

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
2.1.a. Chest Pain									
Objective - To be able to carry out specialist assessment and treatment of patients with chest pain									
K	Define the causes of chest pain Define the indications, limitations, risks and predictive value of non-invasive and invasive investigations	X	X						
S	Be able to take a relevant history and perform a reliable and appropriate examination. Be able to select and use investigations appropriately		X						
A	Appreciate the importance of the history in evaluating chest pain. Take a non-judgemental and non-stereotyping approach to patients Appreciate the anxiety and concerns of patients and relatives with chest pain. Appreciate the contribution non-medical and non-cardiological disciplines have to play in the treatment of patients with chest pain Understand the associated psychological factors of patients with chest pain				X		X		
2.1.b Stable angina									
Objective - To be able to carry out specialist assessment and treatment of patients with stable angina									
K	Define the pathogenesis of atheroma and the importance of risk factors. Define the natural history, pathophysiology, and presentations of coronary artery disease Define the pharmacology of drugs currently used in the treatment of stable angina Define the indications, limitations, risks and predictive value of non-invasive and invasive investigations Define which patients should be investigated further and referred for intervention	X	X						

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Be able to diagnose angina accurately.</p> <p>Be able to take a relevant history and perform a reliable and appropriate examination</p> <p>Be able to select and use investigations appropriately</p> <p>Be able to present the risks and benefits of an intervention to a patient in a way that they understand</p>		X			X			
A	<p>Recognise the role of cardiac nurse specialists and cardiac rehabilitation.</p> <p>Appreciate the interaction of symptoms with the patient's life style</p> <p>Appreciate the concerns and anxiety of patients and relatives with coronary heart disease</p> <p>Advise patients regarding life style and long-term risk factor management</p> <p>Educate patients and relatives</p> <p>Discuss sexual issues including impotence and use of drugs, with the patient and their partner in a sensitive manner</p>				X		X		
2.1.c Acute coronary syndromes and myocardial infarction									
Objective - To be able to carry out specialist assessment and treatment of patients presenting with acute coronary syndromes and myocardial infarction									
K	<p>Define the pathogenesis of acute coronary syndromes and the importance of risk factors.</p> <p>Define the natural history, pathophysiology, and acute presentations of coronary artery disease</p> <p>Define the pharmacology of drugs currently used in the treatment of acute coronary syndromes</p> <p>Define the indications, limitations, risks and predictive value of non-invasive and invasive investigations</p> <p>Define which patients should be investigated further and referred for intervention</p>	X	X						

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Be able to diagnose acute coronary syndromes and myocardial infarction accurately.</p> <p>Be able to take a relevant history and perform a reliable and appropriate examination</p> <p>Be able to select and use investigations appropriately</p> <p>Be able to present the risks and benefits of an intervention to a patient in a way that they understand</p>		X			X			
A	<p>Recognise the role of cardiac nurse specialists and cardiac rehabilitation.</p> <p>Appreciate the interaction of symptoms with the patient's life style including occupation and leisure</p> <p>Appreciate the concerns and anxiety of patients and relatives with coronary heart disease</p> <p>Advise patients regarding life style and long-term risk factor management</p> <p>Educate patients and relatives</p> <p>Discuss sexual issues including impotence and use of drugs, with the patient and their partner in a sensitive manner</p>				X		X		
2.2. Acute breathlessness									
Objective - To be able to carry out specialist assessment and treatment of patients with acute breathlessness									
K	<p>Define the causes of acute breathlessness.</p> <p>Define the management of cardiac and non-cardiac diseases presenting with breathlessness</p> <p>Define the indications for CPAP, non-invasive and invasive ventilation</p>	X	X						
S	<p>Be able to take a relevant history and perform an appropriate examination.</p> <p>Be able to select and use investigations appropriately</p>		X			X			

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	Appreciate the importance of other specialists e.g. respiratory physicians and intensivists				X		X		
2.3. Chronic breathlessness									
Objective - To be able to carry out specialist assessment and treatment of patients with chronic breathlessness									
K	Define the causes of chronic breathlessness. Define the management of patients with chronic shortness of breath	X	X						
S	Be able to take a relevant history and perform an appropriate examination. Be able to select and use investigations appropriately		X			X			
A	Involvement of other specialists e.g. respiratory physicians. Importance of other involved professionals Appreciate the importance of lifestyle, exercise and weight loss See Generic curriculum on Management of chronic Disease				X		X		
2.4. Heart failure									
Objective - 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									
K	Define the aetiology, pathophysiology, diagnosis and management of heart failure. Define the natural history and clinical presentation of patients with heart failure Define the pharmacology of drugs used to treat heart failure Define the indications for referral for surgical interventions (including valve surgery, cardiac transplantation and assist devices)	X	X						

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	Be able to take a relevant history and perform an appropriate examination. Be able to select and use investigations appropriately Be able to select appropriate drug therapy for individual patients with heart failure		X			X			
A	Emphasise the importance of lifestyle, exercise and weight loss. Appreciate the importance of rehabilitation Develop and sustain supportive relationships with patients with chronic heart failure				X		X		
2.5. Cardiomyopathy									
Objective - To be able to carry out specialist assessment and treatment of patients with cardiomyopathy									
K	Define the different types of cardiomyopathy Define the pathogenesis, natural history and prognosis of the cardiomyopathies Define the genetic basis for cardiomyopathies especially hypertrophic cardiomyopathy Define the role of screening Define the role of medical therapy, implantable cardioverter defibrillators, catheter based and surgical based treatments of the cardiomyopathies Define the indications for transplantation	X	X						

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	Be able to take a relevant history and perform an appropriate examination.								
	Be able to select and use investigations appropriately. Echocardiography MRI Exercise testing Determination of oxygen consumption		X	X		X			
A	Appreciate the emotional difficulties encountered by patients and families with cardiomyopathy. Offer advice and support to patient and relatives Educate patients and their families				X		X		
2.6. Patients with valvular heart disease									
Objective - To be able to carry out specialist assessment and treatment of patients with cardiac murmurs									
K	Define the pathological processes that are responsible for valvular heart disease. Define the natural history of valve disorders Define the indications, limitations, risks and predictive value of non-invasive and invasive investigations Define the indications for surgical intervention Define the different types of prosthetic valves available for clinical use Define the anticoagulation regimes appropriate for patients with valve disease and valve prostheses Define which patients need regular follow up Define endocarditis prophylaxis protocols	X	X						

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	Be able to take a relevant history and perform an appropriate examination. Be able to select and use investigations appropriately Be able to perform an echocardiogram		X	X		X			
A	Be able to discuss the advantages and disadvantages of medical versus surgical management in a way that patients can understand. Be able to discuss the advantages and disadvantages of different valve prostheses with patients Appreciate the importance of educating patients about endocarditis prophylaxis and the natural history of valvular heart disease				X		X		
2.7. Pre-syncope and syncope									
Objective - To be able to carry out specialist assessment and treatment of patients with pre-syncope and syncope									
K	Define the causes of syncope and pre-syncope. Define the indications, limitations, risks and predictive value of non-invasive and invasive investigations Define the indications for tilt table testing Define the current recommendations concerning fitness to drive in patients with pre-syncope and syncope	X	X						
S	Be able to take a relevant history and perform an appropriate examination including carotid sinus massage and tilt table tests. Be able to select and use investigations appropriately Develop a management plan for syncopal patients		X			X			

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	Appreciate the importance of other specialists such as ENT and neurologists. Appreciate the importance of the history from relatives and witnesses Appreciate problems specific to the elderly and address their social and medical needs Appreciate the impact of syncope on patients' lifestyle	X	X		X		X		

Cardiology Assessment Blueprint

2.8. Arrhythmias									
Objective - To be able to carry out specialist assessment and treatment of patients with arrhythmias									
Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Define the: Genetics, pathogenesis, natural history and prognosis of arrhythmias. methods of presentation of arrhythmias, their aetiology, recognition and management. normal electrophysiology of the heart and the basis of arrhythmogenesis. pharmacology of drugs currently used in the treatment of arrhythmias including thromboprophylaxis indications for temporary and permanent pacemakers indications for electrophysiological studies and the use of radio-frequency ablation indications for implantable cardioverter defibrillators and cardiac resynchronisation therapy current recommendations concerning fitness to drive	X	X						
S	Be able to take a relevant history, including family history, and perform an appropriate examination. Be able to select and use investigations appropriately Be able to select appropriate drugs	X	X			X			
A	Appreciate the anxiety patients suffer with arrhythmias and with some methods of management e.g. ICD See Generic curriculum on Management of chronic Disease				X		X		

Cardiology Assessment Blueprint

2.8.(b) Atrial fibrillation										
Objective - To be able to carry out specialist assessment and treatment of patients with AF										
Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER	
K	Epidemiology and prognosis Pathophysiology Classification Diagnosis, clinical features and impact on quality of life Associated conditions Diagnostic procedures: - Minimum evaluation - Additional Investigation Embolic complications Management: - anticoagulant therapy - rhythm vs. rate control - conversion to sinus rhythm - prevention of recurrences - control of ventricular rate - pacemaker-defibrillator therapy - catheter ablation - surgery	X	X							

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Take a relevant history and perform an appropriate clinical examination</p> <p>Perform or interpret: ECG, echocardiogram, transesophageal echocardiogram, prolonged ECG monitoring exercise testing</p> <p>Develop appropriate anti-thrombotic strategies</p> <p>Select patients appropriately for cardioversion</p> <p>Perform rhythm or rate control therapy</p> <p>Select and refer patients for</p> <ul style="list-style-type: none"> - electrophysiological studies - atrial catheter ablation - RFA or surgical ablation - pacemaker and defibrillator implantation 		X	X		X			
A	<p>Appreciate the anxiety patients suffer with AF and with some methods of management, e.g. catheter ablation and pacing</p> <p>Recognise the importance of coexisting structural heart diseases for the outcome and management of AF</p> <p>Appreciate the limitations and potential risk of antiarrhythmic drug therapy of AF</p> <p>Appreciate the importance of anticoagulant therapy</p> <p>Appreciate the palliative nature and potential adverse effects of non-pharmacological therapies</p> <p>Appreciate newer methods for treating Atrial Fibrillation and how to refer patients for specialist treatment when appropriate, such as transvenous or surgical ablation</p>		X		X	X	X		

