



ROYAL COLLEGE OF  
PHYSICIANS OF IRELAND

# HIGHER SPECIALIST TRAINING IN CARDIOLOGY



This curriculum of training in Cardiology was developed in 2010 and undergoes an annual review by Dr. Jim Crowley and Dr. Brendan McAdam, National Specialty Directors, Dr. Ann O'Shaughnessy, Head of Education and Professional Development and by the Cardiology Specialty Training Committee. The curriculum was approved by the Irish Committee on Higher Medical Training.

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## Introduction

Cardiology is a clinical speciality dealing with diseases of the heart and circulatory system.

Pathological processes in the vascular tree can arise as a consequence of dysfunction in other systems; therefore, the pathological processes involved and the physical impact of these conditions together with their psychosocial effects require to be understood. Developments in Cardiology have led to circumstances where many cardiologists may wish to engage in a particular aspect of the subject as a sub-speciality, such as cardiac ultrasound, electrophysiology, adult congenital heart disease, or preventive cardiology, therefore, it is important that an interest in such topics is facilitated during training.

Besides these specialty specific elements, trainees in Cardiology must also acquire certain core competencies which are essential for good medical practice. These comprise the generic components of the curriculum.

## Aims

Upon satisfactory completion of specialist training in Cardiology, the doctor will be **competent** to undertake comprehensive medical practice in that specialty in a **professional** manner, unsupervised and independently and/or within a team, in keeping with the needs of the healthcare system.

**Competencies**, at a level consistent with practice in the specialty of Cardiology, will include the following:

- Patient care that is appropriate, effective and compassionate dealing with health problems and health promotion.
- Medical knowledge in the basic biomedical, behavioural and clinical sciences, medical ethics and medical jurisprudence and application of such knowledge in patient care.
- Interpersonal and communication skills that ensure effective information exchange with individual patients and their families and teamwork with other health professionals, the scientific community and the public.
- Appraisal and utilisation of new scientific knowledge to update and continuously improve clinical practice.
- The ability to function as a supervisor, trainer and teacher in relation to colleagues, medical students and other health professionals.
- Capability to be a scholar, contributing to development and research in the field of Cardiology.
- Professionalism.
- Knowledge of public health and health policy issues: awareness and responsiveness in the larger context of the health care system, including e.g. the organisation of health care, partnership with health care providers and managers, the practice of cost-effective health care, health economics and resource allocations.
- Ability to understand health care and identify and carry out system-based improvement of care.

**Professionalism** describes the knowledge, skills, attitudes and behaviours expected by patients and society from individuals during the practice of their profession (*as a doctor*). It includes such concepts as:

- The skills of lifelong learning and the maintenance of competence
- Information literacy
- Ethical behaviour
- Integrity, honesty
- Altruism
- Service to, justice and respect for others
- Adherence to professional codes

## Entry Requirements

Applicants for Higher Specialist Training (HST) in Cardiology must have completed a **minimum** of two years Basic Specialist Training (BST) in approved posts and obtained the MRCPI or (UK).

For MRCPI or UK holders, BST\* should consist of a minimum of 24 months involved with direct patient care.

### **BST in General Internal Medicine (GIM) is defined as follows:**

- A minimum of 24 months in approved posts, with direct involvement in patient care and offering a wide range of experience in a variety of specialties.
- At least 12 of these 18 months must be spent on a service or services in which the emergencies are “unselected”.
- (“unselective take” describes the admission of acute medical patients whose problems encompass the broad generality of medicine i.e. not restricted to a single or small group of specialties. If any major component of acute medicine e.g. cerebrovascular accidents, myocardial infarctions is excluded from the take, this experience must be gained from other posts).
- For further information please review the GPT curriculum

Those who do not hold an MRCP or equivalent qualification must provide evidence of appropriate knowledge, training and experience similar to the above, particularly with regard to dealing with acute (medical) conditions.

## Duration & Organisation of Training

The six years of HST in Cardiology is intended to produce fully trained Cardiologists who will **follow one of two paths (Path 1 or Path 2). The decision as to which path to follow will be made after 4 years of Basic Cardiology, which all trainees will complete.**

The training period shall be so arranged that during basic training (*i.e. first four years*), trainees will be provided with the opportunity to gain experience in the minimum number of procedures as required:

**Path 1** will lead to certification in Cardiology (CSCST) with acknowledgement of additional training having been undertaken in a subspecialty of Cardiology which will be identified on the certificate issued.

**Path 2** will lead to Dual accreditation in Cardiology and General Internal Medicine, utilising the time allocated to subspecialty training during **Path 1** (*above*), to obtain the additional training needed for completion of the GIM curricular requirements

The importance to the practising Cardiologist of an adequate training in General Medicine is acknowledged by the inclusion in the General Cardiology Curriculum of a mandatory year of GIM. It must also be recognised that Specialist Cardiologists, to a greater extent than most other Medical Specialists, need to develop certain additional highly technical skills and competencies. Their capacity to acquire such skills cannot be ascertained prior to entry into HST. As a result, trainees are not asked to decide from the outset which of the two training paths they will eventually follow

**All trainees are enrolled initially in General (Internal) Medicine as well as in Cardiology.**

Then, based on the results of assessments of progress made annually, and particularly on an assessment made during the latter part of basic training a decision is made prior to the commencement of a fifth year of training, enabling the General Internal Medicine CSCST option to be dropped. The 4<sup>th</sup> year assessment will be conducted as a further interview, with detailed reports from trainers during the first 3 years, assessing the trainee’s suitability for Paths 1 or 2. The trainees own wishes in this regard will be considered. Following the interview a recommendation will be made by the Training Board to the trainee regarding further training.

**Any objection by the trainee to the recommendation made would be considered within the terms of the College's Appeals Process.**

Certification in Radiation Protection, Advanced Cardiac Life Support (ACLS) and the undertaking of courses in statistics and management shall take place during this period of training.

Attendance at clinics related to Grown Up Congenital Heart Disease and Heart Disease in Pregnancy is required.

During the final two years of sub-specialty training in Cardiology a minimum exposure to procedures relating to the sub-speciality in question is required.

Those proceeding to certification in Cardiology/General (Internal) Medicine will spend one further year of high intensity General (Internal) Medicine with a further year of advanced general Cardiology. Involvement in research is strongly recommended. It may be necessary to take additional years during which the trainee may complete a course of study leading to a further qualification (MD, PhD).

"Generic" knowledge, skills and attitudes support competencies which are common to good medical practice in all the Medical and related specialties. It is intended that all Specialist Registrars should re-affirm those competencies during Higher Specialist Training. No time-scale of acquisition is offered, but failure to make progress towards meeting these important objectives **at an early stage** would cause concern about a SpR's suitability and ability to become independently capable as a specialist.

## **Flexible Training**

Trainees who are unable to work full-time are entitled to opt for flexible training programmes. EC Directive 93/16/EEC requires that:

*Part-time training shall meet the same requirements as full-time training, from which it will differ only in the possibility of limited participation in medical activities to a period of at least half of that provided for full-time trainees;*

*The competent authorities shall ensure that the total duration and quality of part-time training of specialists are not less than that of full-time trainees.*

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

For details of appointment and funding arrangements for flexible trainees, please see the current issue of the HST training Handbook.

## **Training Programme**

The training programme offered will provide opportunities to fulfil all the requirements of the curriculum of training for Cardiology programmes will offer posts in both general hospitals and teaching hospitals. Each post within the programme will have a named trainer/educational supervisor and programmes will be under the direction of the National Specialty Director for Cardiology or, in the case of GIM, the Regional Specialty Advisor. Programmes will be as flexible as possible consistent with curricular requirements, for example to allow the trainee to develop a sub-specialty interest.

The experience gained through rotation around different departments is recognised as an essential part of HST. A Specialist Registrar may **not** remain in the same unit for longer than 2 years of clinical training; or with the same trainer for more than 1 year.

Where an essential element of the curriculum is missing from a programme, access to it should be arranged, by day release for example, or if necessary by secondment.

## Teaching, Research & Audit

All trainees are required to participate in teaching. They should also receive basic training in research methods, including statistics, so as to be capable of critically evaluating published work.

A period of supervised research relevant to Cardiology is considered highly desirable and will contribute up to 12 months towards the completion of training. Some trainees may wish to spend two or three years in research leading to a MSc, MD, or PhD, by stepping aside from the programme for a time. Additional educational credit may be granted at the discretion of the NSD and STC for clinical work relevant to the Curriculum undertaken during the second and subsequent years of this research, up to a maximum of six months credit. For those intending to pursue an academic path, an extended period of research may be necessary in order to explore a topic fully or to take up an opportunity of developing the basis of a future career. Such extended research may continue after the CSCST is gained. However, those who wish to engage in clinical medical practice must be aware of the need to maintain their clinical skills during any prolonged period concentrated on a research topic, if the need to re-skill is to be avoided.

Trainees are required to engage in audit during training and to provide evidence of having completed the process.

“Generic” knowledge, skills and attitudes support competencies which are common to good medical practice in all the medical and related specialties. It is intended that all Specialist Registrars should confirm these competencies during Higher Medical (*Specialist*) Training.

## Logbook

Up-to-date training records and a portfolio of achievements will be maintained by the trainee throughout HST. The training records will be countersigned as appropriate by the trainers to confirm the satisfactory fulfilment of the required training experience and the acquisition of the competencies set out in the Cardiology Curriculum. They will remain the property of the trainee and must be produced at the annual assessment review.

Each trainee is responsible for maintaining an up-to-date record of progress through training and compiling a portfolio of achievements for presentation at annual assessment review. The trainee also has a duty to maximise opportunities to learn, supplementing the training offered with additional self-directed learning in order to fulfil all the educational goals of the curriculum. Trainees must co-operate with other stakeholders in the training process. It is in a SpR's own interest to maintain contact with the Medical Training Office and Dean of Higher Specialist Training, and to respond promptly to all correspondence relating to training. “Failure to co-operate” will be regarded as, in effect, withdrawal from the HST's supervision of training (*see the HST Training Handbook*).

At annual review, the Training Record will be examined. The results of any assessments and reports by educational supervisors, filed in the portfolio submitted, together with other material capable of confirming the trainee's achievements, will be reviewed.

The methods used to assess progress through training must be valid and reliable. The Cardiology Curriculum has been re-written, describing the levels of competence which can be recognised. The assessment grade will be awarded on the basis of direct observation in the workplace by consultant supervisors. Time should be set aside for appraisal following the assessment e.g. of clinical presentations, case management, observation of procedures. As progress is being made, the lower levels of competence will be replaced progressively by those that are higher. Where the grade for an item is judged to be deficient for the stage of training, the assessment should be supported by a detailed note which can later be referred

to at annual review. The assessment of training may utilise the Mini-CEx, DOPS and Case Based Discussions (CBD) methods adapted for the purpose. These methods of assessment have been made available by HST for use at the discretion of the NSD and nominated trainer. They are offered as a means of providing the trainee with attested evidence of achievement in certain areas of the Curriculum *e.g. competence in procedural skills, or in generic components*. Assessment will also be supported by the trainee's portfolio of achievements and performance at relevant meetings, presentations, audit, in tests of knowledge, attendance at courses and educational events.

## Assessment Process

### Annual Review – The PeTRA Process

An annual review of progress through training will be undertaken on behalf of HST. The training record will be examined at the review. Assessments and reports by educational supervisors, confirmation of achievements and the contents of the portfolio will be reviewed. A decision is made regarding progress, as detailed in the Training Handbook. At some or all of these annual reviews a non-specialty assessor will be present capable of addressing core competencies. An external assessor will participate in the penultimate year review (PYA) which is held to a standard format usually 12-18 months before the planned end of training. The award of a CSCST will be determined by a satisfactory outcome after completion of the entire series of PeTRA assessments.

Each year trainees undergo a formal review by a panel including the Dean, the National Specialty Director, and whenever possible, a representative member from another specialty. The panel will review in detail the training record, will explore with the trainee the range of experience and depth of understanding which has been achieved and consider individual trainer's reports. Attendance by the trainer is highly desirable and essential for the first year and PYA assessments. An opportunity is also given to the trainee to comment on the training being provided; identifying in confidence any deficiencies in relation to a particular post.

A decision on progress through training is reached at each of these annual assessments. The determination and the evidence considered is entered on one of a set of standard PeTRA Forms as follows:

- successful completion of a year of training – **PeTRA Form C**
- completion but with a need for additional targeted training – **PeTRA Form C<sub>1</sub>**
- repeat training year – **PeTRA Form C<sub>2</sub>**

The penultimate year assessment (*the PYA*) reviews the evidence provided in the logbook on the results of the assessment methods employed (*see above*); the evidence provided will be further questioned during the assessment. At the PYA, the panel identifies the residual training outstanding, advising adjustments to the training schedule as necessary, and finally confirming the estimated date for completion (**PeTRA Form T and CSCST issuance**).

