



CERTIFICATION  
(ELECTROPHYSIOLOGY)

**PRACTICAL LOGBOOK 2020/2021**

**Candidate Name:**

**Examination Registration No:**

# **INTRODUCTION TO LOGBOOK AND INSTRUCTIONS FOR USE**

**This logbook supersedes any previous versions and must be used if you have registered to sit the BHRS certification exam after December 2019.**

The logbook forms part of the requirements for BHRS certification. It is specifically aimed at practitioners with a particular interest in cardiac electrophysiology. A separate logbook exists for cardiac device implantation and management.

There is only one generic logbook covering cardiac electrophysiology. All sections of the logbook must be completed prospectively and submitted within 18 months of your exam date. Logbooks submitted after this date will not be marked unless prior written authorisation for an extension has been granted. **Logbook submission is electronic, please review the guidance on the BHRS website.**

All case studies must be completed in full and contain appropriate documentation of ECGs, electrograms and measurements.

You must obtain verification of the information and completion of the assessment sections from your supervisor, who must be experienced in electrophysiology and ideally hold BHRS certification (previously Heart Rhythm UK certificate of accreditation), EHRA certification or the IBHRE qualification (cardiac electrophysiology). Medical device company representatives will not be accepted as a supervisor.

## **How to apply for a logbook extension**

Only one extension will be awarded for exceptional circumstances. No extension will be awarded retrospectively.

A request for a logbook extension must be put in writing and sent to the British Heart Rhythm Society by email to [admin@bhers.com](mailto:admin@bhers.com). Or via letter the address as shown on the BHRS website.

## **SPECIFIC POINTS**

**Any patient identifiable information present within the logbook will result in an automatic fail.** Do not cover patient identifiable information with marker pen - with time this fades. Please pay particular attention to 12 lead ECGs

Each completed logbook will have a total of 5 recorded procedures (first or joint operator)

To gain a certificate of accreditation in electrophysiology it is expected that the candidate has a knowledge and understanding of the following:

Normal ECG and electrogram interpretation and recognition including baseline intervals:

- A-H (ms)
- H-V (ms)
- Coronary sinus activation patterns
- AV relationship
- VA conduction
- Decremental conduction

ECG and EGM interpretation of the following:

- AVNRT
- AVRT and pre-excitation
- Atrial flutter (isthmus dependent and atypical)
- Atrial fibrillation
- Atrial tachycardia
- VT (Normal heart and structural heart disease)

Care and routine maintenance of all equipment:

- Correct application and positioning of all consumables including ECG, defibrillation pads, ground pads, surface kits for navigational mapping systems
- Preparation of all equipment including navigational mapping systems and irrigated catheter systems
- Recording technique including recognition and reduction of artefact
- Recording system settings, use and adjustments
- Pacing system settings, use and adjustments
- Pacing protocols for induction and termination of arrhythmias
- Diagnostic and therapeutic electrode selection and rationale
- Therapy modality and rationale
- Application of anti-arrhythmic medication for diagnostic and therapeutic purposes
- Compatibility of navigation mapping systems, radiofrequency generators, irrigated catheter systems and diagnostic and therapeutic electrodes

The logbook is divided into 3 sections:

Section 1: Standard Electrophysiology

- Ablation of narrow complex tachycardia (SVT) and right sided flutter

Section 2: Complex Electrophysiology

- Ablation of complex atrial arrhythmias (atrial fibrillation and tachycardia)
- Ablation of ventricular tachycardia (normal heart and/or structural heart disease)

Section 3: Record of Procedures

Section 4: Assessment of competencies

- All candidates
- To be completed by supervisor

For doctors / allied health care professionals completing the log you need to take on the role as a cardiac physiologist for ALL sections of the logbook. However, some of the objectives, knowledge and skills are only applicable to doctors

<b><u>Summary of Information Required</u></b>	<b>Number</b>
<b><u>Section 1: Ablation of narrow complex tachycardia and right side flutter</u></b>	
AV node re-entrant tachycardia	1
Pre-excitation	1
Concealed accessory pathway	1
Isthmus dependent (typical) flutter	1
<b><u>Section 2: Ablation of complex atrial arrhythmias</u></b>	
Atrial fibrillation	1
Atypical flutter	1
Ventricular tachycardia in a normal heart	1
Ventricular tachycardia in Structural heart disease	1
<b><u>Section 3: Logbook of ablation cases</u></b>	
All arrhythmias	50 (Including at least 15 atrial fibrillation, 25 SVT and 4 VT)

# **BHRS CERTIFICATION: CARDIAC ELECTROPHYSIOLOGY LOG BOOK**

## **Candidate Details**

<b>Name:</b>	
<b>Address:</b>	
<b>Contact details: Telephone and/or e-mail</b>	

## **Hospitals in Which Work Undertaken**

<b>Time Period</b>	<b>Address</b>

## **Supervisor Details**

<b>Name:</b>	
<b>Professional title/position:</b>	
<b>Address</b>	
<b>Contact details: Telephone and/or e-mail</b>	