Cardiology Assessment Blueprint

2.9. Pericardial disease									
Objective - To be able to carry out specialist assessment and treatment of patients with pericardial disease									
Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Define the pathogenesis, natural history and prognosis of pericardial diseases. Define the modes of presentation of pericardial disease	X	X						
S	Be able to take a relevant history and perform an appropriate examination. Be able to select and use investigations appropriately Be able to undertake pericardiocentesis in appropriately selected patients		X						
A	Be aware of important but uncommon conditions	X							
2.10. Primary and secondary prevention of cardiovascular disease									
Objective - To be able to carry out specialist assessment and treatment of patients with risk factors for vascular disease									
K	Define how to investigate and manage patients with systemic hypertension (both primary and secondary), lipid disorders, diabetes, smoking and family history of cardiovascular disease. Define how to calculate an individual patient's absolute risk of cardiovascular disease on the basis of standard risk factors Define the difference between relative and absolute risk Define the epidemiology of ischaemic heart disease	X	X						
S	Be able to assess the prevalence of coronary heart disease in the community in which you work. Be able to manage risk factors appropriately for individual patients		X			X			

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	Appreciate the importance of risk factor management Appreciate racial and regional variation in cardiovascular risk factor distribution Emphasize the central role of patient education Offer advice and support to family members with familial disease Make active efforts to encourage patients to adopt a healthier lifestyle with specific emphasis on risk factors Appreciate the importance of other specialists such as dieticians, diabetologists and nurse specialists				X		X		
2.10. i. Hypertension									
Objective - 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									
K	Define how to investigate and manage patients with systemic hypertension (both primary and secondary) Define the causes of hypertension Define how to assess patients with hypertension for end organ damage Define how to investigate a patient for secondary hypertension Define the pharmacology of drugs currently used in the treatment of hypertension Define how to manage a patient with resistant hypertension	X	X						

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	Be familiar with protocols and management plans for hypertension		X			X			
	Be able to manage patients with hypertensive emergencies								
A	Interpretation of appropriate biochemical investigations and imaging modalities in the diagnosis and assessment of hypertension								
	Appreciate the racial variation in hypertension and the varying response to pharmacological treatment								
A	Make active efforts to encourage patients to adopt a healthier lifestyle with specific emphasis on risk factors				X		X		
	Support general practitioners with the long term management of patients with risk factors for coronary heart disease								
2.10.ii Lipid Disorders									
Objective - 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									
K	Define how to investigate and manage patients with lipid disorders	X	X						
	Define the pharmacology of drugs currently used in the treatment of lipid disorders								
S	Define the current evidence for pharmacological intervention in both primary and secondary prevention					X			
	Be able to interpret lipid results relevant to individual patients								
A	Make active efforts to encourage patients to adopt a healthier lifestyle with specific emphasis on risk factors				X		X		
	Appreciate the importance of other specialists such as dieticians, diabetologists and nurse specialists								

Cardiology Assessment Blueprint

2.11. Adult Congenital Heart Disease									
Objective - To be able to carry out, under supervision, specialist assessment and treatment of adolescent and adult patients with congenital heart disease									
Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Define the anatomy of the heart and great vessels and have a basic understanding of cardiac embryology and development. Define simple and complex congenital defects and the important aspects of their management Define the natural history of simple and complex congenital conditions Have an understanding of genetics and prenatal diagnosis Know that congenital cardiac lesions and previous surgery may be associated with specific arrhythmias Understand that arrhythmia is the commonest emergency in patients with AACHD Know that pulmonary hypertension complicating congenital heart disease increases the risk of iatrogenic complications Define when to seek specialist advice	X	X						
S	Be able to take a relevant history and perform an appropriate examination. Be able to select and use investigations appropriately Be able to manage acutely presenting AACHD patients with arrhythmias Be able to recognise the arrhythmias that are peculiar to some forms of CHD and require specialist advice Be able to manage patients with congenital heart disease under supervision and liaise with specialists in congenital heart disease		X			X			

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	Appreciate the importance of genetic counselling. Understand the importance of referring patients for a specialist opinion Have appropriate self-confidence and recognition of limitations Appreciate the social and emotional difficulties encountered by patients with congenital heart disease				X		X		
2.12. The prevention and management of endocarditis									
Objective - To be able to carry out specialist assessment and treatment of patients with endocarditis or who are at risk of endocarditis									
K	Define the pathogenesis, presentation and natural history of endocarditis.	X	X						
	Define the common pathogens involved								
	Define how to diagnosis, investigate, treat and monitoring patients with endocarditis								
	Define the indications and limitations of echocardiography and other investigations in the diagnosis and management of endocarditis								
	Define the possible complications of endocarditis								
	Define the indications for surgical intervention								
Define the current guidelines for endocarditis prophylaxis									
S	Be able to take a relevant history and perform an appropriate examination. Be able to select and use investigations appropriately Be able to manage patients with endocarditis Be able to integrate information and advice from microbiologists and cardiac surgeons		X			X			

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	Emphasise the Importance of lifelong antibiotic prophylaxis Appreciate the importance of patient education Consult with Microbiologists and Cardiac Surgeons				X		X		
2.13. Diseases of the Aorta									
Objective - To be able to carry out specialist assessment and treatment of patients who have diseases of the aorta									
K	Define the pathogenesis, presentation and natural history of aortic dissection and aortic aneurysms. Define the indications, limitations and benefits of non-invasive and invasive investigations used in the assessment of aortic diseases Define the medical therapy of diseases of the aorta Define the indications for surgical intervention	X	X						
S	Be able to take a relevant history and perform an appropriate examination. Be able to select appropriately non-invasive imaging Be able to assess manage and give advice on patients with acute aortic dissection Define the indications and limitations of anti-hypertensive drugs		X			X			
A	Appreciate the importance of cooperation with cardiac surgeons. Recognise the urgency of management required of patients with aortic dissection				X		X		

Cardiology Assessment Blueprint

2.14. Cardiac Tumours									
Objective - To be able to carry out specialist assessment and treatment of patients who cardiac tumours									
Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Define the pathology, presentation and natural history of cardiac tumours. Define the indications, limitations and benefits of investigations used in the assessment of cardiac tumours	X	X						
S	Be able to take a relevant history and perform an appropriate examination. Be able to select and use appropriate investigations Be able to perform an echocardiogram		X	X		X			
A	The importance of cooperation with cardiac surgeons				X				
2.15. Cardiac rehabilitation									
Objective - To be able to provide rehabilitation to patients with cardio-vascular disease. Specifically: Post myocardial infarction Angina Post cardiac surgery Heart failure Trainees are encouraged to spend a period of time working with a cardiac rehabilitation team									
K	Define the principles of cardiac rehabilitation and exercise training. Define the use of rehabilitation for secondary prevention	X	X						
S	Be an active member of a multi-disciplinary rehabilitation team. Be able to anticipate and address patient concerns regarding work, exercise and sex Be able to discuss sensitive issues, such as sex, in an understanding manner		X			X			

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>Appreciate the importance of rehabilitation for return to work, driving and sex</p> <p>Appreciate the importance of patient education</p> <p>Appreciate the interplay of physiological and psychological aspects of heart disease</p> <p>Appreciate the role of other professionals including nurse specialists, physiotherapists, dieticians and general practitioners in cardiac rehabilitation</p>				X		X		
2.16. Assessment of patients with cardiovascular disease prior to non-cardiac surgery									
Objective - To be able to carry out specialist assessment of patients with cardiovascular disease prior to non-cardiac surgery									
K	<p>Define how to assess risk prior to non-cardiac surgery for patients with cardiac disease and give advice and management plans accordingly.</p> <p>Define how to optimise a patient's condition in order to minimize the risk of non-cardiac surgery</p>	X	X						
S	<p>Be able to assess risk of anaesthesia and surgery for individual patients.</p> <p>Be able to select and use investigations appropriately</p> <p>Be able to give valid and useful advice to patients, anaesthetists and surgeons</p>		X			X			
A	<p>Be able to discuss suitability for non-cardiac surgery and the risks involved with anaesthetist, surgeons, patients and relatives</p>				X		X		
2.17. Assessment of patients prior to cardiac surgery									
Objective - To be able to carry out specialist assessment and referral for patients requiring cardiac surgery									
K	<p>Define how to assess and investigate cardiac and non-cardiac factors prior to cardiac surgery.</p> <p>Define the general and specific risks and benefits of cardiac surgical interventions for coronary, valvular and congenital heart disease</p>	X	X						

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	Be able to assess patient's symptoms and clinical signs in conjunction with results of specialist investigations to make appropriate surgical referrals. Investigate and optimise general medical conditions pre-operatively		X			X			
A	Liase and discuss with cardiac surgeons directly. Appreciate the concerns and pressure on cardiac surgeons and anaesthetists Appreciate surgical concerns relating to neurological, respiratory and renal complications Have a multi-disciplinary approach to pre-operative assessment. Involve other specialists if indicated Appreciate the technical potential and limitations of surgery				X		X		
2.18. Care of patients following cardiac surgery									
Objective - To be able to carry out specialist assessment and treatment of patients who have had cardiac surgery									
K	Define the potential problems and complications of cardiac surgery whilst on ITU. Define how to approach post-operative rehabilitation	X	X						
S	Be able to assess patients on ITU and give advice to intensivists and surgeons. Be able to participate in the management of patients in the early post-operative period and long term Be able to select and use investigations appropriately		X			X			

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>Appreciate the importance of good communication and collaboration between surgeon, anaesthetist and intensivist.</p> <p>Appreciate the anxiety of relatives whilst patients are on ITU</p> <p>Appreciate the importance of rehabilitation after cardiac surgery</p>				X		X		
2.19. Management of critically ill patients with haemodynamic disturbances									
Objective - To be able to carry out specialist assessment and treatment of patients who are critically ill with haemodynamic disturbances									
K	<p>Define the pathogenesis, presentation and natural history of critical illnesses.</p> <p>Define the indications and complications of intra-aortic balloon pump counter-pulsation</p> <p>Define when to consider patients for ventricular assist devices</p> <p>Define indications for and haemodynamic consequences of positive pressure ventilation</p>	X	X						

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Be able to assess manage and give advice on the critically ill patient.</p> <p>Specifically be able to recognise and manage acute conditions including:</p> <ul style="list-style-type: none"> pulmonary embolism acute pericarditis myocarditis cardiac tamponade aortic dissection cardiac rupture cardiogenic shock post infarction ventricular septal defect and mitral regurgitation circulatory collapse <p>Be able to select and use investigations appropriately to assess haemodynamics.</p> <ul style="list-style-type: none"> Echocardiography Pulmonary artery catheterisation and wedge pressure <p>Define the indications and limitations of inotropic drugs</p> <p>Be able to undertake pericardiocentesis</p>		X			X			
A	<p>The importance of cooperation with anaesthetists/ intensivists and other specialties.</p> <p>Awareness of legal/ ethical issues surrounding care, nutrition and ventilation of the unconscious patient</p> <p>Have sufficient communication skills to sensitively discuss problems of the critically ill with relatives</p> <p>Be able to break bad news</p>				X		X		

