SPECIALTY TRAINING CURRICULUM

FOR

CARDIOLOGY

AUGUST 2010

(Amendments 2016)

Approved 6 September 2016

Joint Royal Colleges of Physicians Training Board

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1 Introduction

The specialty of Cardiology developed as a sub-specialisation for physicians who were predominantly concerned with the care of patients with cardiovascular disorders hence the concepts of Cardiology and Cardiovascular Medicine can be used interchangeably. Care of patients with cardiovascular disorders embraces a wide range of clinical activities and cardiologists need a broad view of the cardiovascular needs of individual patients and the communities in which they live including an understanding of any prevailing health inequalities. This requires knowledge of not only the diagnostic and therapeutic modalities available, but also an appreciation of the importance of the epidemiology and potential for prevention of cardiovascular disease.

Although Cardiology is generally stereotyped as a highly practical skill based medical specialty, with invasive and interventional skills as high-profile components of the workload, competence in other areas of practice such as cardiovascular clinical pharmacology and non-invasive imaging are equally important. Indeed the expert clinical management of patients with heart failure or cardiomyopathy or atrial fibrillation is as rewarding as the quasi-surgical skills demanded of the coronary or electrophysiological interventionist.

Cardiologists need the ability to work as leaders of, or within, teams and systems involving other healthcare professionals in order to effectively provide optimal patient care. Cardiologists generally work as hospital based specialists and need to integrate their work with not only community based primary care colleagues but also other hospital based physicians, e.g. diabetologists or nephrologists, as well as working closely with cardiothoracic surgeons and anaesthetists and the imaging specialties, e.g. radiology and nuclear medicine. Cardiologists may work some of their time as part of acute medical admissions teams looking after emergency medical admissions admitted to acute medicine units. Sub-specialisation within Cardiovascular medicine has become commonplace with individuals focussing the development of their expertise in areas such as cardiac imaging, coronary intervention, heart rhythm disorders, adult congenital heart disease or heart failure.

Cardiovascular medicine enjoys an unrivalled evidence base of effective preventive, diagnostic and therapeutic options. Cardiologists have a wide variety of opportunities for research and the training is designed to facilitate opportunities for academic careers.

2 Rationale

2.1 Purpose of the Curriculum

The purpose of this curriculum is to define the process of training and the competencies needing to be acquired for the award of a certificate of completion of training (CCT) in Cardiology.

Cardiology specialist training will begin following completion of 2 years of training in general medicine (core medical training – CMT or acute care common stem – ACCS) and will normally last for 5 years.

The training is designed to develop both the generic and specialty-specific attributes necessary to practise independently as a consultant cardiologist. The aim is to train individuals to provide the highest standard of service to patients with cardiovascular

2years plus 5 years in Cardiology. Bear in mind that prior to these 7 years you need another 2 years of foundation. So in order to become Cardiologys you need: Medical Scjhool 5 years plus post graduated training 9 years

disorders. This includes the development of positive attitudes towards lifelong learning and the ability to adapt to future technological advances and the changing expectations of society. In this curriculum, the concepts of Cardiovascular Medicine and Cardiology are used interchangeably, reflecting on the one hand, the broad spectrum of patients encountered by the specialty, and on the other hand, the commonly used terminology.

The Cardiovascular medicine curriculum contains the common competencies which apply to all physicianly specialities. Development of these common competencies runs through from core medical training to CCT and is acquired at all stages of specialty training. When planning Cardiovascular medicine specialty programmes, deaneries and trainers will ensure that all the specialty specific and common competencies can be acquired and assessed.

The Cardiovascular medicine curriculum has been mapped to the 4 domains of Good Medical Practice in order to clearly define the skills and behaviours which trainees require to communicate better with patients, carers and their families.

The curriculum covers training for all four nations of the UK.

2.2 Development

This curriculum was developed by the Specialty Advisory Committee (SAC) for Cardiology under the direction of the Joint Royal Colleges of Physicians Training Board (JRCPTB). It replaces the previous version of the curriculum dated May 2007, with changes to ensure the curriculum meets GMC's standards for Curricula and Assessment and to incorporate revisions to the content and delivery of the training programme. Major changes from the previous curriculum include the incorporation of common physicianly, leadership and health inequalities competencies.

The Cardiology SAC tasked a sub-group to review the 2007 curriculum in conjunction with the JRCPTB in preparation for presentation to GMC (project 2010). The group had representation from lay members, trainees, training programme directors, postgraduate deaneries, BCS (British Cardiovascular Society) and affiliated groups of the BCS e.g. BSE (British Society of Echocardiography). The group considered feedback received by the SAC on the 2007 curriculum from training programme directors at twice yearly meetings with the SAC, feedback from trainees at the annual conference and exhibition of the BCS where the SAC hold an open forum with trainees and also via the BJCA (British Junior Cardiac Association) representatives on the SAC. Comments received included new content areas that needed to be added to the syllabus; advice on the delivery of training in specific areas of the curriculum; areas of the curriculum that needed to be clarified. Several drafts were reviewed by the group members, who were able to consult with affiliated groups, trainers, trainees and patient groups, before returning to the JRCPTB curriculum sub-group for final review and collation. The curriculum was amended in 2014 primarily to reflect the development of advanced training in inherited cardiovascular conditions. The amendments were approved by the Cardiology SAC. Further revisions were made in 2016 to update the temporary pacing requirement and echocardiography curriculum delivery tool.

2.3 Training Pathway

Specialty training in cardiology consists of core and higher speciality training. Core training provides physicians with: the ability to investigate, treat and diagnose patients with acute and chronic medical symptoms; and with high quality review skills for managing inpatients and outpatients. Higher speciality training then builds on

these core skills to develop the specific competencies required to practise independently as a consultant cardiologist.

Core training may be completed in either a Core Medical Training (CMT) or Acute Care Common Stem (ACCS) programme. The full curriculum for specialty training in cardiology therefore consists of the curriculum for either CMT or ACCS plus this specialty training curriculum for cardiology.

Full MRCP(UK) must be obtained for ST3 entry and a period of experience in cardiovascular medicine is considered desirable during core training but is not essential.

The approved curriculum for CMT is a sub-set of the Curriculum for General (Internal) Medicine (GIM). A “Framework for CMT” has been created for the convenience of trainees, supervisors, tutors and programme directors. The body of the Framework document has been extracted from the approved curriculum but only includes the syllabus requirements for CMT and not the further requirements for acquiring a CCT in GIM.

Diagrammatic Representation of Curricula:

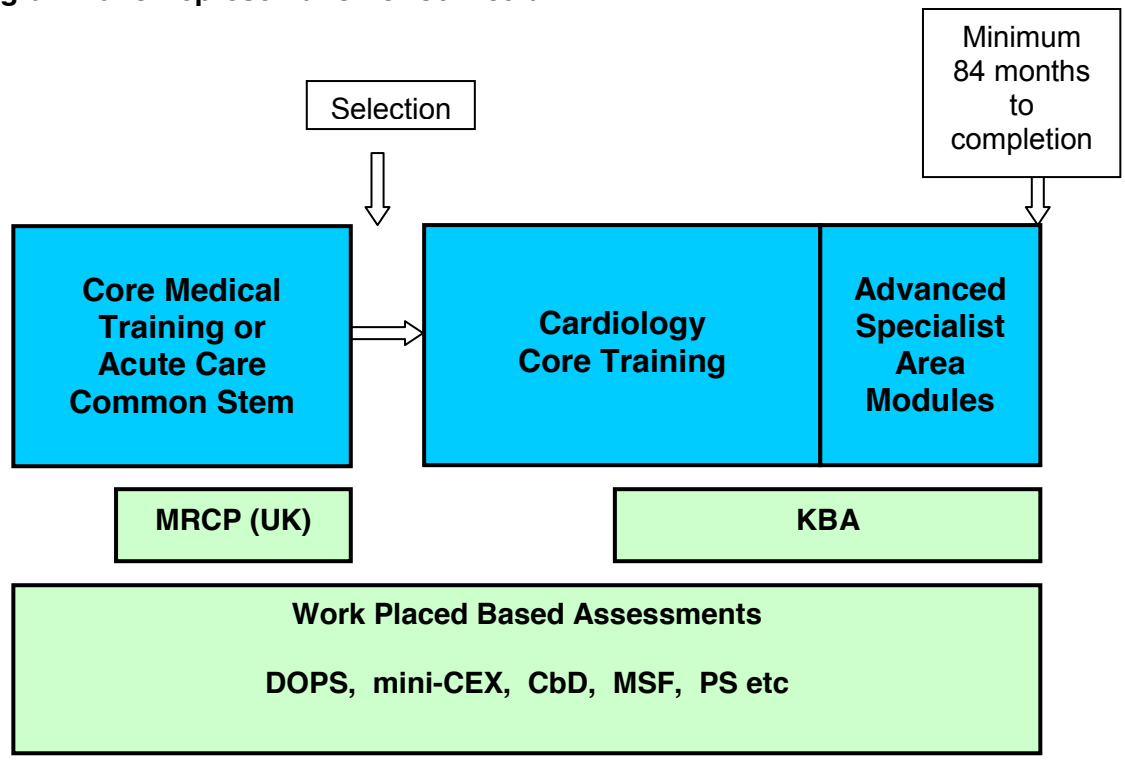


Diagram 1.1 - the training pathway for CCT in Cardiology
Trainees will be recommended to GMC for CCT by JRCPTB upon successful achievement of competencies.

Συνολικά τουλάχιστον 7 χρόνια: Εκπαίδευση κορμού 2 χρόνια, Εκπαίδευση στην Καρδιολογία 5 χρόνια (Γενική Καρδιολογία 3 χρόνια, Υποειδικότητες 2 χρόνια [ευέλικτα])
Η έρευνα γίνεται με διακοπή της κλινικής εκπαίδευσης και δεν λογίζεται ως χρόνος ειδικότητας. Δεν είναι υποχρεωτική αλλά στην πράξη είναι για να βρείς δουλειά. Διαρκεί κατά μέσον 2 χρόνια.
Επίσης ενθάρρυνση για παραπέρα εκπαίδευση 1 τουλάχιστον χρόνο σε υποειδικότητες που δεν υπάρχουν στο εκπαιδευτικό κέντρο.

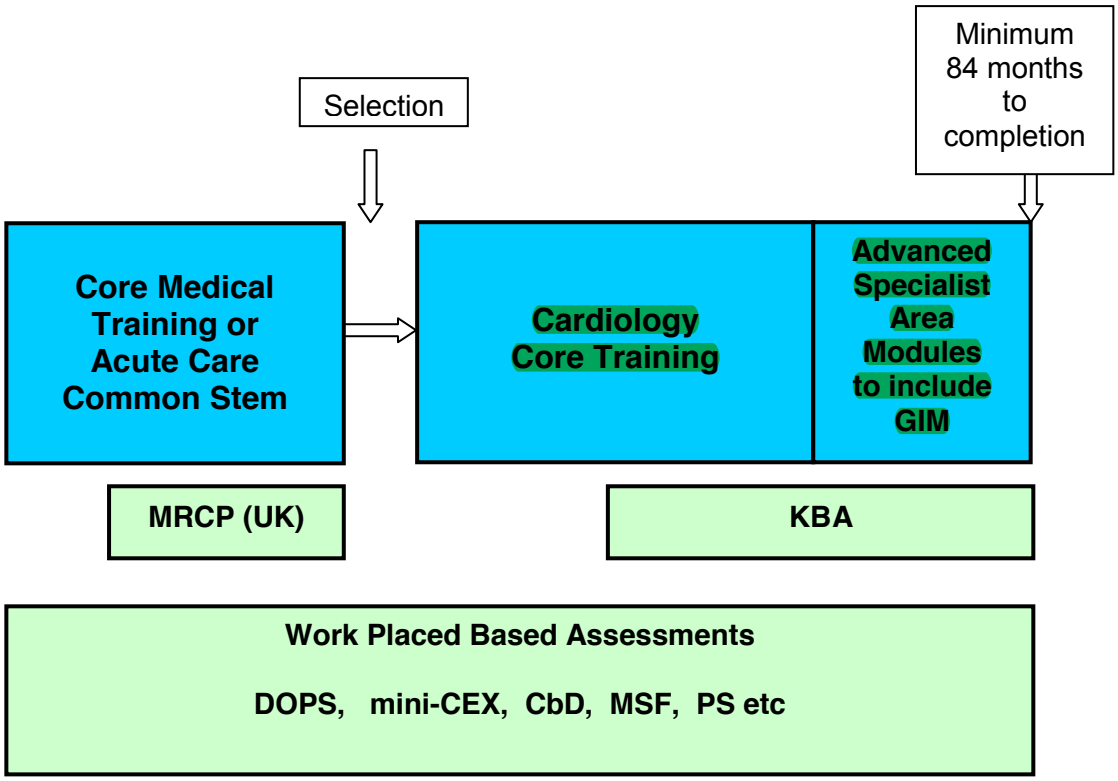


Diagram 1.2 the training pathway for Dual CCT Cardiology with GIM
Trainees will be recommended to GMC for a CCT in both Cardiology and GIM by JRCPTB upon successful achievement of competencies.

Key components of the cardiology training programme are:

- Core training in cardiology – these competencies are to be achieved by all cardiology specialist trainees in the first phase of training, usually first 3 years (see clinical syllabus and see 4.1 the training programme for details).
- Advanced specialist area modules – trainees will undertake a selection of these advanced specialist area modules in their last phase of training; usually last 2 years (see clinical syllabus and 4.1 the training programme for details).
- Research competencies – these are an essential component of training. Most trainees will also undertake a period of OOPR (out of programme research) see 4.4 for details.
- Concomitant training in General (Internal) Medicine and acquisition of the common competencies - (see clinical syllabus and 4.1 the training programme for details).
- Compatibility with a career in academic cardiology – see 4.5 for details.
- Compatibility with out of programme experience or training (OOPE or OOPT) - OOPE is encouraged when it enhances the educational experience already available in the curriculum, OOPT is for training in specialised areas not available in all Deaneries

2.4 Enrolment with JRCPTB

Trainees are required to register for specialist training with JRCPTB at the start of their training programmes. Enrolment with JRCPTB, including the complete payment of enrolment fees, is required before JRCPTB will be able to recommend trainees for a CCT in Cardiology. Trainees can enrol online at www.jrcptb.org.uk

2.5 Duration of Training

Although this curriculum is competency based, the duration of training must meet the European minimum of four years for full time specialty training adjusted accordingly for less than full time training (EU directive 2005/36/EC). The SAC has advised that training from ST1 will usually be completed in seven years in full time training (2 years core medical plus five years specialty training).

The specialist training is a minimum five-year programme that builds a trainee's ability to provide cardiology care in the hospital setting. Competencies concentrate on the provision of appropriate cardiovascular medical care in emergency settings as well as planned inpatient and outpatient settings.

2.6 Less Than Full Time Training (LTFT)

Trainees who are unable to work full-time are entitled to opt for less than full time training programmes. EC Directive 2005/36/EC requires that:

- LTFT shall meet the same requirements as full-time training, from which it will differ only in the possibility of limiting participation in medical activities.
- The competent authorities shall ensure that the competencies achieved and the quality of less than full time training are not less than those of full-time trainees.

The above provisions must be adhered to. LTFT trainees should undertake a pro rata share of the out-of-hours duties (including on-call and other out-of-hours commitments) required of their full-time colleagues in the same programme and at the equivalent stage.

EC Directive 2005/36/EC states that there is no longer a minimum time requirement on training for LTFT trainees. In the past, less than full time trainees were required to work a minimum of 50% of full time. With competence-based training, in order to retain competence, in addition to acquiring new skills, less than full time trainees would still normally be expected to work a minimum of 50% of full time. If you are returning or converting to training at less than full time please complete the LTFT application form on the JRCPTB website www.jrcptb.org.uk .

Funding for LTFT is from deaneries and these posts are not supernumerary. Ideally therefore 2 LTFT trainees should share one post to provide appropriate service cover.

Less than full time trainees should assume that their clinical training will be of a duration pro-rata with the time indicated/recommended, but this should be reviewed during annual appraisal by their TPD and chair of STC and Deanery Associate Dean for LTFT training. As long as the statutory European Minimum Training Time (if relevant), has been exceeded, then indicative training times as stated in curricula may be adjusted in line with the achievement of all stated competencies.

2.7 Dual and Triple CCT

Trainees who wish to achieve a CCT in General (Internal) Medicine (GIM) as well as Cardiology must have applied for and successfully entered a training programme which was advertised openly as a dual training programme. Trainees will need to achieve the competencies, with assessment evidence, as described in both the Cardiovascular medicine and GIM curricula. Individual assessments may provide evidence towards competencies from both curricula. Postgraduate Deans wishing to advertise such programmes should ensure that they meet the requirements of both SACs.

Trainees wishing to obtain a dual CCT with GIM will undertake training in GIM as part of advanced specialist area training (figure 1.2).

In exceptional circumstances a trainee may wish to extend the range of competencies acquired to include another speciality, e.g. Acute Internal Medicine. Such a qualification would equip the CCT holder to act as a Clinical Lead in an Acute Medical Assessment Unit. Working as a Clinical Lead in an Acute Medical Assessment Unit would involve the care of patients in the first 24-72 hours in hospital together with post-take ward rounds. It would have an ongoing commitment to the totality of care to "undifferentiated" patients prior to triage to their respective specialties. It would require an advanced level of procedural skills such as bronchoscopy and/or upper G-I endoscopy. Training to this level requires an indicative period of three years at Specialist Registrar level. Whilst it is anticipated that relatively few Cardiovascular medicine trainees would wish to pursue such a career path, if any individual trainee for professional or geographical reasons wished to do so, then this would probably involve an extension of training by a further year. Such trainees must have applied for and successfully entered a training programme advertised openly as training in three specialties, with agreed assessments and approval from GMC.

Οποιος θέλει να αποκτήσει επιπλέον χρόνο ειδικότητα για ΤΕΠ ένας επιπλέον χρόνος εκπαίδευσης

3 Content of Learning

3.1 Programme Content and Objectives

The full clinical syllabus is presented in section 10 which provides details of the specific knowledge, skills, and behaviours to be attained and demonstrated during training in cardiology.

The competencies are presented in four sections:

- **Common Competencies**
  The common competencies are those that should be acquired by all physicians during their training period starting within their undergraduate career and developed further throughout their postgraduate career.

- **Cardiovascular medicine Core Clinical Syllabus**
  This sets out the cardiovascular medicine learning objectives with the knowledge, skills, attitudes and competencies needed to fulfil the objectives. By the end of the educational programme the trainee will be expected to manage the clinical problems detailed in this section.

- **Cardiovascular medicine Core Procedures**
  This sets out the knowledge, skills, attitudes and competencies required for expertise in the core Cardiovascular medicine procedures and investigations. By

the end of the educational programme the trainee will be expected to select appropriately, interpret correctly and where appropriate perform competently these procedures and investigations.

- **Cardiovascular medicine Advanced Specialist area Modules**
  This sets out the knowledge, skills, attitudes and competencies required for expertise in the advanced specialist area modules. By the end of the educational programme the trainee will be expected to select appropriately, interpret correctly and where appropriate perform competently the specialist area procedures and investigations in order to manage patients presenting to or referred to the particular specialist area.

  The necessary concomitant general medical competencies are detailed in the GIM curriculum.

3.2 Good Medical Practice

In preparation for the introduction of licensing and revalidation, the General Medical Council translated Good Medical Practice into a Framework for Appraisal and Assessment. The guidance was updated April 2014 and is available on the GMC website www.gmc-uk.org. The Framework covers the following domains:
Domain 1 – Knowledge, Skills and Performance
Domain 2 – Safety and Quality
Domain 3 – Communication, Partnership and Teamwork
Domain 4 – Maintaining Trust

The "GMP" column in the syllabus defines which of these 4 domains of the Good Medical Practice Framework are addressed by each competency. Most parts of the syllabus relate to "Knowledge, Skills and Performance" but some parts will also relate to other domains.

4 Learning and Teaching

4.1 The Training Programme

The organisation and delivery of postgraduate training is the statutory responsibility of the General Medical Council (GMC) which devolves responsibility for the local organisation and delivery of training to the deaneries. Each deanery oversees a "School of Medicine" which is composed of the regional Specialty Training Committees (STCs) in each medical specialty. Responsibility for the organisation and delivery of specialty training in Cardiovascular medicine in each deanery is, therefore, the remit of the regional Cardiovascular medicine STC. Each STC has a Training Programme Director (TPD) who coordinates the training programme in the specialty. The training programme indicated by the curriculum will be delivered by local educational providers (LEPs). The Cardiovascular medicine TPDs will have regular meetings with the Cardiovascular medicine SAC to discuss the implementation of the Cardiovascular medicine curriculum.

The sequence of training delivered to trainees by LEPs will ensure appropriate progression in experience and responsibility. The training to be provided at each training site will be defined to ensure that, during the programme, the entire curriculum is covered and also that unnecessary duplication and educationally unrewarding experiences are minimised.

Acting up as a consultant (AUC)

"Acting up" provides doctors in training coming towards the end of their training with the experience of navigating the transition from junior doctor to consultant while maintaining an element of supervision.

Although acting up often fulfills a genuine service requirement, it is not the same as being a locum consultant. Doctors in training acting up will be carrying out a consultant's tasks but with the understanding that they will have a named supervisor at the hosting hospital and that the designated supervisor will always be available for support, including out of hours or during on-call work. Doctors in training will need to follow the rules laid down by the Deanery / LETB within which they work and also follow the JRCPTB rules which can be found at www.jrcptb.org.uk/trainingandcert/Pages/Out-of-Programme.

Τα 3 χρόνια Γενικής Καρδιολογίας / τμήμα των 5 χρόνων της Ειδικής Εκπαίδευσης (αντίστοιχο των 4 δικών μας)

4.2 Components of the Cardiovascular medicine Training Programme

Core Training in Cardiovascular Medicine (First 3 Years)

1ος χρόνος: Νομ Νοσ
2ος και 3ος χρόνος: Νομ Νοσ και Τριτ Νοσ

This phase will provide the necessary acute medical and core cardiological competencies and will usually consist of one year, usually the first, in a district general hospital (DGH). The next two years may be split between DGHs and tertiary centres (i.e. combined Cardiology and cardiothoracic surgical centre). Posts will usually be for one year or six months (rarely shorter if necessary to allow satisfactory completion of the curriculum). The order in which the DGH and tertiary centre experience is gained will be flexible and determined by the specialty training committees for each deanery training programme.

In very exceptional circumstances and with the prior approval of the SAC all this training may be in one setting so long as the fundamental principles of training are fulfilled and an adequate range of acute medical and cardiological investigations and procedures are experienced with appropriate exposure to cardiothoracic surgery including emergency and post-operative care.

Τι πρέπει να μάθουν τα 3 χρόνια: Κλινική Βασικό echo, pacing, catheterization

During early training priority should be given to the acquisition of acute medical competencies alongside core echocardiography, pacing and cardiac catheterisation skills. Training programmes will have to be focussed with clear educational targets (e.g. completion of core echocardiography training within the first year) and with close co-ordination between DGHs and specialist centres to ensure that trainees acquire the necessary competencies within the expected time frame.

Concomitant Training in General (Internal) Medicine

Training in Cardiovascular medicine requires concomitant training in General (Internal) Medicine. Having successfully undertaken general internal medical training as part of their ST1 and ST2 training all specialist trainees in cardiovascular medicine will spend one year after core medical training (usually the first i.e. ST3) being further trained in General (Internal) Medicine. This period will be as part of a Cardiovascular Medicine firm i.e. a team of consultants that takes part in acute medical takes and has continuing responsibility for all the patients assigned to it (after allowing for any locally determined specialist area triage). Inpatient and outpatient work will normally be confined to work within this firm although organisationally it is likely that trainees will often undertake acute medical takes and the post-take round with consultant physicians on other firms. During this year the trainee will undergo Cardiovascular medicine training as well as General Medical training.

The General (Internal) Medicine training will be aimed at providing the trainee with broad medical experience at a higher specialist trainee level of responsibility. The trainee will build on the competencies gained during core training (ST1 and ST2) and will aim to achieve competencies at the highest level of descriptors in as broad a range of conditions as encountered which as a minimum should include the following areas of the General (Internal) Medicine curriculum:
the assessment and care of - Shocked patient, Unconscious patient, Black out/collapse, Breathlessness, Chest Pain, GI bleeding, Palpitation, Medical Complications during acute illness and following surgical procedure, Syncope and pre-syncope, Acute Confusion.

For those specialist trainees in cardiovascular medicine who wish to become a consultant involved in running an acute medical take completion of General (Internal) Medicine competencies across the whole range of the General (Internal) Medicine curriculum will be necessary to be awarded a dual CCT in Cardiology and general medicine (see figure 1.2). This would typically allow the consultant to undertake the care of patients in the first 24-72 hours in hospital and post-take ward rounds. It would not involve an ongoing commitment to the totality of care to 'undifferentiated' patients who would largely be triaged to their respective specialties. Although the time taken to achieve these competencies will vary from trainee to trainee the General (Internal) Medicine curriculum indicates the likely need for two years higher specialist training overall. Hence, for those Cardiovascular medicine trainees who wish to train to this level, further General (Internal) Medicine training will probably be needed to complete the curriculum. This will occur alongside other appropriate specialist area modules and be as part of a cardiovascular medicine firm and inpatient and outpatient work will normally be confined to work with this firm although organisationally it is likely that trainees will often undertake acute medical takes and post-take ward rounds with consultant physicians on other firms. This training will build on the competencies already achieved in ST3. Training programme directors will need to ensure that resultant training plans and timetables combining General (Internal) Medicine and Cardiovascular medicine training can be reasonably expected to deliver the required competencies within the time allocated.

Advanced Specialist area Modules in Cardiovascular medicine (Final 2 Years)

The need for focussed specialist area training in Cardiovascular medicine is evident with many consultant posts in the NHS being advertised as a "Cardiologist with a Special Interest in" – Interventional Cardiology, Electrophysiology, Non-invasive Imaging, Adult Congenital Heart Disease or Heart Failure. These, therefore are the five specialist area topics selected as the titles of the advanced specialist area modules. Previously, many trainees in Cardiology enrolled in informal, locally based specialist area training and consequently there is a clear educational need for the evolution of formal curriculum driven specialist area training. Similar developments are evident both in Europe and the USA.

Πως επιλέγονται οι εκπαιδευόμενοι για το που θα εξειδικευθούν

Trainees will be encouraged to consider during their core training, which specialist area or specialist areas interest them. They should then, through the appraisal processes, discuss with their Educational Supervisors and Training Programme Directors their aptitude for their chosen specialist area and this should be an important factor in their subsequent choice of training posts. The specialist area syllabi should be used by both trainees and trainers to shape the configuration of individuals' training programmes. In some training posts, it will be possible for the trainee to acquire some of the knowledge, skills and attitudes of the specialist area

Υποειδικότητες στις οποίες μπορούν να εξειδικευούν οι ειδικευόμενοι: Επεμβατική, Ηλεκτροφυσιολογία, Απεικόνιση, Συγγενείς καρδιοπάθειες ενηλίκων και Καρδιακή Ανεπάρκεια

Text

Οχι όρος εξειδίκευση καθώς γίνεται στα πλαίσια της ειδικότητας. καρδιολόγος με ειδικό ενδιαφέρον

modules during some of the posts designed for core training. Career guidance will be an important part of this process.

Τα 2 τελευταία χρόνια: 70% εξειδίκευση 30% Γεν Καρδιολογία

For trainees planning for a single specialty CCT in Cardiology, the final two years of clinical training will consist of advanced training in the specialist area modules in conjunction with general Cardiovascular medicine including the necessary involvement with general Cardiovascular medicine on-call rotas to ensure sufficient experience and expertise in emergency Cardiovascular medicine and gaining any remaining competencies needed from core training. As a guideline, 70% of the time should be allocated to Advanced Modular Training and 30% to general cardiology.

At PYA all components of core training will be assessed and any deficiencies will need to be rectified prior to the issuing of a CCT in Cardiology. It will therefore be expected that trainees will have achieved the majority, if not all of the competencies, in core training before embarking on advanced training.

Advanced specialist area training in the final two years will be organised on a modular basis. To allow TPDs and trainees to plan an achievable mixture of modules within the time frame the modules have been allocated indicative 'units' which reflect the time necessary to complete the acquisition of competencies.

Modular Specialist area Training Model:

- Trainees must combine 4 or 5 "units" for CCT
- Modules to be taken in full
- Modular Weightings:

Module	Description	Units
1a 1b	Adolescent and Adult Congenital Heart Disease (ACHD) Heart Disease in Pregnancy (must be attached to ACHD)	2 or 4 1
2	Advanced Rhythm Management EP + Devices Advanced Rhythm Management Device Therapy	4 2
3	Heart Failure	2
4	Coronary Intervention	4
5a 5b 5c 5d 5e	Advanced Echocardiography 1 Advanced Echocardiography 2 Nuclear Cardiology Cardiac MR Cardiac CT	2 4 2 2 2
6	Core Skills in Inherited Cardiovascular Conditions	1
	GIM for dual CCT	2
	Academic Cardiology (Academic post-holders)	Up to 4

2 units = 1 χρόνος εκπαίδευσης

Progression into Specialist area:

All cardiovascular medicine trainees will undergo advanced specialist area training after completion of core competences. Although trainees will sit the KBA before entering ST6 passing the exam will not be an absolute requirement for progression which will be based on satisfactory confirmation of core competences using WPBAs. The KBA score will not be useful to aid decisions around allocation. ST6 and ST7 training is to be organised at deanery or cluster level with the exception of ACHD training which is to be organised at a national level. TPDs should contact the SAC ACHD representative for advice on training opportunities for ST6 and ST7 as soon as

it is clear that an ST5 trainee wishes to undertake advanced specialist area modules in ACHD. ACHD NTN subspecialty advanced training posts will be advertised and appointed nationally, giving trainees in all deaneries who wish to specialise in ACHD the opportunity to train. If the post is outside their deanery, it should be taken as an OOPT.

Trainees are not guaranteed progression to modules of their choice.
Access to advanced specialist area training modules will be subject to trainees' aptitudes and deanery training capacity eg trainees must have achieved level 3 competence in angiography before entering advanced modular training in Interventional Cardiology.
Deaneries might need to arrange short term OOPT to provide some components of advanced specialist area training curricula that are not available locally e.g. exposure to transplantation/LVADs for heart failure, optional PCI interventions etc.

Trainees should specify their preference to their training director and allocation should occur by interview at deanery level using person specifications for each specialty area.

A competitive selection process might be necessary for some over-subscribed modules. This should be a robust process modelled on current arrangements for ST3 allocation with an appropriate person specification, selection criteria, selection process etc. There should be no discrimination other than clinical ability/aptitude. Candidates should specify their first preference to their training director and a second in case that subspecialty advanced training module is unavailable locally and the candidate does not wish to move.

In exceptional circumstances if TPD's identify forthcoming vacant ST6/7 advanced module they could make these known to other TPDs. Hence, if a TPD identifies an ST5 who cannot obtain an appropriate ST6/7 post in their own Deanery, the TPD could apply to the deanery with vacant capacity and arrange a local interview with the receiving Deanery for a post to commence in August. If accepted, the ST6-7 years should be treated as OOPT (not an inter-deanery transfer).

4.3 Teaching and Learning Methods

Adults learn by

- reflecting and building upon their own experiences
- identifying what they need to learn
- being involved in planning their education and training
- evaluating the effectiveness of their learning experiences.

Ο ειδικευόμενος έχει προσωπική ευθύνη για την εκπαίδευσή του

For cardiovascular medicine trainees to maximise their learning opportunities it is important that they work in a ‘good learning environment’. This includes encouragement for self-directed learning as well as recognising the learning potential in all aspects of day to day work. There should be a positive attitude to training with learning from peers being encouraged. There should be active involvement in group discussion as this is an important way for doctors to share their understanding and experiences. A supportive open atmosphere should be cultivated and questions welcomed. For some specific areas of the curriculum appropriate accredited training environments are described in section 10.

The bulk of learning occurs as a result of clinical experience (experiential learning, on-the-job learning) and self-directed study. The degree of self-direct learning will increase as trainees become more experienced. Lectures and formal educational

sessions make up only a small part of the postgraduate training in cardiovascular medicine.

The list of learning opportunities below offers guidance only. There are other opportunities for learning that are not listed here. Trainees will learn in different ways according to their level of experience. Those likely to be used by more experienced trainees are marked with an asterisk. Trainees should regularly update their personal portfolio to keep a personal record, and be able to present to others, the evidence of the learning methods used.

Experiential Learning Opportunities:

Τρόποι απόκτησης γνώσεων ειδικευομένων

1. Every patient seen, on the ward or in out-patients, provides a learning opportunity, which will be enhanced by following the patient through the course of their illness. Patients seen should provide the basis for critical reading around clinical problems.
2. Every time a trainee observes another doctor, consultant or fellow trainee, seeing a patient or their relatives there is an opportunity for learning.
3. Ward-based learning including ward rounds. Ward rounds, including those post-take, should be led by a consultant and include feed-back on clinical and decision making skills.
4. Supervised consultations in outpatient clinics. Trainees should have the opportunity to assess both new and follow-up patients and discuss each case with the supervisor so as to allow feedback on diagnostic skills and gain the ability to plan investigations.
5. Trainees need to learn to make increasingly independent decisions on diagnosis, investigations and treatment consistent with their level of experience and competence and with maintaining patient safety. These decisions should be reviewed with their supervising consultant.
6. There are many situations where clinical problems are discussed with clinicians in other disciplines, such as cardiac surgical multidisciplinary meetings. These provide excellent opportunities for observation of clinical reasoning.

Τρόποι εκμάθησης διενέργειας ιατρικών πράξεων

Training in Practical Procedures: Undertaking supervised practical procedures in Cardiology with a consultant or more senior trainee, including the care and counselling of the patient/carers before and after the procedure, is the key method of gaining competence in these aspects of the curriculum (apprenticeship learning). Also with advances in technology the use of simulators will play an increasing part in the training of practical procedures. As trainees gain experience they will progress from observing to performing and from simple to more complex cases. Trainees should maintain a logbook of experience. Where appropriate the curriculum indicates the likely minimum number of procedures thought necessary to encompass a sufficiently broad spectrum of clinical experience to define performance.

Small Group Learning Opportunities:

1. Case presentations and small group discussion, particularly of difficult cases, including presentations at clinical and academic meetings. This should include critical incident analysis.
2. Small group bedside teaching, particularly covering problem areas identified by trainees.
3. Small group sessions of data interpretation, particularly covering problem areas identified by trainees. Participation in audit meetings, journal clubs and research presentations etc.

One-to-One Teaching:

1. Review of out-patients, ward referrals or in-patients with supervising consultant.
2. Review/case presentations with educational supervisor including selected notes, letters and summaries.
3. Critical incident analysis.
4. Discussion between trainee and trainer of knowledge of local protocols.
5. Feedback following assessments provides excellent teaching opportunities.

Formal Training: Formal training is organised both locally and nationally. The annual meeting of the British Cardiovascular Society will provide the national, formal training recognised by the Cardiology SAC. Local formal training will be organised within deaneries by the STC. Trainees will be required to plan so that they can attend these formal training sessions and apply for study leave in good time. Trainees will also be expected to provide feedback on this training so that the quality of the training can be assessed and the format and content modified. The details of feedback should be recorded in the trainee's portfolio. Trainees must attend two-thirds of formal training sessions both locally and nationally in order to progress through the training program. Trainees will have to attend and pass an IRMER course and an ALS course.

Συνέδρια:
Α) Πανβρεττανικό (καταντιστοιχία του Πανελληνίου)
Β)τοπικά συνέδρια (διοργανωνόμενα από το ΕΚ)
Γ) ALS

Personal Study:
1. Personal study including computer-based learning.
2. Practice examination questions and subsequent reading.
3. Reading journals.
4. Writing reviews and other teaching material.

Teaching Others:
1. Teaching undergraduate medical students and students in allied health professions and postgraduate doctors provides excellent learning opportunities for the teacher.
2. Presenting cases at grand rounds or similar clinical meetings provides the opportunity to review the literature relating to the clinical case. This provides the opportunity for in depth study of one clinical problem as well as learning important critical thinking and communication skills.
3. Journal club presentations allow development of critical thinking and in depth study of particular areas.

Additional Qualifications in Teaching:
Trainees with a particular interest in teaching may wish to undertake study for a higher qualification in teaching, such as a Postgraduate Certificate in Education (PGCert Ed). These courses can usually be undertaken in a modular or distance-learning manner (i.e. concurrent with the training programme) and may facilitate appointment to Consultant or Academic posts with a remit for teaching. Such a qualification is not, however, a replacement for a research-based higher degree. Interested trainees should contact their local University or visit University websites for further information.

Audit and Guidelines
Participation in audit: trainees should be directly involved and expect, after understanding the rationale and methodology, to undertake a minimum of one in-depth audit every in two-years of training. Quality Improvement Projects might supplement this experience. Trainees should be involved in guideline generation and review.

4.4 Research

Development of research competencies forms an important part of the Cardiovascular medicine curriculum as they are an essential set of skills for effective clinical practice. Undertaking research helps to develop critical thinking and the ability to review medical literature. Clinical research also allows development of particular expertise in one area of cardiovascular medicine allowing more in depth knowledge and skills and helping to focus long term career aims and interests. It is therefore highly likely that many Cardiovascular medicine trainees with the appropriate aptitude and desire will wish to take the opportunity to spend extra time in research during specialty training. For those in specialty training, one option to be considered is that of taking time out of programme to complete a specified project or research degree. The timing of research should be flexible but ideally it should occur towards the end of core Cardiovascular medicine training or during advanced training.

Ερευνα:
1.Δεν θεωρείται χρόνος εκπαίδευσης
2. Προς το τέλος προαιρετικά (αλλά σημαντικό αρκετά)
3. ? ρόλος επιστημονικών εταιρών για χρημα τοδότηση

Applications to research bodies, the deanery (via an OOPR form), and JRCPTB (via a Research Application Form) will need to be done by the trainee. The JRCPTB Research Application Form can be accessed via the JRCPTB website. Once completed, it should be returned to JRCPTB together with a job description and an up to date CV. JRCPTB will submit applications to the Cardiovascular medicine SAC for review of the research content. On approval of the research content by the SAC, JRCPTB will advise the trainee and the deanery of the decision. The deanery will make an application to GMC for approval of the out of programme research. **All applications for out of programme research must be prospectively approved.**

Funding will need to be identified for the duration of the research period. In general any research project funded, after open competition, by one of the major grant giving bodies will be accepted. Trainees should bear in mind that 'soft money' Research Fellowships, particularly those supported by the pharmaceutical industry, may not provide adequate research training. Trainees need not count research experience or its clinical component towards a CCT programme but must decide whether or not they wish it to be counted on application to the deanery and the JRCPTB.

A maximum period of 3 years out of programme is allowed.

The SAC will require confirmation from the research supervisor that the trainee completed the period of research training satisfactorily.

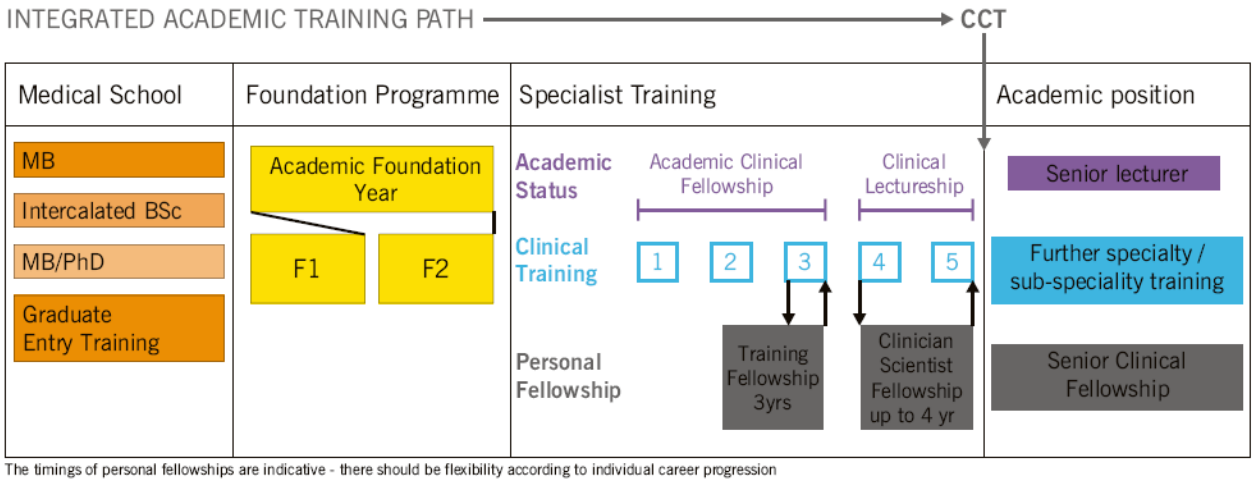
4.5 Trainees in Academic Cardiovascular medicine

It is well recognised that there is a crisis in recruitment and retention of academic cardiologists. Despite Cardiovascular medicine being a vibrant research-led specialty, in recent years the number of individuals appointed to lectureships or senior academic posts in Cardiovascular medicine has fallen. At the same time, research has become more complex and sophisticated, particularly for individuals wishing to undertake laboratory based research. Increasingly, a PhD rather than an MD is required, and the demand of keeping up with rapidly moving fields in research has meant an inevitable conflict between academic and clinical duties for would-be academic Cardiovascular medicine trainees.

In response to these pressures affecting academic medicine as a whole and Cardiovascular medicine in particular, a sub-committee of Modernising Medical Careers and the UK Clinical Research Collaboration, under the chairmanship of Mark Walport, published a report summarising recommendations for training the researchers and educators of the future (The Walport Report).

Academic integrated pathways to CCT are a) considered fulltime CCTs as the default position and b) are run through in nature. The academic programmes are CCT programmes and the time set for the CCT is the time set for academic trainees. If a trainee fails to achieve all the required competencies within the notional time period for the programme, this would be considered at the ARCP, and recommendations to allow completion of clinical training would be made (assuming other progress to be satisfactory) see the guidelines for monitoring training and progress www.academicmedicine.ac.uk/careersacademicmedicine. Extension of a CCT date will be in proportion depending upon the nature of the research and will ensure full capture of the specialty outcomes set down by the Royal College and approved by GMC.

For run-through academic trainees there will be exposure to research during the foundation programme. The next stage would be appointment into academic clinical fellowships, which would occupy ST1 to ST3. Such trainees may then apply for funding for a Training Fellowship for up to three years, during which they will undertake research leading to a MD or PhD. They would then compete for Clinical Lectureships, normally covering a four year period during which the equivalent of the final years of the CCT clinical training would be delivered. The proposals are summarised in paragraphs 1 – 28 of the document (pages 4 – 6). Full detail is then provided on pages 7 – 23. A summary of the scheme is outlined in the figure below.



Academic Clinical Fellowship

The stage at which individuals are recruited into academic clinical fellowships (ACF) is currently variable, some entering at ST1 and some at ST3. For Cardiovascular medicine entry at the later stage would seem more appropriate to allow trainees to have declared an interest in academic Cardiovascular medicine, and to have demonstrated the appropriate competencies for clinical training in Cardiovascular Medicine. Holders of an academic clinical fellowship would be given an NTN(A). It is envisaged that during this three year phase, about ¼ of the trainees' time would be for academic activities. During the first year, time would be spent in GIM and cardiovascular medicine training as currently envisaged for year ST3 in the current proposals. This could be in a DGH or a teaching centre if the latter offers appropriate GIM experience and training. Years ST4 and 5 would be spent in a teaching centre, developing research proposals and an application for a training fellowship to support PhD studies. Then the academic trainee would apply for funding for a Training

Fellowship for up to three years, during which they would undertake research leading to a MD or PhD.

PhD Training Fellowship
The training fellowships are not funded by the new money supporting the Integrated Academic Training Path proposals. These would be obtained through the current schemes from the Research Councils, Wellcome Trust and other Charity funded fellowships. These would be competitive. If successful the academic trainee would be "out of programme" for the training fellowship of three year's duration which would be essentially full time research leading to the award of a doctorate, normally a PhD. As at present, trainees would continue to undertake a small amount of clinical work to avoid skills atrophy.

Clinical Lecturer/Clinician Scientist
Following the successful completion of PhD studies, trainees would compete for Clinical Lectureships (CL). These are within the Integrated Academic Training Path and come with 50% funding. These would provide support normally for a period of up to 5 years for the trainee to continue research while undertaking specialist training towards the award of a CCT. In line with the funding it is likely that only 50% of the time will be spent in direct clinical service. The key principle underlying this phase of training is that the balance of academic and clinical training should be agreed on an *ad personam* basis between the trainee's academic supervisor, the training programme director, and the SAC.