## **SPECIALTY TRAINING CURRICULUM FOR CARDIOLOGY TRAINEES (StRs) AUGUST 2010**

### **Core Heart Rhythm Training**

The necessary skills, attitudes and experience will come from a mixture of attendance at specialist arrhythmia clinics, experiential learning, formal training at study days and/or postgraduate courses. ***As part of a portfolio you should keep a logbook of cases and procedures observed and undertaken.***

### **Advanced Heart Rhythm Training**

#### **Numbers of Procedures**

There is a widespread perception that numbers of procedures undertaken provide a guide to development of competence but trainees learn at different rates and absolute numbers, however high, may not guarantee competence. Therefore, competence will be assessed using DOPS, (Direct Observation of Procedural Skills). However, to guide planning of training there are indicative minimum numbers of procedures likely to be needed to be completed before competence is achieved.

**Electrophysiology and Catheter Ablation:** 100 radiofrequency ablation procedures with 2 first operators; 20 ventricular tachycardia stimulation studies.

#### **Continuing Medical Education & Professional Development**

Trainees will be expected to have: CCAD-verified training logbooks for procedures and outcomes; attendance of local and national training days – at least 2 per year; certified attendance at BHRS / Heart Rhythm UK arrhythmia and device therapy training days each year; certified attendance at one international EP meeting a year during advanced EP training is highly desirable; certified attendance at live electrophysiology/device courses where appropriate.

## SECTION 1: ABLATION OF NARROW COMPLEX TACHYCARDIA

### Section 1

#### Objectives

- To understand the principles and practical aspects of the use of conventional intra-cardiac recording to define the mechanism and precise site of origin of clinical cardiac arrhythmias
- To master catheter ablation techniques for the treatment of arrhythmias

#### Knowledge

- Of endocardial activation patterns in AVNRT and AVRT
- Of endocardial signals suggestive of critical sites for arrhythmia maintenance e.g. very early atrial or ventricular signals in WPW syndrome and slow pathway potentials in AVNRT
- Of the use of intracardiac programmed stimulation to induce and terminate tachycardia, aid in the diagnosis of dual AV nodal pathways and define the mechanism of a junctional reciprocating tachycardia (AVNRT)
- Of the biophysics of RFA catheter ablation, and understanding of alternatives

#### Skills

- Manipulation and positioning of electrophysiological recording, pacing and ablation catheters safely and effectively
- Ability to recognise activation patterns characteristic of specific arrhythmias in “real time”
- Ability to successfully ablate cardiac arrhythmias based on interpretation of endocardial signals and pacing techniques
- Demonstrate endpoints of successful ablation
- To recognise and treat complications

**It is expected that the candidate should present in detail 3 cases. Out of the 3 cases 1 should be for a diagnosis of AV node re-entrant tachycardia (AVNRT), 1 for assessment of a patient with pre-excitation and 1 for AVRT via a concealed accessory pathway.** Physicians should be primary operator for at least 3 of these cases.

The following supportive ECGs and electrogram should be included for each case:

- Baseline 12 lead ECG
- Baseline intra-cardiac electrogram measurements
- Tachycardia 12 lead ECG
- Tachycardia intra-cardiac electrograms with measurements
- Tachycardia intra-cardiac electrograms at initiation

Also include where appropriate:

- AH jump if present
- Wenckebach pacing is PR>RR, Pacing manoeuvres (His synchronous VPB, Parahisian pacing, ventricular entrainment, apex/basal pacing etc.)
- Recordings during radiofrequency ablation (e.g. ablation electrograms, junctional tachycardia, loss of delta wave etc.)

## SECTION 1: AV NODE RE-ENTRANT TACHYCARDIA

<b>No. 1</b>	<b>Date</b> <b>Patient Initials</b>	<b>Pre-Procedure</b> <b>Diagnosis</b>						
<b>Clinical</b> <b>History/Symptoms</b>					<b>Anti-arrhythmic</b> <b>medications</b> <b>(specify)?</b>			
<b>Other Comments</b>								
<b>Baseline Investigations</b>		<b>Results</b>				<b>Results</b>		
<b>Baseline 12 lead ECG</b>	<b>PR</b>	<b>QRS</b>	<b>QTc</b>	<b>Axis</b>	<b>Holter monitor</b>			
<b>ECG at time of symptoms</b>					<b>Implantable loop recorder</b>			
<b>Echocardiogram</b>					<b>Other</b>			
<b><u>DIAGNOSTIC ELECTROPHYSIOLOGY STUDY</u></b>				<b>1<sup>st</sup> Operator Yes/No (Doctors only)</b>				
<b>Vascular</b> <b>Access</b>	<b>Access</b>	<b>Size (French)</b>	<b>Type</b>	<b>Diagnostic</b> <b>Catheters</b>	<b>Poles</b>	<b>Curve</b>	<b>Spacing</b>	
<b>Baseline Intervals</b>		<b>PR</b>	<b>QRS</b>	<b>QT</b>	<b>RR</b>	<b>AH</b>	<b>HV</b>	
<b>Retrograde curve</b>	<b>Yes/No</b>	<b>V-A Conduction</b>	<b>Yes/No</b>	<b>Decremental</b>	<b>Yes/No</b>	<b>V-A ERP</b>		
<b>Anterograde curve</b>	<b>Yes/No</b>	<b>Decremental</b>	<b>Yes/No</b>	<b>A-V node ERP</b>				
		<b>Evidence of dual A-V node physiology</b>	<b>Yes/No</b>	<b>Jump</b>	<b>Yes/No</b>	<b>Echo</b>	<b>Yes/No</b>	
<b>Tachycardia induced</b>	<b>Yes/No</b>	<b>Mechanism of induction</b>						
<b>Drugs used</b>	<b>Yes/No</b>	<b>Specify</b>						
<b>Tachycardia termination</b>								