Cardiology Assessment Blueprint

2.20. Heart Disease in Pregnancy									
Objective - 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									
Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	To describe how pregnancy, delivery and the post partum period may affect cardiac function in normal women and in those with pre-existing or incident cardiac disease	X	X						
	To understand that heart disease is the leading cause of maternal death in the UK								
S	Define the risks of pregnancy for the mother and fetus for different cardiac disorders								
	The risks of recurrence of congenital heart disease in the fetus of mothers with congenital heart disease								
S	The prescribing problems encountered during pregnancy								
	The implications of anticoagulation during pregnancy								
S	Understand that women with heart disease require specialist multidisciplinary pre-conception counselling, antenatal and puerperal care								
	Can take a relevant history and perform an appropriate examination								
S	Can assess cardiac patients' risk of becoming pregnant		X						
	To be able to refer appropriately women with heart disease who are or who are planning to become pregnant								

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>Appreciate the increased anxiety experienced by pregnant women with cardiac disease.</p> <p>To recognize the need for referral to, and the role of, specialist cardiologists in the management of women preconception, during pregnancy and post partum</p> <p>To recognize the role of multidisciplinary care of women with heart disease and in particular liaison with obstetricians, midwives, haematologists, obstetric anaesthetists and intensivists</p>				X		X		
2.21. Resuscitation - Basic and Advanced Life Support									
Objective - To be able to carry out and supervise resuscitation of patients									
K	<p>Define current guidelines on Resuscitation</p> <p>Define the principles of cardiopulmonary resuscitation</p> <p>Define the cardiac and non-cardiac causes of cardiac arrest</p>							X	
S	<p>Be able to supervise pre-hospital care</p> <p>Be proficient in Basic life support</p> <p>Be proficient in Advanced life support</p> <p>Must have undertaken ALS course</p> <p>Be able to effectively perform and supervise resuscitation of patients suffering from cardiac arrests and the critically ill</p>							X	

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	Be able to support relatives. Be able to break bad news in a sympathetic manner Appreciate legal and ethical considerations of resuscitation Familiarity with the legal and ethical issues associated with "do not attempt resuscitation" orders							X	
2.22. Radiation use and safety									
Objective - 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									
K	Define the physics and hazards of ionising radiation to patients and staff. Define the current statutory requirements concerning the medical use of ionising radiation Know how to operate the equipment involved in the use of ionising radiation Define the factors that affect radiation exposure to both patients and staff Know the important aspects of cardioradiology								X
S	Be able to operate radiation equipment safely and effectively. Has successfully completed a period of practical supervised training in the use of radiation equipment			X					X
A	Appreciate the risks and benefits to patients and staff of using ionising radiation								X

Cardiology Assessment Blueprint

2.23. Community Cardiology									
Objective - To be aware of the structures and systems for the delivery of cardiovascular medical care to local populations									
Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Define the policies and strategies underpinning local provision of cardiac care. Define the interactions of local stakeholders in the implementation of policies and strategies Know how to access community support for patients and carers Understand the role of patient support groups and the voluntary sector	X							
S	To be able to interact appropriately with other individuals and organisations participating in the care of patients with cardiovascular disorders		X			X			
A	Appreciate the differing roles and perspectives of individuals and organisations at different points on the patient pathway				X				

Cardiology Assessment Blueprint

2.24. pulmonary Arterial hypertension (PAH)									
Objective - 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									
Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Definition and functional classification of pulmonary hypertension Epidemiology of PAH (incidence, prevalence, aetiology, genetics, high-risk groups) Pathology and pathophysiology of PAH Aetiology Clinical features of PAH Diagnostic criteria of PAH Prognostic markers Management of PAH (medical, surgical and interventional including balloon atrial septostomy, indications, contraindications and possible adverse effects)	X	X						

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Take a relevant history and perform an appropriate clinical examination</p> <p>Recognise clinical signs consistent with PAH</p> <p>Differentiate between primary, secondary pulmonary hypertension and other diseases with similar symptoms</p> <p>Perform and interpret adequate medical assessment (using laboratory analyses including arterial blood gases; pulmonary function test, ECG, Echocardiography, cardiopulmonary stress-testing, ventilation-perfusion lung scan, spiral CT, magnetic resonance imaging, cardiac catheterisation and pulmonary angiography, lung biopsy)</p> <p>Prescribe adequate medical or invasive (surgical, interventional) management</p> <p>Evaluate clinical and haemodynamic prognostic markers</p>		X			X			
A	<p>Establish cooperation with family physicians and other health care professionals for early recognition of primary pulmonary hypertension;</p> <p>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</p> <p>Maintain long-term involvement of patients and their family members in supportive activities for healthy life-style adherence and treatment compliance</p> <p>Appreciate the increased risk of PAH in other medical conditions, such as scleroderma</p>				X		X		

Cardiology Assessment Blueprint

PART 3. CORE PROCEDURES AND INVESTIGATIONS									
3.1. Basic investigations									
Objective – Be able to perform competently and/or select appropriately and interpret correctly and perform competently the following investigations for the diagnosis and assessment of patients with cardiac disease. Electrocardiograms Ambulatory ECG Exercise Testing CXR									
Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Define the indications for, and be able to report and interpret the results of: Electrocardiograms (including high resolution) Ambulatory ECG Exercise testing CXR Define the physiology of exercise	X	X			X			
S	Be able to supervise and analyse exercise tests		X			X			
A	Appreciate the limitations of non-invasive investigations Appreciate the sensitivity, specificity and predictive accuracy of exercise tests		X			X			

Cardiology Assessment Blueprint

3.2. Echocardiography (core)									
Objective - To understand the role of echocardiography in the management of patients with cardiac disease and to be able to satisfactorily carry out, interpret and report transthoracic echocardiography for the diagnosis and assessment of adult patients									
K	<p>BASIC PRINCIPLES</p> <p>Ethics and sensitivities of patient care.</p> <p>Principles of ultrasound imaging, spectral and colour flow Doppler.</p> <p>Indications for echocardiography.</p> <p>Basic instrumentation and scanning</p> <p>LEFT VENTRICLE</p> <p>Coronary anatomy and correlation with 2D views of left ventricle , wall motion and segmentation of left ventricle. Measurements global systolic function.</p> <p>Doppler mitral valve filling patterns.</p> <p>Complications of myocardial infarction.</p> <p>Features of dilated, and hypertrophic cardiomyopathy, athletic heart, hypertensive heart disease.</p> <p>MITRAL VALVE DISEASE</p> <p>Normal anatomy of the mitral valve, and the subvalvar apparatus and their relationship with LV function</p> <p>Causes of mitral stenosis and regurgitation</p> <p>AORTIC VALVE DISEASE and AORTA</p> <p>Causes of aortic valve disease and causes of aortic disease</p> <p>Methods of assessment of aortic stenosis and regurgitation</p> <p>Basic criteria for surgery to understand reasons for making measurements</p> <p>Echocardiographic signs of aortic dissection</p> <p>RIGHT HEART</p> <p>Causes of tricuspid and pulmonary valve disease, RV dysfunction and pulmonary hypertension</p> <p>The imaging features of pulmonary hypertension</p> <p>The estimation of pulmonary pressures</p>	X or BSE exam	X			X			

Cardiology Assessment Blueprint

Curriculum area	Competence	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K (cont)	<p>REPLACEMENT HEART VALVES Types of valve replacement and criteria of normality Signs of failure and indications for TOE</p> <p>INFECTIVE ENDOCARDITIS Duke criteria for diagnosing endocarditis Echocardiographic features of endocarditis Criteria for TOE</p> <p>INTRACARDIAC MASSES Types of mass found in the heart Differentiation of normal from abnormal, features of a myxoma and differentiation of an atrial mass</p> <p>PERICARDIAL DISEASE Anatomy of normal pericardium Features of tamponade, pericardial constriction and restrictive cardiomyopathy</p> <p>ADVANCED ECHOCARDIOGRAPHY Indications for and limitations of transoesophageal echocardiography Indications for and limitations of stress echocardiography. Indications for and limitations of intraoperative echocardiography</p>	X or BSE exam	X			X			
S	<p>Can use basic instrumentation and can care for machine appropriately.</p> <p>Can use appropriate echo probes, machines and software to obtain standard views and measurements, can optimise controls.</p> <p>Can use colour flow in at least two planes for all valves and can obtain pulsed Doppler.</p> <p>Can recognise normal variants.</p> <p>Can differentiate normal from abnormal LV systolic function.</p> <p>Can recognise and describe large wall motion abnormalities.</p>			X or BSE exam					

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S (cont)	<p>Can obtain measures of systolic function & can differentiate diastolic filling patterns.</p> <p>Can detect and recognise complications after myocardial infarction.</p> <p>Can recognise features associated with hypertrophic cardiomyopathy</p> <p>Can recognise rheumatic disease, mitral prolapse, functional mitral regurgitation</p> <p>Can assess mitral stenosis and can assess severity of regurgitation</p> <p>Can recognise bicuspid, rheumatic, and degenerative disease</p> <p>Can measure CW from multiple sites</p> <p>Can derive peak & mean gradients using continuous wave Doppler</p> <p>Can assess the grade of aortic regurgitation</p> <p>Can recognise aortic dilatation</p> <p>Recognises right ventricular dilatation</p> <p>Can estimate PA systolic pressure</p> <p>Can recognise broad types of replacement valve</p> <p>Can diagnose severe paraprosthetic regurgitation</p> <p>Can recognise prosthetic obstruction</p> <p>Can recognise typical vegetations</p> <p>Can recognise an abscess</p> <p>Can recognise a LA myxoma</p> <p>Can differentiate a pleural and pericardial effusion</p> <p>Can recognise the features of tamponade</p> <p>Can judge the route for pericardiocentesis</p> <p>Has seen at least five of each type of advanced study</p>			X or BSE exam					
A	<p>Interacts appropriately with patients.</p> <p>Appreciate the limitations of echocardiography</p> <p>Demonstrate ability to work with and where appropriate educate cardiac physiologists</p>				X		X		

Cardiology Assessment Blueprint

3.3 Nuclear Cardiology (Core)									
Objective - Define the indications for nuclear cardiology investigations. Attend stress, imaging, and reporting sessions. Understand the clinical significance and limitations of the results of nuclear cardiology investigations									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Define the indications for MPS and ERNV.								
	Understand the importance of radiation protection								
	Define the methods of stress used in MPS								
	Have a sound knowledge of the radiopharmaceuticals and protocols used in MPS and ERNV	X							X
	Be familiar with the quipment and techniques used in nuclear cardiology imaging								
	Understand the clinical value of MPS and ERNV in different clinical settings								
S	Be able to understand the results of MPS and ERNV studies and integrate them with those of other investigations in clinical practice		X						
A	Appreciate the strengths and limitations of nuclear cardiology investigations in routine clinical practice.								
	Understand the roles of the various health-care professionals involved in nuclear cardiology and be able to interact with them				X		X		