Following the Clinical lecturer phase the successful trainee will probably prepare for a Clinician Scientist award. These are awards for 3-5 years that allow completion of the research training. In general in these awards clinical service time is kept to a minimum unless there are still residual clinical training issues. A few trainees may be able to miss out the Clinician Scientist phase and be appointed directly to Senior Lecturer posts. Successful Clinician Scientists would be competitive for externally funded Senior Research Fellowships.

NTN(A)s
It is envisaged that a trainee who is entering this path is awarded an NTN(A) via an ACF or CL. This NTN (A) would apply from the ACF or CL phase and they would keep this whilst within the Integrated Academic Training Path until the CCT. If they leave the scheme (exits would be at failure to get a training fellowship or failure to get a Clinical Lectureship) they would take up a local number and enter conventional clinical training.

Integration with the Cardiology curriculum
It is possible that academic trainees will not acquire all of the competencies in the core curriculum within three years given that they will be devoting 25% of their time to academic training. During the clinical lecturer phase, the trainee should complete the remainder of the core training objectives plus complete 2-3 further years of specialist area training leading to award of a CCT. However, consideration should be given to allowing trainees to extend their CCT date if research time needed to be curtailed in order to ensure completion of all core training competencies and this would jeopardise the trainee's ability to compete successfully for a senior clinical fellowship or senior lecturer post.

Since the whole essence of the Walport Committee Report is in favour of developing flexible *ad personam* training programmes for academic trainees a range of different options will be available.

1. Full Specialist area Clinical Training e.g. Interventional Training.
For the reasons outlined above, full specialist area training might be difficult to achieve within a four year Lecturer/Clinician Scientist programme but should be possible within a five year programme. Nevertheless, every effort should be made to support academic trainees pursuing full specialist area training, for example via specific fellowships or dedicated specialist area attachments. In addition, full specialist area training is readily achievable for trainees primarily involved in clinical research who may be able to "double count" some of their research time as clinical training.

2. Partial Specialist area Clinical Training
Some of the specialist area training programmes, such as heart failure, 'device therapy' or imaging modules, may be easier to deliver in parallel with on-going academic training within a four year Lecturer/Clinician Scientist post, still allowing time for completion of core training plus the specialist area.

3. Core Clinical Training Only
This approach would aim to deliver an academic cardiologist who was competent to undertake cardiovascular medicine at a generalist level, and would have completed all the training modules in the core Cardiovascular Medicine curriculum, and passed all necessary assessments (DOPS, mini-CEX, MSF, and KBA). This is equivalent to considering Research, or advanced study/practice as an educationalist, as an additional specialist area equivalent to the existing clinical subspecialties practised in the final two years of training. This option should be the express desire of the trainee, and not a method of denying specialist area training. In the event that a trainee already possesses a PhD on appointment to an academic post at ST3 level, Deaneries and STCs should develop a joint academic & clinical training plan with the trainee and his/her academic supervisor, to allow both a post–doctoral period of dedicated research and clinical (including specialist area) training.

Management Arrangements for Academic Trainees
In order to maximise flexibility for academic trainees, it is recommended that Deanery STCs appoint an academic cardiovascular medicine representative to act as a champion for academic training and help design bespoke academic training programmes. This individual should liaise with the trainee, his/her academic supervisor, and the specialist area trainer(s) to agree an appropriate academic and clinical training plan. No specialist area areas should be barred to academic trainees. Duration of clinical training and calculation of CCT dates should be competency-based not time based, subject to the overall requirements of EU directive 2005/36/EC (see section 2.5) and a minimum 5 years' training from ST3. STCs should not insist on rigid separation between periods of time that are wholly for research or for clinical training, if the trainee can accommodate both activities within the weekly timetable. Trainees should rotate only to hospitals where they can maintain their clinical training without losing contact with the academic centre. Specialist area training may require a specialist area fellowship, in many cases undertaken abroad. As these trainees are supernumerary, the training committee should adopt a sympathetic approach to such training needs. Similarly, full time post doctoral research in the CL post may be taken inside or outside the Deanery, meaning that academic trainees may need more than 3 years out of programme.

Academic trainees should choose or be assigned a clinical academic "mentor" independent of their research supervisor. This individual, who may be in the same or a different Deanery, should provide advice on the proposed clinical and academic training plan to the STC. At ARCP it is important that their academic training is also assessed (see Guidelines for the Annual Review of Competence Progression

(ARCP) for Speciality Registrars undertaking joint clinical and academic training programmes at www.academicmedicine.ac.uk)

Trainees wishing to follow a career in academic Cardiovascular medicine who need further guidance can contact the Cardiovascular medicine SAC via the JRCPTB.

5 Assessment

5.1 The Assessment System

The purpose of the assessment system is to:

- enhance learning by providing formative assessment, enabling trainees to receive immediate feedback, measure their own performance and identify areas for development;
- drive learning and enhance the training process by making it clear what is required of trainees and motivating them to ensure they receive suitable training and experience;
- provide robust, summative evidence that trainees are meeting the curriculum standards during the training programme;
- ensure trainees are acquiring competencies within the domains of Good Medical Practice*;*
- assess trainees' actual performance in the workplace;
- ensure that trainees possess the essential underlying knowledge required for their specialty;
- inform the Annual Review of Competence Progression (ARCP), identifying any requirements for targeted or additional training where necessary and facilitating decisions regarding progression through the training programme;
- identify trainees who should be advised to consider changes of career direction.

The integrated assessment system comprises workplace-based assessments and knowledge-based assessment. Individual assessment methods are described in more detail below.

The assessments will be supported by structured feedback for trainees within the training programme of Cardiovascular medicine. Assessment tools will be both formative and summative and will be selected on the basis of their fitness for purpose.

Workplace-based assessments will take place throughout the training programme to allow trainees to continually gather evidence of learning and to provide trainees with formative feedback. They are not individually summative but overall outcomes from a number of such assessments provide evidence for summative decision making. The number and range of these will ensure a reliable assessment of the training relevant to their stage of training and achieve coverage of the curriculum.

5.2 Assessment Blueprint

In the full syllabus (section10) the "Assessment Methods" shown are those that are appropriate as **possible** methods that could be used to assess each competency. It is not expected that all competencies will be assessed and that where they are assessed not every method will be used.

5.3 Assessment Methods

Δεν υπάρχουν ουσιαστικά τελικές εξετάσεις

The following assessment methods are used in the integrated assessment system:

Εξετάσεις και διπλώματα που καλούνται να αποκτήσουν οι ειδικευόμενοι κατά το χρόνο ειδικότητας

Examinations and Certificates

- Advanced Life Support Certificate (ALS)
- IRMER
- The Examination or KBA in Cardiovascular medicine
- BSE accreditation in core echocardiography

The SAC in conjunction with the British Cardiovascular Society, the European Cardiac Society and the UEMS-Cardiac Section has developed a Knowledge Based Assessment: the European Examination in General Cardiology (EEGC). The aim of this assessment is to assess a trainee's understanding of the necessary knowledge components of the core cardiovascular medicine curriculum to a level appropriate for a newly appointed consultant. A satisfactory performance in the examination is expected during core training, usually in ST5, and satisfactory performance is mandatory before attainment of the CCT. Trainees who fail to achieve the required standard in the examination in ST5 will not be prevented from proceeding to ST6 and ST7 provided their other elements of performance are judged adequate at the ARCP. The performance in the examination is only a small component of assessment for the ARCP which will be dominated by the WPBAs. The performance in the examination will not be a key criterion for allocation to sub-specialty modules. The EEGC will be offered on an annual basis so a trainee will, if necessary, have further opportunities to re-sit the examination in ST6 and ST7. The total number of times that a trainee can sit the EEGC will be determined by the length of their training programme which will be determined by their LETB/deanery.

Information about the EEGC including guidance for candidates, is available on the BCS web-site www.bcs.com

The BSE eLearning module complements experiential learning early in training and completion by end of ST3 is expected. Designed to be formative rather than summative, trainees can resit this module as often as they wish during this year. A certificate of satisfactory completion should be up-loaded on to ePortfolio.

BSE accreditation in adult transthoracic echocardiography can be used in place of DOPS assessments. Details of the processes required for BSE accreditation are available at www.bsecho.org.

Supervised Learning Events (SLEs)

SLEs are formative and require high level trainer feedback, trainee reflection and action plans. They may be linked to curriculum competencies in the ePortfolio as evidence of engagement with the curriculum but it is not necessary to link with large numbers of competencies. The below tools may be used for SLEs with a maximum of 8 linkages for an ACAT and 2 linkages for CbD and mini-CEX.

- mini-Clinical Evaluation Exercise (mini-CEX)
- Case-Based Discussion (CbD)
- Acute Care Assessment Tool (ACAT)

Other Workplace-Based Assessment Tools (WPBAs)

- Multi-Source Feedback (MSF)
- Direct Observation of Procedural Skills (DOPS)
- Patient Survey (PS)
- Audit Assessment (AA)

Καθημερινή informal πιστοποίηση γνώσης και καθοδήγηση του ειδικευόμενου.
Ολα όμως καταγράφονται και πιστοποιούνται

- Quality Improvement Project Assessment Tool (QIPAT)
- Teaching Observation (TO)
- Multiple Consultant Report (MCR)

These methods are described briefly below. More information about these methods including guidance for trainees and assessors is available in the e-portfolio and on the JRCPTB website www.jrcptb.org.uk. Workplace-based assessments should be recorded in the trainee's e-portfolio. The workplace-based assessment methods include feedback opportunities as an integral part of the assessment process, this is explained in the guidance notes provided for the techniques.

SLEs

Mini-Clinical Evaluation Exercise (mini-CEX)
This tool evaluates a clinical encounter with a patient to provide an indication of competence in skills essential for good clinical care such as history taking, examination and clinical reasoning. The trainee receives immediate feedback to aid learning. The mini-CEX can be used at any time and in any setting when there is a trainee and patient interaction and an assessor is available.

Case based Discussion (CbD)
The CbD assesses the performance of a trainee in their management of a patient to provide an indication of competence in areas such as clinical reasoning, decision-making and application of medical knowledge in relation to patient care. It also serves as a method to document conversations about, and presentations of, cases by trainees. The CbD should include discussion about a written record (such as written case notes, out-patient letter, and discharge summary). A typical encounter might be when presenting newly referred patients in the out-patient department.

Acute Care Assessment Tool (ACAT)
The ACAT is designed to assess and facilitate feedback on a doctor's performance during their practice on the Acute Medical Take. Any doctor who has been responsible for the supervision of the Acute Medical Take can be the assessor for an ACAT. This tool can also be applied to an acute cardiology take.

Other WPBAs

Multisource Feedback (MSF)
This tool is a method of assessing generic skills such as communication, leadership, team working, reliability etc, across the domains of Good Medical Practice. This provides objective systematic collection and feedback of performance data on a trainee, derived from a number of colleagues. 'Raters' are individuals with whom the trainee works, and includes doctors, administration staff, and other allied professionals. The trainee will not see the individual responses by raters, feedback is given to the trainee by the Educational Supervisor.

Direct Observation of Procedural Skills (DOPS)
A DOPS is an assessment tool designed to assess the performance of a trainee in undertaking a practical procedure, against a structured checklist. The trainee receives immediate feedback to identify strengths and areas for development.

Patient Survey (PS)

Patient Survey address issues, including behaviour of the doctor and effectiveness of the consultation, which are important to patients. It is intended to assess the trainee's performance in areas such as interpersonal skills, communication skills and professionalism by concentrating solely on their performance during one consultation.

Audit Assessment Tool (AA)
The Audit Assessment Tool is designed to assess a trainee's competence in completing an audit. The Audit Assessment can be based on review of audit documentation OR on a presentation of the audit at a meeting. If possible the trainee should be assessed on the same audit by more than one assessor.

Quality Improvement Project Assessment Tool (QIPAT)
The Quality Improvement Project Assessment tool is designed to assess a trainee's competence in completing a quality improvement project. The Quality Improvement Project Assessment can be based on review of quality improvement project documentation OR on a presentation of the quality improvement project at a meeting. If possible the trainee should be assessed on the same quality improvement project by more than one assessor.

Teaching Observation (TO)
The Teaching Observation form is designed to provide structured, formative feedback to trainees on their competence at teaching. The Teaching Observation can be based on any instance of formalised teaching by the trainee who has been observed by the assessor. The process should be trainee-led (identifying appropriate teaching sessions and assessors).

Multiple Consultant Report (MCR)
The Multiple Consultant Report (MCR) captures the views of consultant supervisors on a trainee's clinical performance. The MCR year summary sheet summarises the feedback received, outcomes for clinical areas and comments which will give valuable insight to how well the trainee is performing, highlighting areas of excellence and areas of support required. MCR feedback will be available to the trainee and included in the educational supervisor's report.

5.4 Decisions on Progress (ARCP)

The Annual Review of Competence Progression (ARCP) is the formal method by which a trainee's progression through her/his training programme is monitored and recorded. ARCP is not an assessment – it is the review of evidence of training and assessment. The ARCP process is described in A Reference Guide for Postgraduate Specialty Training in the UK (the "Gold Guide" – available from www.mmc.nhs.uk). Deaneries are responsible for organising and conducting ARCPs. The evidence to be reviewed by ARCP panels should be collected in the trainee's e-Portfolio.

As a precursor to ARCPs, JRCPTB strongly recommend that trainees have an informal e-portfolio review either with their educational supervisor or arranged by the local school of medicine. These provide opportunities for early detection of trainees who are failing to gather the required evidence for ARCP.

The ARCP Decision Aid is included in section 5.5, giving details of the evidence required of trainees for submission to the ARCP panels.

Κάθε χρόνο γίνεται monitoring όλων όσων κατεγράφησαν και εκτιμάται η πρόοδος

5.5 Guideline for the Use of Work Place Based Assessments (WPBA) (to be used in conjunction with the ARCP Grid)

The assessment strategy outlined in the ARCP decision grid will be trainee driven and below is a guideline to the number and types of assessment required for each **year** of core cardiovascular medicine training followed by that for each **module** of specialist area training. Assessment for core training (ST3 to ST5) applies to **ALL** trainees, whereas the assessment strategies for specialist area training (ST6-ST7) will vary according to the chosen specialist area modules.

For core syllabus objectives, the trainee should arrange the assessments (SLEs) to ensure that the syllabus is sampled over the whole programme. It is preferable that the majority of the core cardiovascular medicine topics be assessed during ST3-5, but if incomplete, the remainder can be sampled in ST6/7.

Assessors should be agreed with the Educational Supervisor in advance of the commencement of WPBA. Examples of suitable assessors would include consultants, senior StRs, Clinical Nurse Specialists, Senior Cardiac Physiologists or Radiographers. A wide range or assessors with appropriate qualifications should be sampled e.g. for Echo DOPS, a Cardiac Physiologist or Consultant with BSE.

The SLEs are formative and designed to provide feedback on progression through the curriculum. They are not summative and although documented in the e-portfolio, will not count to the ARCP. They do however reflect engagement with the assessment process.

Procedural skills however are assessed by DOPS, which are formative in the early stages of training and so provide feedback, but must later become summative in order to document full competence in perceived “life threatening procedures”. This is essential to secure patient safety. A series of “anchor statements” are provided to act as a formative guide to both trainee and trainer. For the procedural skills assessments, they are:

> Level 1 – able to perform the procedure under direct supervision/assistance
> Level 2 – able to perform the procedure with limited supervision/assistance
> Level 3 – competent to perform the procedure unsupervised and deal with complications

For DOPS assessment, there is a basic requirement that assessment is reliable when a minimum of 6 DOPS by 2 different assessors is performed. For most cardiological procedures, this is readily achievable. For example, 2 echo or catheter lists with a mixture of cases (minimum 3 cases per session) would complete the DOPS requirements for these procedures. Some trainees may achieve Level 3 competency in some practical procedures (e.g. echo or angiography) before the end of ST5 if they have had specific focused training, and once Level 3 is obtained, no further assessments are required, but ongoing participation in such procedures should be continued as part of general cardiology training. It should be noted that trainees who opt for the BSE adult accreditation will be exempt from Echo DOPS.

The WPBA schedule for the 3 years of core training (ST3 – ST5) is outlined below.

Assessment during ST3 (Core Training)

The WPBAs are for the purposes of assessing not only the core cardiovascular medicine curricular competencies, but must also include assessment of the General

(Internal) Medicine and common competencies. Mini-CEX and CbD should be used as appropriate as indicated in the syllabus.

SLE (mini-CEX or CbD or ACAT)

A minimum of 3 ACATs (covering the Acute Medical Take)
AND
5 CbD/mini-CEX

DOPS

- Echocardiography - a minimum of 2 by at least 2 different assessors (from 2 lists).The Echocardiography Curriculum Delivery Tool will be used to ensure appropriate coverage of syllabus
- Angiography - a minimum of 2 by at least 2 different assessors (from 2 lists)

These will be formative and used to provide feedback on a trainee's progress in the early stages of training.

- Pericardiocentesis, Temporary Pacing and Cardioversion - try to complete a DOPS assessment each time you do one of these procedures, again recording them as formative assessments, but asking the trainer to indicate the level of competence.
- Permanent Pacing - None required this year

NB. Some trainees may well become Level 3 competent in Cardioversion and/or Temporary Pacing by the end of ST3 (6 DOPS with a minimum of 2 different assessors indicates reliability) in which case no further DOPS will be required in these procedures – Guidance will come from the ARCP panel at the end of ST3

MSF
Not required this year.

Teaching Observation
Assessments of teaching skills should be made in this year using the TO tool

Assessment during ST4 (Core training)
The WPBAs are for the purposes of assessing not only the core cardiovascular medicine clinical competencies, but must also include assessment of the General (Internal) Medicine and common competencies. Mini-CEX and CbD should be used as appropriate as indicated in the syllabus.

SLE (mini-CEX or CbD or ACAT)
A minimum of 3 ACATs (covering the Acute Medical Take)
AND
5 CbD/mini-CEX

DOPS

- Echocardiography - a minimum of 2 by at least 2 different assessors (from 2 lists). The Echocardiography Curriculum Delivery Tool will be used to ensure appropriate coverage of syllabus
- Angiography - a minimum of 2 by at least 2 different assessors (from 2 lists)

These will be formative and used to provide feedback on a trainee's progress in the early stages of training

- Pericardiocentesis, Temporary Pacing and Cardioversion - try to complete a DOPS assessment each time you do one of these procedures, again recording them as formative assessments, but asking the trainer to indicate the level of competence.
- Permanent Pacing - a minimum of 2 by different assessors

NB. Some trainees may well become Level 3 competent in Cardioversion and/or Temporary Pacing and/or echocardiography by the end of ST4 (6 DOPS with a minimum of 2 different assessors indicates reliability) in which case no further DOPS will be required in these procedures – Guidance will come from the ARCP panel at the end of ST4

MSF
Satisfactory completion for presentation to the ARCP panel at the end of ST4

Assessment during ST5 (Core training)
The WPBAs are for the purposes of assessing not only the core curricular competencies, but must also include assessment of the General (Internal) Medicine and common competencies. Mini-CEX and CbD should be used as appropriate as indicated in the syllabus

SLE (mini-CEX or CbD or ACAT)
A minimum of 3 ACATs (covering the Acute Medical Take)
AND
5 CbD/mini-CEX

DOPS
- Echocardiography - a minimum of 6 summative DOPs by at least 2 different assessors (from 3 lists) or BSE accreditation. In addition, the Curriculum Delivery Tool, including 5 video cases demonstrating different pathology, must be completed and certified by either STC lead for echo training or by the Educational Supervisor
- Angiography - a minimum of 2 by at least 2 different assessors (from 2 lists). These will be formative and used to provide feedback on a trainee's progress in the early stages of training

NB. Trainees who wish to train in interventional cardiology during ST6/7 will be expected to achieve Level 3 competency in angiography by the end of ST5, and should accumulate the recommended number of summative DOPS assessments (a minimum of 6 by at least 2 different assessors (from 3 lists) for presentation to the ARCP panel at the end of ST5.

Trainees who have reached Level 3 competence by this stage may undergo summative assessment at this time (as per above). Once summative sign off is achieved, no further DOPs in angiography will be required.

- Pericardiocentesis, Temporary Pacing and Cardioversion - trainees should be Level 3 competent in Cardioversion by the end of ST5 (6 DOPS with a minimum of 2 different assessors indicates reliability). Try to complete a DOPS assessment each time you do a pericardiocentesis or Temporary Pacing, again recording

them as a formative assessment, but asking the trainer to indicate the level of competence.

- Permanent Pacing - a minimum of 6 summative DOPS by 2 different assessors confirming Level 2 competency (2 of the 6 DOPS should be in Pacemaker programming indicating competence in simple brady pacing)

MSF
Not required if satisfactory completion from ST4

Patient Survey
A patient survey should be conducted in the year e.g. after an outpatient clinic

Audit or QIP
An audit or quality improvement project should be completed by the end of ST5 and preferably re-audited and presented. Assessment of the process will use the Audit Assessment or QIPAT.

5.6 Guideline for the Use of WPBA during Specialist area Cardiovascular medicine Training

The specialist area syllabi have been designed on a modular basis that allows diversity of training with the ultimate objective of obtaining a CCT that is suitable for a consultant post. Given that the different specialist area modules require different time commitments and that trainees will want the flexibility to train in a variety of combinations of modules, the 'units' system (see 4.2) aids the planning of compatible combinations.

Trainees should agree with the Training Programme Director their planned combination of modules as well as the order of the programme, such that the expected WPBAs for each year of specialist area training can be planned. As an example, a trainee wishing to train in Devices and Heart Failure may wish to mix the programmes over 2 years rather than specialize in one during ST6 and the other during ST7. In this situation, a combination of WPBAs outlined in the respective modules should be tailored to meet the individual requirements.

The WPBA schedule for the 2 years of specialist area training is outlined below in order:-

- Adult Congenital Heart Disease including Heart Disease in Pregnancy
- Advanced Rhythm Management Electrophysiology + Devices
- Advanced Rhythm Management Device therapy
- Heart Failure
- Interventional Cardiology (PCI)
- Cardiac Imaging
    a. Echocardiography
    b. Nuclear Cardiology
    c. Cardiac Magnetic Resonance
    d. Cardiac CT
- Inherited Cardiovascular Conditions

Guideline for Work Place Based Assessment during ACHD Training (4 Units)

ACHD ST6

MSF
Satisfactory completion for presentation to the ARCP panel at the end of ST6

DOPS
Echocardiography- minimum of 4 formative (2 TTE, 2 TOE) by 2 different assessors

Cardiac catheterisation - minimum of 2 by at least 2 different assessors (from 2 lists) if Level 3 not yet achieved. These will be formative and used to provide feedback on a trainee's progress in this stage of training. Level 2-3 competence is expected in this year

Pericardiocentesis and Temporary Pacing- try to complete a DOPS assessment each time you do these procedure and Level 3 competence is expected at the end of ST7

ACHD ST7

SLE (mini-CEX or CbD)
A minimum of 5 CbD &/or mini-CEX by at least 2 different assessors from the specialist area curriculum (and core curriculum if not previously covered).
AND
2 ACATs (in relation to the Acute Cardiology Take)

MSF
Not required if satisfactory completion from ST6

DOPS
Echocardiography - minimum of 6 summative (4 TTE, 2 TOE) by 2 different assessors

Cardiac catheterisation - minimum of 6 summative assessments by at least 2 different assessors (from 3 lists) confirming Level 3 competence if not already achieved. These are summative in the final year and used to indicate competence at the end of training.

Pericardiocentesis and Temporary Pacing- try to complete a DOPS assessment each time you do these procedure and Level 3 competence is expected at the end of ST7

Please note: PFO closure to Level 3 competence is not required for CCT

Audit or QIP
A second project should be completed by the end of ST7 and for audit, preferably re-audited and presented. Assessment of the process will use the Audit Assessment or QIPAT.

Teaching Observation
Assessments of teaching skills should be made in ST7 using the TO tool.

Patient Survey
A patient survey should be conducted in the year e.g. after an outpatient clinic

Assessment for ACHD Training (2 units) or Pregnancy in Heart Disease Training (1 unit) should be discussed with the Advanced Modular Programme Director.

Guideline for Work Place Based Assessment during Training in Advanced Rhythm Management – Electrophysiology + Devices (4 units) Modules 1 to 4, and Options from Modules 5 to 12

The following are to be completed over the **two year period ST6 and ST7**, with the timing of individual WPBAs being determined by the order of the training programme.

SLEs (mini-CEX &/or CbD)
A minimum of 10 (covering Modules 1 to 12) by at least 2 different assessors. This must include assessment in Pacemaker Programming to include CRT and ICD
and
4 ACATs related to the Acute Cardiology take – (2 per year see ARCP grid)

MSF
Satisfactory completion for presentation to the ARCP panel at the end of ST6

DOPS
6 advanced pacing DOPS (covering all the Device modules) **AND** 6 advanced electrophysiology DOPS (covering all the electrophysiology modules) by at least 2 different assessors. DOPS should be formative during ST6 where Level 2 competency is expected and summative in ST7 where Level 3 competence is required for CCT.

Cardiac catheterisation - minimum of 2 by at least 2 different assessors (from 2 lists) in ST6 if Level 3 not yet achieved. These are still formative and used to provide feedback on a trainee's progress. Level 2-3 competence is expected in this year

A minimum of 6 summative assessments by 2 different assessors (from 3 lists) in ST7 if Level 3 not already achieved. These are summative in the final year and used to indicate competence at the end of training. Level 3 competence is expected by this year.

Pericardiocentesis - try to complete a DOPS assessment each time you do this procedure and Level 3 competence is expected at the end of ST7

Patient Survey
A survey should be conducted in ST7 e.g. after an outpatient clinic.

Teaching Observation
Assessments of teaching skills should be made in ST7 using the TO tool

Audit or QIP
A second project should be completed by the end of ST7 and for audit, preferably re-audited and presented. Assessment of the process will use the Audit Assessment or QIPAT.

Guideline to the use of Work Place Based Assessment during Advanced Heart Rhythm Management – Device Therapy (2 units) – Modules 1, 2 and 3 and Options from Modules 5 and 6

SLEs (mini-CEX &/or CbD)
A minimum of 5 covering modules 1-6 by at least 2 different assessors. Must include assessment in Pacemaker Programming to include CRT and ICD
and
2 ACATs related to the Acute Cardiology take (see ARCP grid)

MSF
Satisfactory completion for presentation to the ARCP panel at the end of ST6

DOPS

Devices - 6 advanced pacing DOPS (covering all the above modules) by at least 2 different assessors. DOPS should be formative during ST6 where Level 2 competency is expected and summative in ST7 where Level 3 competence is required for CCT

Cardiac catheterisation - minimum of 2 by at least 2 different assessors (from 2 lists) in ST6 if Level 3 not yet achieved. These are still formative and used to provide feedback on a trainee's progress. Level 2-3 competence is expected in this year

A minimum of 6 summative assessments by 2 different assessors (from 3 lists) in ST7 if Level 3 not already achieved. These are summative in the final year and used to indicate competence at the end of training. Level 3 competence is expected by this year

Pericardiocentesis - try to complete a DOPS assessment each time you do this procedure and Level 3 competence is expected at the end of ST7

Patient Survey
A survey should be conducted in ST7 e.g. after an outpatient clinic or after an pacing list

Teaching Observation
Assessments of teaching skills should be made in ST7 using the TO tool

Audit or QIP
A second project should be completed by the end of ST7 and for audit, preferably re-audited and presented. Assessment of the process will use the Audit Assessment Tool or QIPAT

Guideline to the use of Work Place Based Assessment during Heart Failure Training (2 units)

SLE (mini-CEX or CbD or ACAT)
A minimum 5 CbD or mini-CEX by at least 2 different assessors from the specialist area curriculum (and core curriculum if not previously covered).
AND
2 ACATs (in relation to the Acute Cardiology Take.

MSF
Satisfactory completion for presentation to the ARCP panel at the end of ST6

DOPS

Cardiac catheterisation - minimum of 2 by at least 2 different assessors (from 2 lists) in ST6 if Level 3 not yet achieved. These are still formative and used to provide feedback on a trainee's progress. Level 2-3 competence is expected in this year

A minimum of 6 summative assessments by 2 different assessors (from 3 lists) in ST7 if Level 3 not already achieved. These are summative in the final year and used to indicate competence at the end of training. Level 3 competence is expected by this year

Right Heart Cardiac Catheterisation to include Haemodynamics - a minimum of 6 summative assessments by 2 different assessors. Level 3 competence is expected at the end of ST7

Pericardiocentesis - try to complete a DOPS assessment each time you do this procedure and Level 3 competence is expected at the end of ST7.

Patient Survey
A survey should be conducted in ST7 e.g. after an outpatient clinic

Teaching Observation
Assessments of teaching skills should be made in ST7 using the TO tool

Audit or QIP
A second project should be completed by the end of ST7 and for audit, preferably re-audited and presented. Assessment of the process will use the Audit Assessment Tool or QIPAT.

Guideline for the use of Work Place Based Assessment during Interventional Cardiology Training (4 units)

Trainees must have achieved level 3 angiography before entering advanced modular training in Interventional Cardiology.

PCI ST6

SLEs (mini-CEX &/or CbD)
A minimum of 5 CbD or mini-CEX by at least 2 different assessors from the specialist area curriculum (and core curriculum if not previously covered).
and
2 ACATs related to the Acute Cardiology Take (see ARCP grid)

MSF
Satisfactory completion for presentation to the ARCP panel at the end of ST6

DOPS
Advanced PCI DOPS - minimum of 6 by at least 3 different assessors
These are formative by definition and used to provide feedback on a trainee's progress in the early stages of training. Level 2 competence is expected in this year

Pericardiocentesis - try to complete a DOPS assessment each time you do this procedure and Level 3 competence is expected at the end of ST7

PCI ST7

SLEs (mini-CEX &/or CbD)
A minimum of 5 CbD or mini-CEX by at least 2 different assessors from the specialist area curriculum (and core curriculum if not previously covered).
and
2 ACATs related to the Acute Cardiology Take (see ARCP grid)

MSF
Not required if satisfactory completion from ST6

DOPS
Advanced PCI DOPS - minimum of 6 summative assessments by 3 different assessors. These are summative in the final year and used to indicate competence at the end of training. Level 3 competence is expected in this year

Pericardiocentesis - try to complete a DOPS assessment each time you do this procedure and Level 3 competence is expected at the end of ST7

Please note: Level 3 competency in PFO closure, Mitral Balloon Valvuloplasty and Alcohol Septal Ablation for HOCM is not required for CCT.

Audit or QIP
A second project should be completed by the end of ST7 and for audit, preferably re-audited and presented. Assessment of the process will use the Audit Assessment Tool or QIPAT

Teaching Observation
Assessments of teaching skills should be made in ST7 using the TO tool.

Patient Survey
A survey should be conducted in ST7 e.g. after an outpatient clinic

Guideline for the use of Work Place Based Assessment during Advanced Echo Training (2 units)

SLEs (mini-CEX &/or CbD)
A minimum of 5 CbD or mini-CEX by at least 2 different assessors from the specialist area curriculum (and core curriculum if not previously covered).
and
2 ACATs related to the Acute Cardiology Take (see ARCP grid)

MSF
Satisfactory completion for presentation to the ARCP panel at the end of ST6

DOPS
Echo - 6 advanced echo (2 TTE, 2 TOE, 2 Stress echo) by 2 different assessors. DOPS should be formative during ST6 where Level 2 competency is expected and summative in ST7 where Level 3 competence is required for CCT

Cardiac catheterisation - minimum of 2 by at least 2 different assessors (from 2 lists) in ST6 if Level 3 not yet achieved. These are still formative and used to provide feedback on a trainee's progress. Level 2-3 competence is expected in this year

A minimum of 6 summative assessments by 2 different assessors (from 3 lists) in ST7 if Level 3 not already achieved. These are summative in the final year and used to indicate competence at the end of training. Level 3 competence is expected by this year

Pericardiocentesis -try to complete a DOPS assessment each time you do this procedure and Level 3 competence is expected at the end of ST7

Patient Survey
A survey should be conducted in ST7 e.g. after an outpatient clinic

Teaching Observation
Assessments of teaching skills should be made in ST7 using the TO tool

Audit or QIPA second project should be completed by the end of ST7 and for audit, preferably re-audited and presented. Assessment of the process will use the Audit Assessment Tool or QIPAT

Guideline for the use of Work Place Based Assessment during Advanced Echo Training (4 units)

The following are to be completed over the **two year period ST6 and ST7**, with the timing of individual WPBAs being determined by the order of the training programme.

SLEs (mini-CEX &/or CbD)
A minimum of 10 CbD or mini-CEX by at least 2 different assessors from the specialist area curriculum (and core curriculum if not previously covered).
and
4 ACATs (2 per year) related to the Acute Cardiology Take (see ARCP grid)

MSF
Satisfactory completion for presentation to the ARCP panel at the end of ST6

DOPS
Echo - 12 advanced echo (4TTE, 4 TOE, 4 Stress echo) by 2 different assessors. DOPS should be formative during ST6 where Level 2 competency is expected and summative in ST7 where Level 3 competence is required for CCT

Cardiac catheterisation - minimum of 2 by at least 2 different assessors (from 2 lists) in ST6 if Level 3 not yet achieved. These are still formative and used to provide feedback on a trainee's progress. Level 2-3 competence is expected in this year

A minimum of 6 summative assessments by 2 different assessors (from 3 lists) in ST7 if Level 3 not already achieved. These are summative in the final year and used to indicate competence at the end of training. Level 3 competence is expected by this year

Pericardiocentesis - try to complete a DOPS assessment each time you do this procedure and Level 3 competence is expected at the end of ST7

Patient Survey

A survey should be conducted in ST7 e.g. after an outpatient clinic or after an angio list

Teaching Observation
Assessments of teaching skills should be made in ST7 using the TO tool

Audit or QIP
A second project should be completed by the end of ST7 and for audit, preferably re-audited and presented. Assessment of the process will use the Audit Assessment Tool or QIPAT.

Guideline to the use of Work Place Based Assessment Tools during Advanced Nuclear Training (2 units)

SLEs (mini-CEX &/or CbD)
A minimum of 5 CbD or mini-CEX by at least 2 different assessors from the specialist area curriculum (and core curriculum if not previously covered).
and
2 ACATs related to the Acute Cardiology Take (see ARCP grid)

MSF
Satisfactory completion for presentation to the ARCP panel at the end of ST6

DOPS
Nuclear imaging - 6 cases on dosing acquisition and reporting by 2 different assessors (e.g. clinician and technician) across the spectrum of disorders DOPS should be formative during ST6 where Level 2 competency is expected and summative in ST7 where Level 3 competence is required for CCT

Cardiac catheterisation - minimum of 2 by at least 2 different assessors (from 2 lists) in ST6 if Level 3 not yet achieved. These are still formative and used to provide feedback on a trainee's progress. Level 2-3 competence is expected in this year

A minimum of 6 summative assessments by 2 different assessors (from 3 lists) in ST7 if Level 3 not already achieved.
These are summative in the final year and used to indicate competence at the end of training. Level 3 competence is expected by this year

Pericardiocentesis - try to complete a DOPS assessment each time you do this procedure and Level 3 competence is expected at the end of ST7

Patient Survey
A surveys should be conducted in ST7 e.g. after an outpatient clinic

Teaching Observation
Assessments of teaching skills should be made in ST7 using the TO tool

Audit or QIP
A second project should be completed by the end of ST7 and for audit, preferably re-audited and presented. Assessment of the process will use the Audit Assessment Tool or QIPAT

Guideline for the use of Work Place Based Assessment Tools during Advanced CMR Training (2 units)

SLEs (mini-CEX &/or CbD)
A minimum of 5 CbD or mini-CEX by at least 2 different assessors from the specialist area curriculum (and core curriculum if not previously covered).
and
2 ACATs related to the Acute Cardiology Take (see ARCP grid)

MSF
Satisfactory completion for presentation to the ARCP panel at the end of ST6

DOPS
CMR imaging - 6 cases on CMR acquisition and reporting by 2 different assessors (e.g. clinician and technician) across the spectrum of disorders DOPS should be formative during ST6 where Level 2 competency is expected and summative in ST7 where Level 3 competence is required for CCT

Cardiac catheterisation - minimum of 2 by at least 2 different assessors (from 2 lists) in ST6 if Level 3 not yet achieved. These are still formative and used to provide feedback on a trainee's progress. Level 2-3 competence is expected in this year

A minimum of 6 summative assessments by 2 different assessors (from 3 lists) in ST7 if Level 3 not already achieved. These are summative in the final year and used to indicate competence at the end of training. Level 3 competence is expected by this year

Pericardiocentesis - try to complete a DOPS assessment each time you do this procedure and Level 3 competence is expected at the end of ST7

Patient Survey
A surveys should be conducted in ST7 e.g. after an outpatient clinic

Teaching Observation
Assessments of teaching skills should be made in ST7 using the TO tool

Audit or QIP
A second project should be completed by the end of ST7 and for audit, preferably re-audited and presented. Assessment of the process will use the Audit Assessment Tool or QIPAT.

Guideline for the use of Work Place Based Assessment Tools during Advanced Cardiac CT (2 units)

SLEs (mini-CEX &/or CbD)

A minimum of 5 CbD or mini-CEX by at least 2 different assessors from the specialist area curriculum (and core curriculum if not previously covered).
and
2 ACATs related to the Acute Cardiology Take (see ARCP grid)

MSF
Satisfactory completion for presentation to the ARCP panel at the end of ST6

DOPS

CT imaging -6 cases on CT acquisition and reporting by 2 different assessors (e.g. clinician and technician) across the spectrum of disorders DOPS should be formative during ST6 where Level 2 competency is expected and summative in ST7 where Level 3 competence is required for CCT

Cardiac catheterisation - minimum of 2 by at least 2 different assessors (from 2 lists) in ST6 if Level 3 not yet achieved. These are still formative and used to provide feedback on a trainee's progress. Level 2-3 competence is expected in this year

A minimum of 6 summative assessments by 2 different assessors (from 3 lists) in ST7 if Level 3 not already achieved. These are summative in the final year and used to indicate competence at the end of training. Level 3 competence is expected by this year

Pericardiocentesis - try to complete a DOPS assessment each time you do this procedure and Level 3 competence is expected at the end of ST7

Patient Survey

A surveys should be conducted in ST7 e.g. after an outpatient clinic

Teaching Observation

Assessments of teaching skills should be made in ST7 using the TO tool

Audit or QIPAT

A second project should be completed by the end of ST7 and for audit, preferably re-audited and presented. Assessment of the process will use the Audit Assessment Tool or QIPAT.

Guideline for the use of Work Place Based Assessment Tools during Inherited Cardiovascular Conditions Training (1 unit)

The assessment programme should be discussed in advance with the ICC Trainer and agreed with the TPD for incorporation into the on-going assessment strategy, depending on Advanced Modular Choice, for ST6/7.

This will be achieved through existing workplace-based assessments (WPBAs), mini-Clinical Evaluation Exercise (mini-CEX), Direct Observation of Procedural Skills (DOPS), Case-Based Discussion (CbD), Patient Survey (PS) as part of the ongoing Advanced Modules with the ICC component incorporated within.

Logbook: Trainees will maintain a continuous log to record patient interactions (inpatient or outpatient, including screening, invasive/non invasive assessment) and a short description of the case and the trainee's reflection for a variety of ICCs. The log should also capture reports of the echocardiograms, advanced imaging (CTs, CMRs and TOEs), advanced arrhythmia testing (pharmacological provocation, invasive EP, signal averaged ECGs) performed on patients with known or suspected ICC by the trainee. The log will be reviewed on a regular basis by the supervisor and must be signed off by the Training Director. The logbook should be placed in the Personal Folder of the e-portfolio.

Core Module – Patient Interactions: 70 patients with a minimum of 10 in each of the three ICC domains. Imaging: 50 cases reflecting the spectrum of imaging modalities (Echo, CT, CMR).

5.7 Cardiology ARCP Decision Aid

The table that follows includes a column for each training year which documents the targets that have to be achieved for a satisfactory ARCP outcome at the end of the training year.

1. Core curriculum requirements for all trainees

	ST3	ST4	ST5	ST6	ST7
ALS (Course and certificate) also 2.24	Valid	Valid	Valid	Valid	Valid
IRMER (Course and certificate) also 2.25			Valid	Valid	Valid
Examination			Specialist Exam attempted/passed	Specialist Exam attempted/passed	Specialist Exam passed
Audit (cumulative requirement)			1 Completed Audit or Quality Improvement Project		2nd Completed Audit or Quality Improvement Project
MSF to assess Good Medical Practice		Satisfactory		Satisfactory	
Patient Survey to assess Good Medical Practice (e.g. post ward round or outpatients)			1 Survey		1 Survey
Management and teaching Courses					Completed
Teaching skills	Teaching Observation				Teaching Observation
CPD (annual attendance requirements at organised teaching or equivalent as organised by local programme)	60% attendance	60% attendance	60% attendance	60% attendance	60% attendance

Common competencies^	ES confirmation that satisfactory progress is being made	ES confirmation that satisfactory progress is being made	ES confirmation that satisfactory progress is being made	ES confirmation that satisfactory progress is being made	ES confirmation that level 3 / 4 achieved for all common competencies
Log book of procedures	Documentation completed	Documentation completed	Documentation completed	Documentation completed	Documentation completed
Educational Supervisor's report	Satisfactory	Satisfactory	Satisfactory	Satisfactory	Satisfactory
Multiple Consultant reports (MCR)	4 - 6	4 - 6	4 - 6	4 - 6	4 - 6
SLE requirements to cover Core Cardiology Curriculum, General Medical Competencies relevant to Cardiology and Core Procedures (See checklist below)	5 CbD or mini-CEX 3 ACATs (Acute Medical or Cardiac take)*	5 CbD or mini-CEX 3 ACATs (Acute Medical or Cardiac take)*	5 CbD or mini-CEX 3 ACATs (Acute Medical or Cardiac Take)*		
SLE requirements to cover Advanced Modular Syllabi and core topics not covered in ST3-5 (see checklist below)				5 CbD or mini-CEX 2 ACATs (Acute Cardiac Take)	5 CbD or mini-CEX 2 ACATs (Acute Cardiac Take)
Minimum DOPS requirements (see table below and assessment section of curriculum)	4-6	4-6	4-6	4-6	4-6

* ACAT for medical take if on GIM rota and cardiac take if on Cardiology rota
^10 of the common competencies do not require directly linked evidence in the ePortfolio

2. Checklist for curricular competencies

Please refer to Cardiology page of the JRCPTB website for the current curriculum, definition of competency levels and guidance on number and format of assessments.

General Medicine Competencies Relevant to Cardiology (to be completed by the end of ST5)	**ST3**	**ST4**	**ST5**		
Chest Pain 2.1.a*					
Breathlessness 2.2 & 2.3*					
Syncope and pre-syncope 2.7*					
Palpitation 2.8*					
Black out/collapse*					
Shocked patient					
Unconscious patient					
GI bleeding Acute Confusion					
Medical Complications during acute illness and following surgical procedure					
**** Note overlap with Cardiology Core Curriculum topics below***					
Core Cardiology Curricula Topics (to be completed by the end of ST7)	**ST3**	**ST4**	**ST5**	**ST6**	**ST7**
1. Chest pain					
2. Stable angina					
3 Acute coronary syndromes and myocardial infarction					
4. Acute breathlessness					
5. Chronic breathlessness					
6. Heart failure					
7. Cardiomyopathy					
8. Patients with valvular heart disease					

9. Pre-syncope and syncope					
10. Arrhythmias					
11. Atrial fibrillation					
12. Pericardial disease					
13a. Primary and secondary prevention of cardiovascular disease					
13b. Hypertension					
13c. Lipid Disorders					
14. Adult Congenital Heart Disease					
15. The prevention and management of endocarditis					
16. Diseases of the Aorta and Cardiac Trauma					
17. Cardiac Tumours					
18. Cardiac rehabilitation					
19. Assessment of Patients with CV Disease Prior to Non-Cardiac Surgery					
20. Assessments of Patients Prior to Cardiac Surgery					
21. Care of Patients Following Cardiac Surgery					
22. Management of Critically Ill Patients with Haemodynamic Disturbances					
22. Heart Disease in Pregnancy					
24. Resuscitation – Basic and Advanced Life Support					
25. Radiation Use and Safety					
26. Community Cardiology					
27. Pulmonary Arterial Hypertension (PAH)					
28. Clinical Genetics and Inherited Cardiovascular Condtions					

Core Procedures and Investigations (to be completed by the end of ST5)	ST3	ST4	ST5	
1. Basic investigations: ECG, Ambulatory ECG and BP, Exercise Testing, CXR				
2. Echo (core)				
3. Nuclear Cardiology (core)				
4. CMR Resonance (core)				
5. Cardiac CT (core)				
6. Heart Rhythm Training (core)				
7. Interventional Cardiology (core)				
8. Pericardiocentesis				

3. Checklist for curricular competencies - Specialist area syllabus

Please refer to Cardiology page of the JRCPTB website for the current curriculum, definition of competency levels and guidance on number and format of assessments during specialist area training.