## **Facilities**

A consultant trainer/educational supervisor has been identified for each approved post. He/she will be responsible for ensuring that the educational potential of the post is translated into effective training which is being fully utilized. The training objectives to be secured should be agreed between trainee and trainer at the commencement of each posting in the form of a written training plan. The trainer will be available throughout, as necessary, to supervise the training process.

All training locations approved for HST have been inspected by the medical training department. Each must provide an intellectual environment and a range of clinical and practical facilities sufficient to enable the knowledge, skills, clinical judgement and attitudes essential to the practice of Cardiology to be acquired.

Physical facilities include the provision of sufficient space and opportunities for practical and theoretical study; access to professional literature and information technologies so that self-learning is encouraged and data and current information can be obtained to improve patient management.

Trainees in Cardiology should have access to an educational programme of e.g. lectures, demonstrations, literature reviews, multidisciplinary case conferences, seminars, study days etc, capable of covering the theoretical and scientific background to the specialty. Trainees should be notified in advance of dates so that they can arrange for their release. For each post, at inspection, the availability of an additional limited amount of study leave for any legitimate educational purpose has been confirmed. Applications, supported if necessary by a statement from the consultant trainer, will be processed by the relevant employer.

**Teaching, Learning & Assessment  
Methods**

## Teaching, Learning & Assessment Methods

*This section relates to the clinical competencies that are required for your training. During your training you will be assessed by methods such as miniCEX, DOPS and Case Based Discussion. It is extremely important that you read this so that you are aware of the requirements of your training.*

### Record of Training

The evidence required to confirm progress through training includes:

- Details of the post(s) occupied, the training plan agreed with weekly timetables and duty rosters; case-mixes and volumes, numbers of practical procedures and outcomes.
- Confirmation of attendance at events in the educational programme, at departmental and inter-departmental meetings and other (optional) educational events.
- Confirmation (certificates) of attendance at subject-based/skills-training/instructional courses; (certificate or diploma from appropriate authority).
- Recorded attendance at conferences and meetings.
- A properly completed logbook with entries capable of testifying to the training objectives which have been attained and the standard of performance achieved.
- Evidence of regular contact with trainers, i.e. appraisals; confirmation of workplace/clinical encounters significant in relation to activities specified in the curriculum.
- Evidence of personal study, e.g. journals taken, membership of specialist society, web-based research, special interest developed.
- CPD/CME activity, returns, study leave records.
- Copies/examples of material prepared for presentation e.g. for audit, teaching, best-practice development, collection of cases, topic reviews, output from research.
- Educational supervisor's reports on **observed** performance (in the workplace): of duties, practical procedures, of presentations made and teaching activity: of advising and working with others, of standards of case notes, correspondence, communication with others e.g. at handover. Results of Mini-CEX, CBDs and DOPS encounters.
- Collective opinions – as used to ascertain a range of generic skills e.g. professionalism, maintaining trust.
- Result (diploma, certificate from recognised body) of completed knowledge-based test and/or practical examination.

### Assessment of Competencies

The competencies to be acquired during training are listed within the Generic and Specialty Sections of this Curriculum.

The competencies will be assessed on a regular basis during your training programme and must be documented in the Training Record (*Logbook*). Progress through training is confirmed by entries which must be authenticated/ countersigned by the educational supervisors.

Documents which provide evidence of satisfactory completion of other necessary components of the curriculum must be filed in the portfolio of achievements compiled by the trainee and reviewed annually.

A report from the educational supervisor will be included. This will be prepared following appraisal, based on his/her assessment of observed performances by the trainee of practical procedures and other duties. The standard of case notes, summaries, correspondence and other material, of presentational ability can also be the subjects of such report, as could the trainee's enthusiasm, judgement, team working or professionalism.

The trainer's report will also be based on a structured pro-forma, as used in the short form of clinical evaluation exercise (*Mini-CEx*); following observation and appraisal of the performance of a procedure (*DOPS*); after discussion of the (*clinical*) reasoning involved in the management of a problem faced by a trainee (*Case-Based Discussion, CBD*).

The results of any summative tests of knowledge taken, e.g. *MCQs and problem-solving tests, including self-administered tests*, should be filed and retained. Confirmation of the acquisition at a particular stage of a specified professional examination may be required in order to make progress towards the completion of training.

## **Learning Methods**

This section gives examples of the learning methods that can be used as guidance to acquire competencies as they appear in the curriculum.

### **Experiential:**

- Working under supervision
- Documenting/reporting progress (*case notes*), preparing summaries (*discharge notes*) other professional correspondence; communicating information to patients/to other health professionals.
- Consults, referrals between departments, handover, providing cross-cover.
- (*In certain specialties*), procedure room and investigation/assessment sessions offer practical opportunities to learn and develop skills under supervision and to exercise judgement when to seek assistance.

### **Self-directed learning:**

- Curriculum-based personal study e.g. *textbooks, journals, literature search, retrieval of web-based information*.
- Information gathering and evaluation
- Active participation in audit
- Tests of knowledge

### **Group learning:**

- Workplace discussions
- Multidisciplinary meetings
- Programmed meetings within the workplace

### **Performance based:**

- Observing, learning, assisting, performing, demonstrating a technique or practical procedure.
- Simulations, role-play

### **Learning through teaching and research:**

- Teaching, giving tutorials, lecturing.
- Mentoring and supervising junior colleagues and other staff.
- Presenting at meetings - local and international.
- Research
- Publication

**External Courses:**

- Specialty study/training days
- Attending mandatory and non-mandatory courses
- Attendance at seminars, relevant conferences, regional, national and international meetings.

**Reflection:**

- In your logbook there is an area to record reflections on training, learning, clinical events and career discussions. In recent years the importance of reflecting as part of the learning process on what you are doing has been shown to improve professional practice. Reflection on what you know and don't know helps to understand that learning is individual and reflection of professional activities can be used to highlight your strengths, weaknesses and areas for development.

## Assessment Methods

### Mini-CEX

**Definition:** Mini-CEX is designed to provide feedback on skills essential to the provision of good clinical care by observing an actual clinical encounter.

**Description:** The mini-CEX is a “snapshot” of a doctor/patient interaction and is based on a 15 minute observation of a single interaction. It is designed to assess the clinical skills and behaviors of trainees assessing such skills as history taking, physical examination skills, clinical judgement, professionalism, organisation/efficiency and overall clinical care. Not all elements will be assessed on each occasion. Immediate feedback should be provided after each encounter by the observer assessing the trainee.

**Frequency of assessment:** At least two miniCEX assessments should take place in each year of training. Where appropriated, one should be based in an outpatient setting and one in an acute setting. The assessments include assessment of skills in history taking, physical examination, appropriate use of investigations, cost-effectiveness, interpretation of investigations, making medical notes, making a diagnosis, treatment and management of disease, appropriate referral to other specialities, standards of care.

#### Competencies assessed:

- Consideration/Professionalism:
- Recognises/accepts patient’s rights (to consent, confidentiality, and information). Establishes trust, shows professional approach.
- Communication:
  - Informs, explains, and advises using appropriate language. Obtains consent, enlists patient’s co-operation.
- Interviewing Skills:
  - Active” listening facilitating relevance; effectively using questions, responding to non-verbal clues.
- Examination Skills:
  - Prepares patient, minimises discomfort/unease. Proceeds logically, efficiently, thoroughly, completely.
- Judgement:
- Correctly identifies/lists problems, prioritises actions in realistic and timely schedule.

**Opportunities for assessment:** The assessment should take place in the usual place of work (*in-patient, clinic, office or department*) where the assessor must directly **observe** the trainee’s performance.

### DOPS:

**Definition:** Directly Observed Procedural Skills (DOPS) is a method, similar to the mini-CEX that has been designed specifically for the assessment of practical skills. DOPS assess the capabilities of a trainee while they perform a procedure.

**Description:** The DOPS is a structured assessment of actual performance. Each DOPS should represent a different procedure. The trainee chooses the timing, procedure and observer.

**Frequency of Assessments:** The number and frequency of assessments of procedural skills will vary from specialty to specialty.

**Competencies assessed:**

- Understanding of Procedure:
  - Relevant anatomy; purpose, indications, contra-indications; outcomes, risks, complications; choice of methods available, technique of procedure.
- Consideration for the Patient:
  - Gives reassurance, minimises discomfort, explains procedure fully; confirms informed consent obtained.
- Preparation:
  - First re-checks all relevant details correct. Safety check; instrumentation, equipment (drugs); positioning; cleansing/aseptic technique; sedation, analgesia, anaesthesia confirmed.
- Professional/technical ability:
  - Dexterity, accuracy, efficiency; obtains, interprets diagnostic material/information; informs, directs staff courteously; recognises own limitations; seeks help where appropriate; manages risk.
- Post-Procedure:
  - Completes documentation; regulates recovery phase, observations; anticipates/deals with complications. Informs/counsels patient/relatives.
- Overall ability to perform Procedure:
  - Ability to complete/undertake procedure; technical abilities as demonstrated; appropriately confident, team/ leadership skills.

**Opportunities for assessment:** While supervising, assisting, observing actual performance in appropriate setting (office, theatre, day procedure, ICU etc.). The assessment should be made under appropriate conditions e.g. with all equipment and personnel necessary to support the procedure.

## Case Based Discussion (CBD)

**Definition:** Case-based discussion (CBD) is used to enable the documenting of conversations about, and presentations of, cases by trainees. This activity happens throughout training, but is rarely conducted in a way that provides systematic assessment and structured feedback. CBD is used to evaluate core skills that can be demonstrated during an interactive discussion based on a single case in which the trainee has been actively involved.

**Description:** CBD is designed to assess clinical decision-making and the application or use of medical knowledge in relation to patient care for which the trainee has been directly responsible. It also enables the discussion of the ethical and legal framework of practice, and in all instances, it allows trainees to discuss why they acted as they did. Although the primary purpose is not to assess medical record keeping, as the actual record is the focus for the discussion, the assessor can also evaluate the record keeping in that instance. The case for discussion can either be selected by the trainee or chosen by the assessor. The assessment will be based on oral discussion and written information available. It includes a bi-lateral (trainee's and trainers) critical appraisal of the reasoning and judgements made, and of the management of the case. Whenever possible the assessment should include issues such as disease notification, health promotion and screening.

**Frequency of Assessment:** This method of assessment has not been validated as yet; however it is a very useful method and can be easily incorporated into journal clubs, post-graduate teaching sessions or on-line etc

### Competencies assessed:

- **Problem Definition:**
  - All relevant facts established, from current/previous history, investigations, interventions; reports, correspondence reviewed.
- **Record Keeping:**
  - Legible, tidy, legally defensible records seen.
- **Reasoning:**
  - Appropriately selected, sequenced investigations/procedures planned. Evidence-based, logical judgements made; (differential) diagnosis established; action plan made with realistic goals.
- **Case Management:**
  - Effective, safe (responsible) prescribing; aware of protocols/guidelines, best practice; monitoring progress, handling complications/mistakes; timely, appropriate referrals, case closure.
- **Reflective Practice:**
  - Shows analytical, constructive approach to case, willingness to learn; acknowledges and prepared to consider other management options; aware of change, possible advances, when to seek help.

**Opportunities for assessment:** The presentation should take place in a suitable environment, with due consideration given to the patient's sensitivities, to confidentiality e.g. in any ward or clinical setting; an office, side- or seminar-room may be found convenient. Case presentations and discussions, e.g. at handover, ward-rounds (inter-) departmental meeting.

## **Mandatory Training Courses**

*(Note: this list only included the generic mandatory courses)*

### **Mandatory Communication course:**

To be completed in Year 1. The course is a short 1 -2 hour course at the start or the end of specialty study days to reduce time spent away from the hospitals.

Communication skills will be assessed as part of the miniCEX assessments

### **Audit:**

Mandatory 1/2 day on audit to be completed in Year 1.

Audit reports are submitted on a yearly basis

### **Ethics:**

Four mandatory study days are to be completed during the training programme. Three study days are for all specialities - Ethics & Law, Ethics in Research and Professionalism. The fourth day 'End of life' is for all specialties except Public Health Medicine, Occupational Medicine and Histopathology who have a speciality specific ethics day.

