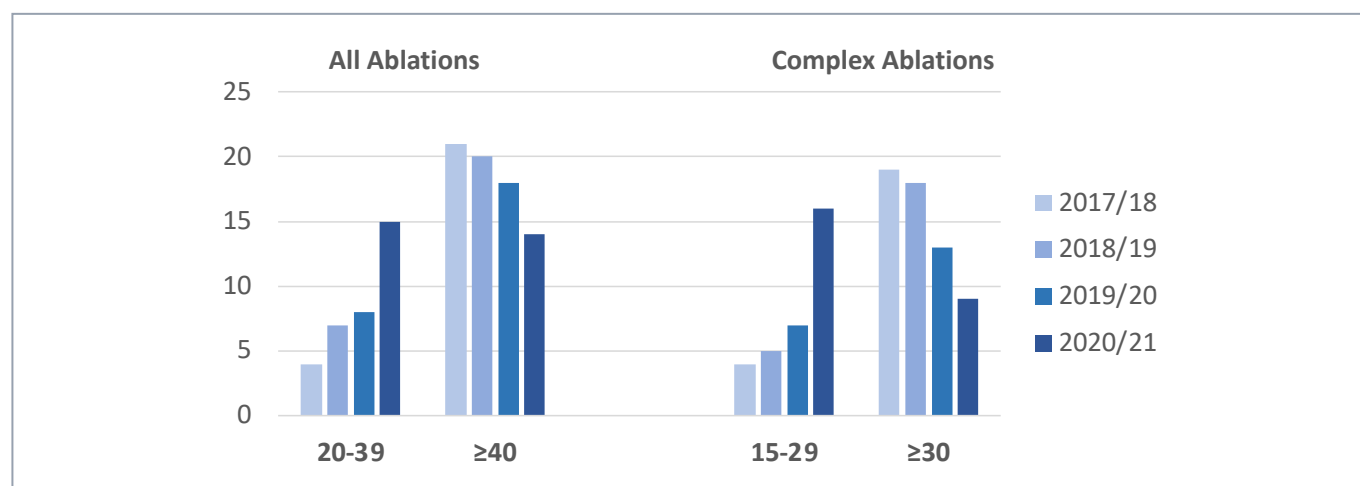
Figure 2.10: Numbers of trainees scrubbed for more than 15 complex device implants in England and Wales, 2017/28 – 2020/21 [NACRM data]



For ablations, a substantial number of trainees are recorded each year to have participated in small numbers of procedures (i.e. less than 20 in total and fewer than 15 complex cases). However, fewer

sub-specialty trainees appear to be undertaking significant ablation volumes (i.e. 40 or more in total) each year [Figure 2.11].

Figure 2.11: Numbers of trainees participating in 20 or more ablations in total, and 15 or more complex ablations in England and Wales, 2017/18 – 2020/21 [NACRM data]



Case Study: Cardiology Trainee, South West region

“I was due to start Cardiology Speciality Training in 2020, but I was redeployed on three separate occasions to cover General Medicine due to the pandemic. I lost probably in the region of 6 months of dedicated Cardiology training because of this that year.

Unfortunately, on returning to a ‘normal’ rota in 2021, this was then changed, and I still (in 2022) have a more intense General Medicine commitment to deal with the challenging inpatient situation due to ongoing COVID and acute pressures. Overall, I have spent more time covering General Medicine than Cardiology in the past year.

Now, having lost so much time for specialist training, I am trying to catch up on echocardiography, putting in pacemakers and undertaking angiograms, as is everyone else, limiting access to training opportunities. This has meant, for example, that training in putting in pacemakers has become sporadic, and it feels like I am starting again on every list.

Overall, COVID has exacerbated an already tricky training environment and resulted in a significant amount of lost training in my specialty.”

3 | Selected Quality Improvement Metrics

This year we focus on the impact of the first year of the COVID-19 pandemic on arrhythmia services. The following quality improvement metrics, previously reported, are considered of secondary importance this year and discussion has been omitted from the summary report:

1. NICE guidance for pacemaker prescriptions.
2. NICE guidance for ICD indications.
3. Data Quality.
4. Data Validity.

However, individual centre reports in the [appendices](#) detail each hospital's performance against all the standards.

3.1 Hospital volumes – device implants and catheter ablations

Case study: Paul (Consultant, SW region)

“It was clear at the start of 2020 from the reports from China, and particularly Italy, that we were potentially going to be overwhelmed by the COVID pandemic. This led to rapid re-planning of our activity. It was unclear in February 2020 how badly we were going to be affected by COVID-19, but it was clear that we had to prepare.

In anticipation of this, we rapidly brought forward plans to replace devices replacement in patients whose batteries were expected to become depleted within six months. Although we had been instructed to cancel all elective activity, we regarded these as life-saving procedures, and continued to operate a reduced service through the pandemic.