No	Units	Specialist area description	ST6	ST7
4.1	4	Advanced Adolescent and Adult Congenital Heart Disease		
4.1b.	1	Heart disease in Pregnancy		
4.2.	4	Advanced Rhythm Training - EP + devices		
	2	Devices only		
4.3	2	Heart Failure (Advanced)		
4.4.	4	Interventional Cardiology		
5a	2	Cardiac Imaging - Echo 1		
	4	Cardiac Imaging - Echo 2		

5b	2	Nuclear		
5c	2	CMR		
5d	2	Cardiac CT		
6	1	Inherited Cardiovascular Conditions		

When two x 2 unit modules are chosen the balance between the completed competencies by the end of ST6 may differ but should be 50% overall combined for both modules. Guidance on allocation to advanced modules and dual CCT training in cardiology and GIM is available on the cardiology page of the JRCPTB website.

4. Core procedures and investigations requiring DOPs assessment

Please refer to Cardiology page of the JRCPTB website for the current curriculum, definition of competency levels and guidance on number and format of assessments.

	ST3	ST4	ST5	ST6	ST7
Transthoracic Echocardiography	Initial experience documented within Echocardiography Curriculum Delivery Tool and DOPS Level 1	Continuing experience documented within Echocardiography Curriculum Delivery Tool and DOPS Level 2	Completion of Echocardiography Curriculum Delivery Tool + Level 3 DOPS or BSE accreditation	Completion of Echocardiography Curriculum Delivery Tool + Level 3 DOPS or BSE accreditation	Completion of Echocardiography Curriculum Delivery Tool + Level 3 DOPS or BSE accreditation
Cardiac Catheterization	Level 1	Level 1-2	Level 2 *	Level 2-3	Level 3
Temporary Pacing	Level 1	Level 2	Level 2	Level 2	Level 3
Permanent Pacing	Level 1	Level 1	Level 2	Level 2	Level 2
Pericardiocentesis	Level 1	Level 1	Level 2	Level 2	Level 3
Cardioversion	Level 2	Level 3	Level 3	Level 3	Level 3

*Trainees who wish to train in PCI must have achieved Level 3 competency in angiography by the end of ST5

5.8 Penultimate Year Assessment (PYA)

The penultimate year assessment (PYA) has traditionally occurred at the RITA/ARCP in the year prior to the anticipated CCT date. This has provided the opportunity for an external assessor from outside the training programme to review the competence progression and determine any major and/or minor deficiencies in the competencies that need to be acquired in the last months of training or indeed may delay progression to CCT. Whilst the RITA/ARCP is often purely a review of evidence, the PYA will include a face to face component. For Cardiovascular medicine trainees following this revised curriculum it will be more appropriate that the PYA should take place at the end of ST5 in order to provide an external review of completion of core training and help in the planning of appropriate combinations of specialist area modules. JRCPTB and the deanery will coordinate the appointment of this assessor with the deaneries and the Cardiovascular medicine SAC.

5.9 Complaints and Appeals

All workplace-based assessment methods incorporate direct feedback from the assessor to the trainee and the opportunity to discuss the outcome. If a trainee has a complaint about the outcome from a specific assessment this is their first opportunity to raise it.

Appeals against decisions concerning in-year assessments will be handled at deanery level and deaneries are responsible for setting up and reviewing suitable processes. If a formal complaint about assessment is to be pursued this should be referred in the first instance to the training programme director who is accountable to the regional deanery. Continuing concerns should be referred to the Head of Schools.

6 Supervision and Feedback

6.1 Supervision

All elements of work in training posts must be supervised with the level of supervision varying depending on the experience of the trainee and the clinical exposure and case mix undertaken. Outpatient and referral supervision must routinely include the opportunity to personally discuss all cases. As training progresses the trainee should have the opportunity for increasing autonomy, consistent with safe and effective care for the patient.

Trainees will at all times have a named Educational Supervisor and Clinical Supervisor, responsible for overseeing their education. Depending on local arrangements these roles may be combined into a single role of Educational Supervisor.

The responsibilities of supervisors have been defined by GMC in the document “Operational Guide for the GMC Quality Framework”. These definitions have been agreed with the National Association of Clinical Tutors, the Academy of Medical Royal Colleges and the Gold Guide team at MMC, and are reproduced below:

Educational Supervisor
A trainer who is selected and appropriately trained to be responsible for the overall supervision and management of a specified trainee’s educational progress during a training placement or series of placements. The Educational Supervisor is responsible for the trainee’s Educational Agreement.

Clinical Supervisor

A trainer who is selected and appropriately trained to be responsible for overseeing a specified trainee's clinical work and providing constructive feedback during a training placement. Some training schemes appoint an Educational Supervisor for each placement. The roles of Clinical and Educational Supervisor may then be merged.

The Educational Supervisor, when meeting with the trainee, should discuss issues of clinical governance, risk management and any report of any untoward clinical incidents involving the trainee. The Educational Supervisor should be part of the clinical specialty team. Thus if the clinical directorate (clinical director) have any concerns about the performance of the trainee, or there were issues of doctor or patient safety, these would be discussed with the Educational Supervisor. These processes, which are integral to trainee development, must not detract from the statutory duty of the trust to deliver effective clinical governance through its management systems.

Opportunities for feedback to trainees about their performance will arise through the use of the workplace-based assessments, regular appraisal meetings with supervisors, other meetings and discussions with supervisors and colleagues, and feedback from ARCP.

6.2 Appraisal

A formal process of appraisals and reviews underpins training. This process ensures adequate supervision during training, provides continuity between posts and different supervisors and is one of the main ways of providing feedback to trainees. All appraisals should be recorded in the e-Portfolio

Induction Appraisal

The trainee and educational supervisor should have an appraisal meeting at the beginning of each post to review the trainee's progress so far, agree learning objectives for the post ahead and identify the learning opportunities presented by the post. Reviewing progress through the curriculum will help trainees to compile an effective Personal Development Plan (PDP) of objectives for the upcoming post. This PDP should be agreed during the Induction Appraisal. The trainee and supervisor should also both sign the educational agreement in the e-portfolio at this time, recording their commitment to the training process.

Mid-point Review

This meeting between trainee and educational supervisor is mandatory (except when an attachment is shorter than 6 months), but is encouraged particularly if either the trainee or educational or clinical supervisor has training concerns or the trainee has been set specific targeted training objectives at their ARCP. At this meeting trainees should review their PDP with their supervisor using evidence from the e-portfolio. Workplace-based assessments and progress through the curriculum can be reviewed to ensure trainees are progressing satisfactorily, and attendance at educational events should also be reviewed. The PDP can be amended at this review.

End of Attachment Appraisal

Trainees should review the PDP and curriculum progress with their educational supervisor using evidence from the e-portfolio. Specific concerns may be highlighted from this appraisal. The end of attachment appraisal form should record the areas where further work is required to overcome any shortcomings. Further evidence of competence in certain areas may be needed, such as planned workplace-based assessments, and this should be recorded. If there are significant concerns following the end of attachment appraisal then the programme director should be informed

7 Managing Curriculum Implementation

7.1 Intended Use of Curriculum by Trainers and Trainees

This curriculum and e-portfolio are web-based documents which are available with supporting documents from the Joint Royal Colleges of Physicians Training Board (JRCPTB) website www.jrcptb.org.uk.

Educational supervisors and trainers can access the up-to-date curriculum from the JRCPTB website and will be expected to use this as the basis of their discussion with trainees. Both trainers and trainees are expected to have a good knowledge of the curriculum and should use it as a guide for their training programme. Each trainee will engage with the curriculum by maintaining the e-portfolio and use the curriculum to develop learning objectives and reflect on learning experiences.

Deaneries, through their Cardiovascular medicine STCs and TPDs, are will be responsible for the quality management of the delivery of the curriculum based training in the Cardiovascular medicine training programmes. This will normally require the establishment of quality leads and/or sub-committees. Each local education provider (LEP) will also have a Training lead, probably an Educational Supervisor, who will link to the STC for issues of Quality Control and Quality Management. Deaneries, with their STCs, will undertake Quality Management reviews of LEPS at regular intervals. There is ongoing discussion between Deans and JRCPTB about the final format of Quality Management reviews of the programme. A pilot study has advocated a system of reviews at approximately 5 year intervals with externality provided by the Cardiovascular medicine SAC and additional, appropriately trained, lay representatives. These processes will use results from GMC surveys, local job evaluation surveys, KBA results, ARCP outcomes and data on appointments of CCT holders. In the event of any concern with training then Deaneries can activate a Triggered Visit with appropriate input dependent on the problem. Information from all this activity will be co-ordinated by the TPD and also fed back to the chairman of the SAC to facilitate the annual report to GMC on the training programmes for the specialty of Cardiovascular medicine. Deaneries will ensure that STCs are appropriately convened and supported for these activities and include trainee representatives.

7.2 Recording Progress

On enrolling with JRCPTB trainees will be given access to the e-Portfolio for Cardiovascular medicine. The e-Portfolio allows evidence to be built up to inform decisions on a trainee's progress and provides tools to support trainees' education and development.

The trainee's main responsibilities are to ensure the e-Portfolio is kept up to date, arrange assessments and ensure they are recorded, prepare drafts of appraisal forms, maintain their personal development plan, record their reflections on learning and record their progress through the curriculum. The trainee should maintain a log book of procedures undertaken to document their experience.

The supervisor's main responsibilities are to use e-Portfolio evidence such as outcomes of assessments, reflections and personal development plans to inform appraisal meetings. They are also expected to update the trainee's record of progress through the curriculum, write end-of-attachment appraisals and supervisor's reports.

8 Curriculum Review and Updating

Since Cardiovascular medicine has historically been a rapidly changing specialty the need for review and up-dating of curricula is evident. Curriculum review will be informed by a number of different processes. The curriculum is specifically designed to guide an educational process and will continue to be the subject of active redrafting, to reflect changes in both Cardiovascular medicine and educational theory and practice. Trainees and regional training programme directors are encouraged to discuss the curriculum and to feedback on content and issues regarding implementation at both Specialty Training Committees and Specialist Advisory Committee levels. Review will be time-tabled to occur annually for any minor changes to the curriculum. The Cardiovascular medicine Curriculum will be reviewed by the Cardiovascular medicine SAC as a whole with input from the various sub-specialties. A working group of the Cardiovascular medicine SAC will be set up in conjunction with Heart Care Partnership UK (HCPUK) to examine the teaching of understanding the role of patients and carers in their care. The content of the advanced modules of specialist area curricula will be reviewed by the affiliated groups of the British Cardiovascular Society in conjunction with the SAC. The affiliated groups will involve the trainees in the evaluation and redrafting of specialist area curricula and will also involve either lay people available through their specialist area organisation or use lay persons recommended by the British Cardiovascular Society, HCPUK or JRCPTB. The Cardiovascular medicine SAC will also be able to use information gathered from specialty heads, specialty deans and the National Health Service. It will have available to it results of the trainee and trainers surveys, which will include questions pertaining to Cardiovascular medicine. Interaction with the NHS will be particularly important to understand the performance of specialists within the NHS and feedback will be required as to the continuing need for Cardiovascular medicine as defined by the curriculum. It is likely that the NHS will have a view as to the balance between generalist and specialist skills, the development of common competencies and, looking to the future, the need for additional specialist competencies and curricula.

9 Equality and Diversity

The impact of the 2014 revisions to the curriculum on different groups has been carefully considered throughout the review process. Training in inherited cardiac conditions is already offered to trainees and formalising this through the curriculum will improve equality of access to ICC modular training.

The Royal Colleges of Physicians and the JRCPTB will comply, and ensure compliance, with the requirements of equality and diversity legislation set out in the Equality Act 2010.

The Federation of the Royal Colleges of Physicians believes that equality of opportunity is fundamental to the many and varied ways in which individuals become involved with the Colleges, either as members of staff and Officers; as advisers from the medical profession; as members of the Colleges' professional bodies or as doctors in training and examination candidates. Accordingly, it warmly welcomes contributors and applicants from as diverse a population as possible, and actively seeks to recruit people to all its activities regardless of race, religion, ethnic origin, disability, age, gender or sexual orientation.

LETB/deanery quality assurance will ensure that each training programme complies with the equality and diversity standards in postgraduate medical training as set by GMC.

Compliance with anti-discriminatory practice will be assured through:

- monitoring of recruitment processes;

- ensuring all College representatives and Programme Directors have attended appropriate training sessions prior to appointment or within 12 months of taking up post;
- LETBs must ensure that educational supervisors have had equality and diversity training (for example, an e learning module) every 3 years
- LETBs must ensure that any specialist participating in trainee interview/appointments committees or processes has had equality and diversity training (at least as an e module) every 3 years.
- ensuring trainees have an appropriate, confidential and supportive route to report examples of inappropriate behaviour of a discriminatory nature. LETBs and Programme Directors must ensure that on appointment trainees are made aware of the route in which inappropriate or discriminatory behaviour can be reported and supplied with contact names and numbers. LETBs must also ensure contingency mechanisms are in place if trainees feel unhappy with the response or uncomfortable with the contact individual.
- monitoring of College Examinations;
- ensuring all assessments discriminate on objective and appropriate criteria and do not unfairly disadvantage trainees because of gender, ethnicity, sexual orientation or disability (other than that which would make it impossible to practise safely as a physician). All efforts shall be made to ensure the participation of people with a disability in training.

10 Full Syllabus

In the tables below, the “Assessment Methods” shown are those that are appropriate as **possible** methods that could be used to assess each competency. It is not expected that all competencies will be assessed and that where they are assessed not every method will be used. See section 5.2 for more details.

Common Competencies

The common competencies are those that should be acquired by all physicians during their training period starting within their undergraduate career and developed throughout their postgraduate career.

Assessment of Progressive Acquisition of the Common Competencies

For all of the common competencies in this section there are four descriptor levels to guide trainees and trainers as to what performance is expected. It is expected that trainees will progressively acquire higher levels of competence during training. Trainees should usually have acquired competence to perform at least at descriptor level 2 during core medical training i.e. before entry into cardiology specialist training. Further assessment during Cardiology training will be undertaken using the workplace-based assessments and it is expected that Cardiology trainees will achieve competencies to the highest level described before CCT.

History Taking, Clinical Examination, Therapeutics and Prescribing

It is important that these competencies are practised to a high level by all Cardiology trainees who should be able to achieve competencies in the highest descriptors early in their Cardiology training.

1. History Taking

To have the ability to obtain a relevant history from increasingly complex patients in increasingly challenging circumstances

To accurately record and synthesise the history with clinical examination to formulate a clear management plan

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
the importance of different elements of history	mini-CEX, MCR	1
patients not always presenting their history in a structured fashion	ACAT, mini-CEX, MCR	1, 3
likely causes of and risk factors for conditions relevant to the presentation	mini-CEX, MCR	1
the way that the history should inform examination, investigation and management	mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
find clues in the cardiac history to allow for provisional diagnosis and planned management	mini-CEX, MCR	1, 3
recognise and overcome barriers to effective communication	mini-CEX, MCR	1, 3
manage time and draw consultation to a close appropriately	mini-CEX, MCR	1, 3
supplement history with standardised instruments/questionnaires when relevant	ACAT, mini-CEX, MCR	1
manage alternative and conflicting views from family, carers and friends	ACAT, mini-CEX, MCR	1, 3,4

assimilate history from the available information from patient and other sources	ACAT, mini-CEX, MCR	1, 3
recognise and interpret the use of non verbal communication from patients and carers	mini-CEX, MCR	1, 3
focus on relevant aspects of cardiac history, especially the importance of previous acute admissions and therapies	ACAT, mini-CEX, MCR	1, 3
Behaviours		
Demonstrate:		
respect for and behaviour in accordance with Good Medical Practice	ACAT, mini-CEX, MCR	3, 4

Level Descriptor	
1	Obtains, records and presents accurate clinical history relevant to the clinical presentation Elicits most important positive and negative indicators of diagnosis Starts to ignore irrelevant information
2	Demonstrates ability to obtain relevant focussed clinical history in the context of limited time e.g. outpatients, ward referral Demonstrates ability to target history to discriminate between likely clinical diagnoses. Records information in most informative fashion Understands the potential problems of accurate history taking when the patients first language is not English Understands different cardiac conditions can present with similar symptoms
3	Demonstrates ability to rapidly obtain relevant history in context of severely ill patients Demonstrates ability to obtain history in difficult circumstances e.g. from angry or distressed patient / relatives Demonstrates ability to keep interview focussed on most important clinical issues
4	Able to quickly focus questioning to establish working diagnosis and relate to relevant examination, investigation and management plan in most acute and common chronic conditions in almost any environment

2. Clinical Examination

To develop the ability to perform focussed and accurate clinical examination in increasingly complex patients and challenging circumstances.

To relate physical findings to history in order to establish diagnosis and formulate a management plan

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The need for an appropriate clinical examination	CbD, mini-CEX, MCR	1
The basis and relevance of physical signs	ACAT, CbD, mini-CEX, MCR	1
Constraints to performing physical examination and strategies that may be used to overcome them	CbD, mini-CEX, MCR	1
The limitations of physical examination and the need for adjunctive forms of assessment	ACAT, CbD, mini-CEX, MCR	1
Skills		

Demonstrate the ability to:		
Carry out a thorough cardiovascular examination and elicit both physical signs that are relevant to the presentation that is valid, targeted and time efficient	ACAT, CbD, mini-CEX, MCR	1
Ascertain the possibility of deliberate harm in vulnerable patients and report suspicions to appropriate agencies	ACAT, CbD, mini-CEX, MCR	1, 2, 3
Elicit important clinical findings	CbD, mini-CEX, MCR	1
Identify the important signs of valvular disease and heart failure	CbD, mini-CEX, MCR	1
Elicit the signs of widespread cardiovascular atheromatous disease	CbD, mini-CEX, MCR	1
Perform relevant adjunctive examinations	CbD, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
behaviour in accordance with Good Medical Practice	CbD, mini-CEX, MSF, MCR	1, 4

Level Descriptor	
1	Performs, accurately records and describes findings from basic physical examination Elicits most important physical signs Uses and interprets findings adjuncts to basic examination e.g. internal examination, blood pressure measurement, pulse oximetry, peak flow, fundal examination
2	Performs focussed clinical examination directed to presenting cardiovascular complaint Actively seeks and elicits relevant positive and negative signs Uses and interprets findings adjuncts to basic examination e.g. electrocardiography, spirometry, ankle brachial pressure index, fundoscopy
3	Performs and interprets relevance of advanced focussed clinical examination e.g. pulse character Elicits subtle findings Uses and interprets findings of advanced adjuncts to basic examination e.g. echocardiography
4	Rapidly and accurately performs and interprets focussed clinical examination in challenging circumstances e.g. in an acute medical context

3. Therapeutics and Safe Prescribing

To develop ability to prescribe, review and monitor appropriate medication relevant to clinical practice including therapeutic and preventative indications.

Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
Indications, contraindications, side effects, drug interactions and dosage of commonly used cardiovascular drugs	ACAT, CbD, mini-CEX, MCR	1, 2
Range of adverse drug reactions to commonly used drugs, drugs requiring therapeutic drug monitoring and the interpretation of results	ACAT, CbD, mini-CEX, MCR	1
Tools to promote patient safety and prescribing, including IT systems	ACAT, CbD, mini-CEX, MCR	1, 2, 3
The effects of age, body size, organ dysfunction and concurrent illness on drug distribution and metabolism, as relevant to the	ACAT, CbD, mini-CEX, MCR	1, 2

trainee's practice		
The roles of regulatory agencies involved in drug use, monitoring and licensing (e.g. National Institute for Clinical Excellence (NICE), Committee on Safety of Medicines (CSM), and Healthcare Products Regulatory Agency and hospital formulary committees	ACAT, CbD, mini-CEX, MCR	1, 2
Skills		
Demonstrate the ability to:		
Review the continuing need for long term medications relevant to the trainees clinical practice	ACAT, CbD, mini-CEX, MCR	1, 2
Knows when drugs can be discontinued e.g. aspirin in anti-coagulated patients	ACAT, CbD, mini-CEX, MCR	1, 2
Anticipate and avoid defined drug interactions, including complementary medicines e.g. warfarin	ACAT, CbD, mini-CEX, MCR	1
Advise patients (and carers) about important interactions and adverse drug effects e.g. anti-hypertensive drugs and diabetic control	ACAT, CbD, mini-CEX, MCR	1, 3
Make appropriate dose adjustments following therapeutic drug monitoring, or physiological change (e.g. deteriorating renal function)	ACAT, CbD, mini-CEX, MCR	1
Use IT prescribing tools where available to improve safety	ACAT, CbD, mini-CEX, MCR	1, 2
Employ validated methods to improve patient concordance with prescribed medication	ACAT, mini-CEX, MCR	1, 3
Provide appropriate explanations to the patient, and carers when relevant, for the use of medicines	ACAT, CbD, mini-CEX, MCR	1, 3
Behaviours		
Demonstrate:		
Recognition of the benefit of minimising number of medications taken by a patient	ACAT, CbD, mini-CEX, MCR	1
Appreciation of the role of non-medical prescribers e.g. heart failure nurses	ACAT, CbD, mini-CEX, MCR	1, 3
Openness to advice from other health professionals on medication issues e.g. ward sister	ACAT, CbD, mini-CEX, MCR	1, 3
Recognition of the importance of resources when prescribing, including the role of a Drug Formulary	ACAT, CbD, mini-CEX, MCR	1, 2
Sharing of prescribing information between a patient's health care providers, e.g. between primary and secondary care	ACAT, CbD, MCR	1, 3
Remaining up to date with therapeutic alerts and understanding of the importance of some drugs and the need for strict compliance e.g. anti-platelet drugs after coronary stenting	ACAT, CbD, MCR	1

Level Descriptor	
1	Understands the importance of patient compliance with prescribed medication Outlines the adverse effects of commonly prescribed medicines Uses reference works to ensure accurate, precise prescribing
2/3	Takes advice on the most appropriate medicine in all but the most common situations. Makes sure an accurate record of prescribed medication is transmitted promptly to relevant others involved in an individual's care. Knows indications for commonly used drugs that require monitoring to avoid adverse effects. Modifies patients' prescriptions to ensure the most appropriate medicines are used for any specific

	condition. Maximises patient compliance by minimising the number of medicines required that is compatible with optimal patient care. Understands the importance of personal drug administration warning cards Encourages patient compliance by providing appropriate explanations of the need for the medicines prescribed. Is aware of the precise indications, dosages, adverse effects and modes of administration of the drugs used commonly within Cardiology and cardiovascular medicine Uses databases and other reference works to ensure knowledge of new therapies and adverse effects is up to date. Knows how to report adverse effects and take part in this mechanism.
4	Is aware of the regulatory bodies relevant to prescribed medicines both locally and nationally. Ensures that resources are used in the most effective way for patient benefit.

Patient Needs at the Centre of Care, the Promotion of Patient Safety, Team Working and Infection Control

The prevalence of long term conditions in patients presenting to Cardiology and General (Internal) Medicine means that specific competencies have been defined in the management of this group of patients including competence in managing end of life care. Many of these competencies will have been acquired during core training but as part of the maturation process for the cardiologist these competencies will become more finely honed and all trainees should be able to demonstrate the competencies described by the highest level descriptors by the time of their CCT.

4. Time Management and Decision Making

To become increasingly able to prioritise and organise clinical and clerical duties in order to optimise patient care.

To become increasingly able to make appropriate clinical and clerical decisions in order to optimise the effectiveness of the clinical team resource

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Organisation is key to time management	ACAT, CbD, MCR	1
Some tasks are more urgent or more important than others	ACAT, CbD, MCR	1,2
The need to prioritise work according to urgency and importance e.g. need for urgent angiography	ACAT, CbD, MCR	1
Some tasks may have to wait or be delegated to others	ACAT, CbD, MCR	1,3
Techniques for improving time management	ACAT, CbD, MCR	1
The importance of prompt investigation, diagnosis and treatment in disease management	ACAT, CbD, mini-CEX, MCR	1, 2
The need for focused summary to direct cardiovascular investigation	ACAT, CbD, mini-CEX, MCR	1, 2
Skills		
Demonstrate the ability to:		
Estimate the time likely to be required for essential tasks and plan	ACAT, CbD, mini-	1

accordingly	CEX, MCR	
Understand the importance of rapid request for investigation eg echocardiography to help direct management of acutely unwell patient	ACAT, CbD, mini-CEX, MCR	1
Group together tasks when this will be the most effective way of working	ACAT, CbD, mini-CEX, MCR	1
Recognise the most urgent / important tasks and ensure that they managed expediently	ACAT, CbD, mini-CEX, MCR	1
Regularly review and re-prioritise personal and team work load	ACAT, CbD, mini-CEX, MCR	1
Organise and manage workload effectively to avoid injurious impact on one's own health.	ACAT, CbD, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
Ability to work flexibly and deal with tasks in an effective fashion	ACAT, CbD, MSF, MCR	3
Recognition of when you or others are falling behind and take steps to rectify the situation	ACAT, CbD, MSF, MCR	3
Communication of changes in priority to others	ACAT, MSF, MCR	1
Remaining calm in stressful or high pressure situations and adopt a timely, rational approach	ACAT, MSF, MCR	1

Level Descriptor	
1	Recognises the need to identify work and compiles a list of tasks Works systematically through tasks with little attempt to prioritise Needs direction to identify most important tasks Sometimes slow to perform important work Does not use other members of the clinical team Finds high workload very stressful
2	Organises work appropriately but does not always respond to or anticipate when priorities should be changed Starting to recognise which tasks are most urgent Starting to utilise other members of the clinical team but not yet able to organise their work Requires some direction to ensure that all tasks completed in a timely fashion
3	Recognises the most important tasks and responds appropriately Anticipates when priorities should be changed Starting to lead and direct the clinical team in effective fashion Supports others who are falling behind Requires minimal organisational supervision
4	Automatically prioritises and manages workload in most effective fashion Communicates and delegates rapidly and clearly Automatically responsible for organising the clinical team Calm leadership in stressful situations Leads cardiac arrest team

5. Decision Making and Clinical Reasoning

To progressively develop the ability to formulate a diagnostic and therapeutic plan for a patient according to the clinical information available

To progressively develop the ability to prioritise the diagnostic and therapeutic plan

To be able to communicate the diagnostic and therapeutic plan appropriately

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Diagnostic reasoning:	ACAT, CbD, mini-CEX, MCR	1
Interpretation of clinical history and physical signs	ACAT, CbD, mini-CEX, MCR	1
The need for rapid management versus less rapid management	ACAT, CbD, mini-CEX, MCR	1
Generation of hypotheses within the clinical context	ACAT, CbD, mini-CEX, MCR	1
The need to test, refine and verify hypotheses	ACAT, CbD, mini-CEX, MCR	1
Problem lists and action plans	ACAT, CbD, mini-CEX, MCR	1
Need for senior advise on formulating plan	ACAT, CbD, mini-CEX, MCR	1
How to use expert advice, clinical guidelines and algorithms	ACAT, CbD, mini-CEX, MCR	1
The need to determine the best value and most effective treatment both for the individual patient and for a patient cohort	ACAT, CbD, mini-CEX, MCR	1, 2
The concepts of disease natural history and assessment of risk	ACAT, CbD, mini-CEX, MCR	1
Methods of quantifying risk e.g. cohort studies	ACAT, CbD, MCR	1
The concepts and drawbacks of quantitative assessment of risk or benefit e.g. numbers needed to treat	ACAT, CbD, MCR	1
Published cardiovascular cost efficacy assessments e.g. from NICE	ACAT, CbD, MCR	1
Commonly used statistical methodology	CbD, mini-CEX, MCR	1
Algorithmic pathways for common cardiological conditions e.g. NSTEMI	CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Interpret clinical features, their reliability and relevance to clinical scenarios including recognition of the variability of presentation of common disorders	ACAT, CbD, mini-CEX, MCR	1
Interpret common investigations accurately e.g. ECGs, CXR, blood enzyme tests	ACAT, CbD, mini-CEX, MCR	1
Recognise critical illness and respond with appropriate urgency	ACAT, CbD, mini-CEX, MCR	1

Generate plausible hypothesis(es) following patient assessment	ACAT, CbD, mini-CEX, MCR	1
Construct a concise and applicable problem list using available information	ACAT, CbD, mini-CEX, MCR	1
Construct an appropriate management plan and communicate this effectively to the patient, parents and carers where relevant	ACAT, CbD, mini-CEX, MCR	1, 3, 4
Is aware of the need for urgency in some patients while effectively communicating with others including colleagues nurses patient and relatives	ACAT, CbD, mini-CEX, MCR	1, 3, 4
Define the relevance of an estimated risk of a future event to an individual patient	ACAT, CbD, mini-CEX, MCR	1
Communicates the impact of lifestyle and risk factors on the likelihood of future events	ACAT, CbD, mini-CEX, MCR	1
Use risk calculators appropriately	ACAT, CbD, mini-CEX, MCR	1
Is aware of the value and limitations of risk scores e.g. GRACE	ACAT, CbD, mini-CEX, MCR	1
Apply quantitative data of risks and benefits of therapeutic intervention to an individual patient	ACAT, CbD, mini-CEX, MCR	1
Search and comprehend medical literature to guide reasoning	AA, CbD, MCR	1
Behaviours		
Demonstrate:		
Acknowledgment of uncertainty	ACAT, CbD, mini-CEX, MCR	1
Willingness to discuss intelligibly with a patient the notion and difficulties of prediction of future events, and benefit/risk balance of therapeutic intervention	ACAT, CbD, mini-CEX, MCR	3
Willingness to facilitate patient choice e.g. PCI versus surgery	ACAT, CbD, mini-CEX, MCR	3
Willingness to search for evidence to support clinical decision making	ACAT, CbD, mini-CEX, MCR	1, 4
Understanding of evidence base versus empiric therapeutic strategies	ACAT, CbD, mini-CEX, MCR	1, 4
Ability to identify one's own biases and inconsistencies in clinical reasoning	ACAT, CbD, mini-CEX, MCR	1, 3
Level Descriptor		
1	In a straightforward clinical case: eg stable angina Develops a provisional diagnosis and a differential diagnosis on the basis of the clinical evidence Institutes an appropriate investigative plan Institutes an appropriate initial therapeutic plan Seeks appropriate support from others Takes account of the patient's wishes	
2	In a difficult clinical case: eg SOB Develops a provisional diagnosis and a differential diagnosis on the basis of the clinical evidence Institutes an appropriate investigative plan Institutes an appropriate initial therapeutic plan	

	Seeks appropriate support from others Takes account of the patient's wishes
3	In a complex case: eg valvular endocarditis Develops a provisional diagnosis and a differential diagnosis on the basis of the clinical evidence Institutes an appropriate investigative plan Institutes an appropriate initial therapeutic plan Seeks appropriate support from others Takes account of the patient's wishes
4	In a complex or emergency: Develops a provisional diagnosis and a differential diagnosis on the basis of the clinical evidence. Takes immediate steps to stabilise the patient Institutes an appropriate investigative plan. Institutes an appropriate therapeutic plan. Seeks appropriate support from others. Takes account of the patient's wishes and records them accurately and succinctly.

6. The Patient as Central Focus of Care

Prioritises the patient's wishes encompassing their beliefs, concerns expectations and needs		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
Health needs of particular populations e.g. ethnic minorities and recognise the impact of culture and ethnicity in presentations of physical and psychological conditions	ACAT, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Give adequate time for patients to express ideas, concerns and expectations	ACAT, mini-CEX, MCR	1, 3, 4
Understand issues related to un-healthy lifestyles	ACAT, mini-CEX, MCR	1, 3, 4
Respond to questions honestly and seek advice if unable to answer	ACAT, CbD, mini-CEX, MCR	3
Encourage the health care team to respect the philosophy of patient focussed care	ACAT, CbD, mini-CEX, MSF, MCR	3
Develop a self-management plan with the patient	ACAT, CbD, mini-CEX, MCR	1,3
Support patients, parents and carers where relevant to comply with clinical management plans	ACAT, CbD, mini-CEX, PS, MCR	3
Encourage patients to voice preferences and personal choices about their care	ACAT, mini-CEX, MCR, PS	3
Behaviours		
Demonstrate:		
Support for patient self-management	ACAT, CbD, mini-CEX, PS, MCR	3

Recognition of the duty of the medical professional to act as patient advocate when required	ACAT, CbD, mini-CEX, MSF, PS, MCR	3, 4

Level Descriptor	
1	Responds honestly and promptly to patient questions but knows when to refer for senior help Recognises the need for disparate approaches to individual patients including dietary issues
2	Recognises more complex situations of communication, accommodates disparate needs and develops strategies to cope
3	Deals rapidly with more complex situations, promotes patients self care and ensures all opportunities are outlined
4	Is able to deal with all cases to outline patient self care and to promote the provision of this when it is not readily available

7. Patient Safety in Clinical Practice

To understand that patient safety depends on the organisation and delivery of care.

To understand the risks of treatments and to discuss these with patients to enable them to make informed decisions about treatments.

Ensure that staff are aware of potential risks and work together to minimise them.

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
the features of a safe working environment	ACAT, CbD, mini-CEX, MCR	1
the hazards of medical equipment in common use	ACAT, CbD, MCR	1
the dangers of sharps and blood contamination	ACAT, CbD, MCR	1
the side effects and contraindications of medications prescribed	ACAT, CbD, mini-CEX, MCR	1
the local safe sedation protocols	CbD, MCR	1
the principles of risk assessment and management	CbD, MCR	1
the components of safe working practice in the personal, clinical and organisational settings	ACAT, CbD, MCR	1
local procedures to facilitate optimal practice e.g. heart failure protocol	ACAT, CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Recognise when a patient is not responding to treatment, reassess the situation, and encourage others to do so e.g. heart failure	ACAT, CbD, mini-CEX, MCR	1
understand when different strategies are required in those not responding to a particular therapy e.g. failed thrombolysis	ACAT, CbD, MCR	1
ensure the correct and safe use of medical equipment, ensuring faulty equipment is reported appropriately e.g. temporary pacing box	ACAT, CbD, mini-CEX, MCR	1
administer, titrate and monitor sedative medications in line with guidelines	ACAT, CbD, mini-CEX, MCR	1
improve patients' and colleagues' understanding of the potential risks of therapeutic interventions	ACAT, CbD, mini-CEX, MCR	1, 3

sensitively counsel a colleague following a significant adverse event, or near –miss, to encourage improvement in practice	ACAT, CbD, MCR	3
recognise and respond to the manifestations of a patient's deterioration (symptoms, signs, observations, and laboratory results)	ACAT, CbD, mini-CEX, MSF, MCR	1
Behaviours		
Demonstrate:		
a high level of safety awareness at all times	ACAT, CbD, mini-CEX, MCR	2
encouragement of feedback from all members of the team on safety issues	ACAT, CbD, mini-CEX, MSF, MCR	3
willingness to take appropriate action when concerns are raised about performance of members of the healthcare team	ACAT, CbD, mini-CEX, MSF, MCR	3
awareness of one's own limitations, and operation within them	ACAT, CbD, mini-CEX, MCR	1
appropriate liaison with patients to ensure comfort, with staff to monitor sedation and anaesthetists when needed	CbD, mini-CEX, PS, MCR	1, 3

Level Descriptor	
1	Discusses risks of treatments with patients and is able to help patients make decisions about their treatment. Does not hurry patients into decisions. Promotes patients safety to more junior colleagues. Always ensures the safe use of equipment. Follows guidelines unless there is a clear reason for doing otherwise. Recognises Acts promptly when a patient's condition deteriorates. Recognises untoward or significant events and always reports these. Leads discussion of causes of clinical incidents with staff and enables them to reflect on the causes. Able to undertake a root cause analysis
2	Demonstrates ability to lead team discussion on risk assessment and risk management and to work with the team to make organisational changes that will reduce risk and improve safety.
3	Able to assess the risks across the system of care and to work with colleagues from different department or sectors to ensure safety across the health care system.
4	Shows support for junior colleagues who are involved in untoward events. Is fastidious about following safety protocols and encourages junior colleagues to do the same

8. Team Working

To develop the ability to work well in a variety of different teams e.g. the ward team
To recognise wider teams e.g. cardiac networks.
To develop the leadership skills necessary to lead teams so that they are more effective

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The components of effective collaboration	ACAT, CbD, MCR	1
The roles and responsibilities of members of the healthcare team	ACAT, CbD, MCR	1
Factors adversely affecting a doctor's performance and methods to	CbD, MCR	1

rectify these		
The value of the multi-disciplinary team meeting	CbD, MCR	1
Skills		
Demonstrate the ability to:		
Practise with attention to the important steps of providing good continuity of care	ACAT, CbD, mini-CEX, MCR	1,3.4
Produce accurate, legible and attributable notes	ACAT, CbD, mini-CEX, MCR	1, 3
Adhere to established protocols	ACAT, CbD, mini-CEX, MCR	1, 3
Prepare patient lists with clarification of problems and ongoing care plan	ACAT, CbD, mini-CEX, MSF, MCR	1
Understands appropriate preparation all for cardiac interventional procedures	ACAT, CbD, mini-CEX, MSF, MCR	1
Understands routine cardiac surgical workup	ACAT, CbD, mini-CEX, MSF, MCR	1
Detailed hand over between shifts and areas of care	ACAT, CbD, mini-CEX , MSF, MCR	1, 3
Demonstrate leadership in: • Education and training • Managing the deteriorating performance of colleagues (e.g. due to stress, fatigue) • Effective handover of care between shifts and teams • Identifying opportunities for new groups to work together • Respecting the views of others in achieving the common purpose of the team	ACAT, CbD, mini-CEX, MCR	1, 2, 3
Lead and participate in interdisciplinary team meetings ensuring that all views are heard	ACAT, CbD, mini-CEX, MCR	3
Provide appropriate supervision to less experienced colleagues	ACAT, CbD, MSF, MCR	3
Able to teach cardiac procedures appropriate to level of expertise and training	ACAT, CbD, MSF, MCR	3
Behaviours		
Demonstrate:		
Encouragement of an open empathetic environment to foster concerns and issues about the functioning and safety of team working	ACAT, CbD, MSF, MCR	3
Recognition of and respect for the request for a second opinion	ACAT, CbD, MSF, MCR	3
Recognition of the importance of induction for new members of a team	ACAT, CbD, MSF, MCR	3
Recognition of the importance of prompt and accurate information sharing with Primary Care team following hospital discharge	ACAT, CbD, mini-CEX, MSF, MCR	3

Level Descriptor	
1	Works well within the multidisciplinary team and recognises when assistance is required from the relevant team member Demonstrates awareness of own contribution to patient safety within a team and is able to outline

	the roles of other team members. Keeps records up-to-date and legible and relevant to the safe progress of the patient. Hands over care in a precise, timely and effective manner.
2	Demonstrates ability to discuss problems within a team to senior colleagues. Provides an analysis and plan for change. Demonstrates ability to work with the virtual team to develop the ability to work well in a variety of different teams – for example the ward team and the infection control team - and to contribute to discussion on the team's role in patient safety. To develop the leadership skills necessary to lead teams so that they are more effective and able to deliver better safer care.
3	Leads multidisciplinary team meetings but promotes contribution from all team members Recognises need for optimal team dynamics and promotes conflict resolution Demonstrates ability to convey to patients after a handover of care that although there is a different team, the care is continuous.
4	Leads multi-disciplinary team meetings allowing all voices to be heard and considered. Fosters an atmosphere of collaboration. Demonstrates ability to work with the virtual team Ensures that team functioning is maintained at all times. Promotes rapid conflict resolution

9. Principles of Quality and Safety Improvement

To recognise the desirability of monitoring performance, learning from mistakes and adopting no blame culture in order to ensure high standards of care and optimise patient safety

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
he elements of clinical governance	CbD, MSF, MCR	1
Local and national significant event reporting systems relevant to Cardiology e.g. National reporting system for device failure	ACAT, CbD, mini-CEX, MCR	1
The importance of evidence-based practice in relation to clinical effectiveness	CbD, MCR	1
Outline local health and safety protocols (fire, manual handling etc)	CbD, MCR	1
The risks associated with the trainee's Cardiology work e.g. radiation hazards and needle stick injury	CbD, MCR	1
The use of patient early warning systems to detect clinical deterioration	ACAT, CbD, mini-CEX, MCR	1
Keep abreast of national patient safety initiatives e.g. National Patient Safety Agency and NCEPOD reports,	ACAT, CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Adopt strategies to reduce risk e.g. pre-procedural preparation with anti-platelet drugs	ACAT, CbD, MCR	1, 2
Contribute to multidisciplinary quality improvement processes e.g. • Audit of personal and departmental performance • Identification and facilitation of areas for change	AA, CbD, MCR	2

• Monitoring of effects of changes in practice • Errors / discrepancy meetings • Critical incident reporting • Unit morbidity and mortality meetings • Local and national databases		
Maintain a folder of information and evidence, drawn from your medical practice	CbD, MCR	2
Reflect regularly on your standards of medical practice in accordance with GMC guidance on licensing and revalidation Maintains procedural logbook with personal data up to date	AA, MCR	1, 2, 3, 4
Behaviours		
Demonstrate:		
Willingness to participate in safety improvement strategies such as critical incident reporting	CbD, MSF, MCR	3
Engage a wide range of disciplines in an open no blame culture	CbD, MSF, MCR	3
Respond positively to outcomes of audit and quality improvement	CbD, MSF, MCR	1, 3
Presents patient issues and evidence at Hospital Audit meetings	CbD, MSF, MCR	1, 3
Co-operate with changes necessary to improve service quality and safety	CbD, MSF, MCR	1, 2

Level Descriptor	
1	Understands that clinical governance is the over-arching framework that unites a range of quality improvement activities. This safeguards high standards of care and facilitates the development of improved clinical services. Maintains personal portfolio (as e-portfolio)
2	Able to define key elements of clinical governance Engages in audit
3	Demonstrates personal and service performance Designs audit protocols and completes audit loop Demonstrates pro-active management of those awaiting cardiac surgery
4	Leads in review of patient safety issues Has ideas for improving optimal In patient stay Implements change to improve service Engages and guides others to embrace governance

10. Infection Control

To develop the ability to manage and control infection in patients. Including controlling the risk of cross-infection, appropriately managing infection in individual patients, and working appropriately within the wider community to manage the risk posed by communicable diseases.

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Understand the principles of infection control as defined by the GMC	ACAT, CbD, mini-CEX, MCR	1
Understands the principles of preventing infection in high risk groups	ACAT, CbD, mini-	1

(e.g. managing antibiotic use to prevent Clostridium difficile) including understanding the local antibiotic prescribing policy	CEX, MCR	
Understand the role of Notification within the UK and identify the principle notifiable diseases for UK and international purposes	ACAT, CbD, mini-CEX, MCR	1
Understand the role of the Health Protection Agency and Consultants in Health Protection (previously Consultants in Communicable Disease Control – CCDC)	CbD, ACAT, MCR	1
Understand the role of the local authority in relation to infection control	ACAT, CbD, mini-CEX, MCR	1
Understands the principles behind catheter laboratory aseptic procedure and maintains high standard of infection control where appropriate during interventional procedures		
Skills		
Demonstrate the ability to:		
Recognise the potential for infection within patients being care for	ACAT, CbD, MCR	1, 2
Counsel patients on matters of infection risk, transmission and control	ACAT, CbD, mini-CEX, PS , MCR	2, 3
Actively engage in local infection control procedures	ACAT, CbD, MCR	1
Actively engage in local infection control monitoring and reporting processes	ACAT, CbD, MCR	1, 2
Prescribe antibiotics according to local antibiotic guidelines	ACAT, CbD, mini-CEX, MCR	1
Recognise potential for cross-infection in clinical settings	ACAT, CbD, mini-CEX, MCR	1, 2
Practice aseptic technique whenever relevant	DOPS, MCR	1
Behaviours		
Demonstrate:		
Encouragement of all staff, patients and relatives to observe infection control principles	ACAT, CbD, MSF	1, 3
Level Descriptor		
2	Demonstrate ability to perform simple clinical procedures utilising aseptic technique. Manages simple common infections in patients using first-line treatments. Communicating effectively to the patient the need for treatment and any prevention messages to prevent re-infection or spread. Understands the importance of wearing gloves when venesection or drip placement Liaise with diagnostic departments in relation to appropriate investigations and tests.	
3	Demonstrate an ability to perform more complex clinical procedures whilst maintaining aseptic technique throughout Identify potential for infection amongst high risk patients obtaining appropriate investigations and considering the use of second line therapies. Understands the antibiotic principles behind the management of endocarditis Communicate effectively to patients and their relatives with regard to the infection, the need for treatment and any associated risks of therapy. Work effectively with diagnostic departments in relation to identifying appropriate investigations and monitoring therapy. Working in collaboration with external agencies in relation to reporting common notifiable diseases, and collaborating over any appropriate investigation or management	

4	Demonstrates an ability to perform most complex clinical procedures whilst maintaining full aseptic precautions, including those procedures which require multiple staff in order to perform the procedure satisfactorily. Identify the possibility of unusual and uncommon infections and the potential for atypical presentation of more frequent infections. Managing these cases effectively with potential use of tertiary treatments being undertaken in collaboration with infection control specialists, Work in collaboration with diagnostic departments to investigate and manage the most complex types of infection including those potentially requiring isolation facilities. Work in collaboration with external agencies to manage the potential for infection control within the wider community including communicating effectively with the general public and liaising with regional and national bodies where appropriate.