### **Leadership Skills:**

Mandatory 3 day course to be taken in year 3-5

### **ACLS:**

ACLS compliant in appropriate specialties

## **Specialty Study Days**

The number and topics of the specialty study days are listed as part of the specialty curricula.

## **Annual assessments**

### **Consultant feedback:**

End of year assessment completed by the Trainers include assessment in areas such as: Team working skills, Leadership skills, Handling of complaints, conflict management

Questions such as the following are included in the assessment form:

- Have there been any complaints from nursing staff, AHP, patients regarding this trainee or their team?
- If so:
  - How did the trainee respond to a complaint about a member of his/her team?
  - How did the trainee respond to a complaint against him/her?.
- Have you any serious issue with your SpR?
- Where there any instances of serious conflict?
- Do you think he/she behaved appropriately?

**Audit:**

It is difficult to complete the audit cycle in a one year period. Each year the trainee should take part in an audit - either to develop and start an audit or to review and change practice as a result of an audit - the complete audit cycle should be understood. In hospitals that have audit systems set up, the trainee should complete a full audit.

Trainees will be required to submit a full audit report and will be encouraged to present audit results at local, national or international meetings.

**Attendance at In- Hospital Speciality Radiology conferences****Time spent in Laboratory/Pathology or attendance at Laboratory/Pathology conferences** (Depending on specialty)**Committee membership:**

Many specialty curricula have identified participation in committees.

**Teaching skills**

Number of undergraduate and postgraduate tutorials, number of membership tutorials.

**Presentations/Publications****On-Call take**

# **GENERIC COMPONENTS**

# Communication & Interpersonal Skills

**Objective:** To be able to communicate effectively and sensitively with patients, their relatives, carers and with professional colleagues in different situations.

**Medical Council Domains of Good Professional Practice:** No. 2: Relating to Patients; No 3. Communication and Interpersonal Skills.

## KNOWLEDGE

### Within a consultation

- How to structure an interview to obtain/convey information; how to identify concerns, expectations, priorities; how to promote understanding, reach conclusions; use/choose appropriate language. Knowledge of procedures/investigations available and alternative options; of strategies to promote compliance through understanding of objectives.
- Able to elicit facts, question using open, followed by closed questions; “active listening”. Gives information clearly, avoids jargon, confirms understanding, is able to encourage co-operation, compliance; obtain informed consent.
- Considerate, shows respect for other’s culture, opinions, patient’s right to be informed, make choices.

### In difficult circumstances

- Understands potential areas for difficulty “awkward situations”, knows how and when to break bad news, how to circumvent cultural, language barriers, deal with sensory or mental impairments, how to deal with challenging or aggressive behaviour.
- Able to communicate essential information where difficulties exist, appropriately uses assistant, interpreter, chaperone, relatives. Able to deal with anger, frustration in self and others.
- Selects an appropriate environment; seeks assistance, makes and takes time. Avoids unrealistic optimism or pessimism.
- Respects another’s right to opinions and to accept or reject advice.

### With professional colleagues and others

- How best and when to communicate with doctors and other members of the healthcare team; how to provide concise, problem-orientated statement of facts and opinions (*written, verbal or electronic*). Knows legal context status of records and reports, of data protection (*confidentiality*), Freedom of Information (FOI) issues.
- Understands relevance to continuity of care and the importance of legible, accessible, authenticated records. Knows when urgent contact becomes necessary and the appropriate place for verbal, telephone, electronic, written communication.
- Communicates effectively, promptly; recognises roles and skills of other health professionals.
- Able to judge own abilities/limitations and when to seek help or give assistance, advice to others; when to delegate responsibility, when to refer.
- Values perspectives of others contributing to management decisions.

### In maintaining continuity of care

- Understands the relevance to outcome of continuity of care, within and between phases of healthcare management.
- The importance of completion of tasks and documentation *e.g. before handover (to another team, department, specialty)*, of identifying outstanding issues, uncertainties.
- Maintains (*legible*) records, is available, contactable, time-conscious, sets (*and attempts to reach*) realistic objectives, identifies/prioritises outstanding problems.
- Alert to avoid potential confusion or misunderstanding through communications failure.



### **Giving explanations**

- The importance of possessing the full facts, and of recognising uncertainty and conflicting evidence on which decisions have to be based.
- How to secure, retain attention avoid distraction. Understand how adults receive information best, the relative value of the spoken, written, visual means of communication, use of reinforcement to assist retention. Risk of information overload.
- Need to interpret results, significance of findings, diagnosis, to explain objectives, limitations, risks of treatment, in terms and by means adjusted to recipients' ability to comprehend.
- Uses language, literature (*leaflets*) diagrams, educational aids and resources appropriately.
- Able to achieve level of understanding necessary to achieve co-operation (*compliance, informed choice, acceptance of opinion, advice, recommendation*).
- Prepared to discuss, repeat information, resolve uncertainty, confusion, respond to questioning, challenge.

### **Responding to complaints**

- Value of hearing and dealing with complaints promptly; the appropriate level, the procedures (*departmental and institutional*); sources of advice, assistance available.
- The importance of obtaining and recording accurate and full information, seeking confirmation from multiple sources.
- Able to establish facts, identify issues and respond quickly and appropriately to a complaint received.
- Accepts responsibility, involves others, consults appropriately.
- Open, prepared to accept criticism, acknowledge shortcomings where they exist, offer an apology.

## **SKILLS**

- Communication
- Conflict resolution
- Dealing with complaints
- Communicate decisions in a clear and thoughtful manner
- Presentation skills

## **ASSESSMENT & LEARNING METHODS**

- Communication course (Year 1)
- Consultant feedback at annual assessment
  - Workplace based assessment e.g Mini-CEx, DOPS, CBD
  - Educational supervisor's reports on observed performance (in the workplace): communication with others e.g. at handover. ward rounds, multidisciplinary team members
- Presentations

## Professionalism & Autonomy

**Objective:** To have the knowledge, skills and attitudes to act in a professional manner at all times and in partnership with patients and colleagues. To develop the attributes of someone trusted to be able to manage complex human, legal and ethical problems.

**Medical Council Domains of Good Professional Practice:** No. 1 Patient Safety and Quality of Patient Care; No 2. Relating to Patients; No. 7 Professionalism

### KNOWLEDGE

#### Patient Centred Care;

- The provision of Patient Centre Care should be at the core of the service a doctor provides
- To put the quality and safety of patient care as a prime objective

#### Behaviour in the workplace;

- **Relationships with patients**
  - Know patients' rights e.g. to be informed sufficiently to enable them to be involved in decisions about their treatment and care. Know boundaries limiting consultations including ethical, duty of care.
  - How to deal with inappropriate behaviour e.g. aggression, threats, violence, harassment, racism.
  - Potential obstacles e.g. cultural, educational, ethical – also preconceptions and prejudices.
  - Ensures confidentiality, respects privacy. Focuses investigation on patient's needs and expectations. Shows sensitivity, develops empathy but avoids personal involvement.
  - Non-judgemental in approaching patient's perceived problems. Prepared to accommodate idiosyncrasies, respecting patients as individuals. Altruistic.
- **Working with colleagues**
  - Know the potential roles and contributions of other specialists – medical, surgical, general practitioners and of other hospital or community-based agencies e.g. social services, also patient support groups and other providers of care.
  - How to arrange cover, safeguarding the handover process, know where responsibility begins and ends, when and where to seek advice.
  - Aware of the extent and limitations of own areas of practice/expertise; recognises and respects others' inputs, capabilities; is able to work co-operatively with other health professionals; refers, delegates appropriately.
  - Realistically schedules and completes tasks and provides full documentation for handover, referral; strives to maintain continuity and standard of care especially across shifts and when arranging rotas and covering absences.
  - Conscientious, reliable, responsible and professional at all times, considerate, shows respect for opinions of others, values good advice, accepts constructive criticism.

### **Creating an environment conducive to learning and improvement**

- Endeavours to foster an environment conducive to learning
- Shares knowledge with trainees, students and other members of the multidisciplinary team
- Encourages and is open to reflective practice
- Seeks out role models and learns from the best practice behaviours of others.
- Participates in quality assurance and clinical improvement systems & training
- Uses evidence based practice in decision making
- Participates in journal clubs, case presentations, grand rounds

### **Time management & continuity of care**

- Is punctual for duty, meetings, handovers and other duties
- Prioritises workload
- Delegates when appropriate to do so
- Knows when to call for help
- Ensures satisfactory handover to ensure continuity of care
- Ensures satisfactory transfer of patients to other medical teams or services when required
- Makes adequate arrangements to cover holidays, study and other leave

### **Honesty & Integrity**

- Acts with honesty and integrity at all times in the delivery of patient care and in working with professional colleagues
- Acts fairly in all situations.

### **Moral Reasoning & Legal and ethical issues (see also Ethics section)**

- Describes and demonstrates an understanding of the main principles of medical ethics including autonomy, justice and confidentiality
- Understands correct procedures for obtaining consent (for treatment, investigations, procedures, research project, post mortem). Legal responsibilities surrounding death/disease certification; regarding mental illness; referrals to coroner; also in criminal cases.
- Understands issues surrounding confidentiality, disclosure/release of information; discovery (FOI) of records. Legal and ethical issues in context of resuscitation, organ donation/transplantation.
- Able to complete certificates, documents, respects patient's wishes, rights, but accepts a doctor's (legal) obligations to society. Able to obtain/provide in full, information relevant to consent.
  - Alert to possible legal implications and ethical aspects of actions
  - Ensures privacy when discussing sensitive issues
  - Seeks timely advice where patient abuse is suspected

### **Team working and leadership**

- How teams work, know how to assign individual and collective responsibilities which respect an individual's (*professional*) status within a team. How to set goals, initiate/co-ordinate action, audit performance, give feedback, e.g. developing guidelines, protocols.
- Positively contributes to planning, motivating, organising activity, employs negotiating, human relations, interpersonal skills appropriately.
- Able to set and apportion individual and team objectives, energise and fortify others to sustain efforts to achieve goals, appraise performance.
- Co-operates as team player; respects the contributions, expertise of others; tolerant but determined as team leader.
- Adopts a holistic approach to patient care
- Knowledge of principles of audit and self assessment

### **Health-Physical health and Handling Stress & Fatigue**

- Know how stress can affect performance, how to reduce stress and develop coping mechanisms to deal with pressure. When to enlist support.
- Understand the relevance of personal health to performance at work: the risks of self-medication, potential for drug and alcohol abuse: know that support is available from Occupational Health Services.
- Able to recognise, cope with stress; asks for help when necessary, is aware of responsibility (*to others*) of having health problems dealt with. Willing to take time off; and, if necessary, re-train/redevelop skills.

### **Commitment to Continuous Improvement in Health care Systems**

- Understands the principles of quality and safety improvement
- Participates in quality improvement activities, including standard setting, follows established practice guidelines, research and audit
- Undergoes training in this area where appropriate

## **SKILLS**

- Professionalism
- Multidisciplinary team working
- Ethical issues
- Leadership
- Time management
- Stress management

## ASSESSMENT & LEARNING METHODS

- RCPI Ethics programme: Ethics I, Ethics II, Ethics III and Ethics IV (mandatory)
- Consultant feedback at annual assessment
  - Workplace based assessment e.g. Mini-Cex, DOPS, CBD
  - Educational supervisor's reports on observed performance (in the workplace): communication with others e.g. at handover. ward rounds, multidisciplinary team members
- Leadership Programme (Year 3 – 5)

## Maintaining Good Practice

**Objective:** To adopt the habits of lifelong learning, and to appreciate and implement the practices of clinical governance.

**Medical Council Domains of Good Professional Practice:** No. 1 Patient Safety and Quality of Patient Care, No. 6 Scholarship, No 7 Professionalism, No 8 Clinical Skills

### KNOWLEDGE

#### Lifelong learning

- Aware of CME/CPD obligations, systems/process for competence assurance/revalidation. Understand the role of appraisal, assessment methods available their application.
  - Sources, resources, opportunities for self-directed and group learning including IT. Know how adults learn.
  - Recognises and makes effective use of learning opportunities, maximises the potential for personal study, plans personal development.
  - Self motivated, inquisitive, eager to learn.

#### Application of clinical governance

- Understand the principles of evidence-based practice, clinical audit and effectiveness, the development/application of best-practice protocols.
- Able to appraise and apply data from research, and to use audit to establish best practice and clinical effectiveness. Utilizes and practices evidence-based medicine.
- Accepts the need for reflective practice and to critically evaluate own work and make changes.