Nonetheless, because many consultants and trainees were redirected to care for patients with COVID-19, our overall activity levels dropped.”

3.1.1 Overview of QI Metric

QI Metric Description/Name	Hospital Activity Volumes
Why is this important?	International studies have demonstrated that outcomes tend to be poorer in hospitals undertaking low volumes of device and ablation procedures. The British Heart Rhythm Society publishes standards for hospitals and clinicians undertaking these procedures in adults. These include minimum recommended procedure volumes, which are stringent by international standards. The standards documents are regularly reviewed: we have compared hospitals' data to those applicable at the time. ^{1,2}
QI theme	Safety.
What is the standard to be met?	<i>Quality Standard 1: (Device Implants):</i> BHRS Standards (2015)¹ recommend that pacing hospitals undertake a minimum of 80 pacemaker implants per year (this was 60 in the 2013 Standard). Training hospitals should conduct ≥ 105 implants per year. <i>Quality Standard 2: (Complex Device Implants):</i> Hospitals undertaking ICD and CRT implant/upgrades should undertake a minimum of 60 such procedures per year. <i>Quality Standard 3 (Simple Catheter Ablation):</i> BHRS Standards (2016)² recommend that ablation hospitals undertake a minimum of 100 ablation procedures per year in total. <i>Quality Standard 4 (AF ablation):</i> Hospitals undertaking AF ablation should perform a minimum of 50 such cases per year.
Key references to support the metric	References as above are in reference list at end of report.
Numerator	Pacemaker implants and complex device (ICD, CRTP, CRTD) implants/upgrades, simple and complex ablations.
Denominator	n/a
Trend	The number of low volume pacemaker and complex device centres continues to fall slowly but remains high. The number of low volume ablation centres (excluding private and children's hospitals) is now very low.
Variance	Apparently low volume centres may partly reflect misreporting. Some genuinely low volume centres may be new, or in remote geographies.

3.1.2 Audit results

In 2020/2021, there was a slight fall in the number of hospitals reporting pacemaker implants (146 vs 154) but not in those reporting complex ICD and CRT implants (103 vs 102).

83% of hospitals met the minimum standard of 80 pacemaker implants [Figure 3.1]. This was

somewhat lower than in recent years. Of note, the proportion of 'high volume' centres (implanting at least twice the minimum) fell from 60% to 47%.

Similarly, for complex devices (ICD and CRT), the proportion of hospitals reaching the minimum number was significantly lower than in recent years [Figure 3.2], as was the proportion of high-volume centres.

Figure 3.1: Number and proportion of hospitals meeting the standard for pacemaker implants in England and Wales, 2016/17 – 2020/21 [NACRM data]