Cardiology Assessment Blueprint

3.4 Cardiac Magnetic Resonance (core)									
Objective - A basic understanding of the role of CMR and its capabilities, including the indications for its use. A basic understanding of how the procedures are carried out, in particular the safety issues. A basic understanding of image analysis, post-processing and interpretation of images and data with emphasis on patient management									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	The indications and contra-indications to CMR The basics of CMR safety The basics of CMR image acquisition The basics of CMR imaging protocols (anatomical imaging and functional imaging) The basics of CMR image processing The limitations of CMR	X							
S	Plan and supervise the pre and post investigation management of CMR patients. Interpret clinical information and the results of other investigations to decide what information must be acquired by CMR Interpret images from basic CMR sequences Interpret CMR reports and their application to clinical management		X						
A	Be aware of the limitations of non-invasive imaging Appreciate the importance of understanding cardiac anatomy in 3-dimensions Have an appropriate threshold for seeking expert advice Appreciate the importance of providing detailed information about the procedure and its potential complications to patients Appreciate the importance of team work with radiologists, radiographers, anaesthetists and technical staff				X		X		

Cardiology Assessment Blueprint

3.5. Heart rhythm training (Core)									
Objective - 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									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>BASIC PRINCIPLES</p> <p>An understanding of the mechanisms of arrhythmias.</p> <p>A thorough understanding of the 12-lead surface ECG during brady- and tachyarrhythmias</p> <p>To have an understanding of the therapeutics of antiarrhythmic drugs, and their hazards</p> <p>SPECIFIC PATIENT GROUPS</p> <p>To know the principles of risk assessment in patients with arrhythmias undergoing cardiac and other surgery, and during pregnancy, and with structural heart disease.</p> <p>BRADYCARDIA AND PACING</p> <p>Investigation of patients with blackouts/ T-LOC</p> <p>Indications for temporary and permanent pacing.</p> <p>An understanding of pacemaker programming</p> <p>INVASIVE ELECTROPHYSIOLOGY</p> <p>Basic understanding of the use and application of invasive electrophysiology studies</p> <p>ICDs and CRT</p> <p>An understanding of the use of ICDs</p> <p>An understanding of the role of devices in heart failure</p> <p>CARDIOVERSION</p> <p>Understanding the mechanisms of cardioversion.</p> <p>Understanding of the indications for cardioversion</p>								
			X	X			X		

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>To be competent in the acute management of arrhythmias, and have an understanding of which patients require further investigation.</p> <p>To be competent in the management of arrhythmias in post cardiac and non-cardiac surgical patients, pregnant patients and patients with structural heart disease</p> <p>Use of external pacing systems.</p> <p>Implantation of temporary pacemakers.</p> <p>Implantation of permanent pacemakers, both single and dual chamber</p> <p>Experience of 20 invasive electrophysiological studies for common arrhythmias, usually involving curative catheter ablation during the same study</p> <p>Experience of at least five ICD implants and five CRT procedures</p> <p>To be competent in elective and emergency DC cardioversion</p>		X	X		X			
A	<p>Appreciate the anxiety often suffered by patients and their relatives.</p> <p>Appreciate the limitations of drug therapy in the treatment of arrhythmias</p> <p>Have appropriate self-confidence and recognition of limitations</p> <p>Appreciate the importance of radiation protection</p>				X		X		
3.6 Invasive and interventional cardiology (core)									
Objective - The trainee will be proficient at carrying out and interpreting, coronary arteriography and left and right heart catheterisation									
K	<p>Define the cardiac anatomy, physiology and haemodynamics relevant to invasive cardiology.</p> <p>Define the indications and limitations of percutaneous interventions in cardiac disease</p> <p>Define the various techniques and their complications</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Be able to perform coronary arteriography, including graft angiography, with right and left heart catheterisation in the assessment of cardiac disease.</p> <p>As a guide, 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 complete a satisfactory DOPS and demonstrate competence as an independent operator</p> <p>Be able to interpret the results of angiography and manage patients appropriately, including referral for PCI or cardiac surgery</p> <p>Trainees should have observed and assisted with percutaneous coronary interventions</p> <p>If available the trainee should have observed trans-septal puncture and myocardial biopsy</p>		X	X		X			
A	<p>The importance of liaising with, and requesting opinions from, cardiac surgeons.</p> <p>Appropriate self-confidence and recognition of limitations</p> <p>The importance of team working with non-medical staff during invasive procedures</p> <p>Appreciate the importance of radiation protection</p>				X		X		
3.7. Pericardiocentesis									
Objective - To be able to carry out pericardiocentesis in the diagnosis and treatment of patients with pericardial disease									
K	Define the indications for diagnostic and therapeutic pericardiocentesis	X	X			X			
S	Be able to undertake pericardiocentesis			X					

Cardiology Assessment Blueprint

4.1a. Adult Congenital Heart Disease									
1. 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									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Define the anatomy of the heart and great vessels. Have a detailed understanding of cardiac embryology and development Define both common and rare congenital defects, their morphology and nomenclature Know that CHD is a continuum from fetal life to childhood to adult life Define the natural history of simple and complex CHD Define the unnatural (operated) history of simple and complex CHD	X	X			X			
S	Be able to take a relevant history and perform an appropriate examination Be able to interpret paediatric, and to perform and interpret adult congenital echocardiograms To be able to use echo to analyse the morphology and physiology of simple and complex CHD		X	X		X			
A	Appreciate the importance of the management of patients during the transition from paediatric to adult clinics. Recognise the importance of a multidisciplinary team in the managements of adolescents and young adults Through attendance at paediatric and adult CHD clinics, recognize how CHD develops and may become modified throughout life Recognise which patients with CHD need lifelong specialist follow up				X	X	X		

Cardiology Assessment Blueprint

2. To be able to apply appropriately the knowledge that the management of ACHD requires a multidisciplinary approach									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>Know that CHD has a psycho-social as well as physical impact on the patient and their family</p> <p>Be able to identify the ways in which CHD may impact on patients' lifestyle</p> <p>Be able to explain how patient education can empower young adults to take responsibility for their health</p>	X				X	X		
S	<p>Demonstrate the ability to educate adolescents and young adults about their condition and its impact on their life.</p> <p>Be able to communicate with the parents and carers of adolescents and young adults, whilst respecting patient confidentiality</p> <p>Be able to communicate effectively within a multi-disciplinary team</p> <p>Be able to communicate sensitively with adolescents and young adults</p>		X		X	X	X		
A	<p>Appreciate the social and emotional difficulties encountered by patients with CHD</p> <p>Appreciate the psychological impact of ACHD on patients and their families</p>				X		X		
3. To apply a thorough understanding of CHD to the investigation of ACHD									
K	<p>Know how to investigate patients with CHD including the use and interpretation of non-invasive investigations such as echo and MRI, and invasive investigations such as cardiac catheterization and TOE.</p> <p>Know the extended role of MRI in the management of patients with ACHD</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Be able to explain the impact of CHD on adolescent and young adults' leisure and work activities</p> <p>Be able to perform and interpret echocardiograms, including TOE, of patients with AACHD</p> <p>Be able to interpret cardiac MRI images</p> <p>Be able to undertake diagnostic cardiac catheterisations in patients with CHD</p>	X	X	X		X			
A	<p>Appreciate the complex relationships that sometimes exist between patients with ACHD and their parents.</p> <p>Recognise the different and complementary contributions of different imaging modalities in the assessment of individual congenital cardiac lesions</p>	X			X	X	X		
4. To apply appropriately a knowledge of CHD to its medical and surgical treatment									
K	<p>Know that congenital cardiac lesions and previous surgery may be associated with specific arrhythmias.</p> <p>Know the indications for first time and repeated cardiac surgery for ACHD</p> <p>Identify potential complications faced by patients with CHD undergoing non-cardiac surgery</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Be able to manage patients with arrhythmias and CHD.</p> <p>Be able to recognise the arrhythmias that are peculiar to some forms of CHD</p> <p>Be able to evaluate patients at particular risk from arrhythmia</p> <p>Be able to oversee the perioperative care of patients having surgical correction of CHD and recognise the post-operative and iatrogenic complications faced by patients with complex disease</p> <p>Be able to assess the risk of non-cardiac surgery and provide appropriate advice on perioperative management to avoid complications; especially the special risks faced by patients with complex disease</p>		X			X			
A	<p>Recognise the urgency of treatment of arrhythmia in some patients with ACHD</p> <p>Recognise the need for first time and repeat operations in ACHD</p> <p>Appreciate the need for effective communication with healthcare professionals involved in the care of ACHD patients undergoing non-cardiac surgery</p>				X	X	X		
5. To be able to apply appropriately a knowledge of CHD to catheter based treatment of ACHD (Specific example: performing and assessing suitability for device closure of atrial septal defect (ASD) or patent foramen ovale: Type 1 trainees)									
K	<p>Know that patent foramen ovale and secundum ASD defect may not exist in isolation</p> <p>Know that both are associated with other lesions that may need simultaneous device closure or may make the index defect unsuitable for device closure</p> <p>Know that the severity of coexistent acquired lesions such as mitral valve disease may be underestimated in the presence of ASD</p> <p>Be able to define and identify the different types of interatrial communication</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>To be assessed as competent in diagnostic ACHD cardiac catheterisation before performing interventions.</p> <p>Be able to undertake catheter based interventions, including joint procedures with paediatric interventional cardiologists for complex interventions</p> <p>Be able to perform and analyse TOE to identify different types of ASD and assess suitability for closure</p> <p>Be able to identify contraindications to device closure</p> <p>Be able to evaluate MV disease in the presence of ASD</p> <p>Be able to assess pulmonary vascular resistance in the presence of a shunt</p> <p>Be able to interpret pulmonary haemodynamic data in evaluating the suitability of an intracardiac repair</p>	X	X	X		X			
A	<p>Recognise the need to audit all CHD activity.</p> <p>Recognise the need to contribute data on all CHD interventions to the national CHD database</p> <p>Recognise the desirability of a team approach to complex CHD interventions</p> <p>Recognise the need for continuous TOE or intracardiac echo monitoring during device closure of cardiac defects</p>				X	X			
6. Pregnancy & sexual health See separate curriculum									