#### Risk management

- Systems, procedures for identifying (*clinical*) risk; correct procedures and action when things go wrong; how to handle complaints.
- Employes procedures and policy for accidents, injuries; for confirming skill and staffing levels, arranging cross-cover, on-call, for supervision.
- Potential complications or side effects of treatments, procedures and investigations; importance of accurate, recent information and available records. The assessment of risk, relative risk.
- Able to assess, anticipate, risks; recognise failure. Openly discuss bad outcomes, locate system weakness, analyse critical incidents.
- Able to discuss potential risks *e.g. with patients, to analyse and balance risk with benefit*. Able to learn from previous experience, from complaints received, errors.
- Is honest in recognising misjudgements.

#### Evidence, audit, guidelines

- Basis for developing evidence-based medicine, kinds of evidence, evaluation; methodologies of clinical trials.
- Sources from which useful data for audit can be obtained, the methods of collection, handling data, the audit cycle.
- Means of determining best practice, preparing protocols, guidelines, evaluating their performance.
- Capable of accessing relevant data (library, internet use). Able to appraise available evidence critically.
- Able to complete an audit cycle relevant to practice; to develop, evaluate, review and update a set of guidelines.
- Uses evidence / guidelines appropriately having due regard for the individual.

## **SKILLS**

- Personal development planning
- Evidence -based practice
- Risk Management
- Audit
- Research

## **ASSESSMENT & LEARNING METHODS**

- Record of attendance at journal clubs, medical grand rounds, SpR teaching sessions, local and national academic meetings
- Record of attendance at CME accredited international meetings
- Attendance at local radiology conferences
- Time spent in laboratory or attendance at laboratory conferences
- Audit Study Day (Year 1)
- Annual Audit
- Leadership Skills Course (Year 3- 5)
- Research Publications
- Consultant feedback at annual assessment
- Workplace based assessment e.g Mini-Cex, DOPS, CBD

## Standards Of Care

**Objective:** To be able to assess patients' problems investigate and treat them appropriately, efficiently, and consistently over time.

**Medical Council Domains of Good Professional Practice:** No. 1 Patient Safety and Quality of Patient Care; No. 2 Relating to Patients; No. 3 Communication and Interpersonal Skills; No. 4 Collaboration and Teamwork; No. 5 Management (including Self Management; No. 8 Clinical Skills,

### KNOWLEDGE

#### History taking and examination

- Diagnostic significance of patterns of symptoms, pathophysiology and physical signs.
- Able to take and analyse a clinical history and perform a reliable and appropriate examination, arrive at a differential diagnosis.
- Exhibit empathy and show consideration for all patients, their impairments and attitudes irrespective of cultural and other differences.

#### Investigation, indications, risks, cost-effectiveness

- Understand the pathophysiological basis of the investigation undertaken.
- Know and be able to explain the procedure for the commonly used investigations, preparations, effects or risks, the reason for the investigation, the information sought and its relevance to management.
- Sensitivity and specificity of results, possible interferences, artefacts.
- Able to understand significance, interpret and explain results of investigations.
- Shows logical approach in choosing, sequencing and prioritising investigations.
- Able to liaise, discuss, negotiate effectively with those undertaking the investigation.
- Careful to select investigations appropriately, considering (*patients'*) needs, risks, value.

#### Treatment and management of disease

- Understand the pharmacology, therapeutics of treatments prescribed, choice of routes of administration, dosing schedules, compliance strategies; the objectives, risks and complications of treatment cost-effectiveness. Natural history of diseases; quality of life concepts.
- Able to assess accurately patient's needs, to prescribe administer, deliver, arrange treatment; recognise and deal with reactions / side effects. Sets realistic therapeutic goals, utilizes rehabilitation services, palliative care appropriately.
- Able to discuss rationale, objectives, risks and alternative options openly, taking into account patients' / their relatives' attitudes, beliefs or other philosophical concepts.
- Recognises that the degrading effects of illness, especially incapacity which is chronic, impacts on relationships and family, having financial as well as social effects.
- Discusses, plans, delivers care appropriate to patient's needs and wishes.

#### Disease prevention and health education

- Disease notification; methods of collection and sources of data. Screening for disease, (*methods, advantages and limitations*). Health promotion and support agencies; means of providing and sources of information for patients.
- Risk factors, preventive measures, strategies applicable to smoking, alcohol, drug abuse, lifestyle changes.

- Able to advise on and promote lifestyle change, stopping smoking, control of alcohol intake. Able to assess and explain risk, encourage positive e.g. *immunisation* and negative preventive measures.
- Enlists / requires patients' involvement in solving their health problems, provides information, education. Avails of support provided by voluntary agencies and patient support groups, as well as expert services e.g. detoxification / psychiatric services.
- Non-judgemental approach to patient's problem: values contributions of health education and disease prevention to health in a community.

### **Notes, records, correspondence**

- Understand the functions of medical records, their value as an accurate up-to-date commentary and source of data.
- Understand the need and place for problem-orientated discharge notes, letters, more detailed case reports, concise out-patient reports, focused reviews.
- Compiles adequate case notes, with results of examinations, investigations, procedures performed, sufficient to provide an accurate, detailed account of the diagnostic and management process and outcome. Provides concise, informative progress reports orally.
- Maintains legible, authenticated records, uses dictation, telephone, e-mail appropriately.
- Appreciates importance of up-to-date, accurate information, its availability, transfer and the need for communicating promptly e.g. *with primary care*.

### **Time management and decision taking**

- How to prioritise demands, respond to patients' needs, sequence urgent tasks. Understand how to establish (*clinical*) priorities e.g. *for investigations, intervention; how to set realistic goals; understand the need to allocate sufficient time, know when to seek help*.
- Understands the need to complete tasks, reach a conclusion, make a decision, take action with allocated time.
- Able to recognise when falling behind and can adjust accordingly; able to cope with changing circumstances, variable demand, prepared to re-prioritise and ask for help.
- Able to collate evidence, summarise, recognise when objective has been gained
- Knows how and when to conclude, disengage.
- Has realistic expectations of own and of others' performance. Time-conscious, punctual.

### **Relevance of professional bodies**

- Understand the relevance to practice of standards of care set down by recognised professional bodies – the Medical Council, Medical Colleges and their Faculties, and the additional support available from professional organisations e.g. *IMO, Medical Defence Organisations and from the various specialist and learned societies*.
- Actively engages with professional/representative/specialist bodies.
- Values the breadth and depth of experience that can be accessed by associating with professional colleagues.

## SKILLS

- History taking and examination
- Appropriate use of investigations
- Treatment and management of disease
- Disease notification
- Health promotion
- Screening
- Study Day - Disease prevention & health education
- Personal and professional organisation and planning; goal setting, time management

## ASSESSMENT & LEARNING METHODS

- Consultant feedback at annual assessment
- Workplace based assessment e.g Mini-Cex, DOPS, CBD
- Educational supervisor's reports on **observed** performance (in the workplace)
- Study Days
- Annual Audit

## Patient Safety

**Objective:** To ensure patient safety is at the core of the health service provided by designing safe systems and processes of care and understanding the role of healthcare systems and human factors in adverse events and errors.

**Medical Council Domains of Good Professional Practice:** No. 1 Patient Safety and Quality of Patient Care.

### KNOWLEDGE

#### Safe Systems, Competency and Safe practice

- Understands multiple factors involved in failures;
- Safe Healthcare Systems-a Safe working environment
- The relationship between 'Human factors' and patient safety
  - Safe working practice. Role of procedures and protocols in optimal practice
- Patient safety relevance in health care and its role in minimizing the incidence and impact of adverse events and maximize recovery from them.
- Knowledge and understanding of the Swiss cheese model.
- Health care errors and system failures; human and economic costs; blame culture

#### Communication

- Disclosure – know the principles of open disclosure
- Knowledge and understanding of valid consent
- Teamwork
- Continuity of care

#### Near Misses and adverse events

- Knowledge of preventing and managing near misses and adverse events. Incident reporting; root cause analysis. Understanding and learning from errors
- Understands and manages clinical risk
- Manages complaints
- Knows when and how to report a near miss or adverse event

#### Quality improvement

- Standardises common processes and procedures – checklists, vigilance
- Evidence based care
- Infection control; healthcare associated infections
- Patient safety and invasive procedures.
- Improvement medication safety; safe prescribing; common medication errors
- Ethical behaviour

## **SKILLS**

- Effective Communication with patients, families and colleagues
- Co-operation and collaboration with colleagues to achieve safe and effective quality patient care
- Being an effective team player
- Understand how and why systems break down and why errors are made
- Be able to learn from errors and near misses to prevent future errors
- Know how to use relevant information from complaints, incident reports, litigation and quality improvement reports to control risks
- Minimise infection through improved infection control practice
- Minimise errors during invasive procedures by developing and adhering to best-practice guidelines for safe surgery.
- Minimise medication errors by practicing safe prescribing principles

## **ASSESSMENT & LEARNING METHODS**

- Consultant feedback at annual assessment
- Workplace based assessment e.g Mini-Cex, DOPS, CBD
- Educational supervisor's reports on observed performance (in the workplace):  
prioritization of patient safety in practice
- RCPI Patient safety on-line course (recommended)
- Completion of infection control induction in the workplace

# Therapeutics and Safe Prescribing

**Objective:** To progressively develop your ability to prescribe, review and monitor appropriate therapeutic interventions relevant to clinical practice in specific specialities including non-pharmacological therapies and preventative care

**Medical Council Domains of Good Professional Practice:** No. 1 Patient Safety and Quality of Patient Care.

## KNOWLEDGE

- Indications, contraindications, side effects, drug interaction, dosage and route of administration of commonly used drugs
- Knowledge of prescribing for common medical conditions
- Knows range of adverse drug reactions to commonly used drugs, including complementary medicines
- Identifies common prescribing hazards
- Identifies high risk medications
- Knows drugs requiring therapeutic drug monitoring and interprets results
- Knows the effects of age, body size, organ dysfunction and concurrent illness or physiological state e.g. pregnancy on drug distribution and metabolism relevant to the trainees practice
- Recognise the roles of regulatory agencies involved in drug use, monitoring and licensing (e.g. IMB , and hospital formulary committees)
- Knows procedure for monitoring, managing and reporting adverse drug reaction

## SKILLS

- Knows how to write a prescription
- Prescribes appropriately in the elderly, childhood, pregnancy and breast feeding
- Make appropriate dose adjustments following therapeutic drug monitoring, or physiological change (e.g. deteriorating renal function)
- Review the continuing need for long term medications relevant to the trainees clinical practice
- Anticipate and avoid defined drug interactions, including complementary medicines
- Advise patients (and carers) about important interactions and adverse drug effects
- Provide comprehensible explanations to the patient, and carers when relevant, for the use of medicines
- Open to advice and input from other health professionals on prescribing
- Participates in adverse drug event reporting

## ASSESSMENT & LEARNING METHODS

- Consultant feedback at annual assessment
- Workplace based assessment e.g Mini-Cex, DOPS, CBD
- Educational supervisor's reports on **observed** performance (in the workplace): prioritization of patient safety in prescribing practice

## Infection Control

**Objective:** To be able to manage and control infection in patients, including controlling the risk of cross –infection, appropriately managing infection in individual patients, and within the wider community to manage the risk posed by communicable diseases.

**Medical Council Domains of Good Professional Practice:** No. 1 Patient Safety and Quality of Patient Care; No. 5 Management (including Self Management).

### KNOWLEDGE

#### Within a consultation

- Understand the principles of infection control as defined by the HIQA
- How to minimize the risk of cross-infection during a patient encounter by adhering to best practice guidelines available
- Treat and manage infection in the individual patient
- Understand the principles of preventing infection in high risk groups e.g managing antibiotic use to prevent Clostridium difficile) Knowledge and understanding the local antibiotic prescribing policy
- Aware of infections of concern, eg MRSA, C Difficile,
- Understands best practice in isolation precautions
- Knows when and how to notify relevant authorities in the case of infectious disease requiring disclosure

#### In surgery or during an invasive procedure

- Understands the increased risk of infection in these patients and adheres to guidelines for minimizing infection in such cases
- Knows the guidelines for needle stick injury prevention and management

#### During an outbreak

- Adheres to guidelines for minimizing infection in the wider community in cases of communicable diseases and seeks expert opinion or guidance from infection control specialists where necessary

### SKILLS

- Practices aseptic techniques, hand hygiene
- Follows guidelines for infection control and management
- Prescribes antibiotics according to antibiotic guidelines Encourages all staff, patients and relatives to observe infection control principles
- Communicates effectively with patients regarding treatment and measures recommended to prevent re-infection or spread
- Collaborates with infection control colleagues to manage more complex or uncommon types of infection including those requiring isolation eg transplant cases, immunocompromised host
- In the case of infectious diseases requiring disclosure:
  - Has knowledge of the diseases requiring disclosure and undertakes notification promptly
  - Collaborates with external agencies regarding reporting, investigating and management of notifiable diseases .
  - Able to advise patients on lifestyle change to minimize the risk of re-infection or spread of infection,

- Enlists / requires patients' involvement in solving their health problems, provides information, education.
- Avails of support provided by voluntary agencies and patient support groups, as well as expert services where appropriate
- Non-judgemental approach to patient's problem:
- Utilises and values contributions of health education and disease prevention and infection control to health in a community.