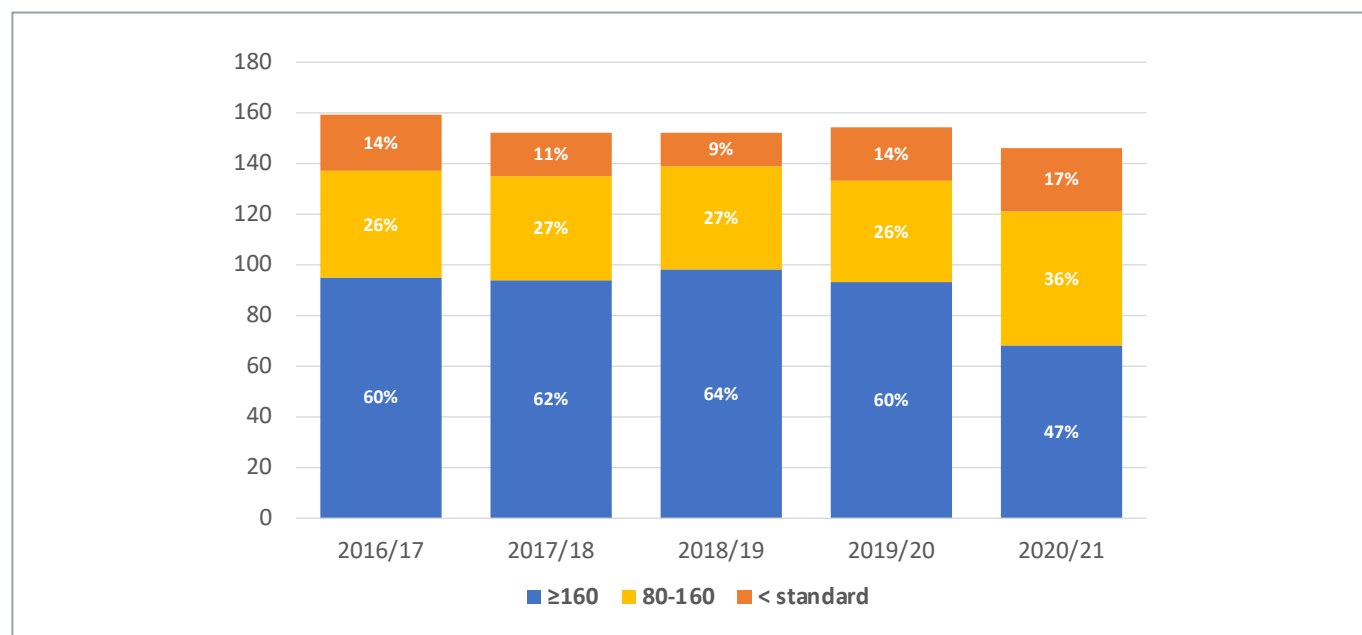


Figure 3.2: Number and proportion of hospitals meeting the standard for complex devices, 2016/17 – 2020/21

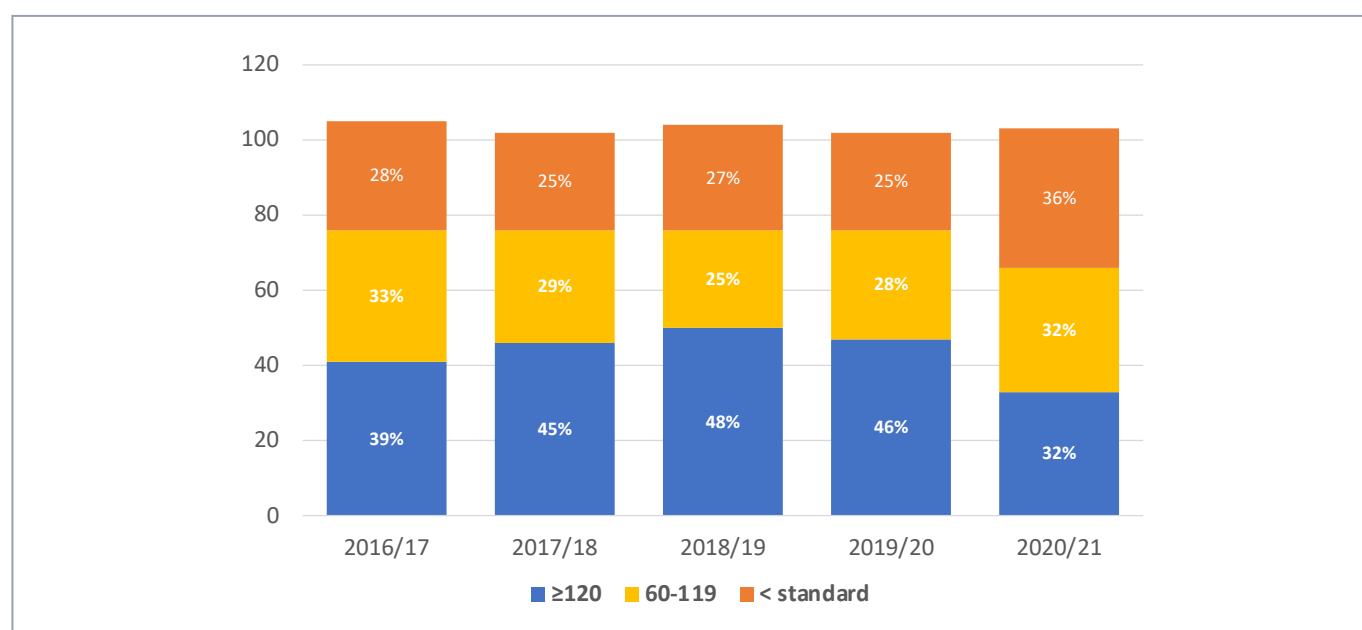
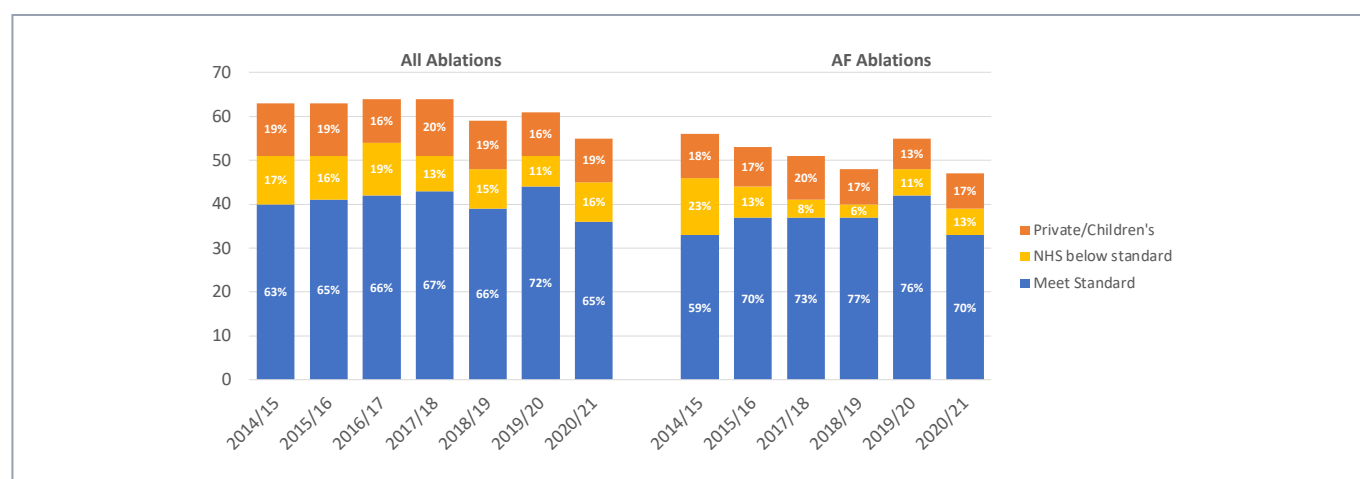


