Cardiac Rhythm Management Audit Project Device Procedure Report

NICOR Report for Barts And The London
2018-19

This report is based on data extracted on **20 December, 2019**.
Period extracted: **1 April 2014 - 31 March 2019**.
Document prepared on **July 3, 2020**.
NICOR, Barts Health NHS Trust

Table of Contents

1 Data Quality/Completeness

Number of records in 2018-19 = **2799**
Number of records after cleaning and removal of duplicates = **2589**

1.1 Year on year change in total reported activity

This calculation is intended to highlight major changes in reported activity, especially due to missing submissions, according to the implanted system type (field 3.12, "maximum system capability").

Table 1: Number of implanted system

System	2017-18	2018-19	Percentage change	Definitions
Pacemaker	1039	1076	3.6	3.12 = AAIR,VVIR,DDDR
ICD	414	477	15.2	3.12 = ICD-VR,ICD-DR,ICD-SQ
CRT P+D	376	344	-8.5	3.12 = CRT-P, CRT-D

In accordance with ONS guidance, exact data have been suppressed where case numbers are less than 3 and approximate values provided- if applicable- when suppressed values could be derived, to ensure anonymity of patient data.
The analysis include all procedures where field 3.11 ("Intervention Category") = new system (first implant), generator change, upgrade, generator + lead, or downgrade.

1.2 Implanted system type validation against generator

This calculation is intended to highlight errors in the reported implanted system type. This is a key field used in most of the analyses. Field 3.12 ("maximum system capability") has been compared to the make and model of generator (fields 3.19 and 3.20) as entered. An apparently "invalid" entry may occasionally be correct if, for example a CRTD generator is implanted with no LV lead so the max system capability is ICD-DR. This table only summarises system type validation for patients with options 1 to 5 in field 3.11 ("Intervention Category").

Table 2: Validation of maximum system capability against generator

	n	%
Valid 3.12 (max system capability) matches 3.20 (generator model)	1858	97.8
Invalid 3.12 (max system capability) does not match 3.20 (generator model)	39	2.1
Invalid 3.20 (generator model) blank or uninterpretable	< 3	0.1
Invalid 3.12 (max system capability) blank or uninterpretable	0	0
Invalid 3.12 and 3.10 blank or uninterpretable	0	0
Total	< 1901	100

Exact data have been suppressed where case numbers are less than 3 and approximate values provided- if applicable- when suppressed values could be derived, to ensure anonymity of patient data.
Rarely, mismatches may be appropriate (e.g. a CRT-D generator with no LV lead), but most commonly field 3.12 is blank or incorrect, e.g. where VVIR is reported instead of ICD-VR. Field 3.20 is difficult to interpret due to multiple ways the generator is typed by centres.

1.3 Data completeness

The tables in this section show the percentages of records for a number of important fields. Please note that the red/amber/green boundaries defined below do not indicate that achieving >95% in each field (green) is considered adequate. For obviously important fields such as GMC, NHS No, Intervention category, Maximum system capability, generator model (where applicable), centres should aim for 100% completeness and the boundaries in future years will become more stringent to reflect this.

A "non-blank" entry does not imply that data are valid, let alone correct. GMC number entries that are not seven digits are regarded as invalid and are not counted. For this reason, the activity data for a centre or operator later in the report may be smaller than the expected figures in Tables 3-6. In future, validity checks on other fields (e.g. permissible values for NYHA class and QRSd) will be introduced.