11. Managing Long Term Conditions and Promoting Patient Self-Care

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The natural history of diseases that run a chronic course e.g. chronic heart failure	ACAT, CbD, mini-CEX, MCR	1
The role of the multi-disciplinary team in long-term care	ACAT, CbD, mini-CEX, MCR	1
The role of the community support e.g. heart failure nurse	ACAT, CbD, mini-CEX, MCR	1
The concept of quality of life	CbD, MCR	1
The concept of patient self-care	CbD, mini-CEX, MCR	1
Medical and social models of disability and the implications of disability discrimination legislation.	CbD, MCR	1
Local health, educational and social service provision including the voluntary sector.	CbD, MCR	1
Skills		
Demonstrate the ability to:		
Develop and agree a management plan with the patient (and carers), to maximise self-care	ACAT, CbD, mini-CEX, MCR	1, 3
Develop and sustain supportive relationships with patients and carers	CbD, mini-CEX, MCR	1, 4
Provide support for those on long term cardiac medication	CbD, mini-CEX, MCR	1, 4
Provide effective patient education	ACAT, CbD, mini-CEX, MCR	1, 3, 4
Be sensitive to the influences of social and cultural issues.	ACAT, CbD, mini-CEX, MCR	1, 3, 4
Promote and encourage involvement of patients in appropriate support networks, both to receive support and to give support to others	CbD, PS, MCR	1, 3
Encourage and support patients in accessing appropriate information	CbD, PS, MCR	1, 3
Provide the relevant and evidence based information in an appropriate manner to facilitate patient choice	CbD, PS, MCR	1, 3
Behaviours		
Demonstrate:		

Willingness to act as a patient advocate when needed	CbD, mini-CEX, MCR	3, 4
Recognition of the potential impact of long term conditions, including disability, on the patient, family and friends	ACAT, CbD, mini-CEX, MCR	1
Ability to facilitate the provision for patients of appropriate	ACAT, CbD, mini-CEX, MCR	1
Equipment and devices and longer term follow up e.g. pacemaker checks	ACAT, CbD, mini-CEX, MCR	1
Willingness to Put patients in touch with the relevant agencies including the voluntary sector and local Charitable Cardiac Patient support groups	ACAT, CbD, mini-CEX, MCR	1, 3
Awareness of the need to combat disability discrimination.	ACAT, CbD, mini-CEX, MCR	1, 2
willingness to facilitate access to the appropriate training and skills in order to develop the patient's confidence and competence to self care	ACAT, CbD, mini-CEX, PS, MCR	1, 3,4
willingness to maintain a close working relationship with other members of the multi-disciplinary team, primary and community care	ACAT, CbD, mini-CEX, MSF, MCR	3
Recognise and respect the role of family, friends and carers in the management of the patient with a long term condition	ACAT, CbD, mini-CEX, PS , MCR	1,3
Recognise how cultural issues may impact on longer term management	ACAT, CbD, mini-CEX, PS, MCR	1,3

Level Descriptor	
1	Describes relevant long term conditions Understands the meaning of quality of life Is aware of the need for promotion of patient self care Helps the patient with an understanding of their condition and how they can promote self management
2	Demonstrates awareness of management of relevant long term conditions Is aware of the tools and devices that can be used in long term conditions Is aware of local and National cardiac support groups Is aware of external agencies that can improve patient care Teaches the patient and the team to promote excellent patient care
3	Develops management plans in partnership with the patient that are pertinent to the patients long term condition Can use relevant tools and devices in improving patient care Engages with relevant external agencies to promote patient care
4	Provides leadership within the multidisciplinary team that is responsible for management of patients with long term conditions Helps the patient networks develop and strengthen

12. End of Life Care in Cardiology

To recognise and become competent in managing end of life care since many cardiac conditions e.g. heart failure, ACHD and valvular heart disease enter an end of life phase where the focus on care should change from therapies designed to alter the natural history of the disease to those aimed at symptom control.

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The natural history and be aware of the prognosis of chronic cardiovascular diseases, CAD,HF,VHD,ACHD and PAH	Exam, CbD, MCR	1
The drug options for symptom control in end stage cardiovascular disease	Exam, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Detect when a patient is entering the terminal phase of their illness	CbD, mini-CEX, MCR	1,3
Access palliative care services where appropriate	CbD, mini-CEX, MCR	1,3
Discuss palliative care management with the patient and their family/carers	CbD, MSF, MCR	1,3
Prescribe drugs for symptom control	CbD, MSF, MCR	1,3
Be aware of the need for stopping disease modifying drugs which are adversely affecting quality of life	CbD, MSF, MCR	1,3
Deal with DNR issues	CbD, MSF, MCR	1,3
Deactivate AICDs	CbD, MSF, MCR	1,3
Behaviours		
Demonstrate:		
Appreciation that palliative care is a multidisciplinary holistic approach to patient care at end of life. Involving the patient and their family/carers.	MSF, MCR	1,3

Communication

Issues of communication both with patients and carers and within the healthcare team are often causes of complaint and inadequate communication can lead to poorer standards of patient care. Specific issues are highlighted within this section to promote better communication generally and within certain situations such as the impact of a patient's background (nationality and culture) on their health.

13. Relationships with Patients and Communication within a Consultation

To communicate effectively and sensitively with patients, relatives and carers		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
How to structure an interview appropriately	ACAT, CbD, mini-CEX, PS, MCR	1
The importance of the patient's background (including ethnicity and wealth), culture (including spirituality and religion), education and preconceptions (ideas, concerns, expectations) to the process	ACAT, CbD, mini-CEX, PS, MCR	1
Skills		
Demonstrate the ability to:		
Establish a rapport with the patient and any relevant others (eg carers)	ACAT, CbD, mini-CEX, PS, MCR	1, 3
Listen actively and question sensitively to guide the patient and to clarify information	ACAT, mini-CEX, PS, MCR	1, 3
Identify and manage communication barriers, tailoring language to the individual patient and using interpreters when indicated	ACAT, CbD, mini-CEX, PS, MCR	1, 3
Deliver information compassionately, being alert to and managing their and your emotional response (anxiety, antipathy etc)	ACAT, CbD, mini-CEX, MCR	1, 3, 4
Use, and refer patients to, appropriate written and other information sources	ACAT, CbD, mini-CEX, MCR	1, 3
Understand the principles behind "Informed consent"	ACAT, CbD, mini-CEX, MCR	1, 3
Check the patient's/carer's understanding, ensuring that all their concerns/questions have been covered	ACAT, CbD, mini-CEX, MCR	1, 3
Indicate when the interview is nearing its end and conclude with a summary	ACAT, CbD, mini-CEX, MCR	1, 3
Make accurate contemporaneous records of the discussion	ACAT, CbD, mini-CEX, MCR	1, 3
Manage follow-up effectively	ACAT, CbD, mini-CEX, MCR	1
Understand how to access sources for questions or queries that they cannot answer	ACAT, CbD, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
Approaching the situation with courtesy, empathy, compassion and professionalism, especially by appropriate body language - act as an	ACAT, CbD, mini-CEX, MSF, PS, MCR	1, 3, 4

equal not a superior		
Ensuring that the approach is inclusive and patient centred and respect the diversity of values in patients, carers and colleagues.	ACAT, CbD, mini-CEX, MSF, PS, MCR	1, 3
Willingness to provide patients with a second opinion	ACAT, CbD, mini-CEX, MSF, PS, MCR	1, 3
Use of different methods of ethical reasoning to come to a balanced decision where complex and conflicting issues are involved	ACAT, CbD, mini-CEX, MSF, MCR	1, 3
Confidence and positive in one's own values	ACAT, CbD, mini-CEX, MCR	1, 3
Involvement of other health professionals caring for the patient in the discussions and lead feedback afterwards	ACAT, CbD, mini-CEX, MCR	1, 3

Level	Descriptor
1	Conducts simple interviews with due empathy and sensitivity and writes accurate records thereof
2	Conducts interviews on complex concepts satisfactorily, confirming that accurate two-way communication has occurred
3	Handles communication difficulties appropriately, involving others as necessary; establishes excellent rapport
4	Shows mastery of patient communication in all situations, anticipating and managing any difficulties which may occur

14. Breaking Bad News

To recognise the fundamental importance of breaking bad news. To develop strategies for skilled delivery of bad news according to the needs of individual patients and their relatives / carers.

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
How bad news is delivered irretrievably affects the subsequent relationship with the patient	ACAT, CbD, mini-CEX, MSF, PS, MCR	1
Every patient may desire different levels of explanation and have different responses to bad news	ACAT, CbD, mini-CEX, PS, MCR	1, 4
That bad news is confidential but the patient may wish to be accompanied	ACAT, CbD, mini-CEX, PS, MCR	1
Involvement of other members of the team in the consultation	ACAT, CbD, mini-CEX, PS, MCR	1
Breaking bad news can be extremely stressful for the doctor or professional involved.	ACAT, CbD, mini-CEX, MCR	1, 3
The interview may be an educational opportunity	ACAT, CbD, mini-CEX, MCR	1
It is important to: Prepare for breaking bad news • Set aside sufficient uninterrupted time • Choose an appropriate private environment • Be certain of the information and to have run it past a senior colleague • Have sufficient information regarding prognosis and treatment	ACAT, CbD, mini-CEX, MCR	1, 3

• Structure the interview • Be honest, factual, realistic and empathic • Be aware of relevant guidance documents		
"Bad news" may be expected or unexpected	ACAT, CbD, mini-CEX, MCR	1
Bad news may include disengagement of a patients expectations such as them having no revascularisation option	ACAT, CbD, mini-CEX, MCR	1
Sensitive communication of bad news is an essential part of professional practice.	ACAT, CbD, mini-CEX, MCR	1
"Bad news" has different connotations depending on the context, individual, social and cultural circumstances.	ACAT, CbD, mini-CEX, PS, MCR	1
That a post mortem examination may be required and understand what this involves	ACAT, CbD, mini-CEX, PS, MCR	1
The local organ retrieval process	ACAT, CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Demonstrate to others good practice in breaking bad news	CbD, DOPS, MSF, MCR	1, 3
Involve patients and carers in decisions regarding their future management	CbD, DOPS, MSF, MCR	1, 3, 4
Encourage questioning and ensure comprehension	CbD, DOPS, MSF, MCR	1, 3
Respond to verbal and visual cues from patients and relatives	CbD, DOPS, MSF, MCR	1, 3
Act with empathy, honesty and sensitivity avoiding undue optimism or pessimism	CbD, DOPS, MSF, MCR	1, 3
Structures the interview e.g. • Demonstrates honesty and integrity to patients carers, nursing colleagues and medical staff colleagues • Sets the scene • Establishes understanding • Discusses; diagnosis, implications, treatment, prognosis and subsequent care	CbD, DOPS, MSF, MCR	1, 3
Behaviours		
Demonstrate:		
leadership in breaking bad news	CbD, DOPS, MSF, MCR	1
Respect for the different ways people react to bad news	CbD, DOPS, MSF, MCR	1

Level Descriptor	
1	Recognises when bad news must be imparted. Is able to "step up to the plate" in this difficult task Recognises the need to develop specific skills Requires guidance to deal with most cases Able to understand the importance of forewarning patients and relatives about the potential for

	bad news (e.g. when a cardiac procedure or operation is not going to plan)
2	Able to break bad news in planned settings Prepares well for interview Prepares patient to receive bad news Responsive to patient reactions
3	Able to break bad news in unexpected and planned settings Clear structure to interview but is not rigid Establishes what patient wants to know and ensures understanding Able to conclude interview
4	Skilfully delivers bad news in any circumstance including adverse events Arranges follow up as appropriate Able to teach others how to break bad news

15. Complaints and Medical Error

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Basic consultation techniques and skills described for Foundation programme and to include • Define the local complaints procedure • Recognise factors likely to lead to complaints (poor communication, dishonesty medical errors etc) • Adopt behaviour likely to prevent complaints • Dealing with dissatisfied patients or relatives • Recognise when something has gone wrong and identify appropriate staff to communicate this with • Recognise when a patients expectation for a cardiac procedure is not fulfilled • Act with honesty and sensitivity in a non-confrontational manner • Adopt the policy of honesty when a cardiac procedure has gone wrong	CbD, DOPS, MSF, MCR	1
Outline the principles of an effective apology	CbD, DOPS, MSF, MCR	1
Identify sources of help and support when a complaint is made about yourself or a colleague	CbD, DOPS, MSF, MCR	1
Skills		
Demonstrate the ability to:		
Contribute to processes whereby complaints are reviewed and learned from	CbD, DOPS, MSF, MCR	1
Understand the role of the Clinical Governance officer	CbD, DOPS, MSF, MCR	1
Explain comprehensibly to the patient the events leading up to a medical error	CbD, DOPS, MSF, MCR	1, 3
Deliver an appropriate apology	CbD, DOPS, MSF,	1, 3, 4

	MCR	
Distinguish between system and individual errors	CbD, DOPS, MSF, MCR	1
Show an ability to learn from previous error	CbD, DOPS, MSF , MCR	1
Behaviours		
Demonstrate:		
leadership over complaint issues	CbD, DOPS, MSF, MCR	1
Recognition of the impact of complaints and medical error on staff, patients, and the National Health Service	CbD, DOPS, MSF, MCR	1, 3
Contribution to a fair and transparent culture around complaints and errors	CbD, DOPS, MSF, MCR	1
Recognition of the rights of patients, family members and carers to make a complaint	CbD, DOPS, MSF, MCR	1, 4
Recognition of the likely causes of complaints in Cardiology and Cardiovascular medicine (from waiting times for investigation to mortality following therapy or intervention)	CbD, DOPS, MSF, MCR	1, 4

Level Descriptor	
1	Defines the local complaints procedure Recognises need for honesty in management of complaints Responds promptly to concerns that have been raised Understands the importance of an effective apology Learns from errors
2	Manages conflict without confrontation Recognises and responds to the difference between system failure and individual error
3	Recognises and manages the effects of any complaint within members of the team Recognises when there may be a need to seek senior and /or medico-legal advice
4	Provides timely accurate written responses to complaints when required Provides leadership in the management of complaints

16. Communication with Colleagues and Cooperation

Recognise and accept the responsibilities and role of the doctor in relation to other healthcare professionals. Communicate succinctly and effectively with other professionals as appropriate.

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Understand the section in "Good Medical Practice" on Working with Colleagues, in particular:	CbD, MSF, MCR	1
The roles played by all members of a multi-disciplinary team	CbD, MSF, MCR	1
The features of good team dynamics	CbD, MSF, MCR	1
The principles of effective inter-professional collaboration to optimise patient, or population, care	CbD, MSF, MCR	1
Skills		

Demonstrate the ability to:		
Communicate accurately, clearly, promptly and comprehensively with relevant colleagues by means appropriate to the urgency of a situation (telephone, email, letter etc), especially where responsibility for a patient's care is transferred	ACAT, CbD, mini-CEX, MCR	1, 3
Be responsive to those seeking a referral eg NSTEMI patient transfer	ACAT, CbD, mini-CEX, MCR	1, 3
Utilise the expertise of the whole multi-disciplinary team as appropriate, ensuring when delegating responsibility that appropriate supervision is maintained	ACAT, CbD, mini-CEX, MSF, MCR	1, 3
Ensure appropriate referrals (eg surgical) are optimally managed	ACAT, CbD, mini-CEX, MSF, MCR	1, 3
Ensure appropriate activation of team when required (eg STEMI alert)	ACAT, CbD, mini-CEX, MSF, MCR	1, 3
Participate in, and co-ordinate, an effective hospital at night team when relevant	ACAT, CbD, mini-CEX, MSF, MCR	1
Communicate effectively with administrative bodies and support organisations	CbD, mini-CEX, MSF, MCR	1, 3
Has exposure to Departmental management team meetings		
Deal with colleagues to prevent and resolve conflict	ACAT, CbD, mini-CEX, MSF, MCR	1, 3
Behaviours		
Demonstrate:		
Awareness of the importance of, and take part in, multi-disciplinary work, including adoption of a leadership role when appropriate	ACAT, CbD, mini-CEX, MSF, MCR	3
Awareness of the dynamics of MDTs	ACAT, CbD, mini-CEX, MSF, MCR	3
Fostering a supportive and respectful environment where there is open and transparent communication between all team members	ACAT, CbD, mini-CEX, MSF, MCR	1, 3
Ensuring appropriate confidentiality is maintained during communication with any member of the team	ACAT, CbD, mini-CEX, MSF, MCR	1, 3
Recognition of the need for a healthy work/life balance for the whole team, including yourself, but take any leave yourself only after giving appropriate notice to ensure that cover is in place	CbD, mini-CEX, MSF, MCR	1
Acceptance of additional duties in situations of unavoidable and unpredictable absence of colleagues	CbD, MSF, MCR	1

Level Descriptor	
1	Accepts his/her role in the healthcare team and communicates appropriately with all relevant members thereof
2	Fully recognises the role of, and communicates appropriately with, all relevant potential team members (individual and corporate)
3	Able to predict and manage conflict between members of the healthcare team
4	Able to take a leadership role as appropriate, fully respecting the skills, responsibilities and viewpoints of all team members

Public Health, Health Promotion, Health Inequalities and Occupational Health

For all hospital based physicians there is a need to be aware of public health issues, health promotion, health inequalities and occupational health. Competencies that promote this awareness are defined in the next section.

17. Occupational Health

To be able to assess the effects of work on cardiac health.

To be able to assess the effects of cardiac disease on work.

To be able to advise patients on return to work after cardiac illnesses

To be able to advise patients regarding effect of cardiac disease on specific occupational matters, eg driving, flying.

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of		
The common occupational risk factors for cardiac disease	Exam, CbD, mini-CEX, MCR	1
The impact of cardiac disease on the ability to work	Exam, CbD, mini-CEX, MCR	1
DVLA/CAA requirements regarding cardiac disease	Exam, CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant occupational history	CbD, mini-CEX, MCR	1,3
Select and use investigations appropriately	CbD, mini-CEX, MCR	1,2
Direct the patient for appropriate advice on disability and compensation for work related illnesses	CbD, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Involvement of other specialists e.g. occupational health physicians	MSF, PS, CbD, mini-CEX, ACAT, MCR	1,3
Recognition of the importance of other involved professionals e.g. physiotherapists, occupational therapists	MSF, PS, CbD, mini-CEX, ACAT, MCR	1,3
Appreciation of the importance of lifestyle, exercise, weight loss and correct use of occupational protection	CbD, mini-CEX, ACAT, MCR	1,3,4

18. Health Promotion, Health Inequalities and Public Health

To progressively develop the ability to work with individuals and communities to reduce levels of ill health, remove inequalities in healthcare provision and improve the general health of a community.

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The factors which influence the incidence and prevalence of common	ACAT, CbD, mini-	1

conditions including the impact of wealth inequalities, disabilities and the health status of migrants and refugees	CEX, MCR	
The factors which influence mental and physical health – psychological, biological, social, cultural and economic (e.g. poverty)	ACAT, CbD, mini-CEX, MCR	1
The importance of cardiovascular risk factors and life style on presentation and natural history of cardiovascular disease	ACAT, CbD, mini-CEX, MCR	1
The influence of lifestyle on health and the factors that influence an individual to change their lifestyle	ACAT, CbD, mini-CEX, MCR	1
The impact of adverse risk factors on procedural outcome (e.g. smoking and cardiac surgery)	ACAT, CbD, mini-CEX, MCR	1
The purpose of screening programmes and know in outline the common programmes available within the UK	CbD, mini-CEX, MCR	1
The key local concerns about health of communities such as smoking and obesity	ACAT, CbD, mini-CEX, MCR	1
The role of other agencies such as the British Heart Foundation	ACAT, CbD, mini-CEX, MCR	1
The implications of disability discrimination legislation for healthcare, e.g. Disabilities Discrimination Act	ACAT, CbD, mini-CEX, MCR	1
The principles of the Mental Capacity Act and the rights of children and vulnerable adults	ACAT, CbD, mini-CEX, MCR	1
The factors influencing ethical decision making: religion, moral beliefs, cultural practices	ACAT, CbD, mini-CEX, MCR	1
Issues related to porcine valves, blood transfusion and Jehovah's Witnesses		
The importance of SMR and can interpret the local relationship between this and health care provision such as revascularisation rates.	ACAT, CbD, mini-CEX, MCR	1
The source of reference for good health care delivery targets e.g. MINAP	ACAT, CbD, mini-CEX, MCR	1
The major causes of global morbidity and mortality and effective, affordable interventions to reduce them	ACAT, CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Identify opportunities to prevent ill health and disease in patients Takes part in a cardiovascular prevention clinic	ACAT, CbD, mini-CEX, PS, MCR	1, 2
Identify opportunities to promote changes in lifestyle and other actions that will positively improve health.	ACAT, CbD, mini-CEX, MCR	1, 2
Identify the interaction between mental, physical and social wellbeing in relation to health.	ACAT, CbD, mini-CEX, MCR	1
Counsel patients appropriately on the benefits and risks of screening	ACAT, CbD, mini-CEX, PS, MCR	1, 3
Communicate effectively with patients from diverse backgrounds and those with special communication needs, such as the need for interpreters etc	CbD, mini-CEX, MCR, MSF	1
Work collaboratively with other agencies to improve the health of communities eg cardiology and cardiac surgery support groups	CbD, mini-CEX, MCR	1
Behaviours		

Demonstrate:		
Engagement in effective team-working around the improvement of health	ACAT, CbD, MSF, MCR	1, 3
Use appropriate methods of ethical reasoning to come to a balanced decision where complex and conflicting issues are involved	CbD, mini-CEX, MCR	1
Adoption of assessments and interventions that are respectful of diversity and patient-centred (e.g. use of blood products)	CbD, mini-CEX, MCR	1
Respond to people in an ethical, honest, and non-judgmental manner	CbD, mini-CEX, MSF, MCR	1
Encouragement of appropriate screening to facilitate early intervention	CbD, MCR	1

Level Descriptor	
1	Discuss with patients and others factors which could influence their personal health. Indicates the risks associated with adverse risk factors and outcomes following cardiac procedures Maintains own health is aware of own responsibility as a doctor for promoting healthy approach to life.
2	Communicate to individuals, information about the factors which influence their personal health. Support an individual in a simple health promotion activity (eg smoking cessation) Leads patient to agencies or groups for support
3	Communicate to an individual and their relatives, information about the factors which influence their personal health. Support small groups in a simple health promotion activity (eg smoking cessation) Provide information to an individual about a screening programme and offer information about its risks and benefits
4	Discuss with small groups the factors that have an influence on their health and describe initiatives they can undertake to address these Attends cardiovascular risk reduction clinic Provide information to an individual about a screening programme offering specific guidance in relation to their personal health and circumstances concerning the factors that would affect the risks and benefits of screening to them as an individual. Engage with local or regional initiatives to improve individual health and reduce inequalities in health between communities

The Law, Ethics and Research

The legal and ethical framework associated with healthcare is a vital part of the practitioner's competence for safe practice. Within this the ethical aspects of research must be considered. The competencies associated with these areas of practice are defined in the following section

19. Principles of Medical Ethics and Confidentiality

To know, understand and apply appropriately the principles, guidance and laws regarding medical ethics and confidentiality

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The principles of medical ethics	ACAT, CbD, mini-CEX, MCR	1
The guidance given by the GMC on confidentiality and situations where this may be inadvertently broken (e.g. showing of identifiable patient data at meetings)	ACAT, CbD, mini-CEX, MCR	1
The provisions legislation such as Data Protection Act, Freedom of Information Act, Disabilities Discrimination Act	ACAT, CbD, mini-CEX, MCR	1
The role of the Caldicott Guardian within an institution, and outline the process of attaining Caldicott approval for audit/ research	ACAT, CbD, mini-CEX, MCR	1, 4
Situations where patient consent, while desirable, may not be required for disclosure e.g. communicable diseases, public interest STEMI cardiogenic shock	ACAT, CbD, mini-CEX, MCR	1, 4
The procedures for seeking a patient's consent for disclosure of identifiable information	ACAT, CbD, mini-CEX, MCR	1
The obligations for confidentiality following a patient's death	ACAT, CbD, mini-CEX, MCR	1, 4
The problems posed by disclosure in the public interest, without patient's consent	ACAT, CbD, mini-CEX, MCR	1, 4
The factors influencing ethical decision making: religion, moral beliefs, cultural practices	ACAT, CbD, mini-CEX, MCR	1
Issues related to porcine valves, blood transfusion and Jehovah's Witnesses	ACAT, CbD, mini-CEX, MCR	1
Do not resuscitate: Define the standards of practice defined by the GMC when deciding to withhold or withdraw life-prolonging treatment	ACAT, CbD, mini-CEX, MCR	1
The principles of the Mental Capacity Act and the rights of children and vulnerable adults	ACAT, CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Use and share information with the highest regard for confidentiality, and encourage such behaviour in other members of the team	ACAT, CbD, mini-CEX, MSF, MCR	1, 2,3
Use and promote strategies to ensure confidentiality is maintained e.g. anonymisation	CbD, MCR	1
Be aware of transmission patient information to unauthorised email addresses without encryption	CbD, MCR	1

Counsel patients on the need for information distribution within members of the immediate healthcare team	ACAT, CbD, MSF, MCR	1, 3
Counsel patients, family, carers and advocates tactfully and effectively when making decisions about resuscitation status, and withholding or withdrawing treatment	ACAT, CbD, mini-CEX, PS, MCR	1, 3
Behaviours		
Demonstrate:		
Encouragement of ethical reflection in others	ACAT, CbD, MSF, MCR	1
Willingness to seek advice of peers, legal bodies, and the GMC in the event of ethical dilemmas over disclosure and confidentiality	ACAT, CbD, mini-CEX, MSF, MCR	1
Respect for patient's requests for information not to be shared, unless this puts the patient, or others, at risk of harm	ACAT, CbD, mini-CEX, PS, MCR	1, 4
Willingness to share information about their care with patients, unless they have expressed a wish not to receive such information	ACAT, CbD, mini-CEX, MCR	1, 3
Willingness to seek the opinion of others when making decisions about resuscitation status, and withholding or withdrawing treatment	ACAT, CbD, mini-CEX, MSF, MCR	1, 3

Level Descriptor	
1	Use and share information with the highest regard for confidentiality adhering to the Data Protection Act and Freedom of Information Act in addition to guidance given by the GMC Familiarity with the principles of the Mental Capacity Act Participate in decisions about resuscitation status and withholding or withdrawing treatment
2	Counsel patients on the need for information distribution within members of the immediate healthcare team and seek patients' consent for disclosure of identifiable information
3	Define the role of the Caldicott Guardian within an institution, and outline the process of attaining Caldicott approval for audit or research
4	Able to assume a full role in making and implementing decisions about resuscitation status and withholding or withdrawing treatment. Acts with appropriate ethical and professional conduct in challenging situations.

20. Valid Consent

To obtain valid consent from the patient

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Outline the guidance given by the GMC on consent, in particular: • Understand that consent is a process that may culminate in, but is not limited to, the completion of a consent form • Understand the particular importance of considering the patient's level of understanding and mental state (and also that of the parents, relatives or carers when appropriate) and how this may impair their capacity for informed consent	CbD, DOPS, MSF, MCR	1
Skills		
Demonstrate the ability to:		
Present all information to patients (and carers) in a format they understand, allowing time for reflection on the decision to give	ACAT, CbD, mini-CEX, Patient Survey,	1, 3

consent	MCR	
Provide a balanced view of all care options Attend for any procedures you are consenting for	ACAT, CbD, mini-CEX, Patient Survey, MCR	1, 3, 4
Behaviours		
Demonstrate:		
Respect for a patient's rights of autonomy even in situations where their decision might put them at risk of harm	ACAT, CbD, mini-CEX, Patient Survey, MCR	1
Avoidance of exceeding the scope of authority given by a patient	ACAT, CbD, mini-CEX, Patient Survey, MCR	1
Avoidance of withholding information relevant to proposed care or treatment in a competent adult	ACAT, CbD, mini-CEX, MCR	1, 3, 4
Willingness to discuss advance directives	ACAT, CbD, mini-CEX, MCR	1, 3
Willingness to obtain a second opinion, senior opinion, and legal advice in difficult situations of consent or capacity	ACAT, CbD, mini-CEX, MSF, MCR	1, 3
Inform a patient and seek alternative care where personal, moral or religious belief prevents a usual professional action	ACAT, CbD, mini-CEX, PS, MCR	1, 3, 4

Level Descriptor	
1	Obtains consent for straightforward treatments with appropriate regard for patient's autonomy
2	Able to explain complex treatments meaningfully in layman's terms and thereby to obtain appropriate consent
3	Obtains consent in "grey-area" situations where the best option for the patient is not clear
4	Obtains consent in all situations even when there are problems of communication and capacity

21. Legal Framework for Practice

To understand the legal framework within which healthcare is provided in the UK in order to ensure that personal clinical practice is always provided in line with this legal framework

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
All decisions and actions must be in the best interests of the patient	ACAT, CbD, mini-CEX, MCR	1
The legislative framework within which healthcare is provided in the UK – in particular death certification and the role of the Coroner/Procurator Fiscal; child protection legislation; mental health legislation (including powers to detain a patient and giving emergency treatment against a patient's will under common law); advanced directives and living Wills; withdrawing and withholding treatment; decisions regarding resuscitation of patients; surrogate decision making; organ donation and retention; communicable disease notification; medical risk and driving; Data Protection and Freedom of Information Acts; provision of continuing care and community nursing care by a local authorities.	ACAT, CbD, mini-CEX, MCR	1, 2
The differences between legislation in the four countries of the UK	CbD, MCR	1

sources of medical legal information	ACAT, CbD, mini-CEX, MCR	1
Disciplinary processes in relation to medical malpractice	ACAT, CbD, mini-CEX, MSF, MCR	1
The role of the medical practitioner in relation to personal health and substance misuse, including understanding the procedure to be followed when such abuse is suspected.	ACAT, CbD, mini-CEX, MSF, MCR	1
Skills		
Demonstrate the ability to:		
Cooperate with other agencies with regard to legal requirements – including reporting to the Coroner's Officer or the proper officer of the local authority in relevant circumstances	ACAT, CbD, mini-CEX, MCR	1
Understanding which cases post procedure should be reported to the coroner	ACAT, CbD, mini-CEX, MCR	1
Prepare appropriate medical legal statements for submission to the Coroner's Court, Procurator Fiscal, Fatal Accident Inquiry and other legal proceedings	CbD, MSF, MCR	1
Present material in Court	CbD, mini-CEX, MCR	1
Incorporate legal principles into day to day practice	ACAT, CbD, mini-CEX, MCR	1
Practice and promote accurate documentation within clinical practice	ACAT, CbD, mini-CEX, MCR	1, 3
Ensure accurate recording of information for those also caring for the patient (e.g. length of clopidogrel dosage, timing of pacemaker check)	ACAT, CbD, mini-CEX, MCR	1, 3
Behaviours		
Demonstrate:		
Willingness to seek advice from the Healthcare Trust, legal bodies (including defence unions), and the GMC on medico-legal matters	ACAT, CbD, mini-CEX, MSF, MCR	1
Promotion of reflection on legal issues by members of the team	ACAT, CbD, mini-CEX, MSF, MCR	1, 3

Level Descriptor	
1	Demonstrates knowledge of the legal framework associated with medical qualification and medical practice and the responsibilities of registration with the GMC. Demonstrates knowledge of the limits to professional capabilities - particularly those of pre-registration doctors.
2	Identify with Senior Team Members cases which should be reported to external bodies and where appropriate initiate that report. Identify with Senior Members of the Clinical Team situations where you feel consideration of medical legal matters may be of benefit. Be aware of local Trust procedures around substance abuse and clinical malpractice.
3	Work with external strategy bodies around cases that should be reported to them. Collaborating with them on complex cases preparing brief statements and reports as required. Actively promote discussion on medical legal aspects of cases within the clinical environment. Practice in accordance of contemporary legislation. Participate in decision making with regard to resuscitation decisions and around decisions related to driving discussing the issues openly but sensitively with patients and relatives
4	Work with external strategy bodies around cases that should be reported to them. Collaborating

	with them on complex cases providing full medical legal statements as required and present material in Court where necessary Lead the clinical team in ensuring that medical legal factors are considered openly and consistently wherever appropriate in the care of a patient. Ensuring that patients and relatives are involved openly in all such decisions.

22. Ethical Research

To ensure that research is undertaken using relevant ethical guidelines

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The GMC guidance on good practice in research	ACAT, CbD, MCR	1
The differences between audit and research	AA, CbD, mini-CEX, MCR	1
How clinical guidelines are produced different categories of evidence (e.g. Class A 1)	CbD, MCR	1
Research principles	CbD, mini-CEX, MCR	1
The principles for ethical committee application	CbD, mini-CEX, MCR	1
The difference between differing forms of “Sponsor”	CbD, mini-CEX, MCR	1
The ethical issues behind Commercially funded research	CbD, mini-CEX, MCR	1
The principles of formulating a research question and designing a project	CbD, mini-CEX, MCR	1
Principal qualitative, quantitative, bio-statistical and epidemiological research methods	CbD, MCR	1
Sources of research funding	CbD, MCR	1
Skills		
Demonstrate the ability to:		
Develop critical appraisal skills and apply these when reading literature	CbD, MCR	1
Demonstrate ability to write a summary trial application (even if based on idea of a senior or previous audit)	CbD, MCR	1
Demonstrate the ability to write a scientific paper	CbD, MCR	1
Apply for appropriate ethical research approval	CbD, MCR	1
Demonstrate the use of literature databases	CbD, MCR	1
Demonstrate good verbal and written presentations skills	CbD, DOPS, MCR	1
Understand the difference between population-based assessment and unit-based studies and be able to evaluate outcomes for epidemiological work	CbD, MCR	1
Behaviours		
Demonstrate:		
Recognition of the ethical responsibilities to conduct research with honesty and integrity, safeguarding the interests of the patient and obtaining ethical approval when appropriate	CbD, MSF, MCR	1
Following of guidelines on ethical conduct in research and consent for	CbD, MCR	1

research			
willingness to the promotion of involvement in research		CbD , MCR	1
Level Descriptor			
1	Defines ethical research and demonstrates awareness of GMC guidelines Differentiates audit and research Knows how to use databases Demonstrates ability to write protocol summary		
2	Demonstrates ability to write a scientific paper Demonstrates critical appraisal skills		
3	Demonstrates ability to apply for appropriate ethical research approval Demonstrates knowledge of research funding sources Demonstrates good presentation and writing skills		
4	Provides leadership in research Promotes research activity Formulates and develops research pathways		

23. Evidence and Guidelines

It is the responsibility of each practitioner to ensure that they are aware of relevant developments in clinical care and also ensure that their practice conforms to the highest standards of practice that may be possible. An awareness of the evidence base behind current practice and a need to audit one's own practice is vital for the physician training in Cardiology and General (Internal) Medicine.

To progressively develop the ability to make the optimal use of current best evidence in making decisions about the care of patients

To progressively develop the ability to construct evidence based guidelines in relation to medical practise

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The application of statistics in scientific medical practice	CbD, MCR	1
The advantages and disadvantages of different study methodologies (randomised control trials, case controlled cohort etc)	CbD, MCR	1
The principles of critical appraisal of published evidence	CbD, MCR	1
Levels of evidence and quality of evidence	CbD, MCR	1
The difference in National, European and US Guidelines for cardiovascular therapy recommendations e.g. NSTEMI, STEMI Valve disease	CbD, MCR	1
The role and limitations of evidence in the development of clinical guidelines	CbD, MCR	1
The advantages and disadvantages of guidelines	CbD, MCR	1
The processes that result in nationally applicable guidelines (e.g. NICE and SIGN)	CbD , MCR	1
Skills		
Demonstrate the ability to:		

search the medical literature including use of PubMed, Medline, Cochrane reviews and the internet	CbD, MCR	1
Appraise retrieved evidence to address a clinical question	CbD, MCR	1
Apply conclusions from critical appraisal into clinical care	CbD, MCR	1
Identify the limitations of research	CbD, MCR	1
Contribute to the construction, review and updating of local (and national) guidelines of good practice using the principles of evidence based medicine	CbD, MCR	1
Behaviours		
Demonstrate:		
Keeping up to date with national reviews and guidelines of practice (e.g. NICE and SIGN)	CbD, MCR	1
Aiming for best clinical practice (clinical effectiveness) at all times, responding to evidence based medicine	ACAT, CbD, mini-CEX, MCR	1
Recognition of the occasional need to practise outside clinical guidelines	ACAT, CbD, mini-CEX, MCR	1
Encouragement of discussion amongst colleagues on evidence-based practice	ACAT, CbD, mini-CEX, MSF, MCR	1

Level Descriptor	
1	Participate in departmental or other local journal club Critically review an article to identify the level of evidence
2	Lead in a departmental or other local journal club Undertake a literature review in relation to a clinical problem or topic
3	Produce a review article on a clinical topic, having reviewed and appraised the relevant literature
4	Perform a systematic review of the medical literature Contribute to the development of local or national clinical guidelines

24. Audit

To progressively develop the ability to perform an audit of clinical practice and to apply the findings appropriately

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The different methods of obtaining data for audit including patient feedback, hospital sources and national reference data	AA, CbD, MCR	1
The uses of audit (developing patient care, risk management etc)	AA, CbD, MCR	1
The steps involved in completing the audit cycle	AA, CbD, MCR	1
The working and uses of national and local databases such as specialty data collection systems e.g. for ICD etc.	AA, CbD, MCR	1
The working and uses of local and national systems for reporting and learning from clinical incidents and near misses	AA, CbD, MCR	1
Skills		
Demonstrate the ability to:		

Design, implement and complete audit cycles	AA, CbD, MCR	1, 2
Contribute to local and national audit projects as appropriate (e.g. BCIS, CCAD)	AA, CbD, MCR	1, 2
Support audit by junior medical trainees and within the multi-disciplinary team	AA, CbD, MCR	1, 2
Behaviours		
Demonstrate:		
Recognition of the need for audit in clinical practice to promote standard setting and quality assurance	AA, CbD, MCR	1, 2

Level Descriptor	
1	Attendance at departmental audit meetings Contribute data to a local or national audit Document one audit activity within the Trust
2	Identify a problem and develop standards for a local audit
3	Compare the results of an audit with criteria or standards to reach conclusions Use the findings of an audit to develop and implement change Organise or lead a departmental audit meeting
4	Lead a complete clinical audit cycle including development of conclusions, implementation of findings and re-audit to assess the effectiveness of the changes Become audit lead for an institution or organisation

Other Common Competencies

25. Teaching and Training

To progressively develop the ability to teach and train the full range of health care professionals using an increasing portfolio of techniques appropriate to the setting

To be able to assess the quality of their own and others teaching

To be able to plan and deliver a training programme with appropriate assessments

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Adult learning principles relevant to medical education	CbD, MCR	1
learning methods and effective learning environments	CbD, MCR	1
How to construct educational objectives	CbD , MCR	1
Effective questioning techniques	CbD, MCR	1
Different teaching formats	CbD, MCR	1
The structure of the effective appraisal interview	CbD, MCR	1
The roles to the various bodies involved in medical education	CbD, MCR	1
The difference between appraisal and assessment	CbD, MCR	1
The workplace-based assessments in use	CbD, MCR	1
Definition of learning objectives and outcomes	CbD, MCR	1
Appropriate local course of action to assist the failing trainee	CbD, MCR	1

Skills		
Demonstrate the ability to:		
Vary teaching format and stimulus, appropriate to situation and subject	CbD, TO, MCR	1
Demonstrate important cardiological signs to others	CbD, TO, MCR	1
Provide effective feedback after teaching, and promote learner reflection	CbD, MSF, TO, MCR	1
Conduct effective appraisal	CbD, MSF, TO, MCR	1
Demonstrate effective lecture, presentation, small group and bed side teaching sessions	CbD, MSF, TO, MCR	1, 3
Provide appropriate career advice, or refer trainee to an alternative effective source of career information	CbD, MSF, TO, MCR	1, 3
Participate in strategies aimed at improving patient education e.g. talking at support group meetings	CbD, MSF, TO, MCR	1
Lead departmental teaching programmes including journal clubs	CbD, TO, MCR	1
Recognise and help manage the trainee in difficulty	CbD, MCR	1
Behaviours		
Demonstrate:		
In discharging educational duties act to maintain the dignity and safety of patients at all times	CbD, MSF, TO, MCR	1, 4
Recognition of the importance of the role of the physician as an educator within the multi-professional healthcare team and uses medical education to enhance the care of patients	CbD, MSF, TO, MCR	1
Balancing the needs of service delivery with the educational imperative	CbD, MSF, TO, MCR	1
Willingness to teach trainees and other health and social workers in a variety of settings to maximise effective communication and practical skills	CbD, MSF, TO, MCR	1
Encouragement of discussions in the clinical settings to colleagues to share knowledge and understanding	CbD, MSF, TO, MCR	1, 3
Maintain honesty and objectivity during appraisal and assessment	CbD, MSF, TO, MCR	1
Willingness to participate in workplace-based assessments	CbD, MSF, TO, MCR	1
Willingness to take up formal tuition in medical education and respond to feedback obtained after teaching sessions	CbD, MSF, TO, MCR	1, 3
Willingness to become involved in the wider medical education activities fostering an enthusiasm for medical education activity in others	CbD, MSF, TO, MCR	1
Recognition of the importance of personal development as a role model to guide trainees in aspects of good professional behaviour	CbD, MSF, TO, MCR	1
Consideration for learners including their emotional, physical and psychological well being with their development needs	CbD, MSF, TO, MCR	1

Level Descriptor	
1	Develops basic PowerPoint presentation to support educational activity Delivers small group teaching to medical students, nurses or colleagues Able to seek and interpret simple feedback following teaching

2	Able to supervise a medical student, nurse or colleague through a procedure Able to perform a workplace based assessment including being able to give effective feedback
3	Able to devise a variety of different assessments (eg multiple choice questions, work place based assessments) Able to appraise a medical student, nurse or colleague Able to act as a mentor to a medical student, nurses or colleague
4	Able to plan, develop and deliver educational activities with clear objectives and outcomes Able to plan, develop and deliver an assessment programme to support educational activities

26. Personal Behaviour

The individual practitioner has to have appropriate attitudes and behaviours that help deal with complex situations. It is also important to recognise and develop clinical leadership in order to work effectively as part of the healthcare team.

To develop the behaviours that will enable the doctor to become a senior leader able to deal with complex situations and difficult behaviours and attitudes.

To work increasingly effectively with many teams and to be known to put the quality and safety of patient care as a prime objective.