## ASSESSMENT & LEARNING METHODS

- Consultant feedback at annual assessment
- Workplace based assessment e.g Mini-Cex, DOPS, CBD
- Educational supervisor's reports on **observed** performance (in the workplace): practicing aseptic techniques as appropriate to the case and setting, investigating and managing infection , prescribing antibiotics according to guidelines
- Completion of infection control induction in the workplace

## Leadership

**Objective:** To have the knowledge, skills and attitudes to act in a leadership role and work with colleagues to plan, deliver and develop services for improved patient care and service delivery

**Medical Council Domains of Good Professional Practice:** No.1 Patient Safety and Quality of Patient Care; No. 3 Communication and Interpersonal Skill; No. 4 Collaboration and Teamwork; No. 5 Management (including Self Management); No 6 Scholarship.

### KNOWLEDGE

#### Demonstrating Personal Qualities

- Develops self-awareness and understanding of personal style and its impact on others
- Efficiently and effectively manages one- self and one's time especially when faced with challenging situations
- Continues personal and professional development through scholarship and further training and education where appropriate
- Acts with integrity and honesty with all people at all times

#### Working with others

- Develops networks to expand knowledge and sphere of influence
- Builds and maintains key relationships. Adapts style to work with different people and different situations
- Encourages contributions from others including patients, carers, members of the multidisciplinary team and the wider community
- Aware of own personal style and other styles and their impact on team performance. Understands the importance of good communication in teams and the role of human factors on effectiveness and patient safety

#### Managing Services

- Knows and understands the structure and function of Irish Health Care System
- Aware of the challenges of managing in healthcare
  - Role of Governance
  - Clinical Directors
- Can contribute to the planning and design of services
- Knows and understands the financing of the health service
  - Preparing a budget
  - Defining value
  - Managing resources
- Knows and Understands the importance of human factors in service delivery.
  - Manages staff training, development and education
- Managing performance
  - Performs staff appraisal and deals effectively with poor staff performance
  - Rewards and incentivises staff for quality and efficiency

#### Improving Services

- Ensures patient safety by adopting and incorporating a patient safety culture
- Critically evaluates where services can be improved by measuring performance, and acting to raise standards where possible Encourages a culture of improvement and innovation
- Facilitating transformation by creating and living a vision

## Setting Direction

- Identifies the external and internal drivers setting the context for change
- Applies knowledge and evidence of systems and resource management to guide service development
- Makes decisions using evidence based medicine and performance measures
- Evaluates the impact of change on health outcomes through ongoing service evaluation

## SKILLS

- Effective Communication with patients, families and colleagues
- Co-operation and collaboration with others; patients, service users, carers colleagues within and across systems
- Being an effective team player Being able to managing resources and people
- Managing performance, performance indicators
- How to write and develop a service plan
- How to prepare and manage a budget

## ASSESSMENT & LEARNING METHODS

- Communication course (Year 1)
- Leadership course (Year 3 – 5)
- Consultant feedback at annual assessment
- Workplace based assessment e.g Mini-Cex, DOPS, CBD
- Educational supervisor's reports on observed performance (in the workplace): on management and leadership skills
- Involvement in hospital committees where possible e.g. division of Medicine, Drugs and Therapeutics, Infection Control etc.

## Management Information Systems & Management Skills

**Objective:** To understand the organisation, regulation and structures of the health services, nationally and locally, and to be competent in the use and management of information on health and health services. To develop personal effectiveness and the skills applicable to the management of staff and activities within a healthcare team.

**Medical Council Domains of Good Professional Practice:** No. 5 Management.

### KNOWLEDGE

#### Health service structure, management and organisation

- The administrative structure of the Health Service, services provided in Ireland and their funding. Department of Health, HSE and Hospital Management structures and systems. The National Regulatory Bodies, health agencies and patient representative groups.
- Can explore, direct, pursue a project, negotiating through the relevant department at an appropriate level. Able to “*operate the system*”. Understand the need for business plans, annual hospital budgets, the relationship between the hospital and PCCC.
- Recognises the advantage of understanding the administrative machinery of the Health Services.

#### The provision and use of information in order to regulate and improve service provision

- Methods of collecting, analysing and presenting information relevant to the health of a population and the apportionment of healthcare resources. The common ways in which data is presented. Know of the sources which can provide information relevant to national or to local services, publications available.
- Able to seek / locate information in order to define an issue needing attention e.g. to provide data relevant to a proposal for change, establishing a priority, obtaining resources.

#### Obtaining information of value in maintaining medical knowledge with a view to delivering effective clinical care

- Understands the contribution that current, accurate knowledge can make to establishing clinical effectiveness, best practice, treatment protocols. Know sources providing updates, literature reviews and digests.
- Able to make use of information, use IT, undertake searches and obtain aggregated data, to critically evaluate proposals for change e.g. *innovative treatments, new technologies*.
- Embraces principles of clinical governance.

#### Delegation skills, empowerment and conflict management

- How to assess, develop personal effectiveness, improve negotiating, influencing and leadership skills. How to manage time more efficiently, deal with pressure and stress. How to motivate and operate within a multidisciplinary team.
- Able to adjust to change, apply management/leadership, negotiating skills to manage change. Self-awareness, able to recognise strengths and weaknesses.
- Appropriately values and uses management techniques and seeks to improve these skills and personal effectiveness.

## **Leadership**

- How to maintain, improve working relationships within a team; appropriately recognise roles, skills, status. Know when and what to delegate, provide support, appraise.
- Motivates and empowers others, knows when help is needed. Able to foresee, forestall, manage conflict.
- Sensitive to and aware of the needs of others.

## **SKILLS**

- Risk Management
- Leadership skills
- Time management
- Delegation skills
- Conflict management
- Clinical governance
- Audit

## **ASSESSMENT & LEARNING METHODS**

- Communication course (Year 1)
- Audit course (Year 1)
- Leadership course (Year 3 – 5)
- Annual audit
- Consultant feedback at annual assessment on management and leadership skills
- Involvement in hospital committees

## Teaching & Research

**Objective:** To recognise the opportunities for personal/professional development that exist for medical teachers, educational supervisors and from involvement with research.

**Medical Council Domains of Good Professional Practice:** No. 6 Scholarship.

### KNOWLEDGE

#### Teaching, educational supervision and assessment

- Know principles of adult learning, teaching and learning methods available and strategies; educational principles directing assessment, methods, formative vs. summative. Value of regular appraisal / assessment in informing training process.
- Able to identify educational objective. Able to design and deliver an effective teaching event, both small and large group. Uses technology / materials effectively. Adequate preparation, timekeeping.
- Appreciates benefit to learner is key objective of teaching sessions, key resource is adequate knowledge of subject.

#### Research, methodology and critical evaluation

- How to design and resource a research project, how to obtain ethical approval. Research methodology, valid statistical analysis, writing and publishing papers. Ethical considerations, declaring an interest.
- Reviewing the literature, framing the question, designing a project capable of providing an answer. Able to derive results and conclusions, able to write or present a paper.
- Intellectually honest.
- Present data in a clear, honest and critical fashion.

### SKILLS

- Bed-side undergraduate and post graduate teaching
- Lectures
- Ethics of research
- Presentation and writing skills

## Ethics

**Objectives:** *Medicine is predominantly concerned with the diagnosis and treatment of illness. Besides the pathological processes involved and the physical impact of each condition, the requirements for practising medicine in a fair, competent and ethical manner must be understood before a doctor is ready for independent practice.*

*Upon satisfactory completion of specialist training, the doctor will be **competent** to undertake comprehensive medical practice in that specialty in a **professional** manner, unsupervised and independently and/or within a team, in keeping with the needs of the Irish healthcare system.*

**Medical Council Domains of Good Professional Practice:** No. 1 Patient Safety and Quality of Patient Care; No. 3 Communication and Interpersonal Skill; No. 6 Scholarship; No. 7 Professionalism.

### KNOWLEDGE

- Knowledge of basic biomedical, behavioural and clinical sciences, medical ethics and medical jurisprudence and application of such knowledge in patient care.
- Interpersonal and communication skills that ensure effective informational exchange with individual patients and their families and teamwork with other health professionals, the scientific community and the public.
- Professionalism.

## Ethics I: Professionalism

**Objectives:** *To explore the relationship between ethics of healthcare delivery and professionalism including the challenges and the impact of current developments*

### KNOWLEDGE

- Knowledge, skills, attitudes and behaviours expected by patients and society from individuals during the practice of their profession (as a doctor).
  - The skills of lifelong learning and the maintenance of competence
  - Information literacy
  - Ethical behaviour
  - Integrity, honesty
  - Altruism
  - Service to, justice and respect for others
  - Adherence to professional code
- Leadership and Accountability
- Role of the Clinical Director
- Dignity & Respect
- Conflicts of interest
- Personal scope of practice & boundaries
- Adverse Events- open communication when adverse events occur
- Discussing errors

## Ethics II: Ethics & Law

*Objectives: To explore the relationship between ethics of healthcare and law including the challenges and the impact of current developments*

### KNOWLEDGE

- Ethical patient care and Irish Law including:
- Informed consent
- Consent and capacity
- Disclosure
- Medical Practitioner's Act
- Malpractice
- Misconduct
- Confidentiality
- Data protection
- Coroner's System
- Medical Council Ethical Guide

## Ethics III: Research

*Objectives: To explore the ethics of healthcare research including the challenges and the impact of current developments*

### KNOWLEDGE

- Principles of research
- Un-ethical conduct
- Genetics
- The Importance of Research in Health Care
- Dept of Health and Children Research Action Plan-implications for researchers
- Reasons for Research being Ethically Regulated
- Genetics
- Researching vulnerable groups
- Data Research/Protection and confidentiality
- Patient information bill
- Human Tissue Act
- Role of Research Ethics Committee
- Conflict of interest

## **Ethics IV: End of Life**

**Objectives:** *To explore the ethics of end of life challenges and the impact of current developments*

### **KNOWLEDGE**

- Euthanasia/Terminal Sedation
- Artificial nutrition/hydration
- Resuscitation issues
- Advanced Directives
- Organ donation
- Death Certification/Coronial System
- Prolongation
- Futility
- Decision making process

### **SKILLS**

- Recognises the dying patient
- Communicates bad news sensitively
- Explores the options for managing the dying patient including DNR and advanced directives
- To incorporate the above ethical concepts in their everyday practice

### **ASSESSMENT & LEARNING METHODS**

- RCPI Ethics programme: Ethics I, Ethics II, Ethics III and Ethics IV (Mandatory)
- Note of examples of ethical dilemmas encountered in training
- Consultant feedback at annual assessment
- Workplace based assessment e.g CBD
- Educational supervisor's reports on observed performance (in the workplace)

## Dealing with and Management of Acutely ill Patients in Appropriate Specialties

**Objective:** To have the knowledge and skills to be able to assess and initiate management of patients presenting as emergencies with the problems outlined below. For each scenario, trainees should in particular gain knowledge and skills to recognise the critically ill and:

*Immediately assess and resuscitate if necessary.*

*Formulate a differential diagnosis, treat and/or refer as appropriate.*

*Select relevant investigations and accurately interpret reports.*

*Communicate the diagnosis and prognosis – see Generic Skills.*

**Medical Council Domains of Good Professional Practice:** No. 1 Patient Safety and Quality of Patient Care, No. 8 Clinical Skills

### KNOWLEDGE

#### Management of acutely ill patients with medical problems

- Know how potentially life-threatening problems present; know the indications for urgent intervention, additional information necessary to support action (*e.g. results of investigations*) and treatment protocols (*see Addendum*).
- Know when to seek help, refer/transfer to another specialty. Know ACLS protocols. Know the ethical and legal principles relevant to resuscitation and DNR orders.
- Able to manage acute medical intake, to receive and refer patients appropriately, to interact efficiently and effectively with other members of the medical team, accept/undertake responsibility appropriately.
- Able to anticipate / recognise, assess and manage life-threatening emergencies, recognise significantly abnormal physiology *e.g. dysrhythmia* and provide the means to correct *e.g. defibrillation*.
- Able to convey essential information quickly to relevant personnel: maintains legible up-to-date records documenting results of investigations. Lists of problems dealt with or remaining, identifies areas of uncertainty; ensures safe handover.
- Remains calm, delegates appropriately, ensures good communication. Tries to meet patient's/ relatives' needs and concerns, respecting their views and right to be informed.