<b>ABLATION</b>		<b>1<sup>st</sup> Operator Yes/No (Doctors only)</b>				
Mapping technique	Conventional		EnSite		Carto	
Ablation Type	Radio-frequency (RF)		Cooled RF		Cryo	
Ablation target						
Ablation catheter			Total ablation time (s)			
Ablation settings	Max. Temperature (°C)		Max. Power (W)		Time (s)	
How was end-point determined						
Outcome						
<b>POST ABLATION</b>						
Intervals	PR	QRS	QT	RR	AH	HV
Other complications						
Candidate comments						
Supervisor comments						
Supervisor's name	Signature			Job title		Date

## SECTION 1: PRE-EXCITATION

<b>No. 2</b>	<b>Date Patient Initials</b>	<b>Pre-Procedure Diagnosis</b>						
<b>Clinical History/Symptoms</b>					<b>Anti-arrhythmic medications (specify)?</b>			
<b>Other Comments</b>								
<b>Baseline Investigations</b>		<b>Results</b>				<b>Results</b>		
Baseline 12 lead ECG		PR	QRS	QTc	Axis	Holter monitor		
ECG at time of symptoms						Implantable loop recorder		
Echocardiogram						Other		
<b>DIAGNOSTIC ELECTROPHYSIOLOGY STUDY</b>					<b>1<sup>st</sup> Operator Yes/No (Doctors only)</b>			
<b>Vascular Access</b>	<b>Access</b>	<b>Size (French)</b>	<b>Type</b>	<b>Diagnostic Catheters</b>	<b>Poles</b>	<b>Curve</b>	<b>Spacing</b>	
<b>Baseline Intervals</b>		PR	QRS	QT	RR	AH	HV	
Retrograde curve	Yes/No	V-A Conduction	Yes/No	Decremental	Yes/No	V-A ERP		
Anterograde curve	Yes/No	Decremental	Yes/No	A-V node ERP				
Location of pathway				Refractory period of pathway				
Tachycardia induced	Yes/No	Mechanism of induction						
Drugs used	Yes/No	Specify						
Tachycardia termination								

<b><u>ABLATION</u></b>		<b>1<sup>st</sup> Operator Yes/No (Doctors only)</b>				
Mapping technique	Conventional		EnSite		Carto	
Ablation Type	Radio-frequency (RF)		Cooled RF		Cryo	
Ablation target						
Ablation catheter			Total ablation time (s)			
Ablation settings	Max. Temperature (°C)		Max. Power (W)		Time (s)	
How was end-point determined						
Outcome						
<b><u>POST ABLATION</u></b>						
Intervals	PR	QRS	QT	RR	AH	HV
Other complications						
Candidate comments						
Supervisor comments						
Supervisor's name	Signature			Job title		Date

## SECTION 1: AV RE-ENTRANT TACHYCARDIA (CONCEALED PATHWAY)

No. 3	Date Patient Initials	Pre-Procedure Diagnosis						
Clinical History/Symptoms					Anti-arrhythmic medications (specify)?			
Other Comments								
Baseline Investigations		Results				Results		
Baseline 12 lead ECG	PR	QRS	QTc	Axis	Holter monitor			
ECG at time of symptoms					Implantable loop recorder			
Echocardiogram					Other			
<b>DIAGNOSTIC ELECTROPHYSIOLOGY STUDY</b>				1 <sup>st</sup> Operator Yes/No ( <i>Doctors only</i> )				
Vascular Access	Access	Size (French)	Type	Diagnostic Catheters	Poles	Curve	Spacing	
Baseline Intervals		PR	QRS	QT	RR	AH	HV	
Retrograde curve	Yes/No	V-A Conduction	Yes/No	Decremental	Yes/No	V-A ERP		
Anterograde curve	Yes/No	Decremental	Yes/No	A-V node ERP				
Location of pathway				Refractory period of pathway				
Tachycardia induced	Yes/No	Mechanism of induction						
Drugs used	Yes/No	Specify						
Tachycardia termination								