>=95%
90-95%
<90%

Table 3: Data completeness of demographics

	NHS No.	1.04 Surname	1.05 Forename	1.06 DOB	1.07 Sex	1.08 Postcode
Demographics	99.5	100	100	100	100	100

Table 4: Data completeness of clinical details for patients requiring new implants and upgrades only

	2.02 Aetiology	2.03 Symptom	2.04 ECG indic.	2.05 Atr rhyt	2.06* NYHA	2.07* LV function	2.09* QRSd	2.10* QRS morph	2.08[a] ICD indic
Clinical Details	93.3	99.1	76.7	100	99.5	99.4	82.4	0	99.4

* only required for ICD and CRT procedures.
[a] only required for ICD procedures

Table 5: Data completeness of procedure details

	3.03* First Op GMC	3.09* Cons. GMC	3.11 Interven	3.12 System type	3.13[a] Fluoro	5.01 Acute comp.	3.19[b] Manuf	3.20[b] Model	3.21[b] Serial No
Procedure Details	100	100	100	100	100	99	99.8	99.9	99.9

* exclude monitor procedures
[a] Records in which fields 3.11 = 1,3,4
[b] Records in which fields 3.11= 1-5

2 Centre Activity

The table shows the reported interventions for the centre based on field 3.11 ("Intervention Category") and 3.12 "Max. system capability").

Table 6: Number of procedures by intervention category

	First Implant	Generator Change	Upgrade	Other	Undefined	Total
PPM (total)	872	166	10	104	0	1152
(including LCP)	(27)	(< 3)	(0)	(< 3)	(0)	(< 31)
ICD-TV	263	87	11	52	0	413
ICD-subcutaneous	87	6	0	15	0	108
CRT-P	60	15	30	8	0	113
CRT-D	115	61	53	47	0	276
Other/blank	0	< 3	0	6	0	< 9
ILR	-	-	-	-	-	519

Exact data have been suppressed where case numbers are less than 3 and approximate values provided- if applicable- when suppressed values could be derived, to ensure anonymity of patient data.
Pacemaker = AAIR, VVIR, DDDR, VDDR; ICD-TV = ICD-VR, ICD-DR, ICD-VDDR. LCP = leadless cardiac pacemakers, identified by 3.20 generator model. Records in which fields 3.11 or 3.12 are blank are not reported; for those in which 3.11 = 9 (monitor procedure only) are not broken down by intervention category.

3 Operator Activity

In this year's and future reports, doctors will be solely identified by the stated seven-digit GMC number, and the name will be identified via the GMC register. This is because of the common finding of multiple submitted spellings of names. For records in which the GMC number is not given or invalid, the operator will not be identified. A procedure has been ascribed to a doctor if his/her GMC number appears as first or second (scrubbed) operator, or as responsible consultant (fields 3.03, 3.06, or 3.09). It follows that each procedure may count toward the activity of up to three doctors, but if GMC numbers are missing, it may not be counted at all.

For doctors implanting bradycardia pacemakers only, BHRS standards (2017) recommends a minimum of 35 new implants a year; for those undertaking complex (ICD/CRT) procedures, a minimum of 30 of complex implants/upgrades is recommended, with a minimum of 60 total pacemaker/complex implants.

The table shows annual activity (as either first/second scrubbed operator, or responsible consultant) for each doctor uniquely identified by GMC registration No.