#### Discharge planning

- Distinguish between illness and disease, disability and dependency. Understand the potential impact of illness and impairment on activities of daily living, family relationships, status, independence. Be aware of quality of life issues.
- Know role and skills of other members of the healthcare team, how to devise and deliver a care package. Know the support available from other agencies *e.g. specialist nurses, social workers, community care*. Understand the principles of shared care with the general practitioner service.
- Show awareness of the pressures/dynamics within a family, the economic factors delaying discharge but recognise the limit to benefit derived from in-patient care. Establish liaison with family and community care, primary care, communicate / report to agencies involved.
- Demonstrates can awareness of the wide ranging effects of illness and the need to bridge the gap between hospital and home.

## **SKILLS**

- ACLS
- Deal with common medical emergencies
- Interpretation of blood results, ECG/Rhythm strips, Chest X-Ray, CT Brain
- Give clear instructions to both medical and hospital staff
- Order relevant follow up investigations
- Discharge planning
- Knowledge of patient pathways
- Knowledge of HIPE
- Multidisciplinary team working
- Communication
- Early regular and on-going consultation with family members and primary care physicians

## **ASSESSMENT & LEARNING METHODS**

- Certified ACLS
- Record of on call
- miniCEX (acute setting) - each year
- Case based discussions
- Consultant feedback at annual assessment

**Specialty Section  
Cardiology**

## History Taking and Clinical Examination

**Objectives:** *To obtain a history from the patient relevant to cardiovascular disorders:*

- *The patient's spontaneous account of symptoms*
- *Questions from the Cardiologist focused on the presence or absence of possible cardiovascular symptoms*
- *The past medical history*
- *Symptoms of any co-morbidities*
- *The social history*
- *Current and past drug therapy*

**Clinical Examination**

- *To complement the subjective findings from the clinical history, with the objective findings on clinical examination of the cardiovascular system.*
- *To perform a general examination of the patient searching for evidence of co-existing illness, as well as manifestations of cardiovascular disease*

### KNOWLEDGE

- Describe the range of, and the meaning of, words used by patients to describe cardiovascular systems
- Recognize classical symptoms of cardiovascular disease, that patients with cardiac chest pain may not present with classical symptoms and to recognize the characteristics of non-cardiac chest pain
- Recognize typical and atypical symptoms of cardiovascular disease
- Recognize cardiovascular risk factors from the patient's history
- Names and side effects of drugs used
- Symptoms and treatments of the co-morbidities often associated with cardiovascular disease.
- Recognise the features on general examination caused by cardiovascular disease
- The physiology and patho-physiology of the cardiac cycle and understand how normal heart sounds, abnormal heart sounds and systolic and diastolic murmurs are generated and how to best auscultate them
- Patho-physiology of the clinical signs of under perfusion and fluid retention
- Ankle-brachial index as a measure of peripheral arterial disease

### SKILLS

- Examine the arterial pulse at different arteries for rate, rhythm and haemodynamic profile, and how to measure arterial blood pressure
- Examine the venous system and in particular to be able to clinically estimate the right atrial pressure
- Examine the precordial impulse
- Analyse and integrate the information obtained by taking a history from a patient to contribute to the development of an overall assessment
- Assess global cardiovascular risk
- Establish a relationship with the patient based on empathy and trust
- Allow the patient time to express his or her symptoms in their own words
- Sympathetically direct open ended questions to the patient
- Take into account the importance of both co-morbidities and social circumstances in relation to cardiovascular disorders

- Examine the peripheral, arterial and venous systems.
- Examine the heart
- Make and record accurate observations about the clinical state of the patient with particular emphasis on the cardiovascular system.
- Use a stethoscope and blood pressure cuff to maximise the information to be gained about abnormalities of the heart and blood vessels.
- Obtain the ankle-brachial index as a sign of peripheral arterial disease
- Examine the patient with due regard for the patients dignity.
- Continually seek or correlate findings on examination with subsequent findings at echocardiography or surgery, thus emphasising life long learning.

## **ASSESSMENT & LEARNING METHODS**

- miniCEX

### **Assessment at SpR year 1**

### **References**

- [www.heartscore.org](http://www.heartscore.org)

# The Electrocardiogram: Standard ECG, Ambulatory ECG, Exercise ECG

**Objectives:** To select, perform and interpret each of the three non-invasive ECG techniques

## KNOWLEDGE

**Identify the indications and recognise the limitations of the following modalities**

### ECG

- The physiology and anatomy of the conduction system.
- Cellular and molecular mechanisms involved in the electrical activity of the heart.
- Basic principles of ECG.
- Normal evolution of the electrical vectors during the cardiac cycle.
- Recognise the normal ECG, and explain how it is formed.
- ECG characteristics of atrial and ventricular hypertrophies, bundle branch blocks and other conduction blocks, tachycardias, bradycardias, acute and chronic myocardial ischemia, pericarditis and myocarditis, electrolyte abnormalities, preexcitation, QT abnormalities, pacemaker dysfunction.

### Exercise ECG Testing

- Main indications, contraindications and limitations
- Evaluation of
  - ischemia
  - valvular diseases
  - hypertrophic cardiomyopathy
  - treatment response
  - functional capacity
  - inducible arrhythmias
- Criteria for stopping the testing
- Complications and their treatment

## SKILLS

- Choose the appropriate techniques for specific clinical situations including a thorough understanding of the Bayesian approach.
- Choose techniques modalities and protocols in a clinical useful and cost effective way, avoiding over- and underutilisation of tests
- Appropriate selection of ECG techniques necessary for the patients' management.
- Explain to patients and their family the implications of the results of the electrocardiogram.
- Perform and interpret ECG, ambulatory ECGs/loop recorder ECGs and exercise ECG testing in the clinical context
- Identify the normal and abnormal ECG, in particular:
  - arrhythmias
  - bundle branch blocks
  - hypertrophy
  - acute and chronic ischemia
  - QT abnormalities
  - pericarditis

- electrolyte abnormalities
  - pacemaker dysfunctions
- Integrate data from different electrocardiographic techniques, as well as from other non-invasive and invasive techniques.
- Recognise strengths and weaknesses of ambulatory ECGs/loop recorder ECGs in a clinical situation.
- Cooperate with interventional cardiologists, electrophysiologists, anaesthetists, cardiac surgeons, as well as with other doctors involved in emergency medicine and intensive care.
- Recognise that the diagnosis and treatment of some arrhythmias need sometimes a multidisciplinary approach.
- Manage complications in a proper and timely way.

#### **ASSESSMENT & LEARNING METHOD**

- Record of ECGs performed and interpreted in logbook:
  - ECG
  - Ambulatory ECGs/loop recorder ECGs
  - Exercise ECG testing

*Competence recorded by trainers each year)*

- DOPs
  - Stress Test
  - Ambulatory ECGs
- Study day on ECG's
- Study Day
-

## Non Invasive Imaging – Echocardiography, CMR, Cardiac CT and Nuclear Techniques

**Objectives:** *Appropriately select from the four imaging modalities of:*

- *Echocardiography;*
- *Cardiac Magnetic Resonance (CMR);*
- *Computed Tomography (CT)*
- *Nuclear Techniques*

*and then integrate the results into individual patient care*

### KNOWLEDGE

- Use the above modalities to measure cardiac structure and function.
  - Ventricular chamber and wall dimensions
  - Left ventricular (LV) Mass
  - Ventricular volumes
  - Ejection / regurgitation fractions
  - Regional wall motion abnormalities
  - Estimation of shunt size
  - Calculation of valve stenosis
  - Estimation of valvular regurgitation
  - Estimation of LV diastolic function
  - Calcification of coronary arteries
  - Myocardial perfusion
  - Myocardial disease
  - Coronary Artery
- Disease
  - Pericardial disease
  - Cardiac tumours
  - Congenital heart disease
  - Non-invasive coronary angiogram
  - Aortic diseases
  - Diseases of the pulmonary circulation

### Echocardiography Techniques

- M-mode
- 2-dimensional (2D) mode
- Doppler imaging (blood flow and tissue)
- Contrast echocardiography
- Indications:
  - Evaluation of systolic and diastolic function (including ejection fraction) of the left ventricle
  - Regional wall motion abnormalities
  - LV mass
  - Chamber volumes and wall dimensions
  - Cardiomyopathies
  - Valvular morphology and function, including stenosis and regurgitation
  - Right ventricular function
  - Shunt lesions
  - Pericardial masses (tumors, thrombi, vegetations)
  - Congenital heart disease
  - Aortic disease

- Modalities
  - Transthoracic echo
  - Stress test
  - Contrast echocardiography
  - 3D echocardiography

### **Cardiovascular Magnetic Resonance (CMR) Techniques**

- 2D mode
- Perfusion imaging
- Late enhancement
- Indication
  - Volumes
  - Ejection fraction
  - LV mass
  - Shunt
- Modalities
  - Cine-MR
  - MR angiography
  - TI imaging

### **Cardiac Computed Tomography Techniques**

- 2D
- 3D
- Indications
  - Calcium score
  - Coronary Artery Disease (CAD) (including grafts and stents)
- Modalities
  - Ultra-fast CT
  - Coronary angiogram

### **Nuclear Imaging Techniques**

- Planar angiography
- SPECT
- Gated SPECT
- Gated blood pool SPECT
- PET
- Tracers
- Thallium
- Technetium-labeled tracers
- Fluorodeoxyglucose
- Indications
  - Myocardial perfusion
  - Viability
  - RV and LV volumes
  - Ejection fraction
  - Diastolic function
  - Phase analysis for cardiac asynchronic
  - Shunt
- Modalities
  - Rest metabolism
  - Stress protocols (exercise or pharmacological)
- Remain current with developments in the field of non-invasive imaging

## SKILLS

- Appropriate selection of imaging techniques for specific clinical situations, including a thorough understanding of the Bayesian approach
- Choose imaging techniques, modalities and protocols in a clinically useful and cost effective way, avoiding over and under utilisation of tests, keeping in mind radiation exposure, where appropriate
- Integrate data from different noninvasive techniques as well as from invasive imaging
- Stress testing
- Cooperate with interventional cardiologists, electrophysiologists, anesthesiologists and other physicians involved in emergency medicine and intensive care, and with cardiac surgeons
- Explain to patients the implications of the results of the test
- Assess the side effects of contrast media and recognize the risk of radiation to patient and personnel
- Recognise the risk of ionizing radiation for patient and personnel

## ASSESSMENT & LEARNING METHOD

- ACLS
- DOPS:
  - Year 1 and 2: Transthoracic echo
  - Year 3 – 4 Transoesophageal echo
- Minimum of 6 months experience in an echo laboratory
- Document performance and interpretation of:
  - Transthoracic, transoesophageal and stress echocardiography
- ≥350 transthoracic echocardiograms
- Exposure to CT, CMR and nuclear sessions
  - Evaluate CT examinations in the clinical context (50 cases)
  - Evaluate cardiac nuclear examinations in the clinical context and with reference to other noninvasive and invasive approaches. (50 cases)
- , CT, Nuclear to certify competence and knowledge
- Radiation Protection Course
- Study Day

## Invasive Imaging – Catheterisation and Angiography

**Objectives:** *Coronary and left ventricular angiography: To be able to perform and interpret native coronary and surgical conduit angiograms and left ventricular angiograms*

*Cardiac catheterisation: To be able to perform and interpret right and left heart catheterisation.*

### KNOWLEDGE

- Principles of fluoroscopic imaging, radiation physics and safety.
- Potential complications of cardiac catheterisation and angiography (including hypotension, heart failure, arrhythmias, ischemic neurologic damage, myocardial ischaemia, contrast reaction, cholesterol embolism, renal failure, vascular complications retroperitoneal bleeding, and cardiac tamponade).
- Radiological anatomy of the heart, aorta, large vessels and coronary arteries, as well as that of the femoral, radial and brachial arteries used for vascular access during catheterisation.
- Knowledge of catheterisation lab equipment (physiological monitoring, transducers, blood gas analysers, power injector).
- Pressure waveforms obtained during cardiac catheterisation.
- Routine collection of haemodynamic and oxymetric data, and how to calculate cardiac output, vascular resistances, valve areas, and AV shunts from measurements.
- Percutaneous and cut down techniques of catheterisation.
- Type of catheters used in coronary arteriography and cardiac catheterisation.
- Equipment and technique used of transeptal cardiac catheterisation, and its applications.
- When and how to perform cardiac pacing and pericardiocentesis, and the potential complications associated with its use.
- Basic principles and indications for intracoronary ultrasound, Doppler and pressure assessment.