<b>ABLATION</b>		<b>1<sup>st</sup> Operator Yes/No (Doctors only)</b>				
Mapping technique	Conventional		EnSite		Carto	
Ablation Type	Radio-frequency (RF)		Cooled RF		Cryo	
Ablation target						
Ablation catheter			Total ablation time (s)			
Ablation settings	Max. Temperature (°C)		Max. Power (W)		Time (s)	
How was end-point determined						
Outcome						
<b>POST ABLATION</b>						
Intervals	PR	QRS	QT	RR	AH	HV
Other complications						
Candidate comments						
Supervisor comments						
Supervisor's name	Signature			Job title		Date

## **SECTION 1: ABLATION OF (ISTHMUS DEPENDENT) FLUTTER**

### **Section 2**

(In addition to objectives, knowledge and skills from Section 1)

#### **Objectives**

- To understand the principles and practical aspects of the use of complex electroanatomic mapping tools (e.g. NavX/ESI, Carto) to define the mechanism and precise site of origin of clinical cardiac arrhythmias

#### **Knowledge**

- Of endocardial activation patterns in atrial flutter (isthmus dependent and atypical)
- Of the use of intracardiac programmed stimulation to demonstrate the presence of unidirectional or bidirectional isthmus block in patients presenting with atrial flutter

#### **Skills**

- Perform entrainment, concealed entrainment and pace-mapping to identify sites critical for arrhythmia maintenance
- Demonstrate endpoints of successful ablation
- Safely deploy, set-up, interpret and use complex mapping systems
- Use of these systems to demonstrate lines of block after catheter ablation lesions

It is expected that the candidate should present in detail 1 isthmus dependent atrial flutter where the patient was in flutter at the start of the case or flutter was induced. Physicians should be primary operator.

The following supportive documentation should be included for each case:

- Baseline 12 lead ECG
- Baseline intra-cardiac electrogram measurements
- Recordings during radiofrequency ablation (e.g. ablation electrograms)

Also include:

- Tachycardia 12 lead ECG
- Tachycardia intra-cardiac electrograms with measurements
- Entrainment from the cavotricuspid isthmus
- Evidence of bidirectional block

## SECTION 1: TYPICAL (ISTHMUS DEPENDENT) ATRIAL FLUTTER

<b>No. 1</b>	<b>Date</b>		<b>Patient Initials</b>					
<b>Clinical History/Symptoms</b>					<b>Anti-arrhythmic medications (specify)?</b>			
<b>Other Comments</b>								
<b>Baseline Investigations</b>		<b>Results</b>				<b>Results</b>		
<b>Baseline 12 lead ECG</b>	<b>PR</b>	<b>QRS</b>	<b>QTc</b>	<b>Axis</b>	<b>Holter monitor</b>			
<b>ECG at time of symptoms</b>					<b>Implantable loop recorder</b>			
<b>Echocardiogram</b>					<b>Other</b>			
<b><u>DIAGNOSTIC STUDY</u></b>					<b>1<sup>st</sup> Operator Yes/No (Doctors only)</b>			
<b>Vascular Access</b>	<b>Access</b>	<b>Size (French)</b>	<b>Type</b>		<b>Diagnostic Catheters</b>	<b>Poles</b>	<b>Curve</b>	<b>Spacing</b>
<b><u>TACHYCARDIA</u></b>								
<b>In tachycardia at start</b>	<b>Yes/No</b>	<b>Tachycardia induced</b>	<b>Yes/No</b>		<b>Mechanism of induction</b>			
<b>Entrainment</b>								
<b>Cycle Length</b>		<b>QRS</b>			<b>Ventricular rate at start</b>			
<b>Entrainment site</b>					<b>Pacing cycle length</b>		<b>Post pacing interval</b>	
<b>Drugs used</b>		<b>Specify</b>						
<b>Tachycardia termination</b>								

<b><u>ABLATION</u></b>		<b>1<sup>st</sup> Operator Yes/No (Doctors only)</b>				
Mapping technique	Conventional		EnSite		Carto	
Ablation Type	Radio-frequency (RF)		Cooled RF		Cryo	
Ablation target						
Ablation catheter			Total ablation time (s)			
Ablation settings	Max. Temperature (°C)		Max. Power (W)		Time (s)	
Evidence of bidirectional block						
<b><u>POST ABLATION</u></b>						
Intervals	PR	QRS	QT	RR	AH	HV
Any complications						
Candidate comments						
Supervisor comments						
Supervisor's name	Signature			Job title		Date



## SECTION 2: ABLATION OF COMPLEX ATRIAL ARRHYTHMIAS

### **Section 3**

(In addition to objectives, knowledge and skills from Sections 1 and 2)

#### **Objectives**

- To select appropriate patients for catheter ablation treatment for AF and complex atrial arrhythmias
- To have a comprehensive understanding of the anatomy and electrophysiology of the atria
- Use all available imaging and mapping systems to undertake safe and effective catheter ablation for these arrhythmias