To develop the attributes of someone who is trusted to be able to manage complex human, legal and ethical problem. To become someone who is trusted and is known to act fairly in all situations

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
One's own values and principles and know how these may differ from those of others.	ACAT, CbD, mini-CEX, MSF, PS, MCR	1,2,3,4
The potential impact (both positive and negative) of personal beliefs on the delivery of healthcare to individuals and communities	ACAT, CbD, mini-CEX, MSF, PS, MCR	1,2,3,4
The impact of one's own emotions, prejudices and behaviour	ACAT, CbD, mini-CEX, MSF, PS, MCR	1,2,3,4
How to deal with inappropriate patient and family behaviour	ACAT, CbD, mini-CEX, MSF, PS, MCR	1,2,3,4
The rights of children, elderly, people with physical, mental, learning or communication difficulties	ACAT, CbD, mini-CEX, MSF, PS, MCR	1,2,3,4
The overall approach of value based practice and how this relates to ethics, law and decision-making	CbD, mini-CEX, MSF, PS, MCR	1,2,3,4
The concept of modern medical professionalism	CbD, MCR	1
The relevance of professional bodies (Royal Colleges, JRCPTB, GMC, Postgraduate Dean, BMA, specialist societies, medical defence organisations)	CbD, MCR	1
Skills		
Demonstrate the ability to:		
Practise with: • integrity • compassion • altruism • respect of cultural and ethnic diversity	ACAT, CbD, mini-CEX, MSF, PS, MCR	1, 2, 3, 4

• regard to the principles of equity • self control		
Behave with honesty and probity	ACAT, MSF, MCR	3
Admit to errors early and pro-actively	ACAT, CbD, mini-CEX, MSF, MCR	1, 3
Act with honesty and sensitivity in a non-confrontational manner	ACAT, CbD, MCR	1
Provide specialist support to hospital and community based services	ACAT, CbD, MSF, MCR	1
Ensure sound communications at all times	ACAT, CbD, MSF, MCR	1
handle enquiries from the press and other media effectively	CbD, DOPS, MCR	1, 3
Behaviours		
Demonstrate:		
Recognition that personal beliefs and biases can impact on the delivery of health services	ACAT, CbD, mini-CEX, MSF, MCR	1
Recognition of the need to use all healthcare resources prudently and appropriately	ACAT, CbD, mini-CEX, MCR	1, 2
Understanding of the principles of cost efficacy (NICE) in relation to Cardiology	ACAT, CbD, mini-CEX, MCR	1, 2
Continuously improving clinical leadership skills to contribution to positively influence healthcare organisations	ACAT, CbD, mini-CEX, MCR	1
Recognise situations when it is appropriate to involve professional and regulatory bodies	ACAT, CbD, mini-CEX, MCR	1
Show willingness to act as a mentor, educator and role model	ACAT, CbD, mini-CEX, MSF, MCR	1
Be willing to accept mentoring as a positive contribution to promote personal professional development	ACAT, CbD, mini-CEX, MCR	1
Participate in professional regulation and continued professional development	CbD, mini-CEX, MSF, MCR	1
Seek and respond to informal and formal feedback e.g. 360 degree feedback as part of appraisal	CbD, MSF, MCR	1, 2, 4
Recognise the right for equity of access to healthcare	ACAT, CbD, mini-CEX, MCR	1
Recognise need for reliability and accessibility throughout the healthcare team	ACAT, CbD, mini-CEX, MSF, MCR	1

Level Descriptor	
1	Works work well within the context of multiprofessional teams. Listens well to others and takes other viewpoints into consideration. Supports patients and relatives at times of difficulty e.g after receiving difficult news. Is polite and calm when called or asked to help
2	Responds to criticism positively and seeks to understand its origins and works to improve. Praises staff when they have done well and where there are failings in delivery of care provides constructive feedback. To wherever possible involve patients in decision making
3	Recognises when other staff are under stress and not performing as expected and provides appropriate support for them. Takes action necessary to ensure that patient safety is not

	compromised
4	Helps patients who show anger or aggression with staff or with their care or situation and works with them to find an approach to manage their problem Is able to engender trust so that staff feel confident about sharing difficult problems and feel able to pointing out deficiencies in care at an early stage.

27. Management and NHS Structure

To understand the principles of managing services
To understand the structure of the NHS and the management of local healthcare systems
To be able to participate in managing healthcare provision

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
GMC guidance on management and doctors	CbD, MCR	1
The local structure of NHS systems recognising the potential differences between the four countries of the UK	ACAT, CbD, MCR	1
The structure and function of healthcare systems as they apply to Cardiology e.g. the role of The Heart Team at DH	ACAT, CbD, MCR	1
The political, social, technical, economic, organisational and professional aspects that can impact on NHS provision of service	CbD, MCR	1
The importance of local demographic, socio-economic and health inequalities data to improve system performance	CbD, MCR	1
The principles of: • Clinical coding • European Working Time Regulations • National Service Frameworks • Health regulatory agencies (e.g., NICE, Scottish Government) • NHS finance, budgeting and planning • Resource allocation and management • The role of the Independent sector as providers of healthcare	ACAT, CbD, mini-CEX, MCR	1
The principles of recruitment and appointment procedures	CbD, MCR	1
Skills		
Demonstrate the ability to:		
Manage other team members: provide guidance, review performance and support development.	ACAT, CbD, MCR	1
Take an active role in promoting the best use of healthcare resources including analysis of a range of performance data	ACAT, CbD, mini-CEX, MCR	1
Work with stakeholders to create and sustain a patient-centred service	ACAT, CbD, mini-CEX, MCR	1
Identify and employ new technologies appropriately, including information technology	ACAT, CbD, mini-CEX, MCR	1
Understand the manner whereby new cardiological therapies/ devices are introduced to the NHS	ACAT, CbD, mini-CEX, MCR	1
Conduct an assessment of the community needs for specific health improvement measures	CbD, mini-CEX , MCR	1

Behaviours		
Demonstrate:		
Recognition of the importance of “just” allocation of healthcare resources	CbD, MCR	1, 2
Recognition of the role of doctors as active participants in healthcare systems	ACAT, CbD, mini-CEX, MCR	1, 2
Responding appropriately to health service targets and take part in the development of services	ACAT, CbD, mini-CEX, MCR	1, 2
Recognition of the role of patients and carers as active participants in healthcare systems and service planning	ACAT, CbD, mini-CEX, PS , MCR	1, 2, 3
Willingness to improve managerial skills (e.g. management courses) and engage in management of the service	CbD, MSF, MCR	1

Level Descriptor	
1	Describes in outline the roles of primary care, including general practice, public health, community, mental health, secondary and tertiary care services within healthcare. Describes the roles of members of the clinical team and the relationships between those roles. Participates fully in clinical coding arrangements and other relevant local activities.
2	Can describe in outline the roles of primary care, community and secondary care services within healthcare. Can describe the roles of members of the clinical team and the relationships between those roles. Participates fully in clinical coding arrangements and other relevant local activities.
3	Can describe the relationship between PCTs/Health Boards, General Practice and Trusts including relationships with local authorities and social services. Participate in team and clinical directorate meetings including discussions around service development. Discuss the most recent guidance from the relevant health regulatory agencies in relation to the specialty.
4	Describe the local structure for health services and how they relate to regional or devolved administration structures. Be able to discuss funding allocation processes from central government in outline and how that might impact on the local health organisation. Participate fully in clinical directorate meetings and other appropriate local management structures in planning and delivering healthcare within the specialty. Participate as appropriate in staff recruitment processes in order to deliver an effective clinical team. Within the Directorate collaborate with other stake holders to ensure that their needs and views are considered in managing services Is able to identify emerging trends and communicate credible strategic development plans using appropriate data analysis that is taken up by other members of the team.

Cardiology Core Clinical Syllabus

The following section outlines the necessary competencies in relation to specific clinical situations.

1. Chest Pain

To be able to carry out specialist assessment and treatment of patients with chest pain		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
The causes of chest pain	Exam, mini-CEX CbD, ACAT, MCR	1
The indications, limitations, risks and predictive value of non-invasive and invasive investigations	Exam, mini-CEX, CbD, ACAT, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform a reliable and appropriate examination	mini-CEX, CbD, ACAT, MCR	1,3,
Select and use investigations appropriately	mini-CEX, CbD, ACAT, MCR	1,2,
Behaviours		
Demonstrate:		
Appreciation of the importance of the history in evaluating chest pain	MSF, PS, MCR	1
A non-judgemental and non-stereotyping approach to patients	MSF, PS, MCR	3,4
Appreciation of the anxiety and concerns of patients and relatives with chest pain	MSF, PS, MCR	1,3,4
Appreciation of the contribution non-medical and non-cardiological disciplines have to play in the treatment of patients with chest pain	MSF, PS, MCR	1,3
Understanding of the associated psychological factors of patients with chest pain	MSF, PS, MCR	1

2. Stable Angina

To be able to carry out specialist assessment and treatment of patients with stable angina		
Knowledge	**Assessment Methods**	**GMP**
Demonstrate knowledge of:		
The pathogenesis of atheroma and the importance of risk factors	Exam, mini-CEX, CbD, MCR	1
The natural history, pathophysiology, and presentations of coronary artery disease	Exam, mini-CEX, CbD, MCR	1
The pharmacology of drugs currently used in the treatment of stable angina	Exam, mini-CEX, CbD, MCR	1
The indications, limitations, risks and predictive value of non-invasive	Exam, mini-CEX,	1

and invasive investigations	CbD, MCR	
Which patients should be investigated further and referred for intervention	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Diagnose angina accurately	CbD, mini-CEX, MCR	1
Take a relevant history and perform a reliable and appropriate examination	CbD, mini-CEX, MCR	1,3
Select and use investigations appropriately	CbD, mini-CEX, MCR	1,2
Present the risks and benefits of an intervention to a patient in a way that they understand	CbD, mini-CEX, MCR	1,3,4
Behaviours		
Demonstrate:		
Recognition of the role of cardiac nurse specialists and cardiac rehabilitation	MSF, PS, MCR	1,3
Appreciation of the interaction of symptoms with the patient's life style	MSF, PS, MCR	1,3
Appreciation of the concerns and anxiety of patients and relatives with coronary heart disease	MSF, PS, MCR	1,3,4
Advise patients regarding life style and long-term risk factor management	MSF, PS, MCR	1,3,4
Education of patients and relatives	MSF, PS, MCR	1,3,4
Discussion of sexual issues including impotence and use of drugs, with the patient and their partner in a sensitive manner	MSF, PS, MCR	1,3,4

3. Acute Coronary Syndromes and Myocardial Infarction

To be able to carry out specialist assessment and treatment of patients presenting with acute coronary syndromes and myocardial infarction		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
The pathogenesis of acute coronary syndromes and the importance of risk factors	Exam, mini-CEX, CbD, MCR	1
The natural history, pathophysiology, and acute presentations of coronary artery disease	Exam, mini-CEX, CbD, MCR	1
The pharmacology of drugs currently used in the treatment of acute coronary syndromes	Exam, mini-CEX, CbD, MCR	1
The indications, limitations, risks and predictive value of non-invasive and invasive investigations	Exam, mini-CEX, CbD, MCR	1
Which patients should be investigated further and referred for intervention	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Diagnose acute coronary syndromes and myocardial infarction	CbD, mini-CEX, MCR	1
Take a relevant history and perform a reliable and appropriate	CbD, mini-CEX, MCR	1,3

examination		
Select and use investigations appropriately	CbD, mini-CEX, MCR	1,2
Present the risks and benefits of an intervention to a patient in a way that they understand	CbD, mini-CEX, MCR	1,3,4
Behaviours		
Demonstrate:		
Recognition of the role of cardiac nurse specialists and cardiac rehabilitation	MSF, PS, MCR	1,3
Appreciation of the interaction of symptoms with the patient's life style including occupation and leisure	MSF, PS, MCR	1,3
Appreciation of the concerns and anxiety of patients and relatives with coronary heart disease	MSF, PS, MCR	1,3,4
Ability to advise patients regarding life style and long-term risk factor management	MSF, PS, MCR	1,3,4
Education of patients and relatives	MSF, PS, MCR	1,3,4
Discussion of sexual issues including impotence and use of drugs, with the patient and their partner in a sensitive manner	MSF, PS, MCR	1,3,4

4. Acute Breathlessness

To be able to carry out specialist assessment and treatment of patients with acute breathlessness		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
The causes of acute breathlessness	Exam, mini-CEX, CbD, ACAT, MCR	1
The management of cardiac and non-cardiac diseases presenting with breathlessness	Exam, mini-CEX, CbD, ACAT, MCR	1
The indications for CPAP, non-invasive and invasive ventilation	Exam, mini-CEX, CbD, ACAT, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform an appropriate examination	CbD, mini-CEX, MCR	1,3
Select and use investigations appropriately	CbD, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Appreciation of the importance of other specialists e.g. respiratory physicians and intensivists	MSF, PS, MCR	1,3

5. Chronic Breathlessness

To be able to carry out specialist assessment and treatment of patients with chronic breathlessness

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The causes of chronic breathlessness	Exam, mini-CEX, CbD, MCR	1
The management of patients with chronic shortness of breath	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform an appropriate examination	CbD, mini-CEX, MCR	1,3
Select and use investigations appropriately	CbD, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Involvement of other specialists e.g. respiratory physicians	MSF, PS, MCR	1,3
Importance of other involved professionals	MSF, PS, MCR	1,3
Appreciate the importance of lifestyle, exercise and weight loss	MSF, PS, MCR	1,3,4
See Common competence: Managing long term conditions and promoting patient self-care	MSF, PS, MCR	

6. Heart Failure

To be able to carry out specialist assessment and treatment of patients with heart failure

Trainees are encouraged to attend specialist heart failure clinics at some time during the training period

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The aetiology, pathophysiology, diagnosis and management of heart failure	Exam, mini-CEX, CbD, MCR	1
The natural history and clinical presentation of patients with heart failure	Exam, mini-CEX, CbD , MCR	1
The pharmacology of drugs used to treat heart failure	Exam, mini-CEX, CbD, MCR	1
When and whom to refer device therapies for heart failure (CRT and ICDs)	Exam, mini-CEX, CbD, MCR	
The indications for referral for surgical interventions (including valve surgery, cardiac transplantation and assist devices	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform an appropriate examination	CbD, mini-CEX, MCR	1,3

Select and use investigations appropriately	CbD, mini-CEX, MCR	1,2
Select appropriate drug and device therapy for individual patients with heart failure	CbD, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Emphasising the importance of self management in heart failure, e.g. lifestyle, exercise and weight loss	MSF, PS, MCR	1,3,4
Appreciation of the importance of rehabilitation	MSF, PS, MCR	1
Development of supportive relationships with patients with chronic heart failure	MSF, PS , MCR	1,3,4
Functioning as leader of or part of a multi-professional team	MSF, PS, MCR	1,3,4

7. Cardiomyopathy

To be able to carry out specialist assessment and treatment of patients with cardiomyopathy

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The different types of cardiomyopathy	Exam, mini-CEX, CbD, MCR	1
The pathogenesis, natural history and prognosis of the cardiomyopathies	Exam, mini-CEX, CbD, MCR	1
The genetic basis for cardiomyopathies especially hypertrophic cardiomyopathy	Exam, mini-CEX, CbD, MCR	1
The role of screening	Exam, mini-CEX, CbD , MCR	1
The role of medical therapy, implantable cardioverter defibrillators, catheter based and surgical based treatments of the cardiomyopathies	Exam, mini-CEX, CbD, MCR	1
The indications for transplantation	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform an appropriate examination	CbD, DOPS, mini-CEX, MCR	1,3
Select and use investigations appropriately • Echocardiography • MRI • Exercise testing • Determination of oxygen consumption	CbD, DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Appreciation of the emotional difficulties encountered by patients and families with cardiomyopathy	MSF, PS, MCR	1,3,4

Offering of advice and support to patient and relatives	MSF, PS, MCR	1,3,4
Education of patients and their families	MSF, PS, MCR	1,3,4

8. Patients with Valvular Heart Disease

To be able to carry out specialist assessment and treatment of patients with cardiac murmurs

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The pathological processes that are responsible for valvular heart disease	Exam, mini-CEX, CbD, MCR	1
The natural history of valve disorders	Exam, mini-CEX, CbD, MCR	1
The indications, limitations, risks and predictive value of non-invasive and invasive investigations	Exam, mini-CEX, CbD, MCR	1
The indications for surgical intervention	Exam, mini-CEX, CbD, MCR	1
The different types of prosthetic valves available for clinical use	Exam, mini-CEX, CbD, MCR	1
The anticoagulation regimes appropriate for patients with valve disease and valve prostheses	Exam, mini-CEX, CbD, MCR	1
Which patients need regular follow up	Exam, mini-CEX, CbD, MCR	1
Endocarditis prophylaxis protocols	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform an appropriate examination	CbD, DOPS, mini-CEX, MCR	1,3
Select and use investigations appropriately	CbD, DOPS, mini-CEX, MCR	1,2
Perform an echocardiogram	CbD, DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
The ability to discuss the advantages and disadvantages of medical versus surgical management in a way that patients can understand	MSF, PS, MCR	1,3,4
the ability to discuss the advantages and disadvantages of different valve prostheses with patients	MSF, PS, MCR	1,3,4
Appreciation of the importance of educating patients about endocarditis prophylaxis and the natural history of valvular heart disease	MSF, PS, MCR	1

9. Pre-Syncope and Syncope

To be able to carry out specialist assessment and treatment of patients with pre-syncope and syncope		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
The causes of syncope and pre-syncope	Exam, mini-CEX, CbD, ACAT, MCR	1
The indications, limitations, risks and predictive value of non-invasive and invasive investigations	Exam, mini-CEX, CbD, ACAT, MCR	1
The indications for tilt table testing and loop recorders	Exam, mini-CEX, CbD, ACAT , MCR	1
The current recommendations concerning fitness to drive in patients with pre-syncope and syncope	Exam, mini-CEX, CbD, ACAT, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform an appropriate examination including carotid sinus massage and tilt table tests	CbD, mini-CEX, ACAT, MCR	1,2,3
Select and use investigations appropriately	CbD, mini-CEX, ACAT, MCR	1,2
Develop a management plan for syncopal patients	CbD, mini-CEX, ACAT, MCR	1,2
Behaviours		
Demonstrate:		
Appreciation of the importance of other specialists such as ENT and neurologists	mini-CEX, MSF, PS, MCR	1,3
Appreciation of the importance of the history from relatives and witnesses	mini-CEX, MSF, PS, MCR	1,3
Appreciation of problems specific to the elderly and address their social and medical needs	mini-CEX, MSF, PS, MCR	1,3
Appreciation of the impact of syncope on patients' lifestyle	mini-CEX, MSF, PS, MCR	1,3

10. Arrhythmias

To be able to carry out specialist assessment and treatment of patients with arrhythmias		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
The genetics, pathogenesis, natural history and prognosis of arrhythmias	Exam, mini-CEX, CbD, MCR	1
The methods of presentation of arrhythmias, their aetiology, recognition and management	Exam, mini-CEX, CbD, MCR	1
The normal electrophysiology of the heart and the basis of	Exam, mini-CEX,	1

arrhythmogenesis	CbD, MCR	
The pharmacology of drugs currently used in the treatment of arrhythmias including thromboprophylaxis	Exam, mini-CEX, CbD, MCR	1
The indications for temporary and permanent pacemakers	Exam, mini-CEX, CbD, MCR	1
The indications for electrophysiological studies and the use of radio-frequency ablation	Exam, mini-CEX, CbD, MCR	1
The indications for implantable cardioverter defibrillators and cardiac resynchronisation therapy	Exam, mini-CEX, CbD, MCR	1
The current recommendations concerning fitness to drive	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history, including family history, and perform an appropriate examination	CbD, Exam, mini-CEX, MCR	1,3
Select and use investigations appropriately	CbD, Exam, mini-CEX, MCR	1,2
Select appropriate drugs	CbD, Exam, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Appreciation of the anxiety patients suffer with arrhythmias and with some methods of management e.g. ICD	MSF, PS, MCR	1,3
See also Common competence: Managing long term conditions and promoting patient self-care	MSF, PS, MCR	
See also Heart rhythm training (core)	MSF, PS, MCR	

11. Atrial Fibrillation

To be able to carry out specialist assessment and treatment of patients with AF		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
Epidemiology pathophysiology and prognosis	Exam, mini-CEX, CbD, MCR	1
Classification	Exam, mini-CEX, CbD, MCR	1
Diagnosis, clinical features and impact on quality of life	Exam, mini-CEX, CbD, MCR	1
Associated conditions	Exam, mini-CEX, CbD, MCR	1
Diagnostic procedures	Exam, mini-CEX, CbD, MCR	1
Embolic complications	Exam, mini-CEX, CbD, MCR	1
Anticoagulation options and indications	Exam, mini-CEX,	1

	CbD, MCR	
Management: • rhythm vs. rate control • conversion to sinus rhythm • prevention of recurrences • control of ventricular rate • pacemaker-defibrillator therapy • catheter ablation or surgery	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform an appropriate clinical examination	CbD, DOPS, mini-CEX, MCR	1,3
Perform or interpret: ECG, echocardiogram, transesophageal echocardiogram, prolonged ECG monitoring exercise testing	CbD, DOPS, mini-CEX, MCR	1,2
Develop appropriate anti-thrombotic strategies	CbD, DOPS, mini-CEX, MCR	1,2
Select patients appropriately for cardioversion	CbD, DOPS, mini-CEX, MCR	1,2
Perform rhythm or rate control therapy	CbD, DOPS, mini-CEX, MCR	1,2
Select and refer patients for: • atrial catheter ablation or surgical ablation • pacemaker and defibrillator implantation	CbD, DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Appreciation of the anxiety patients suffer with AF and with some methods of management, e.g. catheter ablation and pacing	CbD, PS mini-CEX, MSF, MCR	1,3
Recognition of the importance of coexisting structural heart diseases for the outcome and management of AF	CbD, mini-CEX, MSF, PS, MCR	1
Appreciation of the limitations and risks of anti-arrhythmic drug therapy	CbD, mini-CEX, MSF, PS, MCR	1
Appreciation of the importance of anticoagulant therapy	CbD, mini-CEX, MSF, PS, MCR	1
Appreciation of the palliative nature and potential adverse effects of non-pharmacological therapies	CbD, mini-CEX, MSF, PS, MCR	1
Appreciation of newer methods for treating AF and how to refer patients for specialist treatment when appropriate	CbD, mini-CEX, MSF, PS, MCR	1,3

12. Pericardial Disease

To be able to carry out specialist assessment and treatment of patients with pericardial disease		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
The pathogenesis, natural history and prognosis of pericardial diseases	Exam, mini-CEX, CbD, MCR	1
The modes of presentation of pericardial disease	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform an appropriate examination	mini-CEX, CbD, MCR	1,3
Select and use investigations appropriately	mini-CEX, CbD, MCR	1,2
Undertake pericardiocentesis in appropriately selected patients (see Core procedures and Investigations 7)	mini-CEX, CbD, DOPS, MCR	1,2
Behaviours		
Demonstrate:		
Awareness of important but uncommon conditions	CbD, MCR	1

13a. Primary and Secondary Prevention of Cardiovascular Disease

To be able to carry out specialist assessment and treatment of patients with risk factors for vascular disease		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
How to investigate and manage patients with systemic hypertension (both primary and secondary), lipid disorders, diabetes, peripheral vascular disease, smoking and family history of cardiovascular disease	Exam, mini-CEX, CbD, MCR	1
How to calculate an individual patient's absolute risk of cardiovascular disease on the basis of standard risk factors	Exam, mini-CEX, CbD, MCR	1
The difference between relative and absolute risk	Exam, mini-CEX, CbD, MCR	1
The epidemiology of cardiovascular disease	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Assess the prevalence of cardiovascular disease in the community in which you work	CbD, mini-CEX, MCR	1
Manage risk factors appropriately for individual patients	CbD, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		

Appreciation of the importance of risk factor management	MSF, PS, MCR	1
Appreciation of racial and regional variation in cardiovascular risk factor distribution	MSF, PS, MCR	1
Emphasize the central role of patient education	MSF, PS, MCR	1,3
Offer advice and support to family members with familial disease	MSF, PS, MCR	1,3,4
Make active efforts to encourage patients to adopt a healthier lifestyle with specific emphasis on risk factors	MSF, PS, MCR	1,3,4
Appreciate the importance of other specialists such as dieticians, diabetologists and nurse specialists	MSF, PS, MCR	1

13b. Hypertension

To be able to carry out specialist assessment and treatment of patients with hypertension
Trainees are encouraged to attend specialist hypertension clinics during the training period

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Investigation and management of patients with systemic hypertension (both primary and secondary)	Exam, mini-CEX, CbD, MCR	1
The causes of hypertension	Exam, mini-CEX, CbD, MCR	1
How to assess patients with hypertension for end organ damage	Exam, mini-CEX, CbD, MCR	1
How to investigate a patient for secondary hypertension	Exam, mini-CEX, CbD, MCR	1
The pharmacology of drugs currently used in the treatment of hypertension	Exam, mini-CEX, CbD, MCR	1
How to manage a patient with resistant hypertension	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Implement protocols and management plans for hypertension	CbD, mini-CEX, MCR	1
Manage patients with hypertensive emergencies	CbD, mini-CEX, MCR	1,2
Interpret appropriate biochemical investigations and imaging modalities in the diagnosis and assessment of hypertension	CbD, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
Appreciation of the racial variation in hypertension and the varying response to pharmacological treatment	MSF, PS, MCR	1
Active efforts to encourage patients to adopt a healthier lifestyle with specific emphasis on risk factors	MSF, PS, MCR	1,3,4
Support for general practitioners with the long term management of patients with risk factors for coronary heart disease	MSF, PS, MCR	1,3

13c. Lipid Disorders

To be able to carry out specialist assessment and treatment of patients with lipid abnormalities **Trainees are encouraged to attend specialist lipid clinics during the training period**		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
How to investigate and manage patients with lipid disorders	Exam, mini-CEX, CbD, MCR	1
The pharmacology of drugs currently used in the treatment of lipid disorders	Exam, mini-CEX, CbD, MCR	1
The current evidence for pharmacological intervention in both primary and secondary prevention	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Interpret lipid results relevant to individual patients	CbD, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
Active efforts to encourage patients to adopt a healthier lifestyle with specific emphasis on risk factors	MSF, PS, MCR	1,3,4
Appreciation of the importance of other specialists such as dieticians, diabetologists and nurse specialists	MSF, PS, MCR	1,3

14. Adult Congenital Heart Disease

To be able to carry out, under supervision, specialist assessment and treatment of adolescent and adult patients with congenital heart disease		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of: The Epidemiology, Natural History, Presenting Features, Examination Findings, Appropriate Investigations, Management and Referral to Specialist Services of **Simple Congenital Heart Defects;** To include specifically, but not exclusively ASD, VSD, AVSD, Coarctation, Congenital Aortic valve, and LV outflow tract Disease, Pulmonary Stenosis, PDA, Anomalous Pulmonary Venous Drainage	Exam, mini-CEX, CbD, CBAT, ACAT, MCR	1
The Epidemiology, The basics of the natural history, The operations which are done for, The problems which occur in adult life, Appropriate Investigations, Acute management of Complications, Referral to Specialist Services of **Complex Congenital Heart Defects** To include specifically, but not exclusively Transposition of the Great Arteries, Congenitally Corrected transposition of the Great Arteries, Tetralogy of Fallot, Ebsteins Anomaly, Shones Complex, Functionally univentricular heart conditions, The Fontan Circulation, Truncus Arteriosus, Eisenmengers Syndrome	Exam, mini-CEX, CbD, CBAT, ACAT, MCR	1

Presentations of Emergencies in ACHD To include: Arrhythmias and their acute management in high risks situations, Massive haemoptysis, Endocarditis, Heart Failure, Aortic Dissection	Exam, mini-CEX, CbD, CBAT ACAT, MCR	1
Cyanosis complicating congenital heart disease and its management.		1
Pulmonary hypertension complicating congenital heart disease and its management	Exam, mini-CEX, CbD, CBAT, ACAT	1
The process of transition from childhood and paediatric services to adulthood and adult services	Exam, mini-CEX, CbD, CBAT, ACAT, MCR	1
The importance of Genetic syndromes in some cases of congenital heart disease. The increased risk of congenital heart disease in the children of affected adults and the role of ante-natal screening, and embryo selection	mini-CEX,CBAT, CbD, MCR	1
The importance of appropriate contraceptive advice and risk assessment for pregnancy	Exam, mini-CEX, CBAT, CbD, MCR	1
When to seek specialist advice	CbD, CBAT, MCR	1
	mini-CEX, CbD, MSF, MCR	
Skills		
Demonstrate the ability to: Take a relevant history and perform an appropriate examination	CbD, mini-CEX, MCR	1,3
Interface with paediatric team in the handover of patients from paediatric to adult services.	CbD, mini-CEX, MCR	1,3
Select and use investigations appropriately	CbD, mini-CEX, MCR	1,2
Manage acutely presenting ACHD patients with arrhythmias. Be able to recognise the arrhythmias that are specific to some forms of ACHD and require specialist advice	CbD, mini-CEX, MCR	1,2,3
Manage patients with adult congenital heart disease under supervision and liaise with specialists in congenital heart disease	MSF, PS, MCR	1,2,3
Behaviours		
Appreciation of the importance of genetic counselling	MSF, PS, MCR	1
Understand the importance of referring patients for a specialist opinion	MSF, PS, MCR	1
Have appropriate self-confidence and recognition of limitations	MSF, PS, MCR	1
Appreciation of the social and emotional difficulties encountered by patients with congenital heart disease	MSF, PS, MCR	1

To achieve the required clinical experience, trainees in ST3 to ST5 should ideally attend a two-week dedicated clinical attachment in an ACHD surgical specialist centre.

A less desirable alternative is to attend specialist clinics in adult congenital heart disease. In order to achieve competence, it is envisaged that trainees are likely to need to attend a minimum of 10 specialist clinics and /or ward rounds.

To help achieve the knowledge based objectives, trainees should attend the regional StR training days and National Training days

The ACHD Core Check List which is designed to aid in identifying the expected requirements (document available on the JRCPTB website) should be completed, signed by the ACHD Supervisor and stored in the Personal Library of the e-portfolio.

15. The Prevention and Management of Endocarditis

To be able to carry out specialist assessment and treatment of patients with endocarditis or who are at risk of endocarditis		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
The pathogenesis, presentation and natural history of endocarditis	Exam,mini-CEX, CbD, MCR	1
The common pathogens involved	Exam,mini-CEX, CbD, MCR	1
How to diagnosis, investigate, treat and monitoring patients with endocarditis	Exam,mini-CEX, CbD, MCR	1
The indications and limitations of echocardiography and other investigations in the diagnosis and management of endocarditis	Exam, mini-CEX, CbD, MCR	1
The possible complications of endocarditis	Exam, mini-CEX, CbD, MCR	1
The indications for surgical intervention	Exam, mini-CEX, CbD, MCR	1
The current guidelines for endocarditis prophylaxis	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform an appropriate examination	CbD, mini-CEX, MCR	1,3
Select and use investigations appropriately	CbD, mini-CEX, MCR	1,2
Manage patients with endocarditis	CbD, mini-CEX, MCR	1,2
Integrate information and advice from microbiologists and cardiac surgeons	CbD, mini-CEX, MCR	1,2,3
Behaviours		
Demonstrate:		
Appreciate the importance of patient education	MSF, PS, MCR	1,
Consult with Microbiologists and Cardiac Surgeons	MSF, PS, MCR	1,3

16. Diseases of the Aorta and Cardiac TRAUMA

To be able to assess diseases of the aorta, and trauma to the heart and aorta
To be able to implement the appropriate medical, interventional or surgical treatment regime

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The pathogenesis, genetics, presentation and natural history of aortic dissection and aortic aneurysms	Exam, mini-CEX, CbD, MCR	1
The indications, limitations and benefits of non-invasive and invasive investigations used in the assessment of aortic diseases	Exam, mini-CEX, CbD, MCR	1
The medical and surgical therapy of diseases of the aorta	Exam, mini-CEX, CbD, MCR	1
The causes and natural history of trauma to the heart and aorta	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform an appropriate examination	CbD, mini-CEX, MCR	1,3
Select appropriately non-invasive imaging	CbD, mini-CEX, MCR	1
Assess manage and give advice on patients with acute aortic syndromes and cardiac trauma	CbD, mini-CEX, MCR	1,2,3,
Organise appropriate family screening and long term follow up	CbD, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
Appreciate the importance of cooperation with cardiac surgeons	MSF, PS, MCR	1,3
Recognise the urgency of management required of patients with acute aortic syndromes and cardiac trauma	MSF, PS, MCR	1,2

17. Cardiac Tumours

To be able to carry out specialist assessment and treatment of patients who cardiac tumours

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The pathology, presentation and natural history of cardiac tumours	Exam, mini-CEX, CbD, MCR	1
The indications, limitations and benefits of investigations used in the assessment of cardiac tumours	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform an appropriate examination	CbD, DOPS, mini-CEX, MCR	1,3
Select and use appropriate investigations	CbD, DOPS, mini-CEX, MCR	1,2

Perform an echocardiogram	CbD, DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
The importance of cooperation with cardiac surgeons	MSF, CbD, MCR	1,3

18. Cardiac Rehabilitation

To be able to provide rehabilitation to patients with cardio-vascular disease

Specifically:

- **Post myocardial infarction**
- **Angina**
- **Post cardiac surgery**
- **Heart failure**

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The principles of cardiac rehabilitation and exercise training	Exam, mini-CEX, CbD, MCR	1
The use of rehabilitation for secondary prevention	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Be an active member of a multi-disciplinary rehabilitation team	CbD, mini-CEX, MCR	3
Anticipate and address patient concerns regarding work, exercise and sex	CbD, mini-CEX, MCR	1,3,4
Discuss sensitive issues, such as sex, in an understanding manner	CbD, mini-CEX, MCR	1,3,4
Behaviours		
Demonstrate:		
Appreciate the importance of rehabilitation for return to work, driving and sex	MSF, PS, MCR	1
Appreciate the importance of patient education	MSF, PS, MCR	1
Appreciate the interplay of physiological and psychological aspects of heart disease	MSF, PS, MCR	1
Appreciate the role of other professionals including nurse specialists, physiotherapists, dieticians and general practitioners in cardiac rehabilitation	MSF, PS, MCR	1,3

Trainees are encouraged to spend a period of time working with a cardiac rehabilitation team

19. Assessment of Patients with Cardiovascular Disease Prior to Non-Cardiac Surgery

To be able to carry out specialist assessment of patients with cardiovascular disease prior to non-cardiac surgery		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
How to assess risk prior to non-cardiac surgery for patients with cardiac disease and give advice and management plans accordingly	Exam, mini-CEX, CbD, MCR	1
How to optimise a patient's condition in order to minimize the risk of non-cardiac surgery	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Be an active member of a multi-disciplinary rehabilitation team	CbD, mini-CEX, MCR	3
Anticipate and address patient concerns regarding work, exercise and sex	CbD, mini-CEX, MCR	1,3,4
Discuss sensitive issues, such as sex, in an understanding manner	CbD, mini-CEX, MCR	1,3,4
Behaviours		
Demonstrate:		
Appreciate the importance of rehabilitation for return to work, driving and sex	MSF, PS, MCR	1
Appreciate the importance of patient education	MSF, PS, MCR	1
Appreciate the interplay of physiological and psychological aspects of heart disease	MSF, PS, MCR	1
Appreciate the role of other professionals including nurse specialists, physiotherapists, dieticians and general practitioners in cardiac rehabilitation	MSF, PS, MCR	1,3

20. Assessments of Patients Prior to Cardiac Surgery

To be able to carry out specialist assessment and referral for patients requiring cardiac surgery		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
How to assess and investigate cardiac and non-cardiac factors prior to cardiac surgery	Exam, mini-CEX, CbD, MCR	1
The general and specific risks and benefits of cardiac surgical interventions for coronary, valvular and congenital heart disease	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Assess patient's symptoms and clinical signs in conjunction with results of specialist investigations to make appropriate surgical referrals	CbD, mini-CEX, MCR	1,2

Investigate and optimise general medical conditions pre-operatively	CbD, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Liaise and discuss with cardiac surgeons directly	MSF, PS, MCR	1,3
Appreciate the concerns and pressure on cardiac surgeons and anaesthetists	MSF, PS, MCR	1,3
Appreciate surgical concerns relating to neurological, respiratory and renal complications	MSF, PS, MCR	1,3
Have a multi-disciplinary approach to pre-operative assessment. Involve other specialists if indicated	MSF, PS, MCR	3
Appreciate the technical potential and limitations of surgery	MSF, PS, MCR	1

21. Care of Patients Following Cardiac Surgery

To be able to carry out specialist assessment and treatment of patients who have had cardiac surgery

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The potential problems and complications of cardiac surgery whilst on ITU	Exam, mini-CEX, CbD, MCR	1
How to approach post-operative rehabilitation	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Assess patients on ITU and give advice to intensivists and surgeons	CbD, mini-CEX, MCR	1,2,3
Participate in the management of patients in the early post-operative period and long term	CbD, mini-CEX, MCR	1,3
Select and use investigations appropriately	CbD, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Appreciate the importance of good communication and collaboration between surgeon, anaesthetist and intensivist	MSF, PS, MCR	1,3
Appreciate the anxiety of relatives whilst patients are on ITU	MSF, PS, MCR	1
Appreciate the importance of rehabilitation after cardiac surgery	MSF, PS, MCR	1

22. Management of Critically Ill Patients with Haemodynamic Disturbances

To be able to carry out specialist assessment and treatment of patients who are critically ill with haemodynamic disturbances

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The pathogenesis, presentation and natural history of critical illnesses	Exam, mini-CEX, CbD, MCR	1
The indications and complications of intra-aortic balloon pump counter-pulsation	Exam, mini-CEX, CbD, MCR	1
When to consider patients for ventricular assist devices	Exam, mini-CEX, CbD, MCR	1
Indications for and haemodynamic consequences of positive pressure ventilation	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Assess manage and give advice on the critically ill patient	CbD, mini-CEX, MCR	1,2,3
Recognise and manage acute conditions including: • pulmonary embolism • acute pericarditis • myocarditis • cardiac tamponade • aortic dissection • cardiac rupture • cardiogenic shock • post infarction ventricular septal defect and mitral regurgitation • circulatory collapse	CbD, mini-CEX, MCR	1,2
To select and use investigations appropriately to assess haemodynamics: • Echocardiography • Pulmonary artery catheterisation and wedge pressure	CbD, mini-CEX, MCR	1,2
Use inotropic drugs	CbD, mini-CEX, MCR	1
Undertake pericardiocentesis	CbD, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
The importance of cooperation with anaesthetists/ intensivists and other specialties	MSF, PS, MCR	1,3
Awareness of legal/ ethical issues surrounding care, nutrition and ventilation of the unconscious patient	MSF, PS, MCR	1,2,3
Have sufficient communication skills to sensitively discuss problems of the critically ill with relatives	MSF, PS, MCR	1,3,4
Be able to break bad news	MSF, PS, MCR	1,3,4

23. Heart Disease in Pregnancy

To understand the principles, and importance, of appropriate assessment, counselling and treatment of women with heart disease who are or who are planning to become pregnant

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
How pregnancy, delivery and the postpartum period may affect cardiac function in normal women and in those with pre-existing or incident cardiac disease	Exam, mini-CEX, CbD, MCR	1
Heart disease is the leading cause of maternal death in the UK	Exam, mini-CEX, CbD, MCR	1
the risks of pregnancy for the mother and fetus for different cardiac disorders	Exam, mini-CEX, CbD, MCR	1
The risks of recurrence of congenital heart disease in the fetus of mothers with congenital heart disease	Exam, mini-CEX, CbD, MCR	1
The prescribing problems encountered during pregnancy	Exam, mini-CEX, CbD, MCR	1
The implications of anticoagulation during pregnancy	Exam, mini-CEX, CbD, MCR	1
Women with heart disease require specialist multidisciplinary pre-conception counselling, antenatal and puerperal care	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform an appropriate examination	CbD, mini-CEX, MCR	1,3
Assess cardiac patients' risk of becoming pregnant	CbD, mini-CEX, MCR	1
Refer appropriately women with heart disease who are or who are planning to become pregnant	CbD, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Appreciate the increased anxiety experienced by pregnant women with cardiac disease	MSF, PS, MCR	1,3
To recognize the need for referral to, and the role of, specialist cardiologists in the management of women preconception, during pregnancy and post partum	MSF, PS, MCR	1,3
To recognize the role of multidisciplinary care of women with heart disease and in particular liaison with obstetricians, midwives, haematologists, obstetric anaesthetists and intensivists	MSF, PS, MCR	1,3

Where expertise is available, it is mandatory for trainees to attend cardiac pregnancy and pre-pregnancy clinics.
For programmes without dedicated cardiac pregnancy and pre-pregnancy clinics teaching courses should be provided as part of Regional SpR training programmes. In order to achieve core competence, attendance at a minimum of 1 course per year on heart disease in pregnancy is mandatory.

24. Resuscitation – Basic and Advanced Life Support

To be able to carry out and supervise resuscitation of patients

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Current guidelines on Resuscitation	ALS, MCR	1
The principles of cardiopulmonary resuscitation	ALS, MCR	1
The cardiac and non-cardiac causes of cardiac arrest	ALS, MCR	1
Skills		
Demonstrate the ability to:		
Supervise pre-hospital care	ALS, MCR	1
Be proficient in Basic life support	ALS, MCR	1,2
Be proficient in Advanced life support	ALS, MCR	1,2
Must have passed ALS course	ALS, MCR	1
Effectively perform and supervise resuscitation of patients suffering from cardiac arrests and the critically ill	ALS, MCR	1,2
Behaviours		
Demonstrate:		
Ability to support relatives	ALS, MCR	1,3,4
Ability to break bad news in a sympathetic manner	ALS, MCR	1,3,4
Appreciation of legal and ethical considerations of resuscitation	ALS, MCR	1
Familiarity with the legal and ethical issues associated with “do not attempt resuscitation” orders	ALS, MCR	1

25. Radiation Use and Safety

Be able to use radiation equipment appropriately and safely for the diagnosis, assessment and treatment of patients with cardiac disease according to the regulations IRR 99 and IRMER 2000 or their successors

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The physics and hazards of ionising radiation to patients and staff	IRMER, MCR	1
The current statutory requirements concerning the medical use of ionising radiation	IRMER, MCR	1
How to operate the equipment involved in the use of ionising radiation	IRMER, MCR	1
The factors that affect radiation exposure to both patients and staff	IRMER, MCR	1
The important aspects of cardioradiology	IRMER, MCR	1
Skills		
Demonstrate the ability to:		
Operate radiation equipment safely and effectively	DOPS, IRMER, MCR	1,2

Has successfully completed a period of practical supervised training in the use of radiation equipment	DOPS, IRMER, MCR	1
Behaviours		
Demonstrate:		
Appreciation of the risks and benefits to patients and staff of using ionising radiation	IRMER, MCR	1,2,3

26. Community Cardiology

To be aware of the structures and systems for the delivery of cardiovascular medical care to local populations

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The policies, strategies and health data underpinning local provision of cardiac care	Exam, CbD, MCR	1
The interactions of local stakeholders in the implementation of policies and strategies including screening programmes	Exam, CbD, MCR	1
How to access community support for patients/carers and the role of support groups, the voluntary sector and other agencies	Exam, CbD, MCR	1
Local social and cultural issues and practices that affect health inequalities and outcomes (unemployment, smoking, addictive behaviour, poverty etc.)	Exam, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Interact appropriately with other individuals and organisations participating in the care of patients with cardiovascular disorders	CbD, mini-CEX, MCR	1,3
Access and analyse local health data to assess the cardiovascular health needs of the local community	CbD, mini-CEX, MCR	1,3
Behaviours		
Demonstrate:		
Appreciation of the differing roles and perspectives of individuals and organisations at different points on the patient pathway	MSF, MCR	1,3

27. Pulmonary Arterial Hypertension (PAH)

To be able to diagnose pulmonary arterial hypertension (PAH)

To be able to provide optimal management of patients with PAH

To be able to distinguish between the different causes of pulmonary hypertension

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Definition and functional classification of pulmonary hypertension	Exam, mini-CEX, CbD, MCR	1
Epidemiology of PAH (incidence, prevalence, aetiology, genetics, high-risk groups)	Exam, mini-CEX, CbD, MCR	1

Pathology and pathophysiology of PAH	Exam, mini-CEX, CbD, MCR	1
Aetiology	Exam, mini-CEX, CbD, MCR	1
Clinical features of PAH	Exam, mini-CEX, CbD, MCR	1
Diagnostic criteria of PAH	Exam, mini-CEX, CbD, MCR	1
Prognostic markers	Exam, mini-CEX, CbD, MCR	1
Management of PAH (medical, surgical and interventional including balloon atrial septostomy, indications, contraindications and possible adverse effects)	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Take a relevant history and perform an appropriate clinical examination	CbD, mini-CEX, MCR	1,3
Recognise clinical signs consistent with PAH	CbD, mini-CEX, MCR	1
Differentiate between primary, secondary pulmonary hypertension and other diseases with similar symptoms	CbD, mini-CEX, MCR	1
Perform and/or interpret appropriate investigations	CbD, mini-CEX, MCR	1,2
Prescribe adequate medical or invasive (surgical, interventional) management	CbD, mini-CEX	1,2
Evaluate clinical and haemodynamic prognostic markers	CbD, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
Establish cooperation with family physicians and other health care professionals for early recognition of primary pulmonary hypertension	MSF, PS, MCR	1,3,4
Make collaborative efforts with other medical specialists (family medicine, thoracic surgery, invasive Cardiology, imaging) for differential diagnosis of pulmonary hypertension and timely referral to surgical treatment	MSF, PS, MCR	1,3,4
Maintain long-term involvement of patients and their family members in supportive activities for healthy life-style adherence and treatment compliance	MSF, PS, MCR	1,3,4
Appreciate the increased risk of PAH in other medical conditions, such as scleroderma	MSF, PS, MCR	1

28. Clinical Genetics & Inherited Cardiovascular Conditions

To be able to describe the mechanisms that underpin human inheritance and the role of genetic factors in disease
To understand the principles of assessing genetic risk and use of genetic testing
To be able to manage genetic aspects of cardiological conditions, including referral to genetic services
To be able to obtain and communicate information about genetics in a comprehensible, non-directive way

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The contribution to human disease of chromosomes and DNA mutations	Exam, mini-CEX, CbD, MCR	1
The inheritance patterns of single gene disorders	Exam, mini-CEX, CbD, MCR	1
The principles of risk estimates for family members of patients with Mendelian diseases	Exam, mini-CEX, CbD, MCR	1
The principles of recurrence risks for simple chromosome anomalies, e.g. trisomies	Exam, mini-CEX, CbD, MCR	1
The distinctions between genetic screening and genetic testing, national guidelines and the organisation of genetics services	Exam,mini-CEX, CbD, MCR	1
The inherited cardiac disorders presenting to Cardiology	Exam, mini-CEX, CbD, MCR	1
The cardiac disorders with a genetic component (complex disorders) and multisystem disorders in which there is cardiac involvement (e.g. Fabry disease)	Exam, mini-CEX, CbD, MCR	1
Genetic disorders associated with congenital heart disease (e.g. Down syndrome)	Exam, mini-CEX, CbD, MCR	1
The principles of polygenic inheritance, particularly relating to cardiovascular disease such as ischaemic heart disease and hypertension	Exam, mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Draw and interpret a family tree to recognise basic patterns of inheritance	mini-CEX, CbD, MCR	1,3
Identify single gene disorders in Cardiology	mini-CEX, CbD, MCR	1,3
Organise genetic testing and make appropriate referrals to clinical genetics services	mini-CEX, CbD, MCR	1,3
Discuss genetic conditions in a non-directive, non-judgemental manner, being be aware that people have different attitudes and beliefs about inheritance	mini-CEX, CbD, MCR	1,2
Discuss treatment/management and reproductive options available to patients/families with, or at risk of, a genetic condition	mini-CEX, CbD, MCR	1,3
Behaviours		
Demonstrate:		
Awareness that patients may present with a genetic condition when there is no family history	Exam, mini-CEX, CbD, MSF, PS, MCR	1,3

Appreciation that 'genetic tests' includes clinical examination, metabolite assays and imaging as well as analysis of nucleic acid	Exam, mini-CEX, CbD, MSF, PS, MCR	1,3
Awareness of one's own professional limits in regard to managing genetic conditions and know when and where to seek advice	Exam, mini-CEX, CbD, MSF, PS, MCR	1,3
Awareness that, because genetic conditions are often multi-system disorders, comprehensive patient management is likely to involve liaison with other healthcare professionals	Exam, mini-CEX, CbD, MSF, PS, MCR	1,3
Awareness of support services for those with a genetic condition (e.g. Contact a Family)	Exam, mini-CEX, CbD, MSF, PS, MCR	1,3,4
Recognition of the need to offer appropriate referral for comprehensive genetic counselling	Exam, mini-CEX, CbD, MSF, PS, MCR	1,3
Awareness that consultations involving the giving and discussion of genetics information may require more time	Exam, mini-CEX, CbD, MSF, PS, MCR	1,3,4
Appreciation of genetic information impacts not only on the patient but also on their family	Exam, mini-CEX, CbD, MSF, PS, MCR	1,3,4
Understanding of the ethical issues involved in genetic testing, such as confidentiality, testing children, and pre-symptomatic testing	Exam, mini-CEX, CbD, MSF, PS, MCR	1,3,4
Incorporation of the concepts of informed choice and consent into practice	Exam, mini-CEX, CbD, MSF, PS, MCR	1,3,4

Core Procedures and Investigations

1. Basic Investigations

Be able to perform competently and/or select appropriately and interpret correctly the following investigations for the diagnosis and assessment of patients with cardiac disease:

- **Electrocardiograms**
- **Ambulatory ECG**
- **Exercise Testing**
- **CXR**
- **Ambulatory BP**

Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
The physiology of exercise		
the indications for, and be able to report and interpret the results of: • Electrocardiograms (including high resolution) • Ambulatory ECG • Exercise testing • CXR • Ambulatory BP	Exam, CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
supervise and analyse exercise tests	CbD, mini-CEX, MCR	1
Behaviours		

Demonstrate:		
Appreciation of the limitations of non-invasive investigations	CbD, mini-CEX, MCR	1
Appreciation of the sensitivity, specificity and predictive accuracy of exercise tests	CbD, mini-CEX, MCR	1

2 Echocardiography (Core)

To understand the role of echocardiography in the management of patients with cardiac disease. To be able to satisfactorily perform, interpret and report transthoracic echocardiography for the diagnosis and assessment of adult patients.