Cardiology Assessment Blueprint

4.1b. Heart disease in pregnancy									
1. 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 <ul style="list-style-type: none"> • Corrected and uncorrected congenital heart disease • Ventricular dysfunction • Pulmonary hypertension • Rheumatic heart disease • Ischaemic heart disease • Marfan's syndrome • Artificial heart valves • Arrhythmias 									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	To describe how pregnancy, delivery and the post partum period may affect cardiac function in normal women and in those with pre-existing cardiac disease Define the risks of pregnancy for the mother and fetus for different cardiac disorders Define the risks of recurrence of congenital heart disease in the fetus of mothers with congenital heart disease To list the possible adverse effects of drug treatment on both the woman and her fetus Define the implications of anticoagulation during pregnancy	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Be able to take a relevant history and perform an appropriate examination</p> <p>Be able to assess cardiac patients' risk of becoming pregnant</p> <p>To be able to explain the increased risks of pregnancy in women with heart disease</p> <p>To explain the increased risk of CHD in the fetuses of women with ACHD</p> <p>Be able to 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</p> <p>Be able to counsel and manage women who require anticoagulation throughout pregnancy and the puerperium</p>		X			X			
A	<p>Appreciate the increased anxiety experienced by pregnant women with cardiac disease.</p> <p>To recognize the role of cardiologists in the management of women preconception, during pregnancy and post partum</p> <p>To recognize the role of multidisciplinary care of women with heart disease and in particular liaison with obstetricians, midwives, haematologists, obstetric anaesthetists and intensivists</p> <p>To understand the importance of formulating an agreed flexible management plan for delivery</p>				X	X	X		
2. To be able to carry out appropriate assessment of, and provide contraceptive advice to, women with cardiac disease									
K	Know which contraceptive methods are safe and effective in women with different cardiac disorders	X							
S	To be able to provide appropriate contraceptive advice to women with cardiac disease		X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	Recognise the need to address and offer contraceptive advice to women with heart disease					X			
3. To be able to carry out appropriate assessment and treatment of women with pregnancy induced cardiac disease									
K	Know the risk factors for and presenting features of peripartum cardiomyopathy Know the risk of recurrence of peripartum cardiomyopathy in subsequent pregnancies Know the presenting features, investigation and management of cardiovascular emergencies during pregnancy including pulmonary embolism, aortic dissection and myocardial infarction	X	X			X			
S	Initiate investigations to explore the differential diagnosis of peripartum cardiomyopathy and be able to explain the diagnosis and prognosis to the patient and her relatives To be able to investigate and treat appropriately cardiovascular emergencies in pregnancy	X	X			X			
A	Recognize the need for urgent joint assessment between multispecialty teams				X	X	X		

Cardiology Assessment Blueprint

4.2 Core module 1: Pacemaker implantation and programming									
Objective - 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									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>Know the principles of pacing and the engineering of pacemakers and of pacing leads.</p> <p>Understand medico-legal issues concerning consent and provision of information</p> <p>Of the cardiac conduction system and its disease processes</p> <p>Of the cardiac and thoracic anatomy, especially in respect of venous access including the cephalic vein approach</p> <p>Of the indications and guidelines for correct pacemaker prescription including pacing mode</p> <p>Of the safe implantation of pacemakers including the operating environment and antibiotic usage</p> <p>Of management of complications of pacemaker implantation including pneumohaemothorax, lead perforation, lead fracture</p> <p>Of the management of lead problems – when to extract and when not to</p> <p>Of programming issues specifically related to leads</p> <p>Of modern pacing systems and of troubleshooting</p> <p>Of rate modulated pacing and sensor technology</p> <p>Of driving restrictions</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Skills in correct patient selection for and safe implantation of single and dual chamber pacemakers via the cephalic and subclavian approaches.</p> <p>Intravascular catheter manipulation and surgical skills in opening manipulating and closing wounds</p> <p>Managing complications eg cardiac tamponade</p> <p>The insertion and care of temporary pacing wires</p> <p>Detailed and safe approach to cephalic subclavian or internal jugular venous access</p> <p>Competent programming of pacemakers and troubleshooting including the programming of sensors and newer sensors and newer anti-atrial tachycardia algorithms</p>			X					
A	<p>Correct attitude to a surgical approach – appreciating sterility and antibiotic usage</p> <p>To foster a team approach to pacing including a close relationship with cardiac physiologists</p> <p>Committed to audit of long term outcomes including infection and lead complications</p> <p>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</p> <p>To educate patients as to the treatment options open to them and to explain treatment strategies</p> <p>To work closely with other health care professionals as necessary: Cardiac physiologists, Cardiologists, Infection control</p> <p>Care of the elderly, Neurologists</p> <p>To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively</p>				X		X		

Cardiology Assessment Blueprint

4.2 Core module 2: Training in ICD implantation and programming									
Objective - 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)									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Of the cardiac and thoracic anatomy, especially in respect of venous access. Of national and international guidelines for ICD implantation, and their evidence base Of medico-legal issues concerning consent and provision of information Up-to-date knowledge of recent clinical trials in ICD therapy The effects of antiarrhythmic drugs on defibrillation and pacing thresholds Of the proarrhythmic effects of antiarrhythmic drugs and their effect on left ventricular function Of how to manage complications of ICD implantation and problems during longterm follow-up Of the indications for VT ablation, AV nodal ablation, and atrial tachycardia / atrial fibrillation ablation in patients with ICDs Of the current recommendations regarding fitness to drive with an ICD	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Select and investigate patients appropriately for ICD implantation (including whether revascularisation is required).</p> <p>Explain the procedure possible complications, and possible effects on the patient's lifestyle to the patient and relatives</p> <p>Assess the anaesthetic/ sedation needs for the implantation</p> <p>Assess whether a single, dual or triple chamber (i.e. biventricular) device is best suited to the patient</p> <p>Perform the implant procedure competently with an acceptably low complication rate</p> <p>Perform appropriate tests of pacing, sensing and defibrillation safely and thoroughly during the implant</p> <p>Be able to program the device appropriately</p> <p>Perform post-implant assessment of the patient</p> <p>Perform routine followup of ICD patients</p>		X	X					

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>Appreciate the importance of informed consent, and the need to explain lifestyle issues and driving restrictions to the patient</p> <p>Correct attitude to a surgical approach – appreciating sterility and antibiotic usage</p> <p>Appreciate the importance of team-working with nursing, technical, radiographic, anaesthetic and (if appropriate) industry staff</p> <p>Appropriate self-confidence and recognition of limitations</p> <p>Committed to audit of long term outcomes</p> <p>To educate patients as to the treatment options open to them and to explain treatment strategies</p> <p>To work closely with other health care professionals as necessary: Cardiac physiologists, Cardiologists, Infection control, Care of the elderly, Neurologists</p> <p>Appreciate the anxiety that patients suffer with an ICD</p> <p>To appreciate the psychological impact of the patient's arrhythmia illness on the patient and their family, and manage it sensitively</p>			X	X		X		

Cardiology Assessment Blueprint

4.2 Elective module 1: Training in multi-site ventricular pacing for cardiac resynchronisation (CRT)									
Objective - 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									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>Of techniques available to identify patients likely to benefit from CRT and to be aware of limitations of these techniques.</p> <p>Of medico-legal issues concerning consent and provision of information</p> <p>To be able to determine which patients for CRT also require ICD back-up</p> <p>Of all the equipment available, both for implantation and also subsequent programming</p> <p>Of relative benefits of different leads and devices</p> <p>Of implantation techniques and how to deal with common problems</p> <p>Of potential complications</p>	X	X			X			
S	<p>To be able to select appropriate patients for CRT.</p> <p>To be able to consent a patient in a balanced and informed way about the success rate, risks and benefits of CRT</p> <p>To be able to proceed with a CRT implant in a safe and logical fashion</p> <p>To be able to recognize nature of implant difficulties and to take appropriate action to overcome these</p> <p>To appreciate when an alternative technique or approach may be required e.g. surgical device implantation</p> <p>To be able to programme the devices appropriately, and to advise on optimization using recognized techniques such as echocardiography</p>		X	X					

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>Take a sensible, professional attitude to CRT, learn under supervision with appropriate requests for advice.</p> <p>Consent patients sensitively with an objective assessment of likelihood of benefit</p> <p>Be aware of the importance of members of a multi-disciplinary team in heart failure management and in maximising benefit of CRT</p> <p>To deal appropriately with patients in whom CRT implantation has not been effective</p> <p>To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively</p>				X		X		

Cardiology Assessment Blueprint

4.2 Elective module 2: Training in pacing/ICD lead extraction techniques									
Objective - 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									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Of the basic principles of pacing and the electrical properties of the heart. Of medico-legal issues concerning consent and provision of information Of the engineering of pacemakers and of pacing leads Of the published guidelines for lead extraction Of the cardiac and thoracic anatomy Of safe implantation of pacemakers including the operating environment and antibiotic usage Of management of complications of pacemaker implantation including; pneumo-haemothorax. Lead perforation, lead fracture Of the management of lead problems – when to extract and when not to Of programming issues specifically related to leads Of the lead extraction systems including cutting, laser and diathermy sheaths, and the use of the femoral approach to lead extraction Of the specific complications of lead extraction and of how to prevent/handle them	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>In correct patient selection.</p> <p>In the implantation of both single and dual chamber pacemakers via the cephalic and subclavian approaches</p> <p>In handling intravascular catheters</p> <p>In wound repair and closure</p> <p>In handling immediate complications of implants e.g. cardiac tamponade</p> <p>Ability to extract leads from both the superior and femoral approaches</p> <p>In using cutting, laser and femoral extraction techniques</p>		X	X					
A	<p>Correct attitude to a surgical approach – appreciating sterility and antibiotic usage</p> <p>To foster a team approach to lead extraction including a close relationship with cardiac surgeons</p> <p>Use of self audit regarding complications</p> <p>To educate patients as to the treatment options open to them and to explain treatment strategies including surgical extraction</p> <p>To work closely with other health care professionals as necessary: Cardiac technicians Cardiologists Infection control Cardiac surgeons</p> <p>To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively</p>				X		X		

Cardiology Assessment Blueprint

4.2 Core module 3: Training in the mechanisms of arrhythmias, complex electrocardiography and the principles of intracardiac electrophysiology									
Objective - To understand the principles underlying the main causes of cardiac arrhythmias at cellular and tissue level. Familiarity with the use of the surface ECG for arrhythmia management. To understand the classification of clinical arrhythmias based on their site of origin within the heart. A knowledge of the pathophysiology of atrial fibrillation, atrial tachycardia and flutter, junctional tachycardias (including AV nodal tachycardia and the Wolff-Parkinson- White syndrome)									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>Of reentrant, automatic and triggered arrhythmia mechanisms. An understanding of the differences between anatomic and functional reentry, including spiral wave generation.</p> <p>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</p> <p>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 administration</p> <p>Of the causes of wide-complex tachycardias and morphological schemes for the diagnosis of VT</p> <p>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</p> <p>Of the ECG in Long QT and Brugada syndromes and right ventricular dysplasia (ARVD)/cardiomyopathy (ARVC)</p> <p>Of the understanding of minvasive electrophysiological studies (EPS) and their clinical indications</p> <p>To have observed and understood invasive EPSs and radiofrequency ablations</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>History taking and appropriate examination in patients with or at risk of cardiac arrhythmias.</p> <p>Obtaining an adequate ECG record during an arrhythmia using available technologies</p> <p>Demonstrate a systematic approach to interpretation of surface ECGs during arrhythmias</p> <p>Demonstrate appropriate use of vagal manoeuvres and drugs for arrhythmias</p> <p>Demonstrate familiarity with ECG schema for localising accessory pathways in WPW syndrome</p> <p>An appreciation of the relevance and limitations of basic arrhythmia mechanisms in terms of clinical arrhythmia management</p> <p>To be able to describe abnormal electrical activity in terms of the 3-D structure of the human heart in situ</p>		X	X					
A	<p>Take a sensible, Professional attitude to the management of patients with arrhythmias, using non-invasive techniques and treatments appropriately, and conserving resources.</p> <p>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</p> <p>To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively</p>				X		X		