Figure 3.3: Number and proportion of centres meeting the standards for catheter ablation procedures in England and Wales, 2014/15 – 2020/21 [NACRM data]



For ablations, in 2020/21 fewer centres reported catheter ablations (57 vs 61 in 2019/20). One large NHS centre (Imperial College/Hammersmith Hospital) has not reported its ablations to NICOR for over five years, though it has reported device procedures. The BHRS minimum volume standard for total ablation procedures (100 cases) was met by 65% of hospitals. The remainder were evenly split between NHS adult hospitals and private/children's hospitals [Figure 3.3]. Despite the impact of the pandemic on total ablation numbers, these proportions have changed little in recent years.

There is a similar picture for AF ablations, with fewer centres reporting activity but only a small fall in the proportion meeting the standard.

3.1.3 Recommendations for hospitals not achieving the standards

We have chosen not to make any recommendations on this occasion – the fall in implant rates has not been within the control of the hospitals. In recent years, few NHS Adult hospitals have been significantly below the standards.

3.2 Operator volumes

3.2.1 Overview of QI Metric

QI Metric Description/Name	Operator volumes for Device and Ablation procedures
Why is this important?	Studies have demonstrated that device and ablation procedure outcomes tend to be poorer when undertaken by low volume operators. The British Heart Rhythm Society has made recommendations for individual specialists undertaking device (2015) and ablation procedures (2016) in adults. ^{1,2}
QI theme	Safety.
What is the standard to be met?	<i>Quality Standard 5 (Pacemaker Implantation):</i> The minimum volume for an implanting specialist is 35 total new devices per year. <i>Quality Standard 6: (Defibrillator/Cardiac Resynchronization Therapy):</i> For those undertaking complex implants/upgrades the recommendation is at least 30 such procedures within a total of 60 device implants per year. <i>Quality Standard 7 (Catheter ablation):</i> Interventional electrophysiologists undertaking catheter ablation should perform at least 50 procedures per year. <i>Quality Standard 8 (Complex ablation):</i> For those undertaking complex procedures (generally AF ablations) the recommendation is at least 25 such procedures within a total of at least 50 ablations per year; while ≥50 complex procedures is desirable.
Key references to support the metric	See references 1 & 2.
Numerator	Pacemaker implants and complex devices (ICD, CRTD, CRTD) implants/upgrades; simple and complex ablations.
Denominator	n/a
Trend	Due to the COVID-19 pandemic and the fall in ablation and device volumes, the numbers of operators meeting minimum standards has fallen.
Variance	There is wide variation in operator volumes.

3.2.2 Audit results – devices

In contrast to the trends in declining volumes, the proportion of implanting specialists who met the minimum standard of 35 pacemaker implants remained steady at around 60%. However, the proportion of high-volume operators fell somewhat (29% versus ~35% in recent years) [Figure 3.4].

The proportion of consultants implanting complex devices that met the standard has been low (46–50%) in recent years and fell further to 38% in 2020/2021 [Figure 3.5]. Only 9% of complex implanters were high volume (more than twice the minimum), half that seen in recent years.

The reduction in the overall activity described above is mirrored for ablations. For total ablations, the number of consultants who met the minimum of 50 ablations fell from 77% in 2019/20 to 68% in 2020/21 [Figure 3.6]. The number of high-volume operators (100 or more ablations) fell by more than half (from 47% to 22%).