To recognise the indications for advanced echocardiography, e.g. transoesophageal and stress echocardiography.

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of: Indications for echocardiography in emergency, in-patient and outpatient settings. Ethics and sensitivities of patient care.	BSE eLearning module, CbD, Exam mini-CEX, MCR	1
Basic principles of ultrasound imaging, spectral and colour flow Doppler. Basic instrumentation and scanning. Standard methods of measurement and analysis.	BSE eLearning module, CbD, Exam mini-CEX, MCR	1
The echocardiographic assessment of ventricular structure and function in normal and abnormal cases including features of different types of cardiomyopathy	BSE eLearning module, CbD, Exam mini-CEX, MCR	1
The echocardiographic assessment of the cardiac valves in normal and abnormal cases, including prosthetic heart valves	CbD, Exam mini-CEX, MCR	1
Echocardiographic assessment of the thoracic aorta in normal (e.g. screening) and abnormal cases	CbD, Exam mini-CEX, MCR	1
Use of echocardiography to assess the right heart; measurement of pulmonary artery pressure	CbD, Exam mini-CEX, MCR	1
Role and echocardiographic assessment of patients with suspected or confirmed endocarditis, intracardiac mass, pericardial disease	CbD, Exam mini-CEX, MCR	1
Indications for and limitations of advanced echocardiography: tissue Doppler/strain analysis, contrast echo, 3D echocardiography, transoesophageal echocardiography, stress echocardiography , perioperative echocardiography	CbD, Exam mini-CEX, MCR	1
Skills		
Can use appropriate echo probes, machines and applications to obtain standard views and measurements, can optimise controls. Can care for machine appropriately	BSE accreditation or DOPS, MCR	1, 2
Is competent in performing a complete, comprehensive transthoracic echocardiogram in adults, in the emergency, in-patient and out-patient settings	BSE accreditation or DOPS, Curriculum delivery tool, MCR	1
Is competent in the interpretation, measurement and analysis of a transthoracic echocardiogram in adults, in the emergency, in-patient and out-patient settings. Can produce a comprehensive echocardiogram report.	BSE accreditation or DOPS, CbD, Curriculum delivery tool, MCR	1
Behaviours		
Interacts appropriately with patients	MSF, PS, MCR	3

Appreciate the role and limitations of echocardiography	MSF, PS, MCR	1
Demonstrate ability to work with and where appropriate educate cardiac physiologists	MSF, PS, MCR	1,3

For training in echocardiography at each hospital, you must have a supervisor who should be a senior and experienced echocardiographer, ideally BSE accredited. There should also be a named consultant lead for echocardiography training at that site. Where that is not possible, training will be overseen by the echo lead from your local Specialty Training Committee. In order to acquire basic training you will need focused bleep free training sessions, typically a minimum of 12 lists per year. In order to acquire basic training you will need focussed bleep free training sessions. The theory component will be largely self-taught with self directed and distance learning (journal, textbook & internet sources). The BSE eLearning Module will complement this and should be completed early in training. Completion and certification is expected by end of ST3. The necessary skills, attitudes and expertise will come from a mixture of experiential learning (on-the-job experience, i.e. regular scheduled scanning sessions in work plans), formal training at study days and/or postgraduate courses.
Assessment will be based upon the following: (i) completion of the BSE eLearning module; (ii) completion of the Echocardiography Curriculum Delivery Tool (available at JRCPTB web-site www.jrcptb.org.uk/Specialty/Pages/Cardiology), which will demonstrate appropriate coverage of syllabus and (iii) a log-book of cases. For guidance, 250 cases should be collected in a period of 12 months to qualify for BSE adult accreditation. (ii) trainees will undertake DOPS (on lists of cases) during core cardiology training. (iii) the BSE curriculum based assessment tool (available at JRCPTB web-site www.jrcptb.org.uk/Specialty/Pages/Cardiology) may be used to document appropriate coverage of the syllabus (iv) BSE Accreditation in adult echocardiography is regarded as equivalent to completion of core training in echocardiography.

3. Nuclear Cardiology (Core)

To be able to define the indications for nuclear Cardiology investigations

To understand the clinical significance and limitations of the results of nuclear Cardiology investigations having participated in stress, imaging, and reporting sessions

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
the indications for MPS and ERNV	Exam, CBD, MCR	1
the importance of radiation protection	IRMER, Exam, MCR	1
the methods of stress used in MPS	Exam, CBD, MCR	1
the radiopharmaceuticals and protocols used in MPS and ERNV	Exam, CBD, MCR	1
the equipment and techniques used in nuclear Cardiology imaging	IRMER, Exam, MCR	1
the clinical value of MPS and ERNV in different clinical settings	Exam, CBD, MCR	1
Skills		
Demonstrate the ability to:		
understand the results of MPS and ERNV studies and integrate them with those of other investigations in clinical practice	mini-CEX, CbD, MCR	1,2
Behaviours		

Demonstrate:		
Appreciation of the strengths and limitations of nuclear Cardiology investigations in routine clinical practice	MSF, PS, MCR	1
Understanding of the roles of the various health-care professionals involved in nuclear Cardiology and be able to interact with them	MSF, MCR	1,3

It order to gain sufficient experience to achieve the learning objectives it is recommended that the trainee attend at least one stress and one SPECT acquisition session of at least six patients each, and eight reporting sessions of at least six patients each.

4. Cardiac Magnetic Resonance (Core)

To have a basic understanding of the role of CMR and its capabilities, including its indications

To have a basic understanding of how the procedures are carried out, in particular the safety issues

To have a basic understanding of image analysis, post-processing and interpretation of images and data with emphasis on patient management

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
the indications and contra-indications to CMR	Exam, CBD, MCR	1
the basics of CMR safety	Exam, CBD, MCR	1
the basics of CMR image acquisition and image processing	Exam, CBD, MCR	1
the basics of CMR imaging protocols (anatomical imaging and functional imaging)	Exam, CBD, MCR	1
The limitations of CMR	Exam, CBD, MCR	1
Skills		
Demonstrate the ability to:		
plan and supervise the pre and post investigation management of CMR patients	mini-CEX, CbD, MCR	1,2
interpret clinical information and the results of other investigations to decide what information must be acquired by CMR	mini-CEX, CbD, MCR	1,2
interpret images from basic CMR sequences	mini-CEX, CbD, MCR	1,2
interpret CMR reports and their application to clinical management	mini-CEX, CbD, MCR	1,2
Behaviours		
Demonstrate:		
awareness of the limitations of non-invasive imaging	MSF, PS, MCR	1
appreciation of the importance of understanding cardiac anatomy in 3D	MSF, PS, MCR	1
an appropriate threshold for seeking expert advice	MSF, PS, MCR	1,3
appreciation of the importance of providing detailed information about the	MSF, PS, MCR	1,3,4

procedure and its potential complications to patients		
appreciation of the importance of team work with radiologists, radiographers, anaesthetists and technical staff	MSF, PS, MCR	1,3

To achieve the learning objectives of core training for CMR it is envisaged that trainees will need a one month full time attachment (or equivalent part time). It order to gain sufficient experience to achieve the learning objectives it is recommended that the trainee will need: supervision of 10 stress tests, including each form of stress; observation of acquisition of 50 CMR scans, a minimum of 5 must be vascular; observation of processing of 50 studies; supervised reporting of 50 studies for a variety of conditions. If clinical attachments to achieve these learning objectives are not readily available in all programmes then the use of specific training days or secondments should be considered to allow trainees to acquire the training whilst a formal training programme is being developed.

5. Cardiac CT (core)

To be able to integrate cardiac CT into the management of patients with cardiac disease

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The Cardiac Computed Tomography Techniques including contrast administration	Exam, CBD, mini-CEX, MCR	1
The modalities: • Ultra-fast CT • Coronary angiogram (including grafts and stents) The indications for: • Calcium score Exam, CBD, mini-CEX • CT coronary angiography	Exam, CBD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
evaluate CT examinations in the clinical context with the basic understanding of 2D and 3D analysis	Exam, CBD, mini-CEX, MCR	1,2,3
Behaviours		
Demonstrate:		
a cooperative approach to radiologists and radiographers	MSF, MCR	3,4
Awareness of the side effects of contrast media and recognize the risk of radiation to patient and personnel	MSF, IRMER, MCR	1,3,4

The likely necessary experience of cardiac CT to fulfil the learning objectives will be equivalent to 50 cases and 8 half day sessions.

6. Heart Rhythm Training (Core)

To have an understanding of the mechanisms, diagnosis and treatment of arrhythmias
To be competent in DC cardioversion
To be competent to undertake cardiac pacing

	Possible	GMP

Knowledge	Assessment Methods	
Demonstrate knowledge of:		
BASIC PRINCIPLES An understanding of the mechanisms of arrhythmias.	CbD, Exam, mini-CEX, MCR	1
A thorough understanding of the 12-lead surface ECG during brady- and tachyarrhythmias	CbD, Exam, mini-CEX, MCR	1
The therapeutics of antiarrhythmic drugs	CbD, Exam, mini-CEX, MCR	1
SPECIFIC PATIENT GROUPS risk assessment in patients with arrhythmias undergoing cardiac and other surgery, and during pregnancy, and with structural heart disease	CbD, Exam, mini-CEX, MCR	1
BRADYCARDIA AND PACING Investigation of patients with blackouts/T-LOC	CbD, Exam, mini-CEX, MCR	1
Indications for temporary and permanent pacing	CbD, Exam, mini-CEX, MCR	
Pacemaker programming	CbD, Exam, mini-CEX, MCR	
INVASIVE ELECTROPHYSIOLOGY The use and application of invasive electrophysiology studies	CbD, Exam, mini-CEX, MCR	1
ICDs and CRT The use of ICDs	CbD, Exam, mini-CEX, MCR	1
The role of devices in heart failure	CbD, Exam, mini-CEX, MCR	1
CARDIOVERSION The mechanisms of and indications for cardioversion	CbD, Exam, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Acutely manage arrhythmias	CbD, DOPS, mini-CEX, MCR	1,2
Manage arrhythmias in post cardiac and non-cardiac surgical patients, pregnant patients and patients with structural heart disease	CbD, DOPS, mini-CEX, MCR	1,2
Use external pacing systems	CbD, DOPS, mini-CEX, MCR	1,2
Implant temporary pacemakers	CbD, DOPS, mini-CEX, MCR	1,2
Implant permanent pacemakers, both single and dual chamber	CbD, DOPS, mini-CEX, MCR	1,2
Undertake elective and emergency DC cardioversion	CbD, DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Appreciate the anxiety often suffered by patients and their relatives	MSF, PS, MCR	1,3
Appreciate the limitations of drug therapy in the treatment of	MSF, PS, MCR	1

arrhythmias		
Have appropriate self-confidence and recognition of limitations	MSF, PS, MCR	1
Appreciate the importance of radiation protection	MSF, PS, MCR	1

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 log-book of cases and procedures observed and undertaken.

As a guide, it is likely that in order to gain sufficient experience procedures the trainee will need to be involved in: the implantation as well as the pre- and post-procedure care of at least 25 patients requiring permanent pacemakers; 20 invasive electrophysiological studies for common arrhythmias, usually involving curative catheter ablation during the same study; at least five ICD implants and five CRT procedures An important component will be the experience of the care of patients with complex arrhythmias who need hybrid treatment with multiple treatment modalities, i.e. drugs, devices and ablation, (understanding will be tested by a mini-CEX). Ideally, this experience will be gained during a specific module e.g. 2 months in a tertiary arrhythmia centre during ST5.

7. Invasive and Interventional Cardiology (Core)

The trainee will be proficient at carrying out and interpreting, coronary arteriography and left and right heart catheterisation

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
the cardiac anatomy, physiology and haemodynamics relevant to invasive Cardiology	CbD, Exam, mini-CEX, MCR	1
the indications and limitations of percutaneous interventions in cardiac disease	CbD, Exam, mini-CEX, MCR	1
the various techniques and their complications	CbD, Exam, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
perform coronary arteriography, including graft angiography, with right and left heart catheterisation in the assessment of cardiac disease	CbD, DOPS, mini-CEX, MCR	1,2
Interpret the results of angiography and manage patients appropriately, including referral for PCI or cardiac surgery	CbD, DOPS, mini-CEX, MCR	1,2
Assist with percutaneous coronary interventions	CbD, DOPS, mini-CEX, MCR	1,2
Assist with trans-septal puncture and myocardial biopsy	CbD, DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
The importance of liaising with, and requesting opinions from, cardiac surgeons	MSF, PS, MCR	1,3
Appropriate self-confidence and recognition of limitations	MSF, PS, MCR	1

The importance of team working with non-medical staff during invasive procedures	MSF, PS, MCR	1,3
Appreciate the importance of radiation protection	MSF, PS, MCR	1

In order to fulfil the learning objectives it is likely that the trainee will need to undertake at least 250 cardiac catheterisations in order to gain sufficient experience of the procedure to be in a position to complete a satisfactory DOPS to demonstrate competence as an independent operator

8. Pericardiocentesis

To be able to carry out pericardiocentesis in the diagnosis and treatment of patients with pericardial disease		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
The indications for diagnostic and therapeutic pericardiocentesis	CbD, Exam, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
undertake pericardiocentesis	DOPS, MCR	1,2
Behaviours		
Demonstrate:		
Sympathy for the patient's anxiety	MSF, PS, MCR	3

Given the usual clinical circumstances surrounding pericardiocentesis it will not be feasible to undergo standard DOPS assessments for these procedures. In order to document competence trainees should record all supervised pericardiocentesis procedures undertaken using a DOPS-like recording form.

Advanced Specialist Area Modules

1a. Adolescent and Adult Congenital Heart Disease (ACHD)

The advanced specialist area modules in ACHD are designed for the training of the 2 types of ACHD cardiologist:

- the specialist ACHD cardiologist who practices ACHD in one of a small number of specialist ACHD Units.
- the cardiologist with a special interest in ACHD who practices in non-specialist units, or in a specialist unit as a supporting member of team that includes specialist ACHD cardiologists.

A trainee wishing to become a specialist ACHD cardiologist needs to achieve competencies that will equip them to manage independently all aspects of simple and a wide range of complex congenital heart disease. This will require an indicative length of training of 2 years to achieve the necessary competencies, this will equate to 4 'credits' of the ACHD module.

A trainee wishing to become a cardiologist with a special interest in ACHD needs to achieve competencies that will equip them to manage (i) all aspects of simple congenital heart disease independently, (ii) work with an ACHD specialist to manage patients with complex ACHD. This will require an indicative length of training of 1 year to achieve the necessary competencies, this will equate to 2 'credits' of the ACHD module. This will allow time to complete a further specialist area module such as advanced echocardiography or advanced CMR.

An ACHD trainee should be trained by a specialist ACHD consultant cardiologist (as defined by the British Congenital Cardiac Association). They should be based in a specialist ACHD centre which should have the following: at least one full time specialist ACHD consultant cardiologist; at least one specialist ACHD cardiac surgeon; specialist ACHD intervention, pacing and electrophysiology services equipped for patients with complex ACHD; access to cardiothoracic transplant services; a high risk obstetric service; and close links with a paediatric cardiac centre with which a collaborative transition service operates.

ACHD is a small specialty and some deaneries have no specialist ACHD training centre. There are 5 nationally funded ACHD NTNs available for 1 to 2 year specialist area training in ACHD. These posts are advertised nationally, allowing all trainees the opportunity to compete for a training post, if necessary, as an Out Of Programme Training . Trainees or TPDs who wish to know more about these posts should contact the Cardiology SAC..

1a. Adult Congenital Heart Disease

To be able to apply appropriately to the management of ACHD:

(i) a knowledge of the substrate of congenital heart disease (CHD)

(ii) the knowledge that CHD is a lifelong condition

(iii) a knowledge of the natural and unnatural (operated) history of simple and complex CHD

To be able to apply appropriately the knowledge that the management of ACHD requires a multidisciplinary approach

To apply a thorough understanding of CHD to the investigation of ACHD

To apply appropriately a knowledge of CHD to its medical and surgical treatment

To be able to apply appropriately a knowledge of CHD to catheter based treatment of ACHD

Pregnancy & sexual health

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
the anatomy of the heart and great vessels	CbD, mini-CEX, MCR	1
of cardiac embryology and development	CbD, mini-CEX, MCR	1
both common and rare congenital defects, their morphology and nomenclature	CbD, mini-CEX, MCR	1
CHD as a continuum from fetal life to childhood to adult life	CbD, mini-CEX, MCR	1
the natural and unnatural (operated) history of simple and complex CHD	CbD, mini-CEX, MCR	1
the psycho-social as well as physical impact of CHD on the patient and their family	CbD, mini-CEX, MCR	1
the process of transition from childhood and paediatric services to adulthood and adult services	CbD, mini-CEX, MCR	1
the ways in which CHD may impact on patient's lifestyle	CbD, mini-CEX, MCR	1
how to investigate patients with CHD including the use and interpretation of non-invasive investigations such as echo and CMR, and invasive investigations such as cardiac catheterization and TOE	CbD, mini-CEX, MCR	1
the extended role of CMR in the management of patients with ACHD	CbD, mini-CEX, MCR	1
specific arrhythmias associated with congenital cardiac lesions and previous surgery	CbD, mini-CEX, MCR	1
the indications for first time and repeated cardiac surgery for ACHD	CbD, mini-CEX, MCR	1
potential complications faced by patients with CHD undergoing non-cardiac surgery	CbD, mini-CEX, MCR	1
patent foramen ovale and secundum ASD defect may not exist in isolation. Know that both are associated with other lesions that may need simultaneous device closure or may make the index defect unsuitable for device closure	CbD, mini-CEX, MCR	1
the severity of coexistent acquired lesions such as mitral valve disease may be underestimated in the presence of ASD	CbD, mini-CEX, MCR	1
the different types of interatrial communication	CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
take a relevant history and perform an appropriate examination	CbD, DOPS, mini-	1,3

	CEX, MCR	
interpret paediatric, and to perform and interpret adult congenital echocardiograms	CbD, DOPS, mini-CEX, MCR	1,2
use echo to analyse the morphology and physiology of simple and complex CHD	CbD, DOPS, mini-CEX, MCR	1,2
interface with paediatric team in the handover of patients from paediatric to adult services.	CbD, DOPS, mini-CEX, MCR	1,3
educate adolescents and young adults about their condition and its impact on their life	CbD, DOPS, mini-CEX, MCR	1,3,4
communicate with the parents and carers of adolescents and young adults, whilst respecting patient confidentiality	CbD, DOPS, mini-CEX, MCR	1,3,4
communicate effectively within a multi-disciplinary team	CbD, DOPS, mini-CEX, MCR	1,3
communicate sensitively with adolescents and young adults	CbD, DOPS, mini-CEX, MCR	1,3,4
explain the impact of CHD on adolescent and young adults' leisure and work activities	CbD, DOPS, mini-CEX, MCR	1,3
perform and interpret echocardiograms, including TOE, of patients with ACHD. Be able to interpret cardiac MR images	CbD, DOPS, mini-CEX, MCR	1,2
undertake diagnostic cardiac catheterisations in patients with CHD	CbD, DOPS, mini-CEX, MCR	1,2
manage patients with arrhythmias and CHD	CbD, DOPS, mini-CEX, MCR	1,2
recognise the arrhythmias that are peculiar to some forms of CHD and to evaluate patients at particular risk from arrhythmia	CbD, DOPS, mini-CEX, MCR	1,2
explain how patient education can empower young adults to take responsibility for their health	CbD, DOPS, mini-CEX, MCR	
oversee the peri-operative care of patients having surgical correction of CHD and recognise the post-operative and iatrogenic complications faced by patients with complex disease	CbD, DOPS, mini-CEX, MCR	1,2
assess the risk of non-cardiac surgery and provide appropriate advice on peri-operative management to avoid complications; especially the special risks faced by patients with complex disease	CbD, DOPS, mini-CEX, MCR	1,2
Be competent in diagnostic ACHD cardiac catheterisation before embarking on training to perform ACHD interventions	CbD, DOPS, mini-CEX, MCR	1,2
perform and analyse TOE to identify different types of ASD and assess suitability for closure	CbD, DOPS, mini-CEX, MCR	1,2
identify contraindications to device closure and evaluate MV disease in the presence of ASD	CbD, MSF, PS, MCR	1,2
assess pulmonary vascular resistance in the presence of a shunt and interpret pulmonary haemodynamic data in evaluating the suitability of an intracardiac repair	CbD, MSF, PS, MCR	1,2
Behaviours		
Demonstrate:		
Appreciation of the importance of empathetic management of patients during the transition from paediatric to adult services	CbD, MSF, PS, MCR	1,3
Recognition of the importance of a multidisciplinary team in the managements of adolescents and young adults	CbD, MSF, PS, MCR	1,3

Recognition of how CHD develops and may become modified throughout life through attendance at paediatric and adult CHD clinics	CbD, MSF, PS, MCR	1
Recognition of which patients with CHD need lifelong specialist follow up	CbD, MSF, PS, MCR	1
Appreciation of the social and emotional difficulties encountered by patients with CHD	CbD, MSF, PS, MCR	1,3
Appreciation of the psychological impact of ACHD on patients and their families	CbD, MSF, PS, MCR	1,3
Appreciation of the complex relationships that sometimes exist between patients with ACHD and their parents or carers	CbD, MSF, PS, MCR	1,3
Recognition of the different and complementary contributions of different imaging modalities in the assessment of individual congenital cardiac lesions	CbD, MSF, PS, MCR	1
Recognition of the urgency of treatment of arrhythmia in some patients with ACHD	CbD, MSF, PS, MCR	1,2
Recognition of the need for first time and repeat operations in ACHD	CbD, MSF, PS, MCR	1,3
Appreciation of the need for effective communication with healthcare professionals involved in the care of ACHD patients undergoing non-cardiac surgery	CbD, MSF, PS, MCR	1
Recognition of the need to audit all CHD activity	CbD, MSF, PS, MCR	1
Recognition of the need to contribute data on all CHD interventions to the national CHD database	CbD, MSF, PS, MCR	1
Recognition of the desirability of a team approach to complex CHD interventions	CbD, MSF, PS, MCR	1,3
Recognition of the need for continuous TOE or intracardiac echo monitoring during device closure of cardiac defects	CbD, MSF, PS, MCR	1,3

1b. Heart Disease & Pregnancy

Heart disease is the single commonest cause of maternal death in the UK. Women with both acquired and congenital heart disease are at risk from pregnancy. However, the growing population of women with congenital heart disease means that any cardiologist with a special interest in cardiovascular disorders of pregnancy needs a sound training in adult congenital heart disease.

The aim of this syllabus is to describe the main areas of learning that will equip the trainee to manage independently the cardiological aspects of pregnancy and contraception in heart disease. Training should be with a cardiologist with expertise in heart disease and pregnancy and should include joint clinics with an obstetrician with expertise in heart disease in pregnancy. Training should include sessions at a specialist congenital heart disease centre

Teaching and learning opportunities
Trainees will use ward-based learning including ward rounds and supervised consultations in outpatient clinics to learn how to communicate with and assess women with heart disease before conception, antenatally and in the peripartum period, as well as for contraception. Ward rounds and out-patient clinics should have cross specialty and multidisciplinary input, allowing the trainee opportunity to appreciate the roles of all the team members in managing complex patients.
Trainees should be able to interact with clinical nurse specialists and midwives. They should learn counselling and communication skills from them and give medical advice to them within locally agreed guidelines. (i.e. small group work and multidisciplinary group work).

In addition they should make an effort to attend a national or international obstetric medicine meeting annually. Trainees should undertake an audit of management of heart disease in pregnancy.

Research into aspects of cardiovascular disease in pregnancy would be strongly encouraged.

Trainees should apply the range of teaching and learning opportunities to all 3 broad objectives in this curriculum: pregnancy in women with pre-existing heart disease, contraception in women with heart disease and pregnancy induced cardiovascular disease. Small group work, case presentations of complex clinical situations, multidisciplinary group work, web based research, independent study should all be applied. Techniques such as journal clubs, tutorials, lectures and seminars should be used to broaden the Cardiology trainee's understanding of obstetric Cardiology.

1b. Heart Disease in Pregnancy

To be able to carry out appropriate assessment and treatment of women with chronic cardiac disease who are or who are planning to become pregnant including those with

- **Corrected and uncorrected congenital heart disease**
- **Ventricular dysfunction**
- **Pulmonary hypertension**
- **Rheumatic heart disease**
- **Ischaemic heart disease**
- **Marfan's syndrome and other aortopathies**
- **Artificial heart valves**
- **Arrhythmias**

To be able to carry out appropriate assessment of, and provide contraceptive advice to, women with cardiac disease

To be able to carry out appropriate assessment and treatment of women with pregnancy induced cardiac disease

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
the importance of pre-pregnancy assessment and counselling, and optimising cardiovascular health prior to pregnancy	CbD, mini-CEX, MCR	1
the risks of pregnancy for the mother and fetus for different cardiac disorders	CbD, mini-CEX, MCR	1
the risks of recurrence of congenital heart disease in the fetus of mothers with congenital heart disease	CbD, mini-CEX, MCR	1
the possible adverse effects of drug treatment on both the woman and her fetus	CbD, mini-CEX, MCR	1
the implications of anticoagulation during pregnancy	CbD, mini-CEX, MCR	1
safe and effective contraceptive methods in women with different cardiac disorders	CbD, mini-CEX, MCR	1
the risk factors for and presenting features of peripartum cardiomyopathy and the risk of recurrence of peripartum cardiomyopathy in subsequent pregnancies	CbD, mini-CEX, MCR	1
the presenting features, investigation and management of cardiovascular emergencies during pregnancy including pulmonary embolism, aortic dissection and myocardial infarction	CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
take a relevant history and perform an appropriate examination	CbD, mini-CEX, MCR	1,3
assess cardiac patients' risk of pregnancy	CbD, mini-CEX, MCR	1,2
counsel women with heart disease and their partners about the risks of pregnancy	CbD, mini-CEX, MCR	1,3
explain the increased risk of CHD in the fetuses of women with ACHD	CbD, mini-CEX, MCR	1,3
offer ante-natal care, e.g. in the setting of a joint obstetric clinic and as part of a multispecialty team, be able to manage women with heart disease throughout pregnancy, delivery and the post-natal period	CbD, mini-CEX, MCR	1,2,3
counsel and manage women who require anticoagulation throughout	CbD, mini-CEX, MCR	1,3

pregnancy and the puerperium		
provide appropriate contraceptive advice to women with cardiac disease	CbD, mini-CEX, MCR	1,3
explore the differential diagnosis of peripartum cardiomyopathy and be able to explain the diagnosis and prognosis to the patient and her relatives	CbD, mini-CEX, MCR	1,3,4
recognise, investigate and treat appropriately cardiovascular emergencies in pregnancy	CbD, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Appreciation of the increased anxiety experienced by pregnant women with cardiac disease	CbD, MSF, PS, MCR	3
Recognition of the role of cardiologists in the management of women preconception, during pregnancy and postpartum	CbD, MSF, PS, MCR	1
Recognition of the role of multidisciplinary care of women with heart disease and in particular liaison with obstetricians, midwives, haematologists, obstetric anaesthetists and intensivists	CbD, MSF, PS, MCR	1,3
An understanding of the importance of formulating an agreed flexible management plan for delivery	CbD, MSF, PS, MCR	1,3
Recognition of the need to address and offer contraceptive advice to women with heart disease	CbD, MSF, PS, MCR	1
Recognition of the need for urgent joint assessment between multi-specialty teams	CbD, MSF, PS, MCR	1,3

2. Advanced Rhythm Training

Rationale

The purpose of this section is to guide the training of those Cardiology trainees who wish to pursue a more specialised approach to arrhythmias using electrophysiological techniques, catheter ablation and complex device therapy. This will ultimately lead to a career in invasive arrhythmia management.

This syllabus has been designed to allow trainees to tailor their training to possible career options. Advanced rhythm management training can be sub-divided if required into

(i) device therapy - a minimum of advanced rhythm training module 1 + module 2 + module 3 with optional, but recommended, additions of modules 5 (cardiac resynchronisation therapy) and/or 6 (lead extraction)

(ii) EP/ablation therapy – a minimum of advanced rhythm training module 3 + module 4 + module 7 with optional additions of module 8 (AF ablation), module 9 (VT ablation) module 10 (transseptal puncture), module 11 (sudden cardiac death management) and/or module 2 (arrhythmia in ACHD).

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.

Implantable Devices for Managing Arrhythmias: Implantation of 100 systems by the trainee; 100 follow up patients requiring pacemaker interrogation and/or programming; implantation of 25 ICDs and supervision of 50 patients in programming clinics; implantation of 30 BiV devices and their programming and optimisation in a minimum of 30 patients with heart failure using modern techniques such as tissue Doppler imaging.

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

Training Centres

Should have at least 2 electrophysiologists in the scheme who spend the majority of their time practising electrophysiology and be an implanting centre for ≥150 pacemakers per year, implanting centre for ≥30 ICD's per year, an implanting centre for ≥30 CRT devices per year, undertaking ablations and EP studies, (including programmed ventricular stimulation) ≥100 per year, and have availability of complex mapping and ablation technologies, e.g. electro-anatomic systems for catheter and anatomical localization. Also ideally cardiac surgery should be available on site or nearby to provide exposure to

post surgical arrhythmias. The centre should submit consistent, completed activity returns to CCAD database

Trainers
Should have 2-4 dedicated weekly catheter laboratory sessions for management of Heart Rhythm Disorders, should aim to personally undertake at least 30 pacemaker/ICD/CRT implants/yr as primary or sole operator with 60 implants in the previous 3 years where training trainees in device therapy (in certain circumstances, active (scrubbed-in) troubleshooting, and supervising other experienced operators undertaking such levels of activity may be accountable towards these targets) , should be working in a centre performing 100 EPS/ablations per year which may include programmed ventricular stimulation studies where training trainees in electrophysiology and ablation, should all have a thorough grasp of the management of patients with blackouts/T-LOC, should be NHS consultants involved in medical educational CME/CPD, should be able to demonstrate CPD within their specialist field, should contribute their personal data to CCAD for procedures and outcomes, should enforce the contribution of trainees to their training scheme's data submitted to CCAD for procedures and outcomes, should contribute to local and national SpR training days, should aim to contribute to Heart Rhythm UK arrhythmia and/or device therapy training days, should have certified attendance at a minimum of one international EP meeting a year, should aim to contribute to live electrophysiology/device courses where appropriate and where possible should submit their detailed 3 year audit of workload and –case-mix at application for accreditation for new training schemes.

Research Training
All trainees will be encouraged to undertake clinical research, ideally to complete an MD/PhD, by local agreement according to the availability of research opportunities and funding.

2. Module 1: Pacemaker Implantation and Programming

To understand the basic principles of pacing including electrical parameters and the engineering involved

To understand pacemaker lead characteristics

To understand the published guidelines for implantation of pacemakers and clinical indications

To understand the implantation procedure and the cardiac and thoracic anatomy

To master safe sterile technique for all procedures

To have detailed knowledge of the programming of pacemakers following implantation including troubleshooting

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
the principles of pacing and the engineering of pacemakers and of pacing leads	CbD, Exam, mini-CEX, MCR	1
the cardiac conduction system and its disease processes	CbD, Exam, mini-CEX, MCR	1
the cardiac and thoracic anatomy, especially in respect of venous access including the cephalic vein approach	CbD, Exam, mini-CEX, MCR	1
the indications and guidelines for correct pacemaker prescription	CbD, Exam, mini-	1

including pacing mode	CEX, MCR	
the safe implantation of pacemakers including the operating environment and antibiotic usage	CbD, Exam, mini-CEX, MCR	1
management of complications of pacemaker implantation including pneumohaemothorax, lead perforation, lead fracture	CbD, Exam, mini-CEX, MCR	1
the management of lead problems – when to extract and when not to	CbD, Exam, mini-CEX, MCR	1
programming issues specifically related to leads	CbD, Exam, mini-CEX, MCR	1
modern pacing systems and of troubleshooting	CbD, Exam, mini-CEX, MCR	1
rate modulated pacing and sensor technology	CbD, Exam, mini-CEX, MCR	1
driving restrictions	CbD, Exam, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Skills in correct patient selection for and safe implantation of single and dual chamber pacemakers via the cephalic, axillary and subclavian approaches	DOPS, MCR	1,2
Intravascular catheter manipulation and surgical skills in opening manipulating and closing wounds	DOPS, MCR	1,2
Managing complications eg cardiac tamponade	DOPS, MCR	1,2
The insertion and care of temporary pacing wires	DOPS, MCR	1,2
Detailed and safe approach to cephalic subclavian or internal jugular venous access	DOPS, MCR	1,2
Competent programming of pacemakers and troubleshooting including the programming of sensors and newer sensors and newer anti-atrial tachycardia algorithms	DOPS, MCR	1,2
Behaviours		
Demonstrate:		
Correct attitude to a surgical approach – appreciating sterility and antibiotic usage	MSF, PS, MCR	1,2
To foster a team approach to pacing including a close relationship with cardiac physiologists	MSF, PS, MCR	1,3
Committed to audit of long term outcomes including infection and lead complications	MSF, PS, MCR	1,2
To develop a critical attitude towards a safe pacing programme in the hospital and to support patients in their community with adequate pacing follow-up	MSF, PS, MCR	1,2,3
To educate patients as to the treatment options open to them and to explain treatment strategies	MSF, PS, MCR	1,3,4
To work closely with other health care professionals as necessary: Cardiac physiologists, Infection control, Care of the elderly, Neurologists	MSF, PS, MCR	1,3
To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively	MSF, PS, MCR	1,3

2. Module 2: Training in ICD Implantation and Programming

Understand the principles and guidelines for ICDs

To carry out specialist investigation and treatment of patients who may benefit from ICD implantation

To understand the implantation procedure, the cardiac and thoracic anatomy and safe sterile technique for procedures

To be able to implant single and dual chamber ICDs, and recognise and treat complications which may occur

To be able to program ICDs, provide zones for VT of various rates, algorithms for discrimination of VT and SVT, appropriate use of anti-tachycardia pacing algorithms, and appropriate shock therapy. To be able to "troubleshoot" ICD problems, including recognition of; drug-device interactions, appropriate and inappropriate shocks, device and lead complications, and problems that may require specialist intervention such as ablation (for both supraventricular and ventricular arrhythmias)

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Of the cardiac and thoracic anatomy, especially in respect of venous access	CbD, Exam, mini-CEX, MCR	1
Of national and international guidelines for ICD implantation, and their evidence base	CbD, Exam, mini-CEX, MCR	1
Of medico-legal issues concerning consent and provision of information	CbD, Exam, mini-CEX, MCR	1
Up-to-date knowledge of recent clinical trials in ICD therapy	CbD, Exam, mini-CEX, MCR	1
The effects of antiarrhythmic drugs on defibrillation and pacing thresholds	CbD, Exam, mini-CEX, MCR	1
Of the proarrhythmic effects of antiarrhythmic drugs and their effect on left ventricular function	CbD, Exam, mini-CEX, MCR	1
Of how to manage complications of ICD implantation and problems during long-term follow-up	CbD, Exam, mini-CEX, MCR	1
Of the indications for VT ablation, AV nodal ablation, and atrial tachycardia / atrial fibrillation ablation in patients with ICDs	CbD, Exam, mini-CEX, MCR	1
Of the current recommendations regarding fitness to drive with an ICD	CbD, Exam, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Select and investigate patients appropriately for ICD implantation (including whether revascularisation is required)	DOPS, mini-CEX, MCR	1,2
Explain the procedure possible complications, and possible effects on the patient's lifestyle to the patient and relatives	DOPS, mini-CEX, MCR	1,3
Assess the anaesthetic/ sedation needs for the implantation	DOPS, mini-CEX, MCR	1,2
Assess whether a single, dual or triple chamber (i.e. biventricular) device is best suited to the patient	DOPS, mini-CEX, MCR	1
Perform the implant procedure competently with an acceptably low complication rate	DOPS, mini-CEX, MCR	1,2

Perform appropriate tests of pacing, sensing and defibrillation safely and thoroughly during the implant	DOPS, mini-CEX, MCR	1,2
Be able to program the device appropriately	DOPS, mini-CEX, MCR	1
Perform post-implant assessment of the patient	DOPS, mini-CEX, MCR	1
Perform routine follow-up of ICD patients	DOPS, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
Appreciate the importance of informed consent, and the need to explain lifestyle issues and driving restrictions to the patient	DOPS, MSF, PS, MCR	1,3
Correct attitude to a surgical approach – appreciating sterility and antibiotic usage	DOPS, MSF, PS, MCR	1,2
Appreciate the importance of team-working with nursing, technical, radiographic, anaesthetic and (if appropriate) industry staff	DOPS, MSF, PS, MCR	1,3
Appropriate self-confidence and recognition of limitations	DOPS, MSF, PS, MCR	1,3
Committed to audit of long term outcomes	DOPS, MSF, PS, MCR	1,2
To educate patients as to the treatment options open to them and to explain treatment strategies	DOPS, MSF, PS, MCR	1,3,4
To work closely with other health care professionals as necessary: Cardiac physiologists, , Infection control, Care of the elderly, Neurologists	DOPS, MSF, PS, MCR	1,3
Appreciate the anxiety that patients suffer with an ICD	DOPS, MSF, PS, MCR	1,3
To appreciate the psychological impact of the patient's arrhythmia illness on the patient and their family, and manage it sensitively	DOPS, MSF, PS, MCR	1,3

2. Module 3: Training in the Mechanisms of Arrhythmias Complex Electrocardiography and the Principles of Intracardiac Electrophysiology

To foster a team approach to lead extraction including a close relationship with cardiac surgeons		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
Of reentrant, automatic and triggered arrhythmia mechanisms. An understanding of the differences between anatomic and functional reentry, including spiral wave generation	CbD, Exam, mini-CEX, MCR	1
Of the pathophysiology of atrial fibrillation, atrial tachycardia and flutter, junctional tachycardias (including AV nodal tachycardia and the Wolff-Parkinson-White syndrome), ischaemic and nonischaemic VT	CbD, Exam, mini-CEX, MCR	1
Of distinguishing between the principle mechanisms of arrhythmias from the characteristics of the 12-lead surface ECG, and their response to certain manoeuvres such as vagotonic actions and drug	CbD, Exam, mini-CEX, MCR	1

administration		
Of the causes of wide-complex tachycardias and morphological schemes for the diagnosis of VT	CbD, Exam, mini-CEX, MCR	1
Of the use the surface ECG to assess the likely location of a critical tissue sustaining an arrhythmia, e.g. an accessory AV connection in the WPW syndrome	CbD, mini-CEX, MCR	1
Of the ECG in Long QT and Brugada syndromes and right ventricular dysplasia (ARVD)/ cardiomyopathy (ARVC)	CbD, mini-CEX, MCR	1
Of the understanding of invasive electrophysiological studies (EPS) and their clinical indications. To have observed and understood invasive EPSs and radiofrequency ablations	CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
History taking and appropriate examination in patients with or at risk of cardiac arrhythmias	DOPS, mini-CEX, MCR	1,3
Obtaining an adequate ECG record during an arrhythmia using available technologies	DOPS, mini-CEX, MCR	1
Demonstrate a systematic approach to interpretation of surface ECGs during arrhythmias	DOPS, mini-CEX, MCR	1
Demonstrate appropriate use of vagal manoeuvres and drugs for arrhythmias	DOPS, mini-CEX, MCR	1,2
Demonstrate familiarity with ECG schema for localising accessory pathways in WPW syndrome	DOPS, mini-CEX, MCR	1
An appreciation of the relevance and limitations of basic arrhythmia mechanisms in terms of clinical arrhythmia management	DOPS, mini-CEX, MCR	1
To be able to describe abnormal electrical activity in terms of the 3-D structure of the human heart in situ	DOPS, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
a sensible, professional attitude to the management of patients with arrhythmias, using non-invasive techniques and treatments appropriately, and conserving resources	MSF, PS, MCR	1,3
To educate patients as to the treatment options open to them, to empower them to take their own decisions as to their preferred treatment strategy	MSF, PS, MCR	1,3,4
To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively	MSF, PS, MCR	1,3,4