Cardiology Assessment Blueprint

4.2 Core module 4: Training in Intracardiac Electrophysiology Techniques									
Objective - 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									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>Of the electrophysiology of supraventricular tachycardias and typical atrial flutter.</p> <p>Of medico-legal issues concerning consent and provision of information</p> <p>Of the range of variation in presentations and clinical findings associated with different arrhythmia mechanisms</p> <p>Of the range of ECG recording equipment for detecting intermittent arrhythmias and their appropriate use</p> <p>Of 3-dimensional cardiac anatomy</p> <p>Of the equipment required for electrophysiological studies and catheter ablation</p> <p>Of intracardiac electrographic patterns in SVT and atrial flutter, and their interpretation</p> <p>Of ablation techniques and ability to use information from imaging and intracardiac electrograms to guide and evaluate the effectiveness of ablation</p> <p>Of potential complications of invasive electrophysiological procedures and their management</p> <p>Of the pharmacology, side effects and interactions of drugs used in the management of these conditions</p> <p>Of arrhythmogenic right ventricular dysplasia (ARVD) or cardiomyopathy (ARVC)</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>To communicate effectively with patients and their family and contacts to take an effective history</p> <p>To communicate effectively with patients to gain informed consent</p> <p>Competence in performing autonomic maneuvers</p> <p>To prepare a patient for an electrophysiological study, safely and competently insert vascular sheaths and undertake the procedure</p> <p>To safely and accurately manipulate electrodes in the blood vessels and heart</p> <p>To accurately document records of all aspects of patient care</p> <p>Technique of Transeptal punctures</p>		X	X					
A	<p>Take a sensible, professional attitude to arrhythmia management, learn under supervision with appropriate requests for advice.</p> <p>Consent patients sensitively with an objective assessment of risks</p> <p>Be aware of the importance of members of a multidisciplinary catheter laboratory team in safe performance of procedures</p> <p>Communicate effectively and positively with other professionals involved in the patient's care</p> <p>Remain calm and professional in the event of adverse complications</p> <p>Be diligent in recording the management of the patient and achieving effective communication with Primary Care Physicians and other professionals involved</p> <p>To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively</p>				X		X		

Cardiology Assessment Blueprint

4.2 Elective module 3: Training in ABLATION OF SVT, TYPICAL ATRIAL FLUTTER AND NORMAL HEART VENTRICULAR TACHYCARDIA									
Objective - 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									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>Of endocardial activation patterns in AF, atrial flutter, atrial tachycardia, AV nodal reentrant tachycardia, AV reentrant tachycardia and VT.</p> <p>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</p> <p>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</p> <p>Of the use of pacing techniques to define critical sites for arrhythmia generation in patients with VT</p> <p>Of the principles underlying noncontact intracardiac mapping, complex activation and potential maps. An understanding of benefits and limitations of these systems</p> <p>Of the biophysics of RFA catheter ablation, and understanding of alternatives</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Manipulation and positioning of electrophysiological recording, pacing and ablation catheters safely and effectively.</p> <p>Ability to recognize activation patterns characteristic of specific arrhythmias in "real time"</p> <p>Ability to successfully ablate cardiac arrhythmias based on interpretation of endocardial signals and pacing techniques</p> <p>Perform entrainment, concealed entrainment and pace-mapping to identify sites critical for arrhythmia maintenance</p> <p>Demonstrate endpoints of successful ablation</p> <p>Safely deploy, set-up, interpret and use complex mapping systems</p> <p>Demonstrate ability to identify electrical wavefronts during reentrant arrhythmias and electrically silent areas in patients with VT or complex congenital heart disease</p> <p>Use of these systems to demonstrate lines of block after catheter ablation lesions</p> <p>To recognise and treat complications</p>		X	X					
A	<p>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.</p> <p>To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively</p> <p>To deliver a clear explanation of the risks and complications when consenting patients</p>				X		X		

Cardiology Assessment Blueprint

4.2 Elective module 4: Training in CATHETER ABLATION FOR AF/AT & NON-ISTHMUS DEPENDENT ATRIAL FLUTTER									
Objective - 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									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>Of risks associated with ablation of AF/AT/AFL, patient factors that may increase these and methods for reducing these risks.</p> <p>Of medico-legal issues concerning consent and provision of information</p> <p>Of the anatomy of the left and right atria and how this may be distorted by disease process</p> <p>Of all tools used for ablation of AF/AT/AFL including transseptal puncture equipment, ablation catheter, electrophysiology systems (basic and complex), lesion generator</p> <p>Sedative and analgesic drugs and their additive effects on patients</p> <p>Risks associated with central venous puncture at femoral, subclavian and jugular sites and introduction of electrode catheters to the right atrium and coronary sinus</p> <p>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</p> <p>Short, medium and long term complications of AF/AT/AFL management their investigation and treatment</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Good assessment of a patient with AF/AT/AFL appropriate investigations/ therapy to reduce intra-operative risk.</p> <p>Detailed working knowledge of cardiac and thoracic anatomy for AF/AT/AFL ablation</p> <p>Satisfactory consent of patients for ablation</p> <p>Able to safely and effectively sedate a patient for ablation of AF/AT/AFL and monitor throughout the procedure</p> <p>Able to perform femoral and subclavian puncture and intubate the right atrium and coronary sinus with electrode catheters in >80% of patients</p> <p>Able to intubate all four pulmonary veins and perform angiograms in >80% of patients</p> <p>Able to deliver energy in all relevant regions of the atria with minimum risk</p> <p>Able to monitor and investigate patients for possible complications arising from AF/AT/AFL ablation</p>		X	X					

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>Willing to assess, counsel and investigate patients as outpatients.</p> <p>Willing to set up and work equipment used for AF/AT/AFL ablation including EP systems and ablation generator</p> <p>Willing to consent patients for catheter ablation AF/AT/AFL ablation</p> <p>Willing to participate in safe catheter ablation practice and obtain help when needed</p> <p>Willing to undertake central venous puncture and electrode catheter placement and obtain help when needed</p> <p>Willing to intubate the pulmonary veins with electrode and angiographic catheters</p> <p>Willing to safely perform ablation within the left and right atria and obtain help when needed</p> <p>Willing to perform postoperative follow up and obtain help when needed</p> <p>To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively</p>				X		X		

Cardiology Assessment Blueprint

4.2 Elective module 5: Training in CATHETER ABLATION FOR VENTRICULAR TACHYCARDIA									
Objective - 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									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Of the indications and limitations of VT ablation Of medico-legal issues concerning consent and provision of information Recognition of the ECG features of normal heart VT Of mapping techniques used for both normal heart and scar related VT Of the principles of substrate mapping versus VT mapping Of the role and principles of operation of advanced mapping systems Of potential complications and risks of VT ablation Of techniques for induction and termination of VT	X	X			X			
S	Be able to select appropriate patients for VT ablation. Be able to consent a patient in a balanced and informed way about the success rate, risks and benefits of VT ablation Demonstrate catheter manipulation skills necessary to perform VT ablation Be competent at catheter ablation for narrow QRS tachycardia Understand principles of RF energy delivery and alternative energy sources Competence at use of an electronic EP recording system Competence at ICD troubleshooting and programming in patients with VT needing ablation		X	X					

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>Take a sensible and professional attitude to VT ablation, learn under supervision with appropriate requests for advice.</p> <p>Consent patients sensitively with an objective assessment of likelihood of benefit</p> <p>Be aware of the importance of an overall view of the patient and see the arrhythmia in its wider context</p> <p>To deal appropriately with patients in whom VT ablation has not been effective</p> <p>To deal sensitively with end of life decisions in very sick patients with VT</p> <p>To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively</p>				X		X		
4.2 Elective module 6: Training in trans-septal puncture and catheterisation									
Objective - 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									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>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.</p> <p>Of medico-legal issues concerning consent and provision of information</p> <p>Of the type of patients who will require access by TSP</p> <p>Of the equipment required for safe effective access to the left atrium by TSP</p> <p>Of the anticoagulation regime required to minimise the risks of EP interventions in the left atrium/ventricle</p> <p>Of potential complications, particularly the management of cardiac tamponade</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	Be able to select appropriate patients for safe conduct of a TSP.								
	Be able to consent a patient in a balanced and informed way about the risks and benefits of TSP								
	Be able to describe the setup and safe conduct of a TSP		X	X					
	Be able to prepare a patient for a TSP and undertake the procedure safely								
A	Be able to recognize immediately when complications are occurring and minimise harm by taking appropriate action								
	Take a sensible, professional attitude to TSP, learn under supervision with appropriate requests for advice.								
	Consent patients sensitively with an objective assessment of risks								
	Be aware of the importance of members of a multi-disciplinary catheter laboratory team in safe TSP								
	Remain calm and professional in the event of adverse complications of TSP								

Cardiology Assessment Blueprint

4.2 Elective module 7: Training in ADVANCED ASSESSMENT OF THE RISK OF LIFE-THREATENING ARRHYTHMIAS OR SUDDEN CARDIAC DEATH (SCD) BOTH INHERITED AND ACQUIRED									
Objective - 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									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>Of the benefits in ICD therapy in high risk patients after myocardial infarction</p> <p>Of medico-legal issues concerning consent and provision of information</p> <p>Of the benefits of ICD therapy in patients with heart failure</p> <p>Of the symptoms, physical signs, electrocardiographic and other evidence of inherited structural heart disease or primary electrical dysfunction of the heart that confers a high risk of lifethreatening arrhythmias or SCD</p> <p>Of the use of provocative testing to assess risk e.g. drug infusion and programmed ventricular stimulation in the Brugada syndrome</p>	X	X			X			
S	<p>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.</p> <p>To determine which patients are at low risk, in whom treatment might be more harmful than helpful</p>		X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>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.</p> <p>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</p> <p>To appreciate that an accurate diagnosis (e.g. Long QT) and effective treatment has a huge impact on patients' lives</p> <p>To appreciate the psychological impact of the patients' illness on the patient and their family and manage it sensitively</p>				X		X		