#### **Knowledge**

- Of risks associated with ablation of AF/AT, patient factors that may increase these and methods for reducing these risks
- Of the anatomy of the left and right atria and how this may be distorted by disease process
- Of all tools used for ablation of AF/AT including trans-septal puncture equipment, ablation catheter, electrophysiology systems (basic and complex), lesion generator
- Of the anatomy, location of pulmonary veins and risks of cannulation
- Of the risks and complications associated with the energy source used and the location and nature of vulnerable regions in the atria and how to monitor and avoid complications of energy delivery
- Of the short, medium and long term complications of AF/AT management and their investigation and treatment

#### **Skills**

- Detailed working knowledge of cardiac and thoracic anatomy for AF/AT ablation
- Able to create left atrial geometry using anatomical mapping system
- Manipulation and positioning of electrophysiological recording, pacing and ablation catheters safely and effectively in the left atrium
- Able to monitor and investigate patients for possible complications arising from AF/AT ablation

**It is expected that the candidate presents in detail 1 ablation for atrial fibrillation and 1 ablation for a complex atrial tachycardia/atypical flutter using 3D Mapping.** Physicians should be primary operator for the AF case.

The following supportive documentation should be included for each case:

Baseline 12 lead ECG

Baseline intra-cardiac electrogram measurements

Also include where appropriate:

Pre and post pulmonary vein electrograms

3D left atrial map, evidence of manoeuvres to avoid phrenic nerve palsy

Electrograms for entrainment and restoration of sinus rhythm and pressure traces for trans-septal puncture

## SECTION 2: ATRIAL FIBRILLATION

	<b>Date</b> <b>Patient Initials</b>	<b>Paroxysmal/Persistent</b>						
<b>Clinical History/Symptoms</b>					<b>Anti-arrhythmic medications (specify)?</b>	<b>Anti-coagulation</b>		
<b>Other Comments</b>								
<b>Baseline Investigations</b>		<b>Results</b>				<b>Results</b>		
<b>Baseline 12 lead ECG</b>		<b>PR</b>	<b>QRS</b>	<b>QTc</b>	<b>Axis</b>	<b>Holter monitor</b>		
<b>ECG at time of symptoms</b>						<b>Implantable loop recorder</b>		
<b>Echocardiogram</b>						<b>Other</b>		
<b><u>DIAGNOSTIC ELECTROPHYSIOLOGY STUDY</u></b>		<b>1<sup>st</sup> Operator Yes/No (Doctors only)</b>						
<b>Vascular Access</b>	<b>Access</b>	<b>Size (French)</b>	<b>Type</b>		<b>Diagnostic Catheters</b>	<b>Poles</b>	<b>Curve</b>	<b>Spacing</b>
<b>Trans-septal</b>	<b>Yes/No</b>	<b>Sheath(s)</b>			<b>Needle</b>		<b>TOE guidance</b>	<b>Yes/No</b>
<b>Please include if performed</b>								
<b>Tachycardia induced</b>	<b>Yes/No</b>	<b>Mechanism of induction</b>						
<b>Drugs used</b>	<b>Yes/No</b>	<b>Specify</b>						
<b>Tachycardia termination</b>								

<b>ABLATION</b>		<b>1<sup>st</sup> Operator Yes/No (Doctors only)</b>				
Mapping technique	Conventional		EnSite		Carto	
Ablation technique	Wide area circumferential		Focal segmental		Other technology	
Other technology	Phased RF (PVAC)		Cryo (Arctic Front)		Laser (CardioFocus)	
Other ablation target	Lines		CFAE		Autonomic ganglia	
Ablation catheter		Total ablation time (s)				
Ablation settings	Location	Max/min Temperature (°C)	Max. Power (W)	Time (s)		
Evidence of PV isolation						
<b>POST ABLATION</b>						
Intervals (if checked)	PR	QRS	QT	RR	AH	HV
Other complications						
Candidate comments						
Supervisor comments						
Supervisor's name	Signature			Job title		Date

## SECTION 2: COMPLEX ATRIAL ARRHYTHMIA

	Date Patient Initials	Paroxysmal/Persistent						
Clinical History/Symptoms				Anti-arrhythmic medications (specify)?			Anti-coagulation	
Other Comments								
Baseline Investigations		Results			Results			
Baseline 12 lead ECG		PR	QRS	QTc	Axis	Holter monitor		
ECG at time of symptoms					Implantable loop recorder			
Echocardiogram					Other			
<b><u>DIAGNOSTIC ELECTROPHYSIOLOGY STUDY</u></b>				1 <sup>st</sup> Operator Yes/No ( <i>Doctors only</i> )				
Vascular Access	Access	Size (French)	Type	Diagnostic Catheters	Poles	Curve	Spacing	
Trans-septal	Yes/No	Sheath(s)		Needle		TOE guidance	Yes/No	
<b><u>TACHYCARDIA</u></b>								
In tachycardia at start	Yes/No	Tachycardia induced	Yes/No	Mechanism of induction				
Entrainment								
Cycle Length		QRS		Ventricular rate at start				
Entrainment site				Pacing cycle length		Post pacing interval		
Drugs used		Specify						
Tachycardia termination								