There was a similar picture for complex ablations. The number of consultants meeting the minimum of 25 cases fell from 84% in 2019/20 to 73% in 2020/21, while the number of high-volume operators (50 or more cases) fell from 58% to 30%.

Figure 3.4: Number and proportion (%) of specialists meeting the standard for pacemaker implants in England and Wales, 2016/17 – 2020/21 [NACRM data]

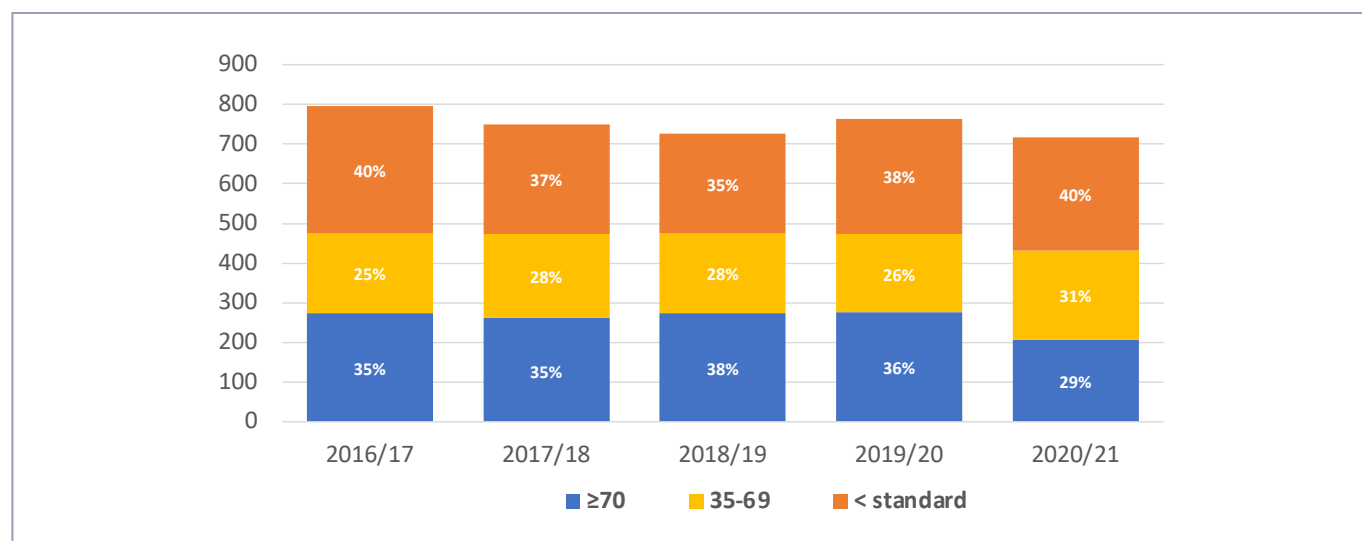


Figure 3.5: Number and proportion (%) of specialists meeting the standard for complex device implants/upgrades, 2016/17 – 2020/21 [NACRM data]