Table 7: Number of fitted devices

GMC No.	Name	Pacemaker (implant/upgrade)	Pacemaker (other)	ICD/CRT (implant/upgrade)	ICD/CRT (other)	Primary Specialty
7411313	Ahluwalia, Nikhil	14	4	11	4	Trainee
4743161	Ahsan, Syed	43	11	27	20	Cardiology
3479388	Amersey, Rajiv	< 3	0	0	< 3	Cardiology and General (internal) medicine
7568054	Ammar, Ahmed	27	16	19	10	
6052025	Ang, Richard	36	< 3	5	< 3	Cardiology
7475210	Baca, Marco	55	19	50	18	Cardiology
6149085	Behar, Jonathan	38	8	37	10	Cardiology
7085022	Cannie, Douglas	3	< 3	< 3	0	Trainee
7085027	Chehab, Omar	0	0	< 3	0	Trainee
7411758	Chen, Yang	5	< 3	5	3	Trainee
3477757	Chow, Wai	54	9	29	18	General (internal) medicine and Cardiology
7044424	Chung, Robin	10	0	5	0	Trainee
7476797	Creta, Antonio	75	14	51	21	Cardiology
6028048	Davies, Ben	0	< 3	0	0	Cardio-thoracic surgery
7293715	Dennis, Adam	21	5	13	8	Trainee
4206941	Dhinoja, Mehul	28	10	52	30	Cardiology
4009089	Earley, Mark	37	20	21	15	Cardiology
4544829	Ezzat, Vivienne	42	23	13	11	Cardiology
4437671	Farooqi, Fahad	30	14	48	11	Cardiology
6030169	Finlay, Malcolm	55	15	15	20	Cardiology
7016357	Graham, Adam	< 3	0	0	0	Trainee
6101833	Gupta, Prity	< 3	0	0	0	
6066030	Hayward, Carl	35	10	54	13	Cardiology
6031316	Hunter, Ross	43	13	33	20	Cardiology
7419406	Kalindjian, Jeremy	3	0	3	< 3	
6159437	Karim, Nabeela	18	4	18	3	Trainee
4635235	Khan, Fakhar	65	15	19	8	Cardiology
6130974	Knowles, Rebecca	15	12	11	3	Trainee
7158502	Koutsogeorgis, Ilias	18	4	11	< 3	Cardiology
3581218	Lambiase, David	45	5	26	17	Cardiology
7548733	Lim, Paul Chun Yih	0	< 3	0	0	
7036823	Lim, Wei-Yao	62	10	38	11	Trainee
7169774	Liu, Simiao	< 3	0	5	3	Trainee
3442476	Lowe, Martin	36	18	24	10	Cardiology
7278744	Maclean, Edward	31	7	12	17	Trainee

Table 7: Number of fitted devices *(continued)*

GMC No.	Name	Pacemaker (implant/upgrade)	Pacemaker (other)	ICD/CRT (implant/upgrade)	ICD/CRT (other)	Primary Specialty
7507866	McLellan, Alexander	< 3	< 3	3	0	
7304201	Mehta, Vishal	16	5	12	3	Trainee
6128001	Merghani, Ahmed	57	16	39	14	Cardiology
6160194	Millar, Lynne	20	12	10	13	Trainee
4125154	Mohiddin, Saidi	0	0	3	0	Cardiology
3303438	Moore, Philip	28	13	42	20	Cardiology
7016922	Morley-Smith, Andrew	12	0	9	4	Trainee
7348635	Murugan Sukumar, Shivasankar	< 3	< 3	< 3	0	
4766948	Muthumala, Amal	52	23	88	32	Cardiology
7126820	Papageorgiou, Nikolaos	48	11	43	15	Cardiology
7088314	Patel, Kush	0	< 3	0	0	Trainee
7620147	Prabhu, Sandeep	49	10	17	19	
7475782	Quadros Bebiano Da Providencia E Costa, Rui Andre	49	11	16	10	Cardiology
6114731	Raine, Daniel	< 3	0	0	0	Cardiology
4328445	Roberts, Neil	0	< 3	0	0	Cardiothoracic surgery
6048344	Rosengarten, James	4	< 3	3	< 3	Cardiology
1707236	Rowland, Edward	25	8	7	8	Cardiology
7090151	Saberwal, Bunny	14	0	< 3	0	Trainee
6143211	Saheecha, Saad	18	5	19	11	Cardiology
6132519	Sawhney, Vinit	38	15	28	14	Cardiology
3338881	Schilling, Richard	37	12	13	12	Cardiology
4209250	Segal, Oliver	39	10	9	4	Cardiology
3549634	Simon, Ron	17	< 3	5	0	Cardiology
7411712	Singhal, Arvind	20	< 3	11	< 3	Trainee
6129361	Sohaib, Syed	20	7	14	4	Cardiology
6130970	Specterman, Mark	12	8	5	4	Trainee
3549854	Sporton, Simon	29	6	20	7	General (internal) medicine and Cardiology
6146796	Srinivasan, Neil	24	10	31	12	Cardiology
3659029	Thomas, Martin	35	11	47	10	Cardiology
6054854	Till, Richard	4	0	3	< 3	Cardiology
2724331	Tsang, Victor	0	< 3	0	0	Cardiothoracic surgery
7304117	Tyebally, Sara	23	10	13	5	Trainee
2734118	Uppal, Rakesh	< 3	0	0	0	Cardiothoracic surgery