<u>MAPPING AND ABLATION</u>		1 <sup>st</sup> Operator Yes/No ( <i>Doctors only</i> )			
3d Mapping system used		Activation map	Yes/No	Voltage Map	Yes/No
Ablation target					
Ablation catheter		Total ablation time (s)			
Ablation settings	Max. Temperature (°C)	Max. Power (W)		Time (s)	
Outcome					
<u>POST ABLATION</u>					
Intervals (if checked)	PR	QRS	QT	RR	AH HV
Other complications					
Candidate comments					
Supervisor comments					
Supervisor's name	Signature		Job title		Date

## SECTION 2: ABLATION OF VENTRICULAR TACHYCARDIA

### Section 4

(In addition to objectives, knowledge and skills from Sections 1 2 and 3)

#### **Knowledge**

- Of techniques for induction and termination of VT
- Of the indications and limitations of VT ablation
- Of endocardial signals suggestive of critical sites for arrhythmia maintenance such as diastolic potentials in VT
- Of mapping techniques used for scar related VT
- Of the principles of substrate mapping versus VT mapping
- Of potential complications and risks of VT ablation

#### **Skills**

- Be able to select appropriate patients for VT ablation
- Be able to consent a patient in a balanced and informed way about success rate, risks and benefits of VT ablation
- Perform entrainment, concealed entrainment and pace-mapping to identify sites critical for arrhythmia maintenance
- Demonstrate ability to identify electrical wavefronts during re-entrant arrhythmias and electrically silent areas in patients with VT or complex congenital heart disease
- Demonstrate catheter manipulation skills necessary to perform VT ablation
- Competence at ICD troubleshooting and programming in patients with VT needing ablation

**It is expected that the candidate is involved in the ablation of at least 4 ventricular tachycardias, 2 of which should be presented in detail.** 1 should be for a VT in patients with normal hearts (e.g. outflow tract tachycardia, including ectopics and fascicular tachycardia, and 1 for VT in patients with structural heart disease (e.g. Adult congenital heart disease, cardiomyopathy or ischaemic heart disease)

The following supportive documentation should be included for each case:

Baseline 12 lead ECG

Baseline intra-cardiac electrogram measurements

Tachycardia 12 lead ECG

Tachycardia intra-cardiac electrograms with measurements

Recordings during radiofrequency ablation (e.g. site of early activation, diastolic potentials etc.)

Also include where appropriate:

3D activation maps, Entrainment electrograms

## SECTION 2: VENTRICULAR TACHYCARDIA (NORMAL HEART)

	Date Patient Initials	Pre-procedure diagnosis							
Clinical History/Symptoms					Anti-arrhythmic medications (specify)?			Anti-coagulation	
Other Comments									
Baseline Investigations		Results				Results			
Baseline 12 lead ECG		PR	QRS	QTc	Axis	Holter monitor			
ECG at time of symptoms						Implantable loop recorder			
Echocardiogram						Other			
<b><u>DIAGNOSTIC ELECTROPHYSIOLOGY STUDY</u></b>					1 <sup>st</sup> Operator Yes/No ( <i>Doctors only</i> )				
Vascular Access	Access	Size (French)	Type	Diagnostic Catheters	Poles	Curve	Spacing		
Trans-septal	Yes/No	Sheath(s)		Needle		TOE guidance	Yes/No		
Baseline Intervals		PR	QRS	QT	RR	AH	HV		
VT stim	Yes/No	Protocol		Site(s)		Shortest coupling intervals			
Drugs used	Yes/No	Specify		Valsalva	Yes/No	Other provocation			
VT induced	Yes/No	VT cycle length		QRS morphology		QRS axis			
Tachycardia termination				ATP	Yes/No	Cardioversion	Yes/No		

<b><u>ABLATION</u></b>		<b>1<sup>st</sup> Operator Yes/No (Doctors only)</b>				
<b>Mapping technique</b>						
<b>Ablation technique</b>	<b>Activation mapping</b>		<b>Pace mapping</b>		<b>Other</b>	
<b>Site of ablation</b>						
<b>Ablation catheter</b>			<b>Total ablation time (s)</b>			
<b>Ablation settings</b>	<b>Max. Temperature (°C)</b>		<b>Max. Power (W)</b>		<b>Time (s)</b>	
<b>Outcome</b>						
<b><u>POST ABLATION</u></b>						
<b>Intervals (if checked)</b>	<b>PR</b>	<b>QRS</b>	<b>QT</b>	<b>RR</b>	<b>AH</b>	<b>HV</b>
<b>Other complications</b>						
<b>Candidate comments</b>						
<b>Supervisor comments</b>						
<b>Supervisor's name</b>	<b>Signature</b>			<b>Job title</b>		<b>Date</b>