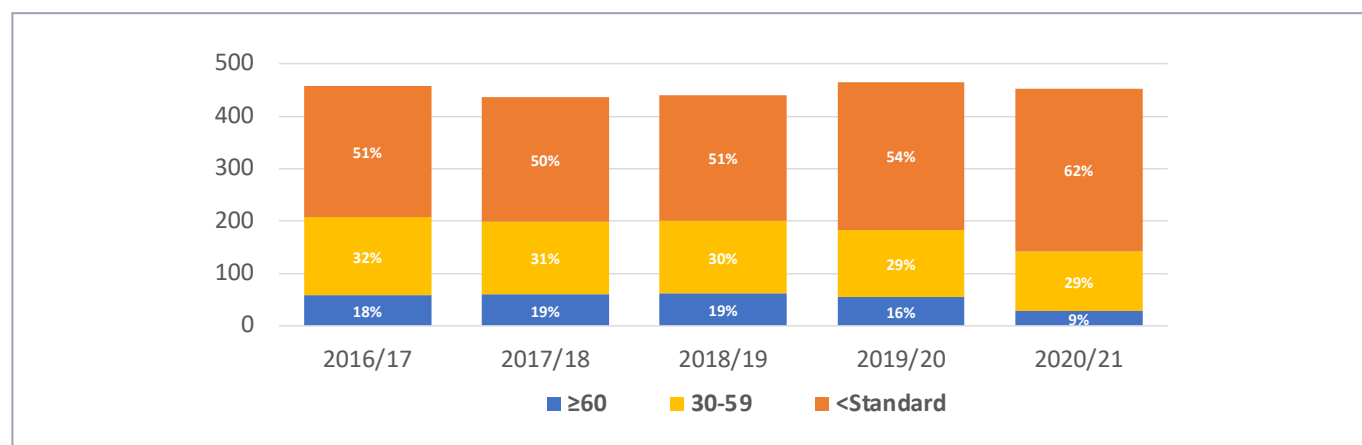
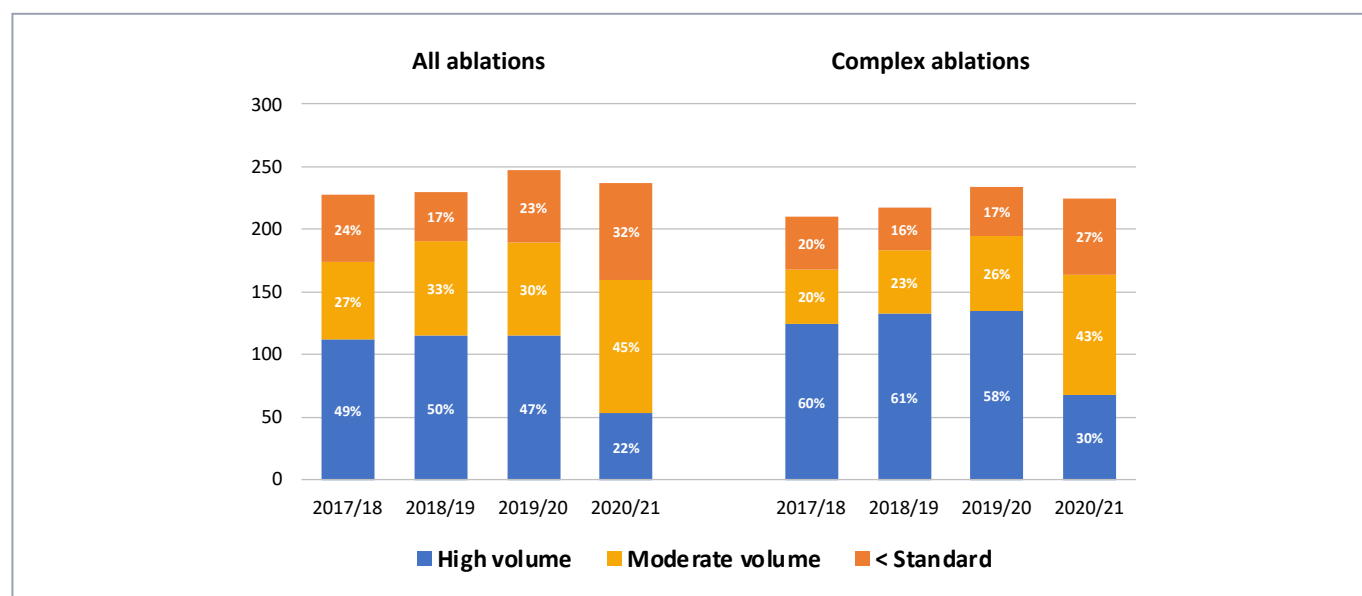


Figure 3.6: Number and proportion of specialists meeting the standards for total and complex ablations (≥50 and ≥25 cases, respectively), 2017/18 – 2020/21 [NACRM data]



Case study: Paul (Consultant Cardiologist, London)

"The pandemic has been a challenging time for doctors treating patients with arrhythmias. Much of our work has been put on hold and procedures that were previously commonplace have been performed much less frequently.

When I come to perform a procedure which would have been routine before the pandemic, frankly I feel rusty. I worry that I am not doing the best job I can for my patients. Many of my colleagues, both junior and senior, share my concerns and we hope that we can get back to normal very soon."

3.2.3 Recommendations for those not meeting the standards

The fall in procedure numbers has been largely a result of the pandemic, and not within the control of specialists. However, doctors who have become de-skilled should consider undertaking procedures jointly with colleagues, especially for complex or high-risk cases. Those persistently undertaking very small volumes of procedures should examine whether this is sustainable, as should their hospitals.

3.3 Re-intervention rates (devices)

In recent years, we have reported the proportion of patients (tracked by NHS number) who have undergone a re-intervention within one year following a first device implant or within one or two years following catheter ablation. In previous years, we have shown the hospital-specific re-intervention rates as using funnel plots, but these have been omitted from the current summary report. Individual hospital data appear in the [appendices](#).

It should be noted that the follow-up period means that the re-interventions reported are to patients whose original procedures were *before* the pandemic. Re-interventions therefore do not reflect the pandemic's effect on the quality or effectiveness of procedures, but they do reflect hospitals' ability to respond to complications or recurrent arrhythmias.