Table 7: Number of fitted devices *(continued)*

GMC No.	Name	Pacemaker (implant/upgrade)	Pacemaker (other)	ICD/CRT (implant/upgrade)	ICD/CRT (other)	Primary Specialty
6152029	Zemrak, Filip	50	15	51	20	Trainee

Exact data have been suppressed where case numbers are less than 3, to ensure anonymity of patient data.
"Pacemaker" and "ICD/CRT" are derived from field 3.12; "implant/upgrade" and "other" are from field 3.11

4 Centre compliance with national guidance

Centres' reported activity is evaluated against contemporary national guidance for bradycardia pacing and ICD implantation. NICE recommendations for CRT are complex and do not cover all indications, so CRT compliance will not be reported this year.

4.1 BHRS standard (2017) for centres implanting bradycardia pacemakers

For centres implanting bradycardia pacemakers, BHRS standards (2017) recommend an annual minimum of 80 new implants (100 for training centres). In the table below, amber is 10% below or above this threshold.

Table 8: Number of implanted bradycardia pacemakers

	n
Total new pacemakers procedures	872

Exact data have been suppressed where case numbers are less than 3, to ensure anonymity of patient data. Data are derived from fields 3.11 and 3.12 as in previous tables

4.2 BHRS standard (2017) for centres implanting ICD/CRT devices

For centres undertaking complex (ICD/CRT) device procedures, BHRS standards (2017) recommend an annual minimum of 60 (total implants + upgrades will be reported). In the table below, amber is 10% below or above this threshold.

Table 9: Number of implanted ICD/CRT devices

	n
Total new/upgrade ICD/CRT	619

Exact data have been suppressed where case numbers are less than 3, to ensure anonymity of patient data. Data are derived from fields 3.11 and 3.12 as in previous tables

4.3 NICE TA324: Dual chamber pacing in sinus node disease without AV block

Table 10: Pacing in sinus node disease

Eligible PPM Implants	No. meeting guidance	% meeting guidance	% not meeting guidance	% indeterminate
188	168	89.4	10.6	0

Exact data have been suppressed where case numbers are less than 3, to ensure anonymity of patient data.
[1] PPM Eligible: Records in which (i) "Intervention" indicates first implant and (ii) "Max system capability" indicates simple pacemaker and (iii) "Atrial rhythm" is not sustained atrial arrhythmia and (iv) "ECG indication" indicates sinus node disease.
[2] Meeting guidance: No. of records in previous column where recommended type has been implanted (3.12 = AAIR or DDDR)
[3] Not Meeting guidance: % of records where other system (i.e. VVIR/VDDR) has been implanted
[4] Indeterminate: % of records where compliance cannot be adjudicated due to missing/invalid data

4.4 NICE TA88: Dual chamber pacing in AV block

Table 11: Pacing in AV block

Eligible PPM Implants	No. meeting guidance	% meeting guidance	% not meeting guidance	% indeterminate
261	251	96.2	3.8	0

Exact data have been suppressed where case numbers are less than 3, to ensure anonymity of patient data.
[1] PPM Eligible: Records in which (i) "Intervention" indicates first implant and (ii) "Max system capability" indicates simple pacemaker and (iii) "Atrial rhythm" is not sustained atrial arrhythmia and (iv) "ECG indication" indicates AV block or conduction disease.
[2] Meeting guidance: No. of records in previous column where recommended type has been implanted (3.12 = DDDR or VDDR)
[3] Not Meeting guidance: % of records where other system (i.e. AAIR or VVIR) has been implanted
[4] Indeterminate: % of records where compliance cannot be adjudicated due to missing/invalid data