Cardiology Assessment Blueprint

4.2 Elective module 8: Training in MANAGEMENT OF CARDIAC ARRHYTHMIAS IN PATIENTS WITH ADULT CONGENITAL HEART DISEASES (ACHD)									
Objective - 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									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>Of techniques available to palliate symptoms and improve prognosis in ACHD patients</p> <p>Of all the complex anatomical variations occurring in and of the cellular level actions of antiarrhythmic drugs that may be employed</p> <p>Of the related surgical procedures used for the management of ACHD</p> <p>Of cross sectional imaging techniques that may assist interventions</p> <p>Of diagnostic catheter based techniques used in the assessment of ACHD patients</p> <p>Of appropriate catheter-based ablation interventions, and the complex technologies used in these procedures</p> <p>Of therapeutic innovations and technology advances that will facilitate improved patient care</p> <p>Of the evidence base which mandates the various treatment strategies that may be employed</p> <p>Of potential complications</p> <p>Of appropriate endpoints that indicate successful medical therapy/device/ablation interventions</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>To be able to select appropriate patients for drug or device or ablation management.</p> <p>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</p> <p>To be able to determine which patients will benefit from intervention or drug prescription</p> <p>To be able to perform complex cardiac catheterization in the haemodynamic evaluation of ACHD patients</p> <p>To be able to proceed with all types of device implants in the full range of complex intracardiac anatomies</p> <p>To be able to undertake the complex range of ablation therapies using multiple access routes and complex catheter manipulations</p> <p>To appreciate the interactions and adjunctive nature of various therapeutic strategies, including indications for surgery</p> <p>To be able to provide all necessary clinical advice to facilitate arrhythmia interventions at the time of surgery</p> <p>To be able to programme any implanted devices appropriately, and to advise on optimization using recognized techniques such as echo after an intervention</p>		X	X					

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>Take a sensible, professional attitude to arrhythmias occurring in ACHD; learn under supervision with appropriate requests for advice.</p> <p>Consent patients sensitively with an objective assessment of likelihood of benefit</p> <p>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</p> <p>To deal appropriately with patients in whom arrhythmias cannot be effectively managed</p> <p>To appreciate the psychological impact of the patient's illness on the patient and their family, and manage it sensitively</p> <p>To appreciate the psychological impact of an awareness of sudden cardiac death risk and manage it sensitively</p>				X		X		
4.3 Heart Failure (Advanced)									
Objective - To be able to function as a specialist in the diagnosis of heart failure. To be able to undertake specialist investigation of the underlying cause/causes of heart failure									
K	<p>Describe the clinical presentation, causes and natural history of heart failure.</p> <p>Define a comprehensive knowledge of national (NICE and SIGN) and international guidelines</p> <p>Be able to identify all possible underlying causes of heart failure</p>	X	X		X				

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Be able to perform a relevant history and examination and refer the patient for an appropriate diagnostic test to define the nature of their cardiac dysfunction.</p> <p>Perform and interpret transthoracic echocardiograms</p> <p>Be able to interpret radionuclide ventriculograms</p> <p>Perform and analyse angiographic ventriculography</p> <p>Selection and interpretation of appropriate investigations to establish an aetiology.</p> <p>Interpretation of the 12 lead ECG</p> <p>The ability to interpret echocardiograms</p> <p>Interpretation of exercise tests</p> <p>Interpretation of stress nuclear tests</p> <p>Interpretation of CMR scans</p> <p>Ability to perform and report coronary angiograms</p> <p>Be able to perform right heart catheterisation</p> <p>Interpretation of 24 hour Holter monitors</p>		X	X		X			
A	<p>Recognise the pivotal role of an accurate diagnosis in planning future investigation and therapy</p> <p>Recognise the importance of establishing an underlying cause with the least invasive test necessary at each stage</p> <p>Be able to use the tests costeffectively</p>				X		X		

Cardiology Assessment Blueprint

Objective - 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 device treatment of heart failure									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>Outline a comprehensive knowledge of the management and prevention of coronary heart disease, hypertension, valve disease, adult congenital heart disease (ACHD) and pericardial disease</p> <p>Describe in detail the current treatment guidelines (NICE/SIGN, ESC and ACC/AHA)</p> <p>Identify evidence-based pharmacotherapy for heart failure including efficacy, effects on morbidity and mortality, side-effects and contraindications</p> <p>Appropriate selection of patients for both cardiac resynchronization and defibrillator therapy based on evidence-based medicine and knowledge of international and local guidelines</p>	X	X		X				

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Selection of patients for revascularisation based on accurate interpretation of invasive and non invasive testing.</p> <p>Detection of patients requiring valve surgery or other corrective procedures</p> <p>Discuss the complicated therapy regimes with the patient</p> <p>Outline the plan for therapy</p> <p>Ability to understand the issues relevant to patients with a chronic disease</p> <p>Be able to manage complex in-patients with acute/decompensated heart failure and those in cardiogenic shock</p> <p>Be able to investigate and manage important co-morbidities (renal dysfunction and anaemia)</p> <p>Interpretation of complex echocardiography to define the presence of dysynchrony</p> <p>Interpretation of 24 hour Holter monitoring and other arrhythmia screening tools</p> <p>Some may wish to perform the implantation of devices according to local needs (see EP curriculum)</p>		X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>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.</p> <p>Interaction with the multidisciplinary team to deliver the therapy, uptitrate drugs and monitor for side effects</p> <p>In particular close communication with specialist heart failure nurses, pharmacists, general medicine, care of the elderly (COTE) and primary care physicians</p> <p>Ability to communicate and liaise with other health care professionals, in particular electrophysiologists</p>				X		X		
Objective - 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									
K	<p>Be able to define adverse prognostic markers in heart failure.</p> <p>Be conversant with 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</p> <p>A knowledge of pulmonary hypertension and its treatment</p> <p>Be able to define a multidisciplinary service/network and be aware of the evidence base underpinning their pivotal role in heart failure management</p> <p>Familiarity with international, national and local guidelines for heart failure management</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Interpretation of metabolic exercise testing</p> <p>Performance of the heart failure survival score</p> <p>Interpretation of nuclear scans</p> <p>Performance and accurate analysis of right heart haemodynamic measurements and knowledge of their significance</p> <p>Ability to attempt reversal of pulmonary hypertension</p> <p>Be able to set up and function as part of a multidisciplinary team</p> <p>Be able to set up and run a heart failure clinic</p> <p>Be able to write and amend guidelines for local heart failure management</p> <p>Be able to construct business cases for service developments in heart failure</p> <p>Be able to function as a clinical lead for heart failure within the local consultant cardiology body</p> <p>Be able to set up, organize and run continuing educational development programmes in heart failure for the local team</p>		X			X			
A	<p>Identify patients who need to be considered for the above therapies because of an adverse prognosis.</p> <p>Have effective communication and referral strategies to regional centres</p> <p>Communicate to patients the risks involved with these therapies</p> <p>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</p>				X		X		

Cardiology Assessment Blueprint

4.4 Clinical care of PCI patients									
Objective - Understand indications for objective tests for ischaemia. Ability to explain results of tests, particularly angiogram, with patient and relatives. Understand principles of risk assessment and clinical features of high risk. 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									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>Sound understanding of indications for, limitations of and relative benefits of exercise ECG, stress echo, myoview scans and MRI</p> <p>Sound knowledge and understanding of indications for PCI, outcomes versus medical therapy and CABG, prognostic benefit in acute coronary syndromes</p> <p>Sound knowledge and understanding of BCIS audit data for national PCI as well as local centre database</p> <p>Sound understanding about common complications and how to avoid them including renal impairment</p> <p>Understanding of pathophysiology of atherosclerosis, angina, myocardial ischaemia and infarction, acute coronary syndromes and the evidence base for their management</p>	X	X			X			
S	<p>To be able to apply theoretical evidence base to individual patient case</p> <p>To be able to choose appropriate patients for PCI</p> <p>To be able to consent a patient in an informed and informative manner including presentation of options, success and complication rates</p> <p>To be able to apply risk stratification and to deploy methods to minimize and/or avoid risk</p>		X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>To present a professional and caring attitude to PCI patients before, during and after the procedure</p> <p>A sensitive approach to consent</p> <p>A caring approach to the high risk patient and patients with important complications</p>				X		X		
4.4 Basic PCI									
<p>Objective - 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 bivalirubin. To be proficient in the application of an IABP</p>									
K	<p>Sound understanding of assessment of lesion severity using angiography, pressure wire and intravascular ultrasound</p> <p>Understanding of PCI equipment including guide catheters, guide wires, balloons, stents</p> <p>To understand and experience other PCI equipment including distal protection, thrombectomy devices</p> <p>Sound knowledge of indications for drug-eluting stents</p> <p>Sound knowledge of evidence base for clopidogrel, glycoprotein IIb/IIIa inhibitors, bivalirudin</p> <p>Sound knowledge of the benefit of and evidence for intra-aortic balloon pump</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Be able to assess lesion severity</p> <p>Be able to choose appropriate equipment for straight forward PCI and develop a strategy for the procedure itself</p> <p>Be able to develop adjuvant therapy appropriately and in a manner that is justified by the current evidence base</p> <p>Be able to insert and maintain an intraaortic balloon pump</p> <p>Be able to detect complications and adjust pre procedure strategy accordingly</p> <p>To be able to perform radial as well as femoral angiography and straightforward PCI</p>		X	X					
A	<p>Assume a professional attitude to learning basic PCI techniques and demonstrate an ability to acquire knowledge both in an apprenticeship and independent manner.</p> <p>To treat each patient as an individual and tailor each intervention to the particular case</p> <p>To foster good relationships with the multidisciplinary team</p> <p>To maintain calm demeanour when a PCI goes badly or adverse events Occur</p>				X		X		

Cardiology Assessment Blueprint

Advanced PCI									
<p>Objective - 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</p>									
Curriculum Area	Competences	Exam	Mini- CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>To have in depth knowledge of the evidence base as it defines risk: benefit in relation to more complex lesion and patient subsets</p> <p>To maintain contemporary knowledge of devices and equipment that are available for high risk lesions and/or patients</p> <p>To maintain contemporary knowledge of techniques that can be applied to complex lesion or patient subsets</p> <p>To understand the pros and cons of PCI versus CABG therapy in complex lesion and patient subsets</p>	X	X			X			
S	<p>To be able to appropriately select patients with complex lesions.</p> <p>To be able to identify and define complex lesion subsets with accuracy and precision</p> <p>To be able to 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</p> <p>To be able to 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</p> <p>To be able to plan a “staged” strategy</p>		X	X					