3.3.1 Overview of QI metric

QI Metric Description/Name	Re-interventions within the first year following pacemaker and complex device implants
Why is this important?	Inpatient complication rates are not an ideal quality measure as many implant-related complications present at a later stage. However, re-interventions in the first year following implants are usually the result of procedural complications and can be used as an index thereof.
QI theme	Outcomes.
What is the standard to be met?	<i>Quality Standard 15 (Pacemaker re-interventions):</i> The rate of re-interventions within a year of a first pacemaker implant should be below the 95% upper control limit (national mean + 2 standard errors). <i>Quality Standard 16 (Complex device re-interventions):</i> The rate of re-interventions within a year of a first ICD or CRT implant should be below the 95% upper control limit (national mean + 2 standard errors).

QI Metric Description/Name	Re-interventions within the first year following pacemaker and complex device implants
Key references to support the metric	Internal reference (funnel plot to distinguish centres with statistically high/low re-intervention rates).
Numerator	All re-interventions in the year following an index procedure, at the implanting hospital or elsewhere.
Denominator	All first pacemaker and complex implants.
Trend	Re-intervention rates for complex devices have been broadly stable in the last three years. There is a slight upward trend in re-intervention rates for new pacemakers.
Variance	There is considerable variance in re-intervention rates, with high rates in a small number of centres, some of which have high procedure volumes.

Most re-interventions within a year of a first device implant reflect complications from the original procedure (though a proportion is due to other clinical factors such as a changed indication, or occasionally manufacturer advisories/recalls).

The national trends in device re-interventions are shown in Figure 3.7. The proportion of patients requiring a re-intervention in the first year following a first pacemaker implant has increased slightly from 4% to 4.5% during the five years to 2019/20.

The re-intervention rate following first ICD and CRT implants has remained steady at around 6% and was 5.7% in 2019/20.

Although the index procedures for the latest data were performed in the year prior to the pandemic, the relative stability of the re-intervention rates suggests that treatment for late complications (such as infection, which is generally serious) may not have been significantly affected by the pandemic.

Figure 3.7: One-year national mean re-intervention rates (%) following pacemaker and complex device implants in England and Wales, 2015/16 – 2019/20 [NACRM data]

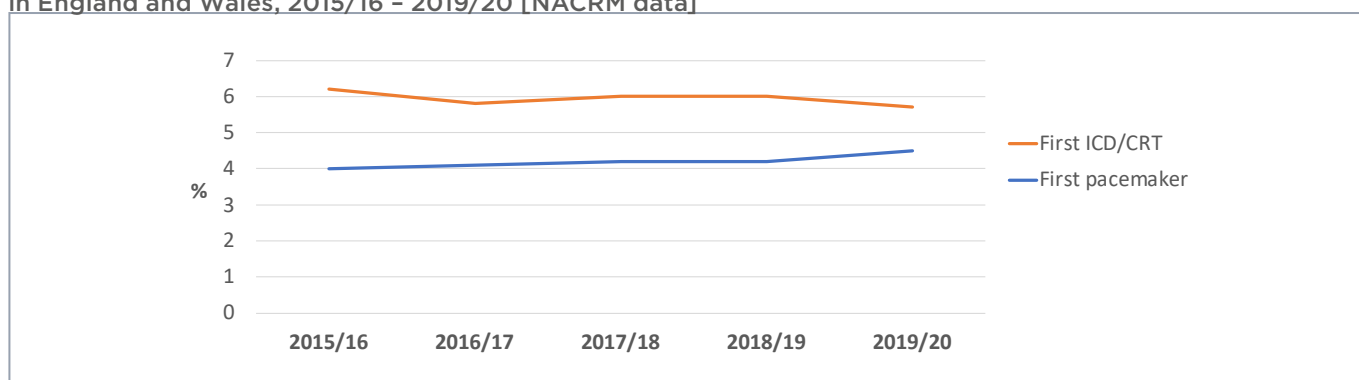
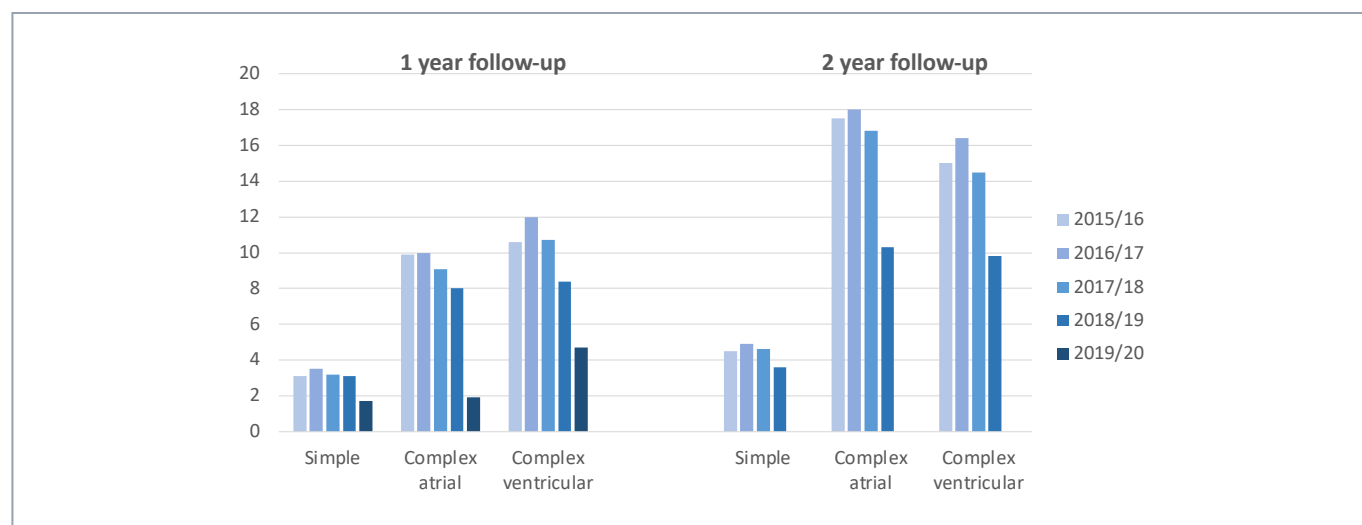