2. Module 4: Intracardiac Electrophysiology Techniques

To successfully evaluate a patient presenting with a sustained narrow complex tachycardia and identify all possible electrophysiological mechanisms

To elicit key factors in the history to help to distinguish between different SVTs

To understand and be able to direct autonomic maneuvers in a clinic setting

To be able to select appropriate investigations to help diagnose the presenting arrhythmia

To correctly select patients appropriate for electrophysiological studies and catheter ablation

To safely and competently carry out an invasive electrophysiological study and interpret the findings

To perform curative catheter ablation procedures

To safely and competently manage all drug therapy associated with care of the patient

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Of the electrophysiology of supraventricular tachycardias and typical atrial flutter	CbD, Exam, mini-CEX, MCR	1
Of medico-legal issues concerning consent and provision of information	CbD, Exam, mini-CEX, MCR	1
Of the range of variation in presentations and clinical findings associated with different arrhythmia mechanisms	CbD, Exam, mini-CEX, MCR	1
Of the range of ECG recording equipment for detecting intermittent arrhythmias and their appropriate use	CbD, Exam, mini-CEX, MCR	1
Of 3-dimensional cardiac anatomy	CbD, Exam, mini-CEX, MCR	1
Of the equipment required for electrophysiological studies and catheter ablation	CbD, Exam, mini-CEX, MCR	1
Of intracardiac electrographic patterns in SVT and atrial flutter, and their interpretation	CbD, Exam, mini-CEX, MCR	1
Of ablation techniques and ability to use information from imaging and intracardiac electrograms to guide and evaluate the effectiveness of ablation	CbD, Exam, mini-CEX, MCR	1
Of potential complications of invasive electrophysiological procedures and their management	CbD, Exam, mini-CEX, MCR	1
Of the pharmacology, side effects and interactions of drugs used in the management of these conditions	CbD, Exam, mini-CEX, MCR	1
Of arrhythmogenic right ventricular dysplasia (ARVD) or cardiomyopathy (ARVC)	CbD, Exam, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
To communicate effectively with patients and their family and contacts to take an effective history	DOPS, mini-CEX, MCR	1,3
To communicate effectively with patients to gain informed consent Competence in performing autonomic manoeuvres	DOPS, mini-CEX, MCR	1,2,3
To prepare a patient for an electrophysiological study, safely and competently insert vascular sheaths and undertake the procedure	DOPS, mini-CEX, MCR	1,2,3
To safely and accurately manipulate electrodes in the blood vessels and heart	DOPS, mini-CEX, MCR	1,2
To accurately document records of all aspects of patient care	DOPS, mini-CEX, MCR	1,2
Technique of Transeptal punctures	DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Take a sensible, professional attitude to arrhythmia management,	MSF, PS, MCR	1,2,3

learn under supervision with appropriate requests for advice		
Consent patients sensitively with an objective assessment of risks	MSF, PS, MCR	1,3
Be aware of the importance of members of a multidisciplinary catheter laboratory team in safe performance of procedures	MSF, PS, MCR	1,3
Communicate effectively and positively with other professionals involved in the patient's care	MSF, PS, MCR	1,3
Remain calm and professional in the event of adverse complications	MSF, PS, MCR	3
Be diligent in recording the management of the patient and achieving effective communication with Primary Care Physicians and other professionals involved	MSF, PS, MCR	1,2
To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively	MSF, PS, MCR	1,3,4

2. Module 5: Multi-site ventricular pacing for cardiac resynchronisation (CRT)

To appreciate the role CRT plays in the management of patients with CHF
To undertake implantation of CRT devices with a high probability of success
To recognize and deal with complications of implant or device behaviour
To be able to optimize therapy delivery

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Cardiac anatomy including the venous system		
techniques available to identify patients likely to benefit from CRT and to be aware of limitations of these techniques	CbD, mini-CEX, MCR	1
Of medico-legal issues concerning consent and provision of information	CbD, mini-CEX, MCR	1
To be able to determine which patients for CRT also require ICD back-up	CbD, mini-CEX, MCR	1
Of all the equipment available, both for implantation and also subsequent programming	CbD, mini-CEX, MCR	1
Of relative benefits of different leads and devices	CbD, mini-CEX, MCR	1
Of implantation techniques and how to deal with common problems	CbD mini-CEX, MCR	1
Of potential complications		
Skills		
Demonstrate the ability to:		
To be able to select appropriate patients for CRT	DOPS, mini-CEX, MCR	1
To be able to consent a patient in a balanced and informed way about the success rate, risks and benefits of CRT	DOPS, mini-CEX, MCR	1,3
To be able to proceed with a CRT implant in a safe and logical fashion	DOPS, mini-CEX, MCR	1,2
To be able to recognize nature of implant difficulties and to take appropriate action to overcome these	DOPS, mini-CEX, MCR	1,2

To appreciate when an alternative technique or approach may be required e.g. surgical device implantation	DOPS, mini-CEX, MCR	1,2
To be able to programme the devices appropriately, and to advise on optimization using recognized techniques such as echocardiography	DOPS, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
Take a sensible, professional attitude to CRT, learn under supervision with appropriate requests for advice	MSF, PS, MCR	1,2,3
Consent patients sensitively with an objective assessment of likelihood of benefit	MSF, PS, MCR	1,3
Be aware of the importance of members of a multi-disciplinary team in heart failure management and in maximising benefit of CRT	MSF, PS, MCR	1,3
To deal appropriately with patients in whom CRT implantation has not been effective	MSF, PS, MCR	1,3,4
To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively	MSF, PS, MCR	1,3,4

2. Module 6: Training in Pacing / ICD Lead Extraction Techniques

To understand the basic principles of pacing
To understand the engineering of endocardial leads
To understand the implantation procedure, and the cardiac and thoracic anatomy
Safe sterile techniques for all procedures
To be able to select appropriate cases for endocardial lead extraction
To be able to safely extract pacing leads using all available technology

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Of the basic principles of pacing and the electrical properties of the heart	CbD, mini-CEX, MCR	1
Of medico-legal issues concerning consent and provision of information	CbD, mini-CEX, MCR	1
Of the engineering and construction of pacemakers and of ICD and pacing leads	CbD, mini-CEX, MCR	1
Of the published guidelines for lead extraction	CbD, mini-CEX, MCR	1
Of the cardiac and thoracic anatomy	CbD, mini-CEX, MCR	1
Of safe implantation of pacemakers including the operating environment and antibiotic usage	CbD, mini-CEX, MCR	1
Of management of complications of pacemaker implantation including; pneumo-haemothorax. Lead perforation, lead fracture	CbD, mini-CEX, MCR	1
Of the management of lead problems – when to extract and when not to	CbD, mini-CEX, MCR	1
Of programming issues specifically related to leads	CbD, mini-CEX, MCR	1
Of the lead extraction systems including cutting, laser and diathermy sheaths, and the use of the femoral approach to lead extraction	CbD, mini-CEX, MCR	1

Of the specific complications of lead extraction and of how to prevent/handle them	CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
In correct patient selection	DOPS, mini-CEX, MCR	1
In the implantation of both single and dual chamber pacemakers via the cephalic, axillary and subclavian approaches	DOPS, mini-CEX, MCR	1,2
In handling intravascular catheters	DOPS, mini-CEX, MCR	1,2
In wound repair and closure	DOPS, mini-CEX, MCR	1,2
In handling immediate complications of implants e.g. cardiac tamponade	DOPS, mini-CEX, MCR	1,2
Ability to extract leads from both the superior and femoral approaches	DOPS, mini-CEX, MCR	1,2
In using cutting, laser and femoral extraction techniques	MCR	1,2
Behaviours		
Demonstrate:		
Correct attitude to a surgical approach – appreciating sterility and antibiotic usage	MSF, PS, MCR	1,2
To foster a team approach to lead extraction including a close relationship with cardiac surgeons	MSF, PS, MCR	1,3
Use of self audit regarding complications	MSF, PS, MCR	1,2
To educate patients as to the treatment options open to them and to explain treatment strategies including surgical extraction	MSF, PS, MCR	1,3,4
To work closely with other health care professionals as necessary: Cardiac technicians, other Cardiologists, Infection Control, Cardiac Surgeons	MSF, PS, MCR	1,3
To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively	MSF, PS, MCR	1,3,4

2. Module 7: Training in Ablation of SVT, Typical Atrial Flutter and Normal Heart Ventricular Tachycardia

To understand the principles and practical aspects of the use of conventional intracardiac recording to define the mechanism and precise site of origin of clinical cardiac arrhythmias

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

To master catheter ablation techniques for the treatment of arrhythmias

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Of endocardial activation patterns in AF, atrial flutter, atrial tachycardia, AV nodal reentrant tachycardia, AV reentrant tachycardia and VT	CbD, mini-CEX, MCR	1
Of endocardial signals suggestive of critical sites for arrhythmia maintenance e.g. very early atrial or ventricular signals in WPW syndrome, slow pathway potentials in AV nodal reentrant tachycardia and mid-diastolic potentials in VT	CbD, mini-CEX, MCR	1
Of the use of intracardiac programmed stimulation to induce and terminate tachycardias, aid in the diagnosis of dual AV nodal pathways, define the mechanism of a junctional reciprocating tachycardia, the presence of unidirectional or bidirectional isthmus block in patients presenting with atrial flutter and pulmonary vein isolation in patients with AF	CbD, mini-CEX, MCR	1
Of the use of pacing techniques to define critical sites for arrhythmia generation in patients with VT	CbD, mini-CEX, MCR	1
Of the principles underlying non contact intracardiac mapping, complex activation and potential maps. An understanding of benefits and limitations of these systems	CbD, Exam, mini-CEX, MCR	1
Of the biophysics of RFA catheter ablation, and understanding of alternatives	CbD, Exam, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Manipulation and positioning of electrophysiological recording, pacing and ablation catheters safely and effectively	DOPS, mini-CEX, MCR	1,2
Ability to recognize activation patterns characteristic of specific arrhythmias in "real time"	DOPS, mini-CEX, MCR	1
Ability to successfully ablate cardiac arrhythmias based on interpretation of endocardial signals and pacing techniques	DOPS, mini-CEX, MCR	1,2
Perform entrainment, concealed entrainment and pace-mapping to identify sites critical for arrhythmia maintenance	DOPS, mini-CEX, MCR	1,2
Demonstrate endpoints of successful ablation	DOPS, mini-CEX, MCR	1
Safely deploy, set-up, interpret and use complex mapping systems	DOPS, mini-CEX, MCR	1,2
Demonstrate ability to identify electrical wavefronts during reentrant arrhythmias and electrically silent areas in patients with VT or complex congenital heart disease	DOPS, mini-CEX, MCR	1

Use of these systems to demonstrate lines of block after catheter ablation lesions	DOPS, mini-CEX, MCR	1
To recognise and treat complications	DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
A professional attitude based on an evaluation of the patient as a whole and an awareness of the efficacy, complications and cost-effectiveness of invasive intracardiac techniques	MSF, PS, MCR	1,3
To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively	MSF, PS, MCR	1,3,4
To deliver a clear explanation of the risks and complications when consenting patients	MSF, PS, MCR	1,3,4

2. Module 8: Training in Catheter Ablation for AF/AT & Non-Isthmus Dependent Atrial Flutter

To select appropriate patients for catheter ablation treatment for atrial fibrillation and complex atrial arrhythmias such as atypical atrial flutter

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

Safe, effective management of appropriate patients with AF, AT, atypical Afl with suitable acknowledgement of this as an emerging and developing technique requiring regular audit and objective review

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Of risks associated with ablation of AF/AT/AFL, patient factors that may increase these and methods for reducing these risks	CbD, Exam, mini-CEX, MCR	1
Of the anatomy of the left and right atria and how this may be distorted by disease process	CbD, Exam, mini-CEX, MCR	1
Of all tools used for ablation of AF/AT/AFL including transseptal puncture equipment, ablation catheter, electrophysiology systems (basic and complex), lesion generator	CbD, Exam, mini-CEX, MCR	1
Sedative and analgesic drugs and their additive effects on patients	CbD, Exam, mini-CEX, MCR	1
Risks associated with central venous puncture at femoral, subclavian and jugular sites and introduction of electrode catheters to the right atrium and coronary sinus	CbD, Exam, mini-CEX, MCR	1
Anatomy, location of pulmonary veins and risks of cannulation 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	CbD, Exam, mini-CEX, MCR	1
Short, medium and long term complications of AF/AT/AFL management their investigation and treatment	CbD, Exam, mini-CEX, MCR	1
Skills		

Demonstrate the ability to:		
Good assessment of a patient with AF/AT/AFL appropriate investigations/ therapy to reduce intra-operative risk	DOPS, mini-CEX, MCR	1,2
Detailed working knowledge of cardiac and thoracic anatomy for AF/AT/AFL ablation	DOPS, mini-CEX, MCR	1,2
Satisfactory consent of patients for ablation	DOPS, mini-CEX, MCR	1,3
Able to safely and effectively sedate a patient for ablation of AF/AT/AFL and monitor throughout the procedure	DOPS, mini-CEX, MCR	1,2,3
Able to perform femoral and subclavian puncture and intubate the right atrium and coronary sinus with electrode catheters in >80% of patients	DOPS, mini-CEX, MCR	1,2
Able to intubate all four pulmonary veins and perform angiograms in >80% of patients	DOPS, mini-CEX, MCR	,1,2
Able to deliver energy in all relevant regions of the atria with minimum risk	DOPS, mini-CEX, MCR	1,2
Able to monitor and investigate patients for possible complications arising from AF/AT/AFL ablation	DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Willing to assess, counsel and investigate patients as outpatients	MSF, PS, MCR	1,3
Willing to set up and work equipment used for AF/AT/AFL ablation including EP systems and ablation generator	MSF, PS, MCR	1,3
Willing to consent patients for catheter ablation AF/AT/AFL ablation	MSF, PS, MCR	1,3,
Willing to participate in safe catheter ablation practice and obtain help when needed	MSF, PS, MCR	1,2,3
Willing to undertake central venous puncture and electrode catheter placement and obtain help when needed	MSF, PS, MCR	1,2,3
Willing to intubate the pulmonary veins with electrode and angiographic catheters	MSF, PS, MCR	1,2
Willing to safely perform ablation within the left and right atria and obtain help when needed	MSF, PS, MCR	1,2
Willing to perform postoperative follow up and obtain help when needed	MSF, PS, MCR	1,2,3
To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively	MSF, PS, MCR	1,3,4

2. Module 9: Training in Catheter Ablation for Ventricular Tachycardia

To understand the role of VT ablation in the overall management of patients with VT
To participate in ablation of normal heart VT
To recognize and deal with VT storms
To be able to participate in scarrelated VT ablation

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
the indications and limitations of VT ablation	CbD, mini-CEX, MCR	1
medico-legal issues concerning consent and provision of information	CbD, mini-CEX, MCR	1
Recognition of the ECG features of normal heart VT	CbD, mini-CEX, MCR	1
mapping techniques used for both normal heart and scar related VT	CbD, mini-CEX, MCR	1
the principles of substrate mapping versus VT mapping	CbD, mini-CEX, MCR	1
the role and principles of operation of advanced mapping systems	CbD, mini-CEX, MCR	1
potential complications and risks of VT ablation	CbD, mini-CEX, MCR	1
techniques for induction and termination of VT	CbD, mini-CEX	1
Skills		
Demonstrate the ability to:		
to select appropriate patients for VT ablation	DOPS, mini-CEX, MCR	1
consent a patient in a balanced and informed way about the success rate, risks and benefits of VT ablation	DOPS, mini-CEX, MCR	1,3
Manipulate catheters necessary to perform VT ablation	DOPS, mini-CEX, MCR	1
Be competent at catheter ablation for narrow QRS tachycardia	DOPS, mini-CEX, MCR	1
Understand principles of RF energy delivery and alternative energy sources	DOPS, mini-CEX, MCR	1
use of an electronic EP recording system	DOPS, mini-CEX, MCR	1,2
ICD troubleshooting and programming in patients with VT needing ablation	DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
a sensible and professional attitude to VT ablation, learn under supervision with appropriate requests for advice	MSF, PS, MCR	1,3
Consent patients sensitively with an objective assessment of likelihood of benefit	MSF, PS, MCR	1,3
Be aware of the importance of an overall view of the patient and see the arrhythmia in its wider context	MSF, PS, MCR	1,3
To deal appropriately with patients when VT ablation has been ineffective	MSF, PS, MCR	1,3,4

To deal sensitively with end of life decisions in patients with VT	MSF, PS, MCR	1,3,4
To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively	MSF, PS, MCR	1,3,4

2. Module 10: Training in Trans-Septal Puncture and Catheterisation

To undertake transseptal catheterisation (TSP) safely for access to the left atrium/ventricle during interventional electrophysiological studies and interventions

To manage the risks of TSP throughout any period of access to the left atrium/ventricle

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Define the anatomical arrangements in the atria with knowledge of the detailed anatomy of the inter-atrial septum, fossa ovalis, His bundle and coronary sinus	CbD, Exam, mini-CEX, MCR	1
Of medico-legal issues concerning consent and provision of information	CbD, Exam, mini-CEX, MCR	1
Of the type of patients who will require access by TSP	CbD, Exam, mini-CEX, MCR	1
Of the equipment required for safe effective access to the left atrium by TSP	CbD, Exam, mini-CEX, MCR	1
Of the anticoagulation regime required to minimise the risks of EP interventions in the left atrium/ventricle	CbD, Exam, mini-CEX, MCR	1
Of potential complications, particularly the management of cardiac tamponade	CbD, Exam, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Be able to select appropriate patients for safe conduct of a TSP	DOPS, mini-CEX, MCR	1,2
Be able to consent a patient in a balanced and informed way about the risks and benefits of TSP	DOPS, mini-CEX, MCR	1,3
Be able to describe the setup and safe conduct of a TSP	DOPS, mini-CEX, MCR	1
Be able to prepare a patient for a TSP and undertake the procedure safely	DOPS, mini-CEX, MCR	1,2
Be able to recognise immediately when complications are occurring and minimise harm by taking appropriate action	DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Take a sensible, professional attitude to TSP, learn under supervision with appropriate requests for advice	MSF, PS, MCR	1,3
Consent patients sensitively with an objective assessment of risks	MSF, PS, MCR	1,3
Be aware of the importance of members of a multi-disciplinary catheter laboratory team in safe TSP	MSF, PS, MCR	1,3
Remain calm and professional in the event of adverse complications of TSP	MSF, PS, MCR	1,3

2. Module 11: Training in Advanced Assessment of the Risk of Life-Threatening Arrhythmias or Sudden Cardiac Death (SCD), Both Inherited and Acquired

To successfully identify patients at high risk of life threatening arrhythmias and SCD using evidence based protocols and awareness of risk in some hereditary cardiac conditions

To identify adults with poor LV function after myocardial infarction who are candidates for an ICD in keeping with the results of large randomized controlled trials

To identify young adults at risk of SCD by assessing symptomatic patients for the presence of a structural cardiac abnormality e.g. HOCM, or a primary electrical disease that confers high-risk e.g. Long QT syndrome or Brugada syndrome

To understand the use and applicability of non-invasive, invasive and genetic testing effectively to screen family members of those who have suffered life-threatening arrhythmias or SCD for evidence of risk that might lead to preventative treatments

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Of the benefits in ICD therapy in high risk patients after myocardial infarction	CbD, Exam, mini-CEX, MCR	1
Of medico-legal issues concerning consent and provision of information	CbD, Exam, mini-CEX, MCR	1
Of the benefits of ICD therapy in patients with heart failure	CbD, Exam, mini-CEX, MCR	1
Of the symptoms, physical signs, electrocardiography and other evidence of inherited structural heart disease or primary electrical dysfunction of the heart that confers a high risk of life threatening arrhythmias or SCD	CbD, Exam, mini-CEX, MCR	1
Of the use of provocative testing to assess risk e.g. drug infusion and programmed ventricular stimulation in the Brugada syndrome	CbD, Exam, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
To be able to assimilate electrocardiographic, haemodynamic, echocardiographic and other clinical data, in conjunction with evidence based guidelines from randomized, controlled trials to prescribe ICD and other potentially life-saving treatments in patients deemed to be at high risk	CbD, mini-CEX, MCR	1,2
To determine which patients are at low risk, in whom treatment might be more harmful than helpful	CbD, mini-CEX, MCR	1,2,3
Behaviours		
Demonstrate:		
To appreciate the importance of multidisciplinary collaboration, especially with colleagues in other disciplines e.g. echocardiography, cardiac NMR imaging and other specialties such as clinical genetics in the risk assessment and screening of patients and families for inherited cardiac conditions	MSF, PS, MCR	1,3
To appreciate the importance of cardiac risk on patients health and social well-being, and the impact on education, family life, employment, driving and insurance especially in the young	MSF, PS, MCR	1,3
To appreciate that an accurate diagnosis (e.g. Long QT) and effective	MSF, PS, MCR	1,3

treatment has a huge impact on patients' lives		
To appreciate the psychological impact of the patients' illness on the patient and their family and manage it sensitively	MSF, PS, MCR	1,3,4

2. Module 12: Training in Management of Cardiac Arrhythmias in Patients with Adult Congenital Heart Diseases (ACHD)

To appreciate the role of arrhythmogenesis in the morbidity and mortality of the various conditions in patients with palliated or "corrected" congenital heart disease

To interpret cardiac arrhythmias and undertake risk stratification of identified arrhythmias in this patient population

To undertake sudden cardiac death risk stratification

To undertake complex interventions in this patient groups, including device implantation and ablation of arrhythmia mechanisms

To undertake management strategies which will determine long term outcome in respect of physiological monitoring and prevention of sudden cardiac death

To be able to undertake long term follow up of patients with arrhythmias and ACHD

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Of techniques available to palliate symptoms and improve prognosis in ACHD patients	CbD, Exam, mini-CEX, MCR	1
Of all the complex anatomical variations occurring in and. Of the cellular level actions of antiarrhythmic drugs that may be employed	CbD, Exam, mini-CEX, MCR	1
Of the related surgical procedures used for the management of ACHD	CbD, Exam, mini-CEX, MCR	1
Of cross sectional imaging techniques that may assist interventions	CbD, Exam, mini-CEX, MCR	1
Of diagnostic catheter based techniques used in the assessment of ACHD patients	CbD, Exam, mini-CEX, MCR	1
Of appropriate catheter-based ablation interventions, and the complex technologies used in these procedures	CbD, Exam, mini-CEX, MCR	1
Of therapeutic innovations and technology advances that will facilitate improved patient care	CbD, Exam, mini-CEX, MCR	1
Of the evidence base which mandates the various treatment strategies that may be employed	CbD, Exam, mini-CEX, MCR	1
Of potential complications	CbD, Exam, mini-CEX, MCR	1
Of appropriate endpoints that indicate successful medical therapy/device/ablation interventions	CbD, Exam, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
To be able to select appropriate patients for drug or device or ablation management	DOPS, mini-CEX, MCR	1,2
To be able to consent a patient in a balanced and informed way about the success rate, risks and benefits of medical therapies and interventions	DOPS, mini-CEX, MCR	1,3

To be able to determine which patients will benefit from intervention or drug prescription	DOPS, mini-CEX, MCR	1,
To be able to perform complex cardiac catheterization in the haemodynamic evaluation of ACHD patients	DOPS, mini-CEX, MCR	1,2,
To be able to proceed with all types of device implants in the full range of complex intracardiac anatomies	DOPS, mini-CEX, MCR	1,2
To be able to undertake the complex range of ablation therapies using multiple access routes and complex catheter manipulations	DOPS, mini-CEX, MCR	1,2
To appreciate the interactions and adjunctive nature of various therapeutic strategies, including indications for surgery	DOPS, mini-CEX, MCR	1,2
To be able to provide all necessary clinical advice	DOPS, mini-CEX, MCR	1,2,3
To facilitate arrhythmia interventions at the time of surgery	DOPS, mini-CEX, MCR	1,2,
To be able to programme any implanted devices appropriately, and to advise on optimization using recognized techniques such as echo after an intervention	DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
Take a sensible, professional attitude to arrhythmias occurring in ACHD; learn under supervision with appropriate requests for advice	MSF, PS, MCR	1,2,3
Consent patients sensitively with an objective assessment of likelihood of benefit	MSF, PS, MCR	1,3
Be aware of the importance of members of a multi-disciplinary team in management of these complex patients who will often require surgical and psychological inputs for management	MSF, PS, MCR	1,3
To deal appropriately with patients in whom arrhythmias cannot be effectively managed	MSF, PS, MCR	1,3,4
To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively	MSF, PS, MCR	1,3,4
To appreciate the psychological impact of an awareness of sudden cardiac death risk and manage it sensitively	MSF, PS, MCR	1,3,4

3. Heart Failure (Advanced)

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Teaching and Learning Methods

The trainee would be expected to achieve the learning objectives by spending a year in a recognised training centre and being attached to a cardiologist with a specific interest in heart failure. During this attachment, they would attend and participate in heart failure clinics and in the in-patient management of heart failure cases. (i.e. supervised consultations in outpatients and ward rounds)

Trainees should be trained in centres with established multidisciplinary heart failure services/networks. During this attachment they should be able to interact with heart failure nurses and give medical advice to them within locally agreed guidelines. (i.e. small group work and multidisciplinary group work). The trainee would continue to obtain the skills needed for diagnosis and investigation of heart failure by gaining further exposure to transthoracic and transoesophageal echocardiography, nuclear cardiology and CMR (with rotation to specialist units, if necessary). (i.e. practical opportunities for skill acquisition).

Training of trainees in selection of patients for device therapy and transplantation/LVADs, this can be done locally if sufficient resources exist or may entail transfer to a regional centre. Adequate exposure to cardiac transplantation my require secondment to a Transplant Centre for at least one month.

Trainees are advised to join the British Society for Heart Failure and attend the organised national/regional symposia which mirror the curriculum. In addition they should try to attend an international heart failure meeting annually. Trainees should undertake two audits of heart failure management. Research into aspects of either clinical heart failure or more basic science heart failure interests would be strongly encouraged.

To be able to function as a specialist in the diagnosis of heart failure with expert knowledge of heart failure; its causes, natural history and treatment.

To be able to undertake specialist investigation of the underlying cause/causes of heart failure

To be able to provide specialist treatment of the underlying aetiologies of heart failure

To be able to deliver specialist medical treatment of heart failure

To be able to advise on appropriate device treatment of heart failure

To be able to select patients for advanced heart failure therapies (cardiac transplantation and left ventricular assist devices)

To be able to function as part of and manage a multiprofessional team

To produce a cardiologist who can function as Clinical Lead for Heart Failure in a Trust

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		1
The clinical presentation, causes and natural history of heart failure	mini-CEX, CbD, MCR	
National (NICE and SIGN) and International (ESC/ACC/AHA) guidelines for diagnosis and treatment	mini-CEX, CbD , MCR	1
The management and prevention of coronary heart disease, hypertension, valve disease, adult congenital heart disease (ACHD) and pericardial disease	mini-CEX, CbD, MCR	1
Evidence-based pharmacotherapy for heart failure including efficacy, effects on morbidity and mortality, side-effects and contraindications	mini-CEX, CbD, MCR	1
Selection of patients for both cardiac resynchronization and defibrillator therapy based on evidence-based medicine and knowledge of international and local guidelines	mini-CEX, CbD, MCR	1

Adverse prognostic markers in heart failure	mini-CEX, CbD, MCR	1
The relative prognoses of patients treated by medical therapy and transplantation/device therapy in those with advanced heart failure with ongoing symptoms despite optimisation of therapy	mini-CEX, CbD, MCR	1
Pulmonary hypertension and its treatment	mini-CEX, CbD, MCR	1
Multidisciplinary service/networks and be aware of the evidence base underpinning their pivotal role in heart failure management	mini-CEX, CbD, MCR	1
Skills		
Demonstrate the ability to:		
Perform a relevant history and examination and refer the patient for an appropriate diagnostic test to define the nature of their cardiac dysfunction.	CbD, DOPS, mini-CEX, MCR	1,3
Perform and interpret transthoracic echocardiograms	CbD, DOPS, mini-CEX, MCR	1,2
Interpret radionuclide ventriculograms	CbD, DOPS, mini-CEX, MCR	1
Perform and analyse angiographic ventriculography	CbD, DOPS, mini-CEX, MCR	1,2
Select and interpret of appropriate investigations to establish an aetiology. Interpret the 12 lead ECG	CbD, DOPS, mini-CEX, MCR	1
Interpret exercise tests (including cardiopulmonary tests)	CbD, DOPS, mini-CEX, MCR	1
Interpret stress nuclear tests	CbD, DOPS, mini-CEX, MCR	1
Interpret CMR scans	CbD, DOPS, mini-CEX, MCR	1
perform and report coronary angiograms	CbD, DOPS, mini-CEX, MCR	1,2
perform right heart catheterisation	CbD, DOPS, mini-CEX, MCR	1,2
Interpret 24 hour Holter monitors	CbD, DOPS, mini-CEX, MCR	1
Select patients for revascularisation based on accurate interpretation of invasive and non invasive testing	CbD, DOPS, mini-CEX, MCR	1,2
Detect patients requiring valve surgery or other corrective procedures	CbD, DOPS, mini-CEX, MCR	1
Discuss the complicated therapy regimes with the patient	CbD, DOPS, mini-CEX, MCR	1,3
understand the issues relevant to patients with a chronic disease	CbD, DOPS, mini-CEX, MCR	134
manage complex in-patients with acute/decompensated heart failure and those in cardiogenic shock	CbD, DOPS, mini-CEX, MCR	1,2
investigate and manage important co-morbidities (renal dysfunction and anaemia)	CbD, DOPS, mini-CEX, MCR	1,2
Interpret complex echocardiography to define the presence of dysynchrony	CbD, DOPS, mini-CEX, MCR	1
Interpret 24 hour Holter monitoring and other arrhythmia screening	CbD, DOPS, mini-	1

tools	CEX, MCR	
Interpret metabolic exercise testing	CbD, DOPS, mini-CEX, MCR	1
Perform the heart failure survival score	CbD, DOPS, mini-CEX, MCR	1
Perform and analyse right heart haemodynamic measurements and knowledge of their significance	CbD, DOPS, mini-CEX, MCR	1,2
reversal of pulmonary hypertension during RHC	CbD, DOPS, mini-CEX, MCR	1,2
set up and function as part of a multidisciplinary team	CbD, DOPS, mini-CEX, MCR	1,3
set up and run a heart failure clinic	CbD, DOPS, mini-CEX, MCR	1,2,3
write and amend guidelines for local heart failure management	CbD, DOPS, mini-CEX, MCR	1,2,3
construct business cases for service developments in heart failure	CbD, DOPS, mini-CEX, MCR	1,2
function as a clinical lead for heart failure within the local consultant cardiology body	CbD, DOPS, mini-CEX, MCR	1,2,3,4
set up, organize and run continuing educational development programmes in heart failure for the local team	CbD, DOPS, mini-CEX, MCR	1,3
Behaviours		
Recognise the pivotal role of an accurate diagnosis in planning future investigation and therapy	MSF, PS, MCR	1
Recognise the importance of establishing an underlying cause with the least invasive test necessary at each stage	MSF, PS, MCR	1
Be able to use the tests cost effectively	MSF, PS, MCR	1
Appreciation of the need to consult with and discuss optimum management with other health care professionals, in particular with cardiac surgeons, interventional cardiologists, obstetricians and ACHD specialists	MSF, PS, MCR	1,3
Interaction with the multidisciplinary team to deliver the therapy, uptitrate drugs and monitor for side effects. In particular close communication with specialist heart failure nurses, pharmacists, general medicine, care of the elderly (COTE) and primary care physicians	MSF, PS, MCR	1,3
Ability to communicate and liaise with other health care professionals, in particular electrophysiologists	MSF, PS, MCR	1,3
Identify patients who need to be considered for the above therapies because of an adverse prognosis	MSF, PS, MCR	1,2
Have effective communication and referral strategies to regional centres	MSF, PS, MCR	1,3
Communicate to patients the risks involved with these therapies	MSF, PS, MCR	1,3,4
Ability to communicate and interact with other members of the multidisciplinary team: heart failure nurses, COTE and general physicians, primary care physicians, palliative care services and pharmacists	MSF, PS, MCR	1,3

4. Interventional Cardiology

Background
The development of the advanced training in interventional cardiology component of the Cardiology curriculum coincides with a pan-European initiative, supported by the European Cardiac Society to develop a universally recognised standard for training in percutaneous coronary intervention (PCI).

Rationale
This syllabus aims to ensure that interventional cardiologists are trained to a level that ensures safe and high quality patient care. Trainees completing this training will be competent to provide a complete package of care that incorporates (a) a high standard of technical skill and expertise, (b) sound clinical judgement in decision-making regarding the appropriateness of a procedure, (c) skilful and sensitive interaction with patients and relatives in communicating appropriately in order to empower them in the decision-making and consent processes, (d) experience of diagnosing and managing PCI-related complications and (e) a fundamental awareness of their responsibility to look after patients upon whom they have performed PCI. In the rapidly changing field of interventional Cardiology, proficiency is maintained only by continued education and practice. This initial period of specialist area training will therefore represent the start of an ongoing process.

Learning Methods

Apprenticeship Learning
Traditionally this has been the dominant method in interventional cardiology and it should remain an important component. The training programme should ensure that the trainee is exposed to several different teachers over the 2 years. It will be expected that the trainee accompanies each trainer regularly during their normal working week so that they share the experience of: (a) outpatient assessment (b) pre-procedural assessment (c) angiogram review and interaction with surgical colleagues (d) PCI sessions (e) post-procedure review of patients undergoing PCI.

Formal Learning
Multidisciplinary meetings; Study days at local or national meetings and postgraduate courses – recommended 30 days in 2 years; research and audit in the field of interventional Cardiology; Practical skills learning outside the catheter lab with simulators.

Methods of Assessment

DOPS
DOPS will be used for assessment of a trainee at regular intervals during the 2 year programme and review of these should be a component of the 3 monthly supervisor appraisals.

Log Book to Record Procedures
All trainees should maintain a continuous log of their procedures. The log should be compatible with current data sets required by the current BCS logbook. Whilst it is now widely accepted that absolute numbers of procedures do not guarantee competence, it is likely that in order to gain sufficient experience by the end of their training, the trainee will have performed at least 200 procedures as first or only operator. The procedure log will be reviewed on a regular basis by the supervisor and the log must be signed off by the Training Director (see below)

Appraisal with Supervisors and Training Director
The supervisor at each stage will be a recognised specialist in interventional cardiology and trained to be a trainer. The supervisor will provide regular appraisal, at least every 3 months, to discuss progress, activity, individual strengths and weaknesses. Each appraisal meeting will generate a written summary that will be signed off by both parties. At the end of the time with a particular supervisor, he/she will issue a formal report on progress, shared with the trainee that will be assessed by and with the Training Director. At the end of the period of specialist area training, each trainee will undergo appraisal with the Training Director, who will hold ultimate responsibility for "signing off" the training period and the competence of the trainee.

The Training Centre
Each training centre should be an independent PCI unit. It is recommended in the European curriculum that a recognized training centre should perform at least 800 PCI per year and that this should include both acute and elective cases.

Supervisors and Training Directors
At least 2 supervisors should be available for training in each training centre who should have received training in supervising postgraduate training. PCI supervisors will be expected to have an experience of at least 1000 first operator PCIs and/or a minimum of 5 years as a specialist in PCI. Each trainee should be exposed to formal supervision by at least 2 different trainers during each component of their training.
The Training Director will be responsible for training in one or more recognised training centres. The individual will be recognised by BCIS and will have a special interest in training. The Training Director will be responsible for (a) local coordination of trainee attachments and (b) will perform a final Director's appraisal at the end of the training programme at which the log book, supervisors' reports, certification of study day attendance will be reviewed in a formal manner. Requirements of the Training Director, in terms of clinical experience, will be the same as described for a supervisor above. Indeed, it is highly likely that the Training director will also act as a supervisor for his/her local centre. It will be left to local discussion whether each Training Centre has its own Training Director, but it is likely that in many circumstances there will be one Training Director covering 2-3 centres.

Training Programme
Typically, the training programme will divide into 3 phases, during which the trainee will acquire all the skills laid out in the accompanying syllabus

(a) PHASE 1: First 6 months
Focus on assessment and preparation of patient; Acquisition of a sound understanding of indications for and interpretation of non-invasive testing including exercise testing, stress echo, nuclear scans, CMR and cardiac CT; Explanation of angiogram findings and discussion regarding management options with patient and relatives; Assisting supervisor in performance of PCI in elective, urgent and emergency settings; Routine post procedure care on the day of procedure and for the duration of the patient stay

(b) PHASE 2: The Second 6 Months
Progression to working as primary operator under close supervision for increasingly challenging and complex anatomy; Emergency PCI as primary operator, including acute MI intervention.

(c) PHASE 3: The Second Year
Perform PCI as the sole operator, with supervision available, but without immediate supervisor necessarily being involved until requested; Development of strategy for the PCI case in increasingly complex or high risk cases; Assess and minimise risk by careful

assessment of patients and ability to determine cases for intra-aortic balloon pump; Independent ability to assess and manage optimally common complications associated with PCI; Option for 2-3 month special training in non-essential interventional skills, including rotablation, mitral valvuloplasty, alcohol septal ablation etc; Independent ability to acquire and critically assess the research base and apply it to everyday clinical practice; Independent ability to understand the principles of commissioning, tariffs and other fundamentals of everyday healthcare provision; Final appraisal with Training Director to assess log book, supervisor reports, DOPS results and examination (optional).

4a.Clinical Care of PCI Patients

To understand the indications for objective tests for ischaemia
To be able to explain results of tests, particularly angiogram, with patient and relatives
To understand the principles of risk assessment and clinical features of high risk
To understand methods for minimising risk
To be able to anticipate, diagnose and treat complications appropriately
To be able to communicate risk of procedure with patient
To provide continuity of care to patients undergoing PCI
To maintain a database of clinical activity including outcome audit for PCI procedures

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
indications for, limitations of and relative benefits of exercise ECG, stress echo, nuclear scans and CMR	CbD, mini-CEX, MCR	1
indications for PCI, outcomes versus medical therapy and CABG, prognostic benefit in acute coronary syndromes	CbD, mini-CEX, MCR	1
BCIS audit data for national PCI as well as local centre database	CbD, mini-CEX, MCR	1
common complications and how to avoid them	CbD, mini-CEX, MCR	1
pathophysiology of atherosclerosis, angina, myocardial ischaemia and infarction, acute coronary syndromes and the evidence base for their management	CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
apply theoretical evidence base to individual patient case	CbD, mini-CEX, MCR	1
choose appropriate patients for PCI	CbD, mini-CEX, MCR	1,2
consent a patient in an informed and informative manner including presentation of options, success and complication rates	CbD, mini-CEX, MCR	1,3
apply risk stratification and to deploy methods to minimize and/or avoid risk	CbD, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
a professional and caring attitude to PCI patients before, during and after the procedure	MSF, PS, MCR	3,4
A sensitive approach to consent	MSF, PS, MCR	3,4
A caring approach to the high risk patient and patients with important complications	MSF, PS, MCR	3,4

4b. Basic PCI

To acquire skilful and robust interpretation of angiography, with particular attention to the need for tailored views of stenosis

To be able to employ techniques designed to assess angiographically equivocal lesions including pressure wire and IVUS

To undertake and learn the principles of PCI under supervision as primary and secondary operator in a variety of clinical settings

To have more than 1 arterial access option (ie femoral and radial)

To apply appropriately adjuvant therapy including clopidogrel, glycoprotein IIb/IIIa inhibitors and bivalirudin

To be proficient in the application of an IABP

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
assessment of lesion severity using angiography, pressure wire and intravascular ultrasound	CbD, mini-CEX, MCR	1
PCI equipment including guide catheters, guide wires, balloons, stents	CbD, mini-CEX, MCR	1
other PCI equipment including distal protection, thrombectomy devices	CbD, mini-CEX, MCR	1
indications for drug-eluting stents	CbD, mini-CEX, MCR	1
evidence base for clopidogrel and other oral anti-platelet drugs, glycoprotein IIb/IIIa inhibitors, bivalirudin	CbD, mini-CEX, MCR	1
the benefit of and evidence for intra-aortic balloon pumping	CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
assess lesion severity	DOPS, mini-CEX, MCR	1
choose appropriate equipment for straight forward PCI and develop a strategy for the procedure itself	DOPS, mini-CEX, MCR	1,2
develop adjuvant therapy appropriately and in a manner that is justified by the current evidence base	DOPS, mini-CEX, MCR	1,2
insert and maintain an intraaortic balloon pump	DOPS, mini-CEX, MCR	1,2
detect complications and adjust pre-procedure strategy accordingly	DOPS, mini-CEX, MCR	1,2
perform radial as well as femoral angiography and straightforward PCI	DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
a professional attitude to learning basic PCI techniques and demonstrate an ability to acquire knowledge both in an apprenticeship and independent manner	MSF, PS, MCR	1,2,3
treatment of each patient as an individual and tailoring of each intervention to the particular case	MSF, PS, MCR	1,3,4

Fostering of good relationships with the multidisciplinary team	MSF, PS, MCR	3
Maintenance of a calm demeanour when a PCI goes badly or adverse events occur	MSF, PS, MCR	3

4c. Advanced PCI

To be able to competently perform PCI on more complex lesions including bifurcations, vein grafts, total chronic occlusions, left main, ostial disease

To be able to perform PCI in high risk patients including acute MI, carcinogenic shock, rescue, advanced co-morbidities and inoperable patients

To be able to develop strategies for PCI in patients with multivessel disease

To be able to interact with other specialists in patients who need revascularisation prior to non-cardiac surgery such as patients with cancer, orthopaedic conditions and aortic aneurysms.

To maintain keen interest in the evidence base and new technologies and to exhibit a pioneering interest in new developments

To engage cardiac surgical colleagues in discussion about potential "cover" for high risk complex cases

To recognise the importance of concentrating specialist skills and to work in partnership with colleagues where necessary

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
the evidence base as it defines risk: benefit in relation to more complex lesion and patient subsets	CbD, mini-CEX, MCR	1
devices and equipment that are available for high risk lesions and/or patients	CbD, mini-CEX, MCR	1
Techniques that can be applied to complex lesion or patient subsets	CbD, mini-CEX, MCR	1
the pros and cons of PCI versus CABG therapy in complex lesion and patient subsets	CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
appropriately select patients with complex lesions	DOPS, mini-CEX, MCR	1
identify and define complex lesion subsets with accuracy and precision	DOPS, mini-CEX, MCR	1
communicate the nature of the potential PCI procedure with patients or relatives and to be able to tailor their informed consent to the complexity of the procedure	DOPS, mini-CEX, MCR	1,3,4
identify the correct time to stop a procedure when the initial strategy has not necessarily been completed if the circumstances dictate that it is in the patient's best interest	DOPS, mini-CEX, MCR	1,2
plan a "staged" strategy	DOPS, mini-CEX, MCR	1,2
Behaviours		
Demonstrate:		
a responsible attitude to the selection and application of PCI in complex lesion and patient subgroups	MSF, PS, MCR	1,2,3

high quality care as to motivation behind complex PCI	MSF, PS, MCR	1,2
preparedness to be involved in properly planned and executed multicentre research to assess the benefit of such intervention	MSF, PS, MCR	1,2
Involvement of other members of the multidisciplinary team in the strategy for complex PCI	MSF, PS, MCR	3
a calm demeanour during complex cases	MSF, PS, MCR	3

4d. Optional Interventions

To acquire competence in the performance of mitral balloon valvuloplasty
To acquire competence in the performance of rotablation
To acquire competence in the performance of complex PCI from the radial approach
To acquire competence in performance of carotid artery or renal stenting
To acquire competence in the closure of ASD or PFO
To acquire competence in the technique for alcohol septal ablation in HOCM

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The specialised technique under the immediate supervision of a high volume and skilled operator	CbD, mini-CEX, MCR	1
the indications for specialised interventional techniques	CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
acquire these specialist skills with direct supervision until competent as a solo and independent operator	DOPS, MCR	1,2
Behaviours		
Demonstrate:		
Deployment of these specialised techniques only in appropriate circumstances	MSF, PS, MCR	1,2
Readiness to take over patients referred by colleagues in order to utilise these specialist skills	MSF, PS, MCR	1,2,3

5. Cardiac Imaging

5a. Advanced Echocardiography

Introduction

Echocardiography (cardiac ultrasound) is the most commonly performed and widely applicable cardiac imaging modality. Transthoracic echocardiography (TTE) is important in the management of all forms of heart disease, including acute and chronic coronary disease, heart failure, valve disease and congenital heart disease. It is performed in all general hospitals in the UK, predominantly by Cardiac Physiologists, with medical input and clinical leadership provided by cardiologists (the latter is a requirement of British Society of Echocardiography Departmental Accreditation [ref]). The number of echocardiograms performed in the UK is rising significantly.