## SECTION 2: VENTRICULAR TACHYCARDIA (STRUCTURAL HEART DISEASE)

No. 1	Date Patient Initials	Pre-procedure diagnosis					
Clinical History/Symptoms					Anti-arrhythmic medications (specify)?		Anti-coagulation
Other Comments						ICD in-situ	Yes/No
Baseline Investigations		Results				Results	
Baseline 12 lead ECG	PR	QRS	QTc	Axis	Holter monitor		
ECG at time of symptoms					Implantable loop recorder		
Echocardiogram					Coronary angiogram		
MRI/CT					Other		
<b>DIAGNOSTIC ELECTROPHYSIOLOGY STUDY</b>		<b>1<sup>st</sup> Operator Yes/No (Doctors only)</b>					
Vascular Access	Access	Size (French)	Type	Diagnostic Catheters	Poles	Curve	Spacing
Trans-septal	Yes/No	Sheath(s)		Needle		TOE guidance	Yes/No
Epicardial access	Yes/No	Sheath(s)		RV puncture	Yes/No		
Baseline Intervals		PR	QRS	QT	RR	AH	HV
VT stim	Yes/No	Protocol		Site(s)		Shortest coupling intervals	
Drugs used	Yes/No	Specify		Valsalva	Yes/No	Other provocation	
VT induced	Yes/No	VT cycle length		QRS morphology		QRS axis	
Tachycardia termination					Cardioversions (number)		

<b>ABLATION</b>		<b>1<sup>st</sup> Operator Yes/No (Doctors only)</b>					
<b>Mapping technique</b>							
<b>Ablation technique</b>	<b>Activation mapping</b>		<b>Substrate mapping</b>		<b>Pace mapping</b>		
<b>Entrainment</b>	<b>Yes/No</b>		<b>Concealed</b>	<b>Yes/No</b>			
<b>Sites of ablation</b>							
<b>Ablation catheter</b>			<b>Total ablation time (s)</b>				
<b>Ablation settings</b>	<b>Max. Temperature (°C)</b>		<b>Max. Power (W)</b>		<b>Time (s)</b>		
<b>Outcome</b>							
<b>POST ABLATION</b>							
<b>Intervals (if checked)</b>	<b>PR</b>	<b>QRS</b>	<b>QT</b>	<b>RR</b>	<b>AH</b>	<b>HV</b>	
<b>Other complications</b>							
<b>Candidate comments</b>							
<b>Supervisor comments</b>							
<b>Supervisor's name</b>	<b>Signature</b>			<b>Job title</b>			<b>Date</b>

## SECTION 3: RECORD OF CASES

### **Section 3**

(In addition to objectives, knowledge and skills from Sections 1 and 2)

#### **Objectives**

- To have a broad experience of a wide range of electrophysiological procedures

#### **Knowledge**

- As for section 1 and 2

#### **Skills**

- As for section 1 and 2

**It is expected that the candidate present details of 50 electrophysiological cases they have performed. Physicians should be the first operator in at least 40. Candidates should include the cases presented in detail in sections 1 and 2.**

**Candidates are expected to include at least:**

- 20 Supraventricular tachycardia
- 5 Cavotricuspid isthmus dependent flutter
- 10 Atrial fibrillation
- 5 Atypical flutter or focal atrial arrhythmia, including atypical flutters following atrial fibrillation ablation
- 4 Ventricular tachycardias

The following details should be included for each case

Date of procedure

Final diagnosis

Was ablation performed

Outcome

Complications

1<sup>st</sup> operator (Doctors only)

### SECTION 3: RECORD OF CASES

	Date	Indication for ablation/ symptoms	Diagnosis	Was ablation performed	Outcome	Complications	1 <sup>st</sup> Operator (doctors only)
1							
2							
3							
4							
5							

Supervisor's name	Signature	Job title	Date
-------------------	-----------	-----------	------

### SECTION 3: RECORD OF CASES

	Date	Indication for ablation/ symptoms	Diagnosis	Was ablation performed	Outcome	Complications	1 <sup>st</sup> Operator (doctors only)
6							
7							
8							
9							
10							

Supervisor's name	Signature	Job title	Date
-------------------	-----------	-----------	------

### SECTION 3: RECORD OF CASES

	Date	Indication for ablation/ symptoms	Diagnosis	Was ablation performed	Outcome	Complications	1 <sup>st</sup> Operator (doctors only)
11							
12							
13							
14							
15							

Supervisor's name	Signature	Job title	Date
-------------------	-----------	-----------	------

### SECTION 3: RECORD OF CASES

	Date	Indication for ablation/ symptoms	Diagnosis	Was ablation performed	Outcome	Complications	1 <sup>st</sup> Operator (doctors only)
16							
17							
18							
19							
20							

Supervisor's name	Signature	Job title	Date
-------------------	-----------	-----------	------

### SECTION 3: RECORD OF CASES

	<b>Date</b>	<b>Indication for ablation/ symptoms</b>	<b>Diagnosis</b>	<b>Was ablation performed</b>	<b>Outcome</b>	<b>Complications</b>	<b>1<sup>st</sup> Operator (doctors only)</b>
21							
22							
23							
24							
25							