Figure 3.8: One and two-year national mean re-intervention rates (%) following catheter ablation procedures in England and Wales, 2015/16 – 2019/20 [NACRM data]



The picture for catheter ablation is very different. There was a substantial fall in re-interventions following ablations that were performed in the year prior to the pandemic. This was particularly marked for AF ablations which fell from 8% to 1.9%

[Figure 3.8]. This undoubtedly reflects the low availability of AF ablation during the first pandemic year, particularly as repeat procedures are often more complex.

4 | Future directions

The COVID-19 pandemic has continued to impact the delivery of cardiology services during 2021/22. Catheter ablation has been hit particularly hard, and at the time of writing (February 2022) few ablation centres have resumed normal levels of activity, let alone the increased levels that will be required to tackle long waiting lists.

As normal service resumes, it will be important to ensure that quality is not sacrificed and that new technologies continue to be adopted appropriately.

Next year's report will therefore continue to track how COVID-19 has impacted overall activity levels for devices and ablations, and the procedural experience necessary for specialists to maintain their skills, and for trainees to obtain them. We intend to resume full reporting of our eight usual quality measures.

It is intended that we will publish patient-reported outcome measures (PROMs), as these are probably the best tool to measure the effectiveness of treatments for symptoms (as is the case with catheter ablation for atrial fibrillation). However, the mandatory PROMs project is part of a national initiative which we await.

NICOR intends to move all the audit domains, including CRM, to 'live' reporting, so that hospitals can view their own performance in real time as data are submitted, and compare it to that of the rest of the country. This will hopefully reduce the long wait for annual reports, and will also drive better data submission as well as clinical quality.

Links to Hospital Episodes Statistics data may permit a more detailed analysis of complications, for example, by linking diagnostic codes for pneumothorax (ICD-10 Diagnosis Code J95.811 post-procedural pneumothorax) to procedures. We hope that we will be able to introduce such new metrics in future.

5 | Appendices

[Appendix 1: Device implant rates by patient geography \(interactive maps\) 2014/15 to 2020/21](#)

[Appendix 2: Ablation rates by patient geography \(interactive maps\) 2014/15 to 2020/21](#)

[Appendix 3: Individual hospital reports – devices](#)

[Appendix 4: Individual hospital reports – ablations](#)

[Appendix 5: Procedure volumes by hospital – devices](#)

[Appendix 6: Procedure volumes by hospital – ablations](#)

[Appendix 7: Procedure volumes by operator – devices](#)

[Appendix 8: Procedure volumes by operator – ablations](#)

[Appendix 9: 1-year re-intervention rates – devices 2019/20](#)

[Appendix 10: 1-year re-intervention rates – ablation 2019/20](#)

[Appendix 11: 2-year re-intervention rates – ablation 2018/19](#)

6 | References

- 1 Standards for implantation and follow-up of cardiac rhythm management devices in adults: British Heart Rhythm Society; 2018. <https://bhrrs.com/wp-content/uploads/2019/03/180122-sp-BHRS-Standards-Implantation-and-Follow-Up-of-CRM-Devices-in-Adults.pdf>
- 2 Standards for interventional electrophysiology study and catheter ablation in adults – February 2016. <https://bhrrs.com/wp-content/uploads/2019/03/160216-Standards-Interventional-electrophysiology-study.pdf>

7 | Thanks and acknowledgements

The following contributed to this report:

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This report is available online [here](#).