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>To maintain a responsible attitude to the selection and application of PCI in complex lesion and patient subgroups</p> <p>To maintain high quality care as to motivation behind complex PCI</p> <p>To be prepared to be involved in properly planned and executed multicentre research to assess the benefit of such intervention</p> <p>To involve other members of the multidisciplinary team in the strategy for complex PCI</p> <p>To maintain calm demeanour during complex cases</p>				X		X		
optional interventions									
Objective - 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									
K	<p>Acquire clear and in depth understanding of a specialized technique under the immediate supervision of a high volume and skilled operator</p> <p>To understand the indications for specialised interventional techniques</p>	X	X			X			
S	<p>To be able to acquire these specialist skills with direct supervision until competent as a solo and independent operator</p>			X					
A	<p>To deploy these specialized techniques only in appropriate circumstances</p> <p>To be ready to take over patients referred by colleagues in order to utilise these specialist skills</p>				X		X		

Cardiology Assessment Blueprint

4.5 a Advanced transthoracic echocardiography									
Objective - To be able to carry out complex transthoracic studies									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Advanced instrument settings The role of intravascular contrast agents for opacification of the left ventricular cavity and assessment of wall motion Types, normal function and abnormalities of prosthetic heart valves The effect of valve disease on left ventricular function Normal venous flow patterns Quantitative Doppler techniques including PISA , resistance, regurgitant fractions The principles of 3D techniques The principles of Doppler tissue imaging including strain rate imaging Advanced calculation of LV mass and volume including abnormal geometry with normal mass The prognostic importance of LV geometry	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	To optimise instrument settings Identify pericardial constriction and differentiate it from restrictive cardiomyopathy To differentiate moderate and severe valve disease in the presence of left ventricular dysfunction To detect prosthetic valve obstruction and early dysfunction in biological replacement valves To assess cardiac shunts To detect complex congenital heart disease To detect minor wall motion abnormalities To determine abnormalities of left ventricular geometry To determine suitability for balloon mitral valvotomy and mitral valve repair To determine suitability for cardiac resynchronisation and optimise A-V and VV settings in DDD and biventricular pacemakers To determine suitability for LV reconstructive surgery To detect arrhythmogenic RV dysplasia To detect infiltrative cardiomyopathies		X	X		X			
A	Demonstrate the ability to collaborate with specialists in other imaging modalities Demonstrate the ability to think reflectively Demonstrate the ability to judge a test result in the clinical context Demonstrate the ability to train and educate in echocardiography				X		X		

Cardiology Assessment Blueprint

4.5 a Transoesophageal echocardiography									
Objective - To perform and interpret transoesophageal studies (TOE)									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Indications and contraindications for TOE. Limitations of TOE including Blind-spots Principle of disinfection Principles of assessment of anaesthetic risk Other techniques including cCT and CMR and comparisons with transthoracic echo Cardiac anatomy from TOE windows The effects of anaesthesia and cardiopulmonary bypass on the heart	X	X			X			
S	To assess anaesthetic risk and plan the procedure appropriately. To intubate safely in unsedated, sedated and anaesthetised patients To monitor the patient throughout the procedure To clean and store the probe Be able to assess valve disease including post-repair To determine suitability for mitral valve repair To detect and assess aortic dissection To detect and quantify a patent foramen ovale To detect ASDs including sinus venosus defects To detect intracardiac thrombus To assess wall motion abnormalities To recognise an underfilled heart		X	X					

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>Explain the procedure to the patient and maintain trust.</p> <p>To explain the results adequately</p> <p>Demonstrate the ability to work with sonographers, cardiac surgeons, anaesthetists and interventional cardiologists</p> <p>Demonstrate the ability to integrate the results of TOE with the clinical context to produce recommendations</p> <p>Demonstrate the ability to collaborate with specialists in other imaging modalities</p> <p>Demonstrate the ability to think reflectively</p> <p>Demonstrate the ability to audit results</p>				X		X		

Cardiology Assessment Blueprint

Objective - To perform stress echocardiography									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	<p>The principles, indications and clinical role of stress echo</p> <p>The pathophysiology and biochemical and mechanical changes associated with hibernation, infarction and ischaemia</p> <p>Different stressors including dobutamine, exercise, pacing, atropine, adenosine and dipyridamole</p> <p>The physical properties and side-effects of intravascular contrast agents for opacification of the LV cavity and myocardial perfusion</p> <p>The effects of flow on the left ventricle, the heart valves and the right heart in patients with valve disease</p> <p>The methods of reporting a stress echocardiogram including wall motion analysis, contrast assessment and long axis function</p> <p>The evidence for stress echocardiography in the detection of coronary disease, coronary risk stratification, and the detection of viable myocardium</p> <p>The use of stress echocardiography in valve disease</p> <p>The cost-effectiveness of stress echocardiography</p> <p>The comparison of echocardiography with other techniques</p> <p>The principles of myocardial contrast</p>	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	To prepare and administer pharmacological stressors safely To prepare and administer contrast agents safely To be capable of managing complications including allergic reactions and arrhythmias and to be able to resuscitate in the event of cardiac arrest To set up an echocardiography machine appropriately for stress echocardiography To record echocardiograms during a stress study To recognise subtle abnormalities of wall-motion and differentiate wall thickening and wall motion To analyse a stress study using split screen analysis To perform stress studies in patients with valve disease		X	X					

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
A	<p>To explain the procedure to a patient and maintain trust.</p> <p>To explain the results appropriately</p> <p>Demonstrate the ability to work with sonographers, cardiac surgeons and interventional cardiologists</p> <p>Demonstrate the ability to collaborate with specialists in other imaging modalities</p> <p>Demonstrate the ability to integrate the stress study with the clinical context to produce recommendations</p> <p>Demonstrate the ability to think reflectively</p> <p>Demonstrate the ability to audit results</p> <p>Demonstrate the ability to compare different techniques including cardiac magnetic resonance and nuclear perfusion imaging</p> <p>To integrate results from a variety of techniques including coronary angiography to produce an appropriate synthesis</p>				X		X		

Cardiology Assessment Blueprint

4.5 a Nuclear									
Objective - (1) Learning objective: The trainee will be able to stress patients safely and effectively using dynamic exercise and pharmacological stress (2) Learning objective: The trainee will be able to work with nuclear cardiology radiopharmaceuticals safely									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Outline the physics of X-ray and gamma emission from radionuclides Outline the interactions of Xray / gamma photons with matter Outline the method of generation of thallium-201 and technetium-99m Describe the preparation of technetium-99m-based perfusion tracers Describe the physiological properties of available myocardial perfusion tracers Describe the tracer protocols used in perfusion scintigraphy, and the advantages and disadvantages of each Outline the properties of less commonly used radiopharmaceuticals such as MIBG and PET tracers	X	X			X			
S	Draw up and calibrate appropriate doses of radiopharmaceutical Administer radiopharmaceuticals for stress and rest MPS and for blood-pool labelling		X			X			
A	Understands the regulatory framework which governs nuclear cardiology Reacts appropriately to adverse incidents such as spillages	X			X		X		

Cardiology Assessment Blueprint

Objective - (3) To be able to acquire and process nuclear cardiology studies (4) To be able to report nuclear cardiology studies (5) To be able to advise cardiologists and other specialists on the appropriate use of nuclear cardiology techniques in different clinical situations									
Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
K	Outline the basic construction, operation, and QC of a gamma camera Describe the principles of SPECT acquisition, ungated and gated Describe the principles of SPECT processing, ungated and gated Outline the principles of attenuation correction Obtain a high quality ERNV study Define the myocardial territories of the coronary arteries and their main branches Describe our current understanding of hibernating myocardium Compare MPS with other investigations used in patients with coronary disease Outline the evidence for the clinical effectiveness and cost effectiveness of MPS	X	X			X			

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	Prepare and position patients for a comfortable SPECT acquisition Select an acquisition protocol suitable for the tracer, dose, and patient Obtain a high quality ungated and gated SPECT acquisition Reconstruct and reorient ungated and gated SPECT acquisitions Process an ERNV study Use a range of image display formats, including quantitative analysis Recognise common artefacts on MPS Recognise reversible and fixed perfusion defects on MPS Assess regional and global LV systolic function from gated SPECT acquisitions Identify hibernating myocardium Write structured, clinically integrated MPS reports Report ERNV studies		X	X		X			
A	Recognise problems in ungated and gated SPECT raw data Know when to repeat suboptimal image acquisitions Recognise high risk MPS studies and react accordingly Liaises with cardiologists and other specialists both before and after the nuclear cardiology investigation				X		X		

Cardiology Assessment Blueprint

Objective - To equip the trainee to independently support all general aspects of a CMR service								
K	<p>The imaging and functional characteristics of different congenital and acquired cardiac abnormalities.</p> <p>Indications for, and contra-indications to, the application of CMR</p> <p>MR physics and a basic understanding of the various MR sequences</p> <p>Comprehension of the various CMR sequences; their strengths, weaknesses and application and optimisation</p> <p>Comprehension of various CMR protocols for different clinical application/disease entities</p> <p>Understanding of CMR artefacts; their influence on interpretation and minimisation</p> <p>Detailed knowledge of the different image processing tools both for analysis of functional data and for reformatting structural data</p> <p>Practical knowledge of image formats; their characteristics and limitations, and the ability to interchange data between them</p> <p>Risks and complications of CMR</p> <p>Safety in the CMR scanner suite</p> <p>Relationship of CMR with other imaging modalities for complex physiological measurements and interventions</p> <p>The use of phantom models to assess CMR and measurement under controlled conditions</p>	X	X			X		

Cardiology Assessment Blueprint

Curriculum Area	Competences	Exam	Mini-CEX	DOPS	MSF	CbD	PS	ALS	IRMER
S	<p>Set up and organise a CMR service</p> <p>Develop CMR study protocols for particular conditions and adapt them to specific patients</p> <p>Optimise and acquire CMR sequences which provide the best image/functional information</p> <p>Perform post-processing on CMR data for image presentation and quantification of physiological data</p> <p>Interpret and report CMR structural and functional data</p> <p>Provide training to radiographers and other clinical staff such as cardiology radiology trainees</p> <p>Explain the physiology and pharmacology of pharmacological stress, including dobutamine, adenosine and dipyridamole</p> <p>Define the indications and protocols for each form of stress, and recognise complications and manage appropriately</p> <p>Describe current ALS guidelines</p>		X	X		X			
A	<p>Appreciate the importance of good communication skills with other members of the clinical team as well as patients.</p> <p>Appreciate 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</p> <p>Appreciate the importance of understanding individual limitation and need for expert/outside advice</p> <p>Appreciate the rapidly changing nature of CMR and by keeping abreast of these changes optimising the service provided</p>				X		X		