<b>Supervisor's name</b>	<b>Signature</b>	<b>Job title</b>	<b>Date</b>
--------------------------	------------------	------------------	-------------



### SECTION 3: RECORD OF CASES

	<b>Date</b>	<b>Indication for ablation/ symptoms</b>	<b>Diagnosis</b>	<b>Was ablation performed</b>	<b>Outcome</b>	<b>Complications</b>	<b>1<sup>st</sup> Operator (doctors only)</b>
26							
27							
28							
29							
30							

<b>Supervisor's name</b>	<b>Signature</b>	<b>Job title</b>	<b>Date</b>
--------------------------	------------------	------------------	-------------

### SECTION 3: RECORD OF CASES

	Date	Indication for ablation/ symptoms	Diagnosis	Was ablation performed	Outcome	Complications	1 <sup>st</sup> Operator (doctors only)
31							
32							
33							
34							
35							

Supervisor's name	Signature	Job title	Date
-------------------	-----------	-----------	------

### SECTION 3: RECORD OF CASES

	Date	Indication for ablation/ symptoms	Diagnosis	Was ablation performed	Outcome	Complications	1 <sup>st</sup> Operator (doctors only)
36							
37							
38							
39							
40							

Supervisor's name	Signature	Job title	Date
-------------------	-----------	-----------	------

### SECTION 3: RECORD OF CASES

	Date	Indication for ablation/ symptoms	Diagnosis	Was ablation performed	Outcome	Complications	1 <sup>st</sup> Operator (doctors only)
41							
42							
43							
44							
45							

Supervisor's name	Signature	Job title	Date
-------------------	-----------	-----------	------

### SECTION 3: RECORD OF CASES

	Date	Indication for ablation/ symptoms	Diagnosis	Was ablation performed	Outcome	Complications	1 <sup>st</sup> Operator (doctors only)
46							
47							
48							
49							
50							

Supervisor's name	Signature	Job title	Date
-------------------	-----------	-----------	------

## SECTION 4 ASSESSMENT OF COMPETENCIES (all candidates)

### ELECTROPHYSIOLOGY SKILLS ASSESSMENT: STANDARD ABLATION

To be completed by supervising consultant

Electrophysiology Skill	Sections 1 and 2			
	AVNRT	AVRT	Typical Flutter	Atypical Flutter
Check environment, including location of emergency equipment				
Select a study protocol appropriate to the procedure on the haemodynamic monitoring system				
Prepare all consumables and select EP electrodes appropriate to the case				
Ensure compatibility between electrodes, RF generators, cool flow pumps and navigational mapping systems				
Set up navigational mapping systems i.e. Velocity, Carto etc. according to the procedure type				
Connect all EP electrodes to the haemodynamic monitoring systems via the junction boxes				
Identify, record and measure the baseline rhythm i.e. AH, HV intervals and cycle length				
Record and identify subsequent rhythms				
Safely perform basic pacing protocols and threshold checks				
Monitor the patients vital signs throughout the procedure				
Adjust parameters as necessary, for example, sweep speed, gains, electrogram position, pressure display, and electrograms displayed				
<b>Date</b>				
<b>Supervisor's name:</b>	<b>Signature:</b>		<b>Job title:</b>	

For each field, you need to mark the trainee: 1 - 3 Unsatisfactory; 4 - 6 Satisfactory; 7 - 9 Above expected; 0 – Not applicable  
 You must justify each score of 1 – 3 with at least one explanation / example

## ELECTROPHYSIOLOGY SKILLS ASSESSMENT: COMPLEX ABLATION

	Sections 3 and 4			
Electrophysiology Skill	Atrial Fibrillation	Atrial Tachycardia	VT (normal heart)	VT (structural heart disease)
Check environment, including location of emergency equipment				
Select a study protocol appropriate to the procedure on the haemodynamic monitoring system				
Prepare all consumables and select EP electrodes appropriate to the case				
Ensure compatibility between electrodes, RF generators, cool flow pumps and navigational mapping systems				
Set up navigational mapping systems i.e. Velocity, Carto etc. according to the procedure type				
Connect all EP electrodes to the haemodynamic monitoring systems via the junction boxes				
Identify, record and measure the baseline rhythm i.e. AH, HV intervals and cycle length				
Record and identify subsequent rhythms				
Safely perform basic pacing protocols and threshold checks				
Monitor the patients vital signs throughout the procedure				
Adjust parameters as necessary, for example, sweep speed, gains, electrogram position, pressure display, and electrograms displayed				
<b>Date</b>				
<b>Supervisor's name:</b>	<b>Signature:</b>		<b>Job title:</b>	

For each field, you need to mark the trainee: 1 - 3 Unsatisfactory; 4 - 6 Satisfactory; 7 - 9 Above expected; 0 – Not applicable  
 You must justify each score of 1 – 3 with at least one explanation / example