### SKILLS

- Ordering, performing and interpreting invasive tests, by appropriately weighing up the risks and benefits of these procedures.
- Select the appropriate treatment modality (medical, percutaneous or surgical) based on the data generated by cardiac catheterisation, taking the clinical context into account.
- Obtain percutaneous arterial access (femoral, radial, brachial) and venous access and achieve haemostasis after catheterisation.
- Perform left heart catheterization including coronary angiography, ventriculography, and angiography of coronary bypass grafts
- Perform right heart catheterisation at the bedside including measurement of cardiac output, pressure measurement and oxymetry
- Proficiency in managing life-threatening arrhythmias and other emergency situations in the cath lab, including resuscitation and life support measures.
- Evaluate normal and pathological coronary angiograms. ventriculograms, aortograms, and pulmonary angiograms.
- Recognise the limitations and potential risk of invasive procedures and inform patients accordingly.
- Recognise the risks of ionizing radiation for the patient and clinical personnel.
- Consult and liaise with nurse and technician personnel and specialized physicians

### ASSESSMENT & LEARNING METHODS

- DOPS
  - Year 5/6:
    - Transeptal cardiac catheterisation
    - Intracoronary ultrasound
- Documented experience:
  - Left heart catheterization including coronary angiography, ventriculography, and angiography of coronary bypass grafts
  - Right heart catheterisation at the bedside including measurement of cardiac output, pressure measurement and oxymetry
- Study Day

## References

- [www.escardio.org/guidelines](http://www.escardio.org/guidelines)
- Clinical role of cardiac magnetic resonance in cardiovascular disease.(European Heart Journal 1998; 19: 19-39)

## Genetics

**Objectives:** *To be able to perform general cardiological assessment and treatment of patients with inherited or familial cardiovascular disease.*

### KNOWLEDGE

- Incidence and prevalence of inherited cardiovascular disorders in the local community.
- Knowledge of cardiac embryology and major gene families involved in cardiogenesis.
- Principles of Mendelian inheritance.
- Principles of polygenic cardiovascular diseases (such as hypertension, diabetes and dyslipidaemias)
- Knowledge of major monogenic cardiovascular diseases; hypertrophic cardiomyopathy, familial aortopathies such as the Marfan syndrome, Ehlers Danlos syndrome, and William's syndrome; familial dilated cardiomyopathies; familial channelopathies; familial disorders of septation; familial basis of conotruncal anomalies; trisomies in particular trisomy 21; familial dyslipidaemias in particular disorders of the low density lipoprotein receptor.
- Familial basis of inherited cardiac tumours

### SKILLS

- Evaluate relevant family history and construct a family pedigree.
- Distinguish autosomal dominant, autosomal recessive, X-linked, and mitochondrial patterns of inheritance.
- Develop a systematic method of approaching a family with a potentially inherited cardiovascular disease.
- Counsel index cases, family members at risk on the probability of being affected by a genetic cardiovascular disorder.
- Adopt appropriate counseling skills to explain, educate and inform patients fully of the nature of their disease, the diagnostic tests used to make a diagnosis and the inherent strengths and weaknesses of such diagnostic tests in individuals at risk.
- Recognise problems with pedigree interpretation such as incomplete penetrance, variable expressivity, and age related patterns of expressivity.
- Consult with clinical geneticists and medical professionals of other specialties on patients with genetic disorders

### ASSESSMENT & LEARNING METHODS

- Study day

# Clinical Pharmacology

**Objectives:** To master the theory and practice of state of the art pharmacological treatment of cardiovascular disorders

## KNOWLEDGE

- Classification and mode of action of drugs (with emphasis on angiotensin-converting enzyme inhibitors, angiotensin-receptor blockers, aldosterone antagonists, renin inhibitors, antiarrhythmic drugs, betablockers, calcium antagonists, diuretics, lipid-lowering drugs, antiplatelet agents, anticoagulants, inotropes, digitalis, nitrates, other vasodilating drugs, drugs with cardiac toxicity and other drugs with novel mechanisms like potassium channel blockers)
- Recognise for the drugs listed above:
  - Pharmacokinetics (absorption, bioavailability, distribution, biotransformation, excretion)
  - Pharmacodynamics
  - Pharmacogenetics
  - Indications.
  - Contraindications
  - Interactions
  - Adverse effects and toxicity.
- Perform and interpret diagnostic tests to assess drug efficacy and safety (laboratory tests, ECG and haemodynamic monitoring, Echo).
- Knowledge of randomised clinical trials and evidence based medicine.

## SKILLS

- Take a relevant history of a patient's medication regime, including purchase of over the counter medicines. Identify and incorporate the importance of herbal remedies taken by patients.
- Assess the risks and benefits of prescribing an individualized drug treatment regimen for a given cardiovascular condition.
- Monitor the desired effects of a patient's drug therapy and also the side effects.
- Recognise and manage possible drug interactions (including treatments of concomitant diseases).
- Evaluate the design and results of published clinical trials.
- Incorporate the principles of evidence based therapy and current guidelines into clinical practice.
- Communicate with patients and their family members to improve treatment compliance, and to ensure early recognition of possible adverse effects.
- Consider cost-effectiveness and feasibility of the prescribed treatment regimen

## ASSESSMENT AND LEARNING METHODS

- Study Day

### Assessment throughout training

# Cardiovascular Disease Prevention – Risk Factors, Assessment and Management

**Objectives:** *To assess and treat patients with risk factors for cardiovascular disease. Evaluate how different prevention methods work. Describe cardiovascular disease and risk factors in the local community. Contribute to the global efforts in reducing Cardiovascular morbidity and mortality by communicating the prevention message to the public. Approach risk prevention in a holistic way, understanding the potentiation of cardiovascular risk by clustering of risk factors. Diagnose and treat different forms of arterial hypertension. Assess cardiac and other endorgan complications in patients with arterial hypertension. Diagnose and treat cardiovascular complications in the diabetic patient, appreciating the continuum ranging from impaired fasting glucose to insulin dependent diabetes and its complications.*

## KNOWLEDGE

- Epidemiology of cardiovascular disease in the local community: incidence, prevalence, survival
- Risk factors and describe distribution and frequency of high risk conditions in the local community
- Risk assessment in primary prevention, multifactorial risk interaction: risk scoring charts.
- Diet and nutrition in relation to cardiovascular risk management.
- Special treatment/prevention strategies for smoking, dyslipidaemia, diabetes mellitus, hypertension, physical inactivity, left ventricular hypertrophy (LVH), obesity, metabolic syndrome, psychosocial factors.
- Recognise that risk factors often cluster and require a comprehensive approach.
- Risk assessment in secondary prevention including drug therapy.
- Complications and consequences of specific risk factors.

### Hypertension

- Epidemiology aetiology and pathophysiology of Essential Hypertension.
- Complications and consequences of essential hypertension.
- Diagnosis and assessment of essential hypertension; - Blood pressure measurement, including ambulatory blood pressure monitoring
- Symptoms and signs of target organ damage
- Diagnostic procedures
- Management of essential hypertension.
- Secondary hypertension and recall its various causes
- Renovascular hypertension
- Bilateral renal parenchymal disease
- Hypertension induced by hormonal contraceptives and conjugated oestrogens
- Other forms of secondary hypertension.
- Cell biology of left ventricular hypertrophy

### Dyslipidemia

- Diagnoses and treatment of different forms of dyslipidemia.
- Cardiac and extra-cardiac complications of dyslipidemia.
- Epidemiology, aetiology and pathophysiology of dyslipidemia
- Complications and consequences of dyslipidemia
- Diagnosis, assessment and management of dyslipidemia.
- Cell biology of atherosclerosis.

## Diabetic heart disease

- Diabetes Mellitus
- Role of diabetes in Coronary heart disease in the following areas
  - Epidemiology
  - Pathophysiology of cardiovascular complications
  - Role of risk factor intervention
  - screening for CAD in diabetics
  - screening for diabetes in CAD (oral glucose testing)
- Pathophysiology of diabetes and its non-cardiac and cardiac complications (CAD, diabetic cardiomyopathy, autonomic neuropathy and its cardiovascular affects).
- Treatments including diet, exercise, hypoglycaemic drugs and insulin
- Current thinking regarding the concept of the metabolic syndrome

## SKILLS

- Evaluate CVD risk and assess global CVD risk at individual level (HeartSCORE).and population level (mortality, morbidity, disability)
- Evaluate the benefit of prevention at individual and population levels
- Appreciate the importance of risk factor management.
- Evaluate and manage risk factors appropriately and communicate their importance to patients, their families and the wider community.
- Appreciate variation in CVD risks across population, socioeconomic, gender, and racial groups.
- Through patient education, encourage a healthier lifestyle with specific emphasis on risk factors and maintenance of favourable risk profile over lifetime.
- Offer advice and support to family members with inherited CVD.
- Cooperate with other specialists such as dieticians, diabetologists and specialist nurses.
- Participate actively at CVD prevention programs (children, adults and elderly).
- Consider cost-effectiveness of the prescribed treatment regimen.
- Assess blood pressure using the correct methods for diagnosis and treatment control in hypertension, including ambulatory blood pressure monitoring.
- Advise patients on lifestyle management and treatment compliance.
- Advise patients on measuring their own blood pressure.
- Perform cost efficient screening for secondary hypertension.
- Select adequate treatment for lowering blood pressure to target values and prevent/treat end-organ damage.
- Select appropriate parameters in order to describe the risk profile in an individual patient with hypertension.
- Identify secondary organ damage (in particular cardiac, neurological, renal and atherosclerotic vascular disease) caused by hypertension.
- Manage multi-drug treatment regimes according to a patient's co-morbidities and possible side effects.
- Recognise that the diagnosis and treatment of hypertension need a multidisciplinary approach.
- Be able to motivate the patient to maintain long term compliance with antihypertensive therapy.
- Appreciate that hypertension itself is often under diagnosed and under -treated.
- Recognise the clustering of risk factors that include hypertension in order to formulate a holistic approach to patient management
- Assess dyslipidemia using the correct methods for diagnosis and therapeutic control.
- Advise patients on measuring their lipids.

- Select adequate treatment for lowering blood pressure to target values and prevent/treat its consequences
- Recognise that the diagnosis and treatment of dyslipidemia sometimes need a multidisciplinary approach.
- Be able to motivate the patient to maintain long-term compliance with antihypertensive lipid lowering therapy
- Recognise the clustering of risk factors that include dyslipidemia in order to formulate an integrated approach to patient management.
- Select appropriate parameters to describe the risk profile in an individual patient with dyslipidemia
- Identify other vascular areas affected by atherosclerotic vascular disease
- Manage multidrug treatment regimens according to a patient's comorbidities and possible side effects.
- Manage the prevention, diagnosis and treatment of diabetes and its associated cardiovascular complications.
- Actively participate in a multidisciplinary network of physicians and assistant medical personnel in order to treat patients with diabetes adequately according to disease state and complications.
- Be aware of the importance of recognising the continuum that extends from primary prevention to treatment of end organ damage.
- Appreciate the importance of treating asymptomatic patients in order to improve prognosis.
- Recognise the clustering of risk factors that include diabetes in order to formulate a holistic approach to patient management

## **ASSESSMENT & LEARNING METHODS**

Study Day

**Assessment throughout training**

## Acute Coronary Syndrome (ACS)

**Objectives:** To be able to perform specialist assessment and treatment of patients with acute coronary syndromes including

- STEMI (ST segment elevation myocardial infarction)
- Non-STEMI
- Unstable angina

To understand indications, techniques, typical acute and long-term problems, limitations, complications, alternatives, and adjunctive pharmacotherapy of PCI

### KNOWLEDGE

- Pathophysiology of acute coronary syndromes; Myocardial ischaemia, Atherosclerosis of the epicardial coronary arteries, Events that precipitate ACS, Non-atheromatous CAD
- Dominant clinical features of ACS; Cardiac ischaemic chest pain, examination of CV system in ACS, Silent ischaemia and infarction
- Diagnostic process in unstable angina and non-ST elevation MI - analysis of symptoms and clinical differential diagnosis, 12-lead ECG, Laboratory studies, Imaging modalities
- Diagnostic procedures in AMI - analysis of symptoms and clinical differential diagnosis, 12-lead ECG, Laboratory studies, Imaging modalities
- Potential complications of AMI; Myocardial Ischemia, Arrhythmias and Mechanical complications
- Treatment options for AMI; Pre-hospital and early-hospital adjunctive pharmacological therapy, percutaneous coronary intervention (PCI), Coronary bypass grafting (CABG), early in-hospital.