4.5 NICE TA314: ICD for primary prevention

Table 12: Primary prevention ICD implants

Eligible ICD Implants	No. meeting guidance	% meeting guidance	% not meeting guidance	% indeterminate
258	221	85.7	14	0.4

Exact data have been suppressed where case numbers are less than 3, to ensure anonymity of patient data.
[1] ICD Eligible: Records in which (i) "Intervention" indicates first implant and (ii) "Max system capability" indicates ICD-VR or ICD-DR or ICD-SQ and (iii) "ICD indication" indicates primary prevention.
[2] Meeting guidance: No. of records where either (i) "Aetiology" indicates cardiomyopathy other than DCM (HCM, ARVC, amyloid, sarcoid, other), channelopathy or structural congenital HD; or (ii) "LV function" is poor; and "NYHA status" is not IV.
[3] Not Meeting guidance: % of records where the above criteria are not met
[4] Indeterminate: % of records where compliance cannot be adjudicated due to missing/invalid data

4.6 NICE TA314: ICD for secondary prevention

Table 13: Secondary prevention ICD implants

Eligible ICD Implants	No. meeting guidance	% meeting guidance	% not meeting guidance	% indeterminate
88	73	83	17	0

Exact data have been suppressed where case numbers are less than 3, to ensure anonymity of patient data.
[1] ICD Eligible: Records in which (i) "Intervention" indicates first implant and (ii) "Max system capability" indicates ICD-VR or ICD-DR or ICD-SQ and (iii) "ICD indication" indicates secondary prevention.
[2] Meeting guidance: No. of records in previous column where procedures were either (i) "Symptom" includes cardiac arrest or aborted sudden death; or (ii) "Symptom" includes syncope and "ECG indication" includes nonsustained VT/VF or sustained VT/VF or torsade de pointes; or (iii) "ECG Indication" includes sustained VT/VF and LV Function is poor
[3] Not Meeting guidance: % of records where the above criteria are not met.
[4] Indeterminate: % of records where compliance cannot be adjudicated due to missing/invalid data

5 1-year all-cause re-intervention

As an index of late complications, we will be reporting all-cause re-intervention within 12 months of a first device implant. This will be ascribed to the original implanting centre, not the centre undertaking the re-intervention where the re-intervention was at a different centre. In this analysis, patients have been tracked by both NHS No. and Hospital/Hospital No. However, because under-reporting of NHS No. may lead to re-interventions being under-identified, the national report will only include centres with $\geqslant 90\%$ completeness of NHS No. in both years (2017-18 and 2018-19) used for analysis; the data deficiency will be highlighted for other centres.

It is understood that re-intervention does not always reflect a complication from the original procedure: it may be due to a manufacturers recall or a change in clinical indication, for example. In future reports, we will take these factors (if appropriately documented in later fields in the dataset) into account.

Table 14: Re-interventions within a year

	No. of first implants in 2017/18*	Re-interventions within 1 year†
Simple devices	860	61 (7.09%)
Complex devices	479	25 (5.22%)

Exact data have been suppressed where case numbers are less than 3 and approximate values provided- if applicable- when suppressed values could be derived, to ensure anonymity of patient data.

* No. of patients where "Intervention" = first implant and "Max system capability" indicates AAIR/VVIR/DDDR/VDDR (simple) or ICD-VR/ICD-DR/ICD-SQ/CRTP/CRTD (complex)

† Of these, no. of patients identified who have undergone a further intervention (other than 'monitor procedure only') within 365 days.

Of first implants performed in 2017-18, 0 patient(s) with simple devices and 1 patient(s) with complex devices had a reintervention within one year in a different hospital.