Transoesophageal echocardiography (TOE) is an advanced application of echocardiography, using an endoscopic approach to achieve high quality images. It is the gold standard imaging modality in a wide range of valve diseases, endocarditis and cardioembolic disease. It is also widely utilised in the critical care and perioperative cardiac surgical environments. High quality TOE should be available in all major cardiology departments, and is desirable in all general hospitals.

Stress echocardiography combines TTE with a cardiac stressor (pharmacological, exercise or pacing) to assess cardiac function in coronary disease (inducible ischaemia, viability), heart failure (functional reserve) and valve disease (haemodynamic effects). Stress echo is a growing specialist area; it is a valid alternative to CMR and nuclear cardiology techniques that is cost effective and clinically proven. However, it is operator dependent and requires high levels of training and experience.

Rationale & Aims

All cardiology trainees will receive a thorough training in TTE during Core Cardiology, to a competence level whereby they will perform, interpret and report standard TTE (equivalent to BSE Accreditation in TTE).

Cardiologists undertaking Specialist area Training in Advanced Echocardiography will fall into two main groups:
Advanced Echocardiography (1) - those wishing to perform echocardiography to a high standard, in conjunction with a second compatible cardiology specialist area e.g. CMR, heart failure, adult congenital heart disease
Advanced Echocardiography (2) - those wishing to be highly specialist echocardiologists, performing all aspects of advanced echocardiography and providing clinical leadership in echocardiography within cardiology departments.

<u>Advanced Echocardiography (1) (2 units)</u>

This will consist of training in:
Advanced Transthoracic Echocardiography. It is expected that trainees choosing Echocardiography Specialist area will have achieved BSE Accreditation, or achieved an equivalent standard, during Core Cardiology Training. This will be built upon, acquiring knowledge and skills in advanced technologies (e.g. tissue Doppler, speckle tracking and strain analysis, 3D echo, contrast echo) and advanced techniques for the assessment of complex cardiac disease, including complex valve disease (e.g. selection for percutaneous therapies and surgical repair), heart failure and resynchronisation therapy and adult congenital heart disease (type 2).

Standard Transoesophageal Echocardiography. This will be designed for trainees to achieve the necessary knowledge, skills and experience to be competent, independent operators in the setting of a general cardiology department. A standard equivalent to BSE Accreditation in TOE is expected.

Specialist area Training in Advanced Echocardiography (2) (4 units)

This will build upon Specialist area Training in Advanced Echocardiography (1). It will consist of training in:

Advanced Transthoracic Echocardiography (as above)
Standard Transoesophageal Echocardiography (as above)
Advanced Transoesophageal Echocardiography. This will include knowledge, skills and experience of advanced technology, such as 3D TOE and advanced clinical applications including perioperative TOE in cardiac surgery and TOE for percutaneous cardiac interventions.
Stress echocardiography. This will be designed for trainees to achieve the necessary knowledge, skills and experience to be competent, independent operators in stress echocardiography.

Learning Methods
(a) The theoretical background for echocardiography is learned from books, interactive educational media, distance-learning modules (BSE), national and regional courses, training days contained with conferences e.g. BCS, BSE annual meetings and EuroEcho.
(b) Practical experience (apprenticeship or experiential learning) is gained through supervised training in performing and reporting echocardiography.

Supervision and Feedback
The entire training programme should be overseen by a cardiologist with echocardiographic expertise who will act as Specialist area Training Director and, where appropriate, Educational Supervisor. Training Directors/Educational Supervisors should be recognised specialists, preferably holding BSE Accreditation in Transthoracic and Transoesophageal Echocardiography. They will ensure that a trainee receives a comprehensive education and has experience of all necessary pathology, if necessary by secondment to regional centres. The trainee will carry a document listing echocardiographic competencies which will be signed by the supervisor.

Recommended standards for training centres, clinical and educational supervisors (cardiologists and cardiac physiologists) have been developed by BSE (see BSE Departmental Accreditation).

Assessment Methods
BSE Accreditation in Transthoracic Echocardiography. This is suggested for all trainees completing core cardiology with an interest in echocardiography; it is strongly recommended for those entering Advanced Echocardiography.

BSE Accreditation in Transoesophageal Echocardiography. This is strongly recommended for all trainees completing Advanced Echocardiography.

DOPS will be used to assess performance and interpretation of advanced transthoracic, transoesophageal and stress echocardiography

Logbook: as a guide for trainees and trainers the indicative case numbers that are likely to be necessary to achieve competence and provide sufficient experience are:
Advanced TTE – 100 cases

Standard TOE – 100 cases
Advanced TOE – 75 cases
Stress echocardiography – 100 cases

Advanced echocardiography – 1 (2 units)

This module is designed to be undertaken along with another "2 unit" cardiology specialist area, e.g. CMR, cardiac CT, Nuclear Cardiology, or Heart Failure etc.

5a. Advanced Transthoracic Echocardiography

To develop advanced skills and competence in transthoracic echocardiography.
To be able to perform and report complex transthoracic studies

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Advanced instrument settings	CbD, mini-CEX, MCR	1
Advanced calculation of LV mass and volume including abnormal geometry with normal mass and the prognostic importance of LV geometry	CbD, mini-CEX, MCR	1
Quantitative Doppler techniques including PISA, resistance, regurgitant fractions	CbD, mini-CEX, MCR	1
Types, normal function and abnormalities of prosthetic heart valves	CbD, mini-CEX, MCR	1
The principles of 3D echocardiography	CbD, mini-CEX, MCR	1
The principles of speckle tracking including strain imaging	CbD, mini-CEX, MCR	1
The role of intravascular contrast agents for opacification of the left ventricular cavity and assessment of wall motion	CbD, mini-CEX, MCR	1
The principles of Doppler tissue imaging including strain imaging	CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Assess complex heart valve disease, including severity, suitability for repair/percutaneous procedures and effects on ventricular function	CbD, DOPS, mini-CEX, MCR	1
Detect prosthetic valve dysfunction	CbD, DOPS, mini-CEX, MCR	1
Assess complex congenital heart disease in adults	CbD, DOPS, mini-CEX, MCR	1
Perform detailed assessment in heart failure	CbD, DOPS, mini-CEX, MCR	1
Perform detailed assessment of ventricular structure and function in inherited and acquired heart muscle disease	CbD, DOPS, mini-CEX, MCR	1
Assess mechanical dyssynchrony, suitability for cardiac resynchronisation therapy and perform echo-optimisation of biventricular pacemakers	CbD, DOPS, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
The ability to collaborate with specialists in other imaging modalities	MSF, PS, MCR	1,3
The ability to think reflectively	MSF, PS, MCR	1,3

The ability to judge a test result in the clinical context	MSF, PS, MCR	1,3
The ability to train and educate in echocardiography	MSF, PS, MCR	1,3

5a. Transoesophageal Echocardiography

To perform and interpret transoesophageal echocardiograms (TOE)		
Knowledge	**Possible Assessment Methods**	**GMP**
Demonstrate knowledge of:		
Indications, contraindications and limitations of TOE	CbD, Exam, mini-CEX, MCR	1
Principle of disinfection, probe maintenance and storage	CbD, Exam, mini-CEX, MCR	1
Principles of assessment of anaesthetic risk	CbD, Exam, mini-CEX, MCR	1
TOE views, image planes and echo-anatomic correlations	CbD, Exam, mini-CEX, MCR	1
The effects of anaesthesia and cardiopulmonary bypass on the heart	CbD, Exam, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Assess anaesthetic risk and plan and monitor the procedure appropriately	DOPS, mini-CEX, MCR	1,2
perform a complete, comprehensive transoesophageal echocardiogram in conscious sedated or anaesthetised adult patients	BSE Exam or DOPS, MCR	1
interpret, measure and analyse a transoesophageal echocardiogram in adults and produce a comprehensive echocardiogram report.	BSE Exam or DOPS, CbD, MCR	1
Assess complex heart valve disease, including severity, suitability for repair/percutaneous procedures and assess valve disease post-procedure.	DOPS, mini-CEX, MCR	1
Assess acute aortic syndromes (dissection, intramural haematoma)	DOPS, mini-CEX, MCR	1
Use TOE in the investigation of stroke or embolic events, including detection of patent foramen ovale, intracardiac thrombus, tumour	DOPS, mini-CEX, MCR	1
Detect and assess simple congenital heart defects, eg ASD (including sinus venous defects)	DOPS, mini-CEX, MCR	1
Perform TOE in the critical care setting, to assess ventricular function, filling and inotropic status	DOPS, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
The ability to adequately explain the procedure to the patient and maintain trust	MSF, PS, MCR	1,3,4
the ability to work with sonographers, cardiac surgeons, anaesthetists and interventional cardiologists	MSF, PS, MCR	1,3
the ability to integrate the results of TOE with the clinical context to produce recommendations	MSF, PS, MCR	1,2

the ability to collaborate with specialists in other imaging modalities	MSF, PS, MCR	1,3
the ability to think reflectively	MSF, PS, MCR	1,3
the ability to audit results		1,2

Advanced echocardiography 2 – (4 units)

5a. Advanced Transthoracic Echocardiography

To develop advanced skills and competence in transthoracic echocardiography.

To be able to perform and report complex transthoracic studies.

To be able to run a transthoracic echocardiography service including the quality assurance and training of other practitioners.

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Advanced instrument settings	CbD, mini-CEX, MCR	1
Advanced calculation of LV mass and volume including abnormal geometry with normal mass and the prognostic importance of LV geometry	CbD, mini-CEX, MCR	1
Quantitative Doppler techniques including PISA, resistance, regurgitant fractions	CbD, mini-CEX, MCR	1
Types, normal function and abnormalities of prosthetic heart valves	CbD, mini-CEX, MCR	1
The principles of 3D echocardiography	CbD, mini-CEX, MCR	1
The principles of speckle tracking including strain imaging	CbD, mini-CEX, MCR	1
The role of intravascular contrast agents for opacification of the left ventricular cavity and assessment of wall motion	CbD, mini-CEX, MCR	1
The principles of Doppler tissue imaging including strain imaging	CbD, mini-CEX, MCR	1
National and international recommendations and guidelines for the following: (i)indications for echocardiography (ii) standards for performing and reporting of echocardiograms (iii)Institutional Accreditation for echocardiography departments (iv) the roles of clinical and technical leadership in echocardiography departments (v) training and supervision	mini-CEX, MCR	1, 3
Skills		
Demonstrate the ability to:		
Assess complex heart valve disease, including severity, suitability for repair/percutaneous procedures and effects on ventricular function	CbD, DOPS, mini-CEX, MCR	1
Detect prosthetic valve dysfunction	CbD, DOPS, mini-CEX, MCR	1
Assess complex congenital heart disease in adults	CbD, DOPS, mini-CEX, MCR	1
Perform detailed assessment in heart failure	CbD, DOPS, mini-CEX, MCR	1
Perform detailed assessment of ventricular structure and function in inherited and acquired heart muscle disease	CbD, DOPS, mini-CEX, MCR	1

Assess mechanical dyssynchrony, suitability for cardiac resynchronisation therapy and perform echo-optimisation of biventricular pacemakers	CbD, DOPS, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
the ability to collaborate with specialists in other imaging modalities	MSF, PS, MCR	1,3
the ability to think reflectively	MSF, PS, MCR	1,3
the ability to judge a test result in the clinical context	MSF, PS, MCR	1,3
leadership role in organisation and administration	MSF, MCR	1, 2
leadership skills in training and clinical supervision	MSF, MCR	1, 2
Collaborative working practices with cardiologists, cardiac surgeons, other medical staff, cardiac physiologists, echocardiographers and nurses	MSF, MCR	1, 2
the ability to train and educate in echocardiography	MSF, PS, MCR	1,3

5a. Transoesophageal Echocardiography

To develop advanced skills and competence in transoesophageal echocardiography.

To be able to perform and report complex transoesophageal studies.

To be able to run a TOE service including the quality assurance and training of other practitioners

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
Indications, contraindications and limitations of TOE	CbD, mini-CEX, MCR	1
Principle of disinfection, probe maintenance and storage	CbD, mini-CEX, MCR	1
Principles of assessment of anaesthetic risk	CbD, mini-CEX, MCR	1
TOE views, image planes and echo-anatomic correlations	CbD, mini-CEX, MCR	1
The principles and techniques of 3D transoesophageal echocardiography	CbD, mini-CEX, MCR	1
The effects of anaesthesia and cardiopulmonary bypass on the heart	CbD, mini-CEX, MCR	1
National and international recommendations and guidelines for the following: (i) indications for echocardiography (ii) standards for performing and reporting of echocardiograms (iii) Institutional Accreditation for echocardiography departments (iv) the roles of clinical and technical leadership in echocardiography departments (v) training and supervision	mini-CEX, MCR	1, 3
Skills		
Demonstrate the ability to:		
Assess anaesthetic risk and plan and monitor the procedure appropriately	DOPS, mini-CEX, MCR	1,2
perform a complete, comprehensive transoesophageal echocardiogram in conscious sedated or anaesthetised adult patients	DOPS, MCR	1
interpret, measure and analyse transoesophageal echocardiogram in adults and produce a comprehensive echocardiogram report.	DOPS, CbD, MCR	1

Assess complex heart valve disease, including severity, suitability for repair/percutaneous procedures.	DOPS, mini-CEX, MCR	1
Perform TOE during percutaneous cardiac interventional procedures, eg PFO closure, percutaneous valve intervention and assess valve disease post-procedure.	DOPS, mini-CEX, MCR	1
Perform perioperative TOE during cardiac surgery. Assess suitability for, and efficacy of valve repair, identify perioperative complications, interpret findings in the setting of cardiopulmonary bypass.	DOPS, mini-CEX, MCR	1
Assess acute aortic syndromes (dissection, intramural haematoma)	DOPS, mini-CEX, MCR	1
Use TOE in the investigation of stroke or embolic events, including detection of patent foramen ovale, intracardiac thrombus, tumour	DOPS, mini-CEX, MCR	1
Detect and assess simple and complex congenital heart defects, eg ASD (including sinus venous defects)	DOPS, mini-CEX, MCR	1
Perform TOE in the critical care setting, to assess ventricular function, filling and inotropic status	DOPS, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
Explain the procedure to the patient and maintain trust	MSF, PS, MCR	1,3,4
To explain the results adequately	MSF, PS, MCR	1,3,4
the ability to work with sonographers, cardiac surgeons, anaesthetists and interventional cardiologists	MSF, PS, MCR	1,3
the ability to integrate the results of TOE with the clinical context to produce recommendations	MSF, PS, MCR	1,2
the ability to collaborate with specialists in other imaging modalities	MSF, PS, MCR	1,3
the ability to think reflectively	MSF, PS, MCR	1,3
Development of leadership role in organisation and administration	MSF, MCR	1, 2
Development of leadership skills in training and clinical supervision	MSF, MCR	1, 2
Collaborative working practices with cardiologists, cardiac surgeons, other medical staff, cardiac physiologists, echocardiographers and nurses	MSF, MCR	1, 2
the ability to audit results		1,2

5a. Stress Echocardiography

To develop advanced skills and competence in stress echocardiography.

To be able to perform and report stress echocardiograms.

To be able to run a stress echocardiogram service including the quality assurance and training of other practitioners.

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The principles, indications and clinical role of stress echocardiography	CbD, mini-CEX, MCR	1
The pathophysiology and biochemical and mechanical changes associated with hibernation, infarction and ischaemia	CbD, mini-CEX, MCR	1
Different stressors including dobutamine, exercise, pacing, atropine, adenosine and dipyridamole	CbD, mini-CEX, MCR	1
The physical properties and side-effects of intravascular contrast agents for opacification of the LV cavity and myocardial perfusion	CbD, mini-CEX, MCR	1
The effects of flow on the left ventricle, the heart valves and the right heart in patients with valve disease	CbD, mini-CEX, MCR	1
The methods of reporting a stress echocardiogram including wall motion analysis, contrast assessment and long axis function	CbD, mini-CEX, MCR	1
The evidence for stress echocardiography in the detection of coronary disease, coronary risk stratification, and the detection of viable myocardium	CbD, mini-CEX, MCR	1
The use of stress echocardiography in valve disease	CbD, mini-CEX, MCR	1
The cost-effectiveness of stress echocardiography	CbD, mini-CEX, MCR	1
The comparison of echocardiography with other techniques	CbD, mini-CEX, MCR	1
The principles of myocardial contrast	CbD, mini-CEX, MCR	1
National and international recommendations and guidelines for the following: (i) indications for echocardiography (ii) standards for performing and reporting of echocardiograms (iii) Institutional Accreditation for echocardiography departments (iv) the roles of clinical and technical leadership in echocardiography departments (v) training and supervision	mini-CEX, MCR	1, 3
Skills		
Demonstrate the ability to:		
prepare and administer pharmacological stressors safely	DOPS, mini-CEX, MCR	1,2
prepare and administer contrast agents safely	DOPS, mini-CEX, MCR	1,2
managing complications including allergic reactions and arrhythmias and to be able to resuscitate in the event of cardiac arrest	DOPS, mini-CEX, MCR	1,2
set up an echocardiography machine appropriately for stress echocardiography	DOPS, mini-CEX, MCR	1,2
record echocardiograms during a stress study	DOPS, mini-CEX, MCR	1
recognise subtle abnormalities of wall-motion and differentiate wall	DOPS, mini-CEX,	1

thickening and wall motion	MCR	
perform stress studies in patients with valve disease	DOPS, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
The ability to adequately explain the procedure to a patient and maintain trust	MSF, PS, MCR	1,3,4
the ability to work with sonographers, cardiac surgeons and interventional cardiologists	MSF, PS, MCR	1,3
the ability to collaborate with specialists in other imaging modalities	MSF, PS, MCR	1,3
the ability to integrate the stress study with the clinical context to produce recommendations	MSF, PS, MCR	1,2
the ability to think reflectively	MSF, PS, MCR	1,3
the ability to audit results	MSF, PS, MCR	1,2
the ability to compare different techniques including cardiac magnetic resonance and nuclear perfusion imaging	MSF, PS, MCR	1,
The ability to integrate results from a variety of techniques including coronary angiography to produce an appropriate synthesis.	MSF, PS, MCR	1,2
Development of leadership role in organisation and administration	MSF, MCR	1, 2
Development of leadership skills in training and clinical supervision	MSF, MCR	1, 2
Collaborative working practices with cardiologists, cardiac surgeons, other medical staff, cardiac physiologists, echocardiographers and nurses	MSF, MCR	1, 2

5b. Nuclear Cardiology (Advanced)

Techniques use a gamma camera to image the distribution of injected radiopharmaceuticals. They provide clinically effective and cost-effective diagnostic and prognostic information in patients with known or suspected coronary artery disease (CAD) and/or left ventricular (LV) dysfunction. Myocardial perfusion scintigraphy (MPS) has been available for the investigation of patients with known or suspected CAD for more than two decades, and its value has been recognised in a recent Technology Appraisal by the National Institute for Clinical Excellence (NICE). However, in marked contrast to the situation in other Western countries, MPS has been slow to establish itself in routine clinical practice in the UK. NICE suggested an approximately four-fold shortfall in the provision of MPS in England and Wales.

Rationale
Nuclear Cardiology in the UK has traditionally been practised by radiologists and nuclear physicians rather than cardiologists, in marked contrast to other cardiac imaging techniques such as echocardiography and coronary angiography. This lack of involvement by cardiologists may have contributed to the underuse of MPS. Given the subtleties in the modern management of coronary disease, technically accurate reports written by radiologists and nuclear physicians may fail to address important clinical issues in a particular case, or may be frankly misleading to a referring cardiologist with a rudimentary understanding of MPS. To address this it is important that more cardiologists are encouraged to enter nuclear Cardiology as a specialist area having undergone appropriate advanced training.

Aims
Nuclear medicine is probably the most regulated area of medicine. In order to run a nuclear Cardiology service independently, a consultant requires an ARSAC (Administration of Radioactive Substances Advisory Committee) certificate for the administration of radiopharmaceuticals. This also allows him/her to act as the practitioner under the IRMER (Ionising Radiation (Medical Exposure) Regulations 2000) regulations. ARSAC is prepared to issue certificates for a limited range of nuclear medicine investigations (eg cardiac), but stipulates that “the practical experience required will be consistent with that required for specialist training in nuclear medicine, but restricted to the limited range requested.” Moreover, “the practical experience should not be limited to reporting alone. It should include vetting of requests, decisions on the most appropriate procedure, patient preparation, procedures for supplying the appropriate radiopharmaceutical, the procedure itself, post-procedure processing, etc.”

There may well be a role for a cardiologist with an interest in non-invasive imaging to provide aspects of a nuclear Cardiology service under the supervision of a radiology or nuclear medicine colleague. However, a really meaningful advanced training scheme in nuclear Cardiology for cardiologists should be as robust as that for nuclear physicians, equipping the trainee to apply for and be granted an ARSAC certificate. In addition, that trainee will bring to nuclear Cardiology a sound background in clinical Cardiology. This will increase the prestige of the specialist area amongst cardiologists, and ultimately lead to a more appropriate and more frequent use of the investigations in the routine management of patients.

Teaching and Learning Methods
Nuclear Cardiology is a very technical specialist area, and a high degree of familiarity with all aspects of the investigations is necessary. A certain amount of didactic teaching is desirable, and could conveniently be obtained by attending courses. Attachment to a

nuclear medicine department performing MPS at high volume is required, and it is unlikely that all the Learning Objectives would be met in less than 6 months (whole time equivalent). Participation in departmental audit and multidisciplinary meetings is encouraged.

Assessment Methods

Direct observation by experts from the relevant craft groups (physician, technologist, medical physicist). A log book of cases to document clinical experience should be compiled.

It is unlikely that the Skills and Attitudes components of the Learning Objectives would be achieved without the following experience: Stress, supervision of 150 stress tests, of which a minimum of 25 should be with each form of stress (exercise, vasodilator drug, inotropic drug). Tracer handling, calibration and injection of 50 perfusion tracer doses, of which at least 25 should have been during stress. SPECT acquisition, acquisition of 100 SPECT scans, of which a minimum of 25 should be with gating. SPECT processing, processing of 250 SPECT studies (ie patients). ERNV, performance of 25 ERNV studies, including blood pool labelling, acquisition, and processing. Reporting, 500 MPS studies (patients) should have been reported by the candidate, of which up to 250 may be archive cases. 25 ERNV studies should have been reported. Of the 500 MPS studies, there should be minimum numbers of cases from each of the following categories: normal with artifact (25), abnormal diagnostic (25), high risk prognostic (25), post MI (25), post CABG (25), pre noncardiac surgery (25), pre-revascularisation (10), hibernation (5), non-atheromatous cardiac disease (5)

5b. Nuclear Cardiology

The trainee will be able to stress patients safely and effectively using dynamic exercise and pharmacological stress

The trainee will be able to work with nuclear Cardiology radiopharmaceuticals safely

To be able to acquire and process nuclear Cardiology studies

To be able to report nuclear Cardiology studies

To be able to advise cardiologists and other specialists on the appropriate use of nuclear Cardiology techniques in different clinical situations

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
the physics of X-ray and gamma emission from radionuclides	CbD, mini-CEX, MCR	1
the interactions of X-ray / gamma photons with matter	CbD, mini-CEX, MCR	1
the method of generation of thallium-201 and technetium-99m	CbD, mini-CEX, MCR	1
the preparation of technetium-99m-based perfusion tracers	CbD, mini-CEX, MCR	1
the physiological properties of available myocardial perfusion tracers	CbD, mini-CEX, MCR	1
the tracer protocols used in perfusion scintigraphy, and the advantages and disadvantages of each	CbD, mini-CEX, MCR	1
the properties of less commonly used radiopharmaceuticals such as MIBG and PET tracers	CbD, mini-CEX, MCR	1
the basic construction, operation, and QC of a gamma camera	CbD mini-CEX, MCR	1
the principles of SPECT acquisition, ungated and gated	CbD, mini-CEX, MCR	1
the principles of attenuation correction	CbD, mini-CEX, MCR	1
a high quality ERNV study	CbD, mini-CEX, MCR	1
the myocardial territories of the coronary arteries and their main branches	CbD, mini-CEX, MCR	1
current understanding of hibernating myocardium	CbD, mini-CEX, MCR	1
Comparison of MPS with other investigations used in patients with coronary disease	CbD, mini-CEX, MCR	1
the evidence for the clinical effectiveness and cost effectiveness of MPS	CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Draw up and calibrate appropriate doses of radiopharmaceutical	CbD, mini-CEX, MCR	1,2
Administer radiopharmaceuticals for stress and rest MPS and for blood-pool labelling	CbD, mini-CEX, MCR	1,2
Prepare and position patients for a comfortable SPECT acquisition	CbD, mini-CEX, MCR	1,2,3
Select an acquisition protocol suitable for the tracer, dose, and patient	CbD, mini-CEX, MCR	1
Obtain a high quality ungated and gated SPECT acquisition	CbD, mini-CEX, MCR	1
Reconstruct and reorient ungated and gated SPECT acquisitions	CbD, mini-CEX, MCR	1
Process an ERNV study	CbD, mini-CEX, MCR	1
Use a range of image display formats, including quantitative analysis	CbD, mini-CEX, MCR	1

Recognise common artefacts on MPS	CbD, mini-CEX, MCR	1
Recognise reversible and fixed perfusion defects on MPS	CbD, mini-CEX, MCR	1
Assess regional and global LV systolic function from gated SPECT acquisitions	CbD, mini-CEX, MCR	1
Identify hibernating myocardium	CbD, mini-CEX, MCR	1
Write structured, clinically integrated MPS reports	CbD, mini-CEX, MCR	1
Report ERNV studies	CbD, mini-CEX, MCR	1
Behaviours		
Demonstrate:		
Understanding of the regulatory framework which governs nuclear Cardiology	MSF, PS, MCR	1,2
Appropriate reaction to adverse incidents such as spillages	MSF, PS, MCR	1,2
Recognition of problems in ungated and gated SPECT raw data	MSF, PS, MCR	1
Understanding of when to repeat suboptimal image acquisitions	MSF, PS, MCR	1,2
Recognition of high risk MPS studies and react accordingly	MSF, PS, MCR	1,2
Liaison with cardiologists and other specialists both before and after the nuclear Cardiology investigation	MSF, PS, MCR	1,3

5c. Cardiovascular Magnetic Resonance (CMR) (Advanced)

Introduction
Cardiovascular Magnetic Resonance (CMR) is extremely versatile and has the potential to produce non-invasive cardiac imaging with 3D reconstruction capability free from ionising radiation.

Rationale
Cardiac imaging using MR is currently severely limited in its availability and it is important that a cadre of well trained cardiac imagers specialized in CMR becomes available.

Aims
Specialists who wish to run a CMR program need a much more detailed knowledge than provided by core training. This extends to both the role of CMR in the management of a wide range of heart disease, but also the technical aspects of how to obtain high quality information for all the different indications and how to process and report the scans.

Duration of Training
A minimum of a one year program of clinical training will be necessary in order to allow the trainee to independently manage a CMR service.

Research and Audit
It is envisaged that trainees will undertake research and audit within the CMR department. The pursuit of a higher degree is desirable but not compulsory. Time spent solely in research may not contribute to clinical competency in the specialist area, but it is recognised that currently in CMR boundaries between clinical service and research are not always clear-cut.

Clinical Experience
It is envisaged that advanced trainees will be predominantly involved in the clinical provision of the CMR service. It is important that, as trainee clinicians, the trainees retain a close involvement with the clinical activities of the department. They should be closely involved with combined Cardiology/imaging meetings, especially presenting CMR cases. Their on-call commitment should be adequate to meet continuing training requirements.

Assessment Methods
In addition to WPBAs the trainee's should maintain a log book (recording investigations or procedures performed by the trainee) and record critical reflection on events in clinical practice (the assessor should examine the trainee's documentation of points learned from the care of individual patients).

Experience
These indicative levels of experience are compatible with international guidelines and it is unlikely that the Learning Objectives for advanced training would be achieved without the following experience: A total of at least 12 months training in CMR under the aegis of a Level 3 qualified mentor with supervised interpretation of a total of at least 300 CMR studies representing the range of abnormalities observed in practice, but to include substantial proportions (at least 50) of both cardiac and vascular studies. For at least 100 studies, the trainee must be present during the scan, ideally as the primary operator and should perform the analyses and make the initial interpretation. There should be participation in an ongoing quality assurance or improvement program for the laboratory or facility in which he or she is associated.

5c. Cardiovascular Magnetic Resonance (CMR) (Advanced)

To be able to run a cardiac magnetic resonance unit including the quality assurance and training of other practitioners

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of:		
The imaging and functional characteristics of different congenital and acquired cardiac abnormalities	CbD, mini-CEX, MCR	1
Indications for, and contra-indications to, the application of CMR	CbD, mini-CEX, MCR	1
MR physics and a basic understanding of the various MR sequences		
the various CMR sequences; their strengths, weaknesses and application and optimisation	CbD, mini-CEX, MCR	1
the various CMR protocols for different clinical application/disease entities	CbD, mini-CEX, MCR	1
CMR artefacts; their influence on interpretation and minimisation	CbD, mini-CEX, MCR	1
the different image processing tools both for analysis of functional data and for reformatting structural data	CbD, mini-CEX, MCR	1
image formats; their characteristics and limitations, and the ability to interchange data between them	CbD, mini-CEX, MCR	1
Risks and complications of CMR	CbD, mini-CEX, MCR	1
Safety in the CMR scanner suite	CbD, mini-CEX, MCR	1
Relationship of CMR with other imaging modalities for complex physiological measurements and interventions	CbD, mini-CEX, MCR	1
The use of phantom models to assess CMR and measurement under controlled conditions	CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to:		
Set up and organise a CMR service	CbD, DOPS, mini-CEX, MCR	1,3
Develop CMR study protocols for particular conditions and adapt them to specific patients	CbD, DOPS, mini-CEX, MCR	1
Optimise and acquire CMR sequences which provide the best image/functional information	CbD, DOPS, mini-CEX, MCR	1
Perform post-processing on CMR data for image presentation and quantification of physiological data	CbD, DOPS, mini-CEX, MCR	1
Interpret and report CMR structural and functional data	CbD, DOPS, mini-CEX, MCR	1
Provide training to radiographers and other clinical staff such as Cardiology radiology trainees	CbD, DOPS, mini-CEX, MCR	1,3
Explain the physiology and pharmacology of pharmacological stress, including dobutamine, adenosine and dipyridamole	CbD, DOPS, mini-CEX, MCR	1
Define the indications and protocols for each form of stress, and recognise complications and manage appropriately	CbD, DOPS, mini-CEX, MCR	1
Describe current ALS guidelines	CbD, DOPS, mini-	1

	CEX, MCR	
Behaviours		
Demonstrate:		
Appreciation of the importance of good communication skills with other members of the clinical team as well as patients	MSF, PS, MCR	1,3,4
Appreciation of the importance of good organisational skills in running a CR service to ensure effective service delivery and in particular in timely and accurate reporting/ presentation of the scans	MSF, PS, MCR	1,3
Appreciation of the importance of understanding individual limitation and need for expert/outside advice	MSF, PS, MCR	1,3
Appreciation of the rapidly changing nature of CMR and by keeping abreast of these changes optimising the service provided	MSF, PS, MCR	1

5d. Cardiac CT (Advanced)

Background
The latest generation of CT scanners allow images of coronary arteries and other cardiac structures to be obtained with an acceptable temporal and spatial resolution. Recent studies have demonstrated both high sensitivity and specificity of CT coronary angiography (CTA) when compared against conventional invasive angiography for the diagnosis of significant coronary artery disease (CAD). The primary strength of ECG gated CTA is a high negative predictive value, making it a highly reliable investigation for ruling out significant CAD.

Data obtained during ECG-gated contrast acquisition allows non-invasive assessment of coronary arteries but additionally also provides the opportunity to assess the size of cardiac chambers, myocardium, pericardium, pulmonary arteries, surrounding lung parenchyma, and other structures. The spectrum of information available within the scan data provides challenges in interpretation as well as a wealth of information about the disease process and adequate training is required to allow accurate analysis.

CT scanning has been an essential part of Radiology training since the 1980's and forms a part of routine practice such that radiologists are familiar with the presentation of CT image data and the workstation tools used for its analysis. Cardiologists are familiar with coronary artery imaging from their extensive experience with invasive angiography and cardiac function assessment through the use of echocardiography, myocardial perfusion scintigraphy (MPS) and cardiac MR, however, they are likely to have limited exposure to CT scanning, the analysis of CT image data and the interpretation of non-cardiac structures.

The radiation exposure from CCTA poses an important challenge higher radiation exposure to the patient is associated with inexperience of the operator. The Ionising Radiation (Medical Exposures) Regulations 2000 (IRMER) state the legal requirement for exposures to be optimised and justified, due to the lifetime attributable increased risk of cancer incidence associated with medical exposure.

Cardiac CT is a technically demanding procedure, which can only be optimally performed with detailed knowledge and training. This must include the physical principles of ECG gated CT, image optimization with minimum radiation dose, cardiac anatomy & physiology, plus knowledge of the cardiac disease processes to allow appropriate diagnosis and enhance clinical management.

Training Standards in Cardiac CT
Radiologists and Cardiologists receive core training in cardiovascular physiology and imaging. However, as cardiac CT remains an emerging technique it is unlikely that sufficient experience will have been obtained during basic training in either specialty, and specific training should therefore be obtained prior to independently performing cardiac CT. To this end international levels of clinical competency have been established. The Cardiology curriculum endorses the principle that high standards of clinical training and competency are vital to ensure the appropriate use of cardiac CT at acceptable radiation dosage and in this document sets out the standards required to support best practice.

5d. Cardiac CT (Advanced)

To be able to independently perform and interpret cardiac CT

To be able to run a cardiac CT unit including the quality assurance and training of other practitioners.

Knowledge	Assessment Methods	GMP
Demonstrate knowledge of: Cardiac CT techniques:	CbD, mini-CEX, MCR	1
Image optimisation and advanced post-processing	CbD, mini-CEX, MCR	1
stress imaging	CbD, mini-CEX, MCR	1
Features of wall motion and perfusion abnormalities	CbD, mini-CEX, MCR	1
Functional assessment	CbD, mini-CEX, MCR	1
Assessment of bypass grafts and stents	CbD, mini-CEX, MCR	1
The role of CT in assessing: valve disease , heart failure, cardiac masses, pericardial disease and congenital heart disease	CbD, mini-CEX, MCR	1
The appearance of non-cardiac pathology on CT	CbD, mini-CEX, MCR	1
The indications, value and limitations of other cardiac imaging modalities	CbD, mini-CEX, MCR	1
Skills		
Demonstrate the ability to: perform and interpret CT examinations in the clinical context (suggested experience being equivalent to at least 300 cases and 32 half day sessions)	CbD, mini-CEX, MCR	1,3
asses non- cardiac pathology	CbD, mini-CEX, MCR	1,2
run a quality assurance programme in cardiac CT	CbD, mini-CEX, MCR	1,2
train others in cardiac CT	CbD, mini-CEX, MCR	1,2
conduct research of cardiac CT	CbD, mini-CEX, MCR	1,2
incorporate the results of cardiac CT with the results of other cardiac imaging modalities	CbD, mini-CEX, MCR	1,2
Behaviours		
Demonstrate: a cooperative approach to radiologists and radiology technicians	MSF, MCR	1
Awareness of the side effects of contrast media and recognize the risk of radiation to patient and personnel	MSF, IRMER, MCR	3,4
A cooperative approach to other cardiac imaging practitioners	MSF, MCR	1,3,4

6. Inherited Cardiovascular Conditions

Introduction

The development of an advanced training in Inherited Cardiovascular Conditions (ICC) component of the curriculum acknowledges the need for ICC patients to receive specialist management and the emergence of national commissioning of ICC services in England. The term ICC embraces cardiovascular diseases for which a genetic aetiology is confirmed or suspected, including families affected by sudden cardiac death. For the purposes of training, ICC are considered in three categories: Heart muscle diseases (cardiomyopathy), inherited arrhythmias (IA) and vasculopathies. Although the ICC cardiologist will have competencies in the genetics component relevant to all ICC categories, the syllabus is designed to allow trainees to tailor training toward one or two of the three ICC categories, and to complete training in a complimentary specialty.

Background

In an assessment of service provision in the UK endorsed by the Department of Health and the British Heart Foundation, the Foundation for Genomics and Population Health (PHG) recommended that cardiac networks develop access to ICC services and should anticipate that these services will be under **increasing** demand over the next 5-10 years. The report identifies a 14-fold variation in the national provision of clinical care for the inherited cardiac conditions. The report recommends the following:

1. Each cardiac network should ensure that its population has access to specialised expert ICC services for children and adults.
2. Across the UK providers and commissioners of ICC services should anticipate and plan for a steady increase in demand within the next 5 to 10 years.
3. Professional groups should take the lead in developing and agreeing a set of standards for specialised ICC services. This would include a description of the required skills and facilities, indications of expected activity, organisational aspects, audit and research.
4. Professionals from the range of ICC services should work with appropriate professional organisations, regulatory bodies, educational institutions and providers of specialist training to develop a workforce with the necessary specialist competences.

Recommendations (1) and (2) provide the rationale for this new subspecialty training program. The remainder of the document addresses training needs inherent to recommendations (3) and (4).

Overview - Rationale & Aims

Promote quality for patients with inherited cardiovascular conditions by training ICC professionals.

The curriculum below is designed to introduce interested trainees who are training in other relevant advanced modules (e.g. electrophysiology, imaging, ACHD or heart failure) into the field of ICC. This will constitute one extra module during ST6/7 to complement the on-going modules.

Clinical:

The curriculum will provide essential knowledge, skills and behaviours for a trainee in the training scenario including knowledge and skills in genetics and genetic counselling. The curriculum also recognises that patients are referred with clinical findings that can be

explained by genetic and non-genetic mechanisms and so will also include training in other cardiac conditions such as myocarditis.

The Training Programme and Requirements for Completion of Specialist Training

While there is overlap between many existing training provisions and some the core skills required in different ICCs, there is a major need to provide core, and where appropriate, more specialist knowledge on the diagnosis and management of genetic cardiovascular disorders. The aim is to provide this in a flexible format to allow trainees with different core interests to access benefit. Core skills will be incorporated into a single flexible training module.

It is expected however that most future ICC specialists will require additional training outside the CCT in other areas, the balance of which will depend on the associated other specialist training.

Learning Methods

Apprenticeship Learning
A major portion of training will occur in the outpatient department, in MDT discussions and in cardiovascular imaging reporting sessions. The training programme should ensure the trainee is exposed to several different teachers in these settings. Outpatient sessions will include training by clinical geneticist and genetics counsellors.

Formal Learning
This will comprise study days at local or national meetings and postgraduate courses. Recommended is 5 days during the training period in ST6/7, which could include an audit project.

Methods of Assessment

This will be achieved through existing workplace-based assessments (WPBAs), mini-Clinical Evaluation Exercise (mini-CEX), Direct Observation of Procedural Skills (DOPS), Case-Based Discussion (CbD), Patient Survey (PS).

Logbook: Trainees will maintain a continuous log to record patient interactions (inpatient or outpatient, including screening, invasive/non invasive assessment) and a short description of the case and the trainee's reflection for a variety of ICCs. The log should also capture reports of the echocardiograms, advanced imaging (CTs, CMRs and TOEs), advanced arrhythmia testing (pharmacological provocation, invasive EP, signal averaged ECGs) performed on patients with known or suspected ICC by the trainee. The log will be reviewed on a regular basis by the supervisor and must be signed off by the Training Director. The logbook should be placed in the Personal Folder of the e-portfolio.

Core Module – Patient Interactions: 70 patients with a minimum of 10 in each of the three ICC domains. Imaging: 50 cases reflecting the spectrum of imaging modalities (Echo, CT, CMR).

The assessment programme should be discussed in advance with the ICC Trainer and agreed with the TPD for incorporation into the on-going assessment strategy, depending on Advanced Modular Choice, for ST6/7.

Core Skills in ICC (1 Unit during ST6/7)

Competencies:

1. To diagnose common ICCs
2. Construct and interpret a family pedigree
3. To conduct family screening and genetic evaluation
4. To interpret cardiovascular imaging
5. To interpret pharmacological provocation EP testing
6. Understand sudden death prevention in ICC patients.
7. To interact with paediatric cardiologists and develop interfaces for family screening and transition
8. Diagnosis and management of inflammatory heart disease
9. Indications for Invasive Diagnostics and Therapies
10. To function as part of a multidisciplinary team.
11. To deliver teaching on ICCs

Inherited Cardiovascular Conditions

To be able to carry out, under supervision, specialist assessment and treatment of patients with inherited cardiovascular conditions

Knowledge	Possible Assessment Methods	GMP
Demonstrate knowledge of: International guidelines for diagnosis and treatment of common ICCs	CbD, mini-CEX, MCR	1,2
The clinical utility and limitations of genetic diagnoses including an understanding of concept of heredity, clinical penetrance, genotype-phenotype variation and the principles of family screening.	CbD, mini-CEX, MCR	1,2
The basic principles underlying the interpretation of molecular genetic abnormalities.	CbD, mini-CEX, MCR	1,2
Cardiovascular involvement in the common genetically determined multi-system syndromes such as muscular dystrophies.	CbD, mini-CEX, MCR	1,2
Indications for cardiovascular imaging and non-invasive EP testing in ICCs.	CbD, mini-CEX, MCR	1,2
The causes of sudden adult death syndrome (SADS) and the principles of managing families and survivors.	CbD, mini-CEX, MCR	1,2
The role of cardiovascular pathology, including molecular autopsy, in the diagnosis of ICC conditions and following sudden cardiac death.	CbD, mini-CEX, MCR	1,2
Patient support groups and their roles in managing ICC patients and their families.	CbD, mini-CEX, MCR	1,2
The causes and natural history of myocarditis	CbD, mini-CEX, MCR	1,2
Indications for invasive cardiac haemodynamic / electrophysiologic studies, surgical / ablative/device therapy, cardiac biopsy.	CbD, mini-CEX, MCR	1,2
Indications for device implantation in the ICCs (DDD, ICD, ILR, CRT)	CbD, mini-CEX, MCR	1,2
Basic management of devices in patients with ICCs (DDD, ICD, ILR, CRT).	CbD, mini-CEX, MCR	1,2

Risks from pregnancy, anaesthesia/surgery, exercise and intercurrent illness.	CbD, mini-CEX, MCR	1,2
The legal framework relevant to sudden cardiovascular death	CbD, mini-CEX, MCR	1,2
Skills		
Demonstrate the ability to:		
Diagnose common ICCs	Mini-CEX, CbD, MCR	1,2
Perform symptomatic assessments for common ICCs	Mini-CEX, CbD, MCR	1,2,3
Perform prognostic risk assessment for common ICCs	Mini-CEX, CbD, MCR	1,2,3
Construct pedigrees and undertake family screening and counselling In the appropriate multidisciplinary setting, contribute to the clinical interpretation and integration of imaging data (including nuclear, echo, CMR and CT). This should include assessment of cardiac morphology and function, non-invasive cardiac haemodynamics, fibrosis imaging and aortic imaging.	Mini-CEX, CbD, MCR	1,3
Interpret 12-lead ECGs, Holters, exercise ECGs	Mini-CEX, CbD, MCR	1,2
How to manage implanted devices (DDD, ICD, ILR, CRT) in ICC patients.	Mini-CEX, CbD, MCR	1,2
Deliver clinical management based on assessments from ICC, surgical, electrophysiological, imaging and genetics experts.	Mini-CEX, CbD, MCR	1,2
Support the work of multidisciplinary services and networks	Mini-CEX, CbD, MCR	1,2,3
Deliver ICC teaching	TO, MCR	1,2
Behaviours		
Recognition of the pivotal role of an accurate diagnosis in planning future investigation and therapy	MSF, PS, MCR	1,2
Recognition of the relative safety and cost-effectiveness of routine investigations	MSF, PS, MCR	1,2
Appreciation of the need to consult with and discuss optimum management with other health care professionals, in particular with cardiac imagers, geneticists, electrophysiologists, interventional cardiologists, cardiac surgeons, obstetricians and ACHD specialists	MSF, PS, MCR	1,2,3
Effective communication with referring physicians and GPs.	MSF, PS, MCR	1,2,3
Communicate an understanding of medical, social and psychological implications to patients and families of an ICC diagnosis (including sudden cardiac death)	MSF, PS, MCR	1,2,4
An ability to recognise and manage personal limitations when presented with complex ICC cases	MSF, PS, MCR	1,2,4