### Percutaneous coronary intervention

- Mechanisms of action of main PCI techniques (balloon angioplasty, stent implantation, rotablation).
- Fundamental characteristics of balloons and stents, including typical lengths and diameters, antiproliferative drug coating.
- Problem of restenosis, acute and subacute stent thrombosis, and appropriately weigh risks and benefits of interventional techniques.
- Recognize the added risk from diabetes and renal impairment;
- Acute and chronic complications of PCI.
- Current differential indications for surgical and interventional revascularization as well as conservative treatment of CAD with respect to anatomy, extent of disease, role of left ventricular function both in the setting of ACS and of chronic CAD.
- Knowledge of adjuvant drug therapy, in particular anticoagulation regimes and platelet-inhibitors (aspirin, thienopyridines, glycoprotein IIb/IIIainhibitors).

## SKILLS

- Appreciate the role of risk factors, the clinical characteristics of coronary occlusion, and subsequent clinical course.
- Interpret biochemical markers of myocardial damage.
- Interpret ECG and imaging techniques to detect and locate ischaemia and/or infarction.
- Understand the importance of monitoring patients with ACS.
- Provide appropriate pharmacological treatment including analgesic, antiplatelet, and antithrombotic and anti-ischaemic therapy.
- Understand indications and contraindications for acute reperfusion treatment and make appropriate decisions.
- Demonstrate proficiency in selecting cardiac catheterisation in the context of ACS.
- Demonstrate proficiency in treating patients with heart failure and cardiogenic shock, including invasive haemodynamic monitoring.
- Demonstrate knowledge of advanced CPR techniques and management of life threatening arrhythmias.
- Recognise the urgency of organised teamwork required for the optimal management of patients with ACS.
- Recognise the urgency of making rapid decisions regarding patients with ACS, from the time of their arrival in the emergency department until definitive therapy is established (for example minimising door-to-balloon/needle time).
- Appreciate the distress that unexpected and serious illness causes both to the patient and their relatives.
- Recognise when to transfer the patient to another hospital for interventional or surgical revascularisation.
- Contribute to improving public awareness of the significance of chest pain and encouraging early presentation.

### **Percutaneous coronary intervention**

- To appropriately select ACS patients who are candidates for urgent angiography and PCI
- To appropriately select chronic CAD patients who are candidates for angiography and PCI.
- To adapt pharmacotherapy, especially anticoagulation and antiaggregatory medication, before and after PCI to clinical needs.
- To be responsive to potential hazards such as contrast nephropathy, arterial access complications (hematoma), drug compliance issues, drug resistance, non-cardiac diseases or interventions with bleeding risks while the patient is on thienopyridine and aspirin medication.
- Explain risk, benefits and alternatives in a compassionate way to the patient and be responsive to his fears and worries; take patient's wishes, co-morbidities and social situation into account when making medical decisions
- Interact and cooperate professionally with interventional cardiologists, heart surgeons, and supporting medical personnel

## ASSESSMENT & LEARNING METHODS

- Study Day

# Chronic Ischaemic Heart Disease

**Objectives:** *To be able to perform specialist assessment and treatment of patients with chronic Ischaemic Heart Disease (IHD).*

*To evaluate patients and interpret the results of diagnostic procedures.*

*To select and manage appropriate therapies*

*To be able to perform exercise or pharmacological stress testing alone, or in conjunction with, an imaging modality*

## KNOWLEDGE

- Epidemiology of chronic IHD and its risk factors
- Molecular and cellular biology of IHD, its pathology and development, and the effects of ischaemia on the cardiac myocyte
- Describe events that precipitate a clinical angina attack
- Outline the prognosis of chronic IHD
- Clinical assessment of known or suspected chronic IHD, including evaluation of chest pain, other symptoms and signs, and diagnostic procedures
- Management of chronic IHD, including lifestyle measures, pharmacological management -
  - disease modifying drugs
  - symptom controlling drugs
- Explain the role and relative merits of medical therapy and revascularisation (percutaneous coronary intervention or coronary artery bypass surgery) in the patient with IHD

## Stress Testing

- Basic principles of coronary physiology
- Principles of exercise physiology
- Mechanisms of action of vasodilators and inotropic drugs used for stress testing
- Appreciating the indication of stress testing in other cardiac disorders (including valvular disease, arrhythmias and heart failure)

## SKILLS

- Risk stratify individual patients and to select an appropriate management strategy.
- Select, use and interpret non-invasive and invasive diagnostic tools for the evaluation of ischaemia, viability, left ventricular structure and function and coronary anatomy.
- Identify and treat risk factors for chronic IHD.
- Recognise the importance of risk factor management and secondary prevention.
- Consult with specialists such as interventional cardiologists, cardiac surgeons, dieticians and diabetologists in order to devise an appropriate management plan for individual patients
- Be able to interpret the ECG to detect ischaemia and/or arrhythmias
- Managing life-threatening arrhythmias, ischaemia, or other emergency situations, including ACLS, during the test
- Select the appropriate stress modality for a particular patient and interpret according to Bayesian principles taking into account specific strengths and weaknesses of a given test modality in a given patient (e.g., frequent false positive stress ECG in women)

- Study day

### Assessment throughout training

### References

- European guidelines on cardiovascular disease prevention in clinical practice – Executive Summary. (European Heart Journal 2007; doi: bis.1093/eurheartj/ehm316)
- Management of stable angina pectoris. (European Heart Journal 2006; 27: 1341-1381)
- Guidelines on universal myocardial infarction redefinition (European Heart Journal 2007; doi: bis.1093/eurheartj/ehm355)
- Details of the latest ESC Guidelines can be found at: [www.escardio.org/guidelines](http://www.escardio.org/guidelines)

# Myocardial Disease

**Objectives:** *To be able to perform specialist assessment and treatment of patients with cardiomyopathy, myocarditis and pericardial disease.*

## KNOWLEDGE

- Epidemiology of dilated, hypertrophic, restrictive, infiltrative cardiomyopathies and obliterative endomyocardial disease
- Pathophysiology including genetics, clinical features and diagnostic criteria of cardiomyopathies
- Medical and invasive (surgical, electrophysiological and interventional) management of cardiomyopathies: indications, contraindications, possible adverse effects
- Prognostic factors

### Myocarditis

- Myocarditis and its aetiology
- Clinical features, pathology and diagnostic criteria of infective and non-infective myocarditis, in particular the typical features of different forms of myocarditis on magnetic resonance imaging
- Treatment of patients with myocarditis and its complications

## SKILLS

- Interpret diagnostic data (ECG, ambulatory ECG, Echo, exercise testing, chest X-ray, cardiac catheterisation, coronary angiography, magnetic resonance and radionuclide imaging, endomyocardial biopsy, genetic assessment)
- Select appropriate treatment and support modalities (medical, interventional, surgical, ICD/CRT, assist devices, balloon pumping or other treatment)
- Assess individual prognosis in relation to the need for transplantation.
- Evaluate patients for endomyocardial biopsy recognizing diagnostic yield and potential risk of this procedure.
- Establish cooperation with medical professionals in other specialties (immunology, bacteriology, genetics, cardiac surgery, interventional cardiology, imaging) for timely differential diagnosis of myocardial disease and further treatment
- Counsel patients with cardiomyopathies and their relatives about associated risks

## ASSESSMENT & LEARNING METHODS

- Study Day

### Assessment at SpR years three/four

### References

- Clinical expert consensus document on hypertrophic cardiomyopathy (European Heart Journal 2003; 24: 1965 - 1991)

# Pericardial Disease

**Objectives:** *To be able to perform specialist assessment and treatment of patients with pericardial diseases*

## KNOWLEDGE

- Classify and define
  - Acute pericarditis (infective, idiopathic or neoplastic)
  - Chronic pericarditis
  - Constrictive pericarditis
- Describe for each the epidemiology, pathophysiology, and aetiology (including infective, inflammatory and neoplastic disorders)
- Relevant investigations: noninvasive and invasive.
- Differential diagnosis of constrictive pericarditis from restrictive cardiomyopathy
- Management of pericarditis
- Related complications; pericardial effusion, cardiac tamponade and constriction

## SKILLS

- Demonstrates knowledge of the ECG abnormalities in acute pericarditis
- Select and use the different noninvasive imaging modalities: echo, CMR, CT as well as invasive pressure measurements to diagnose pericardial disease.
- Evaluate haemodynamic status;
- Determine the aetiology of pericardial effusion
- Clinically differentiate pericarditis from myocardial ischaemia.
- Assist in and ideally perform pericardiocentesis on appropriately selected patients
- Consider pericardial diseases within the differential diagnosis of a patient presenting with cardiovascular disease
- Be aware of the different diagnostic and therapeutic strategies required for each individual case
- To work closely with radiologists, cardiac surgeons and oncologists.

## ASSESSMENT & LEARNING METHODS

- Study Day

### Assessment at SpR years 3/4

### References

- Guidelines on the diagnosis and management of pericardial diseases. (European Heart Journal 2004; 25: 587 - 610)

# Cardiac Tumours

**Objectives:** *To be able to perform specialist assessment and treatment of patients with cardiac tumours*

## KNOWLEDGE

***Given this is rare it is recommended that basic knowledge only is essential***

- Epidemiology, pathophysiology, pathology and clinical manifestations of primary cardiac tumours and metastatic cardiac tumours, including lymphoma
- Effect of tumour size and location
- Clinical features including
  - Impairment of cardiac function
  - Systemic manifestations
  - Systemic and pulmonary emboli
  - Signs of physical obstruction to blood flow (e.g. atrial myxoma)
  - Pericardial involvement-constriction and tamponade
- Appropriate diagnostic procedures
  - echocardiography, computed tomography, magnetic resonance imaging
- Operative management (tumour removal, heart transplantation, palliative management)

## SKILLS

- Select and use appropriate imaging modalities
- Consider a differential diagnosis of primary or secondary neoplastic involvement of the heart
- Recognise other cardiac masses including thrombi or vegetations
- Collaborate effectively with cardiovascular surgeons and with other specialists dealing with neoplastic disease
- Understand the importance of support and counselling for the patient and family

## ASSESSMENT & LEARNING METHODS

- Study Day

# Congenital Heart Disease in Adult Patients

**Objectives:** To be able to assess, manage and appropriately refer adult patients with congenital heart disease including those patients who have undergone previous cardiac surgery

## KNOWLEDGE

- Epidemiology, aetiology, prevention, pathophysiology, nomenclature, and foetal and transitional circulations
- Diagnosis and assessment
- Principles of management Identify pathology, diagnosis and management of specific conditions
  - Atrial septal defect
  - Atrioventricular septal defects
  - Ventricular septal defects
  - Anomalous pulmonary venous connections
  - Pulmonary stenosis
  - Aortic stenosis
  - Patent ductus arteriosus
  - Coarctation of the aorta
  - Tricuspid atresia
  - Ebstein's anomaly of the tricuspid valve
  - Abnormalities of the left atrioventricular junction
  - Tetralogy of Fallot
  - Double-outlet right ventricle
  - Complete transposition of the great arteries
  - Congenitally corrected transposition of the great arteries
  - Double outlet left ventricle
  - Common arterial trunk
  - Pulmonary atresia
  - Congenital malformations of coronary arteries
  - Congenital malformations of pulmonary arteries
  - Aortic arch anomalies
  - Arteriovenous malformations

## SKILLS

- Select imaging techniques and where appropriate use invasive procedures for diagnosis and treatment.
- Provide long term follow up, including patient monitoring and lifestyle advice.
- Understand the importance of referring patients for a specialist opinion.
- Appreciate the importance of genetic counselling.
- Appreciate the social and emotional difficulties encountered by adult patients with congenital heart disease

## ASSESSMENT & LEARNING METHODS

- Study Day

## References

- Guidelines for the interpretation of the neonatal electrocardiogram (European Heart Journal 2002: 1329 - 1344)

## Pregnancy and Heart Disease

**Objectives:** *To be able to perform cardiac evaluation and treatment of women contemplating pregnancy.*

*To be able to perform cardiac follow-up of the pregnant patient with heart disease*

*To be able to perform specialist assessment and treatment of cardiac patients after pregnancy*

### KNOWLEDGE

- For each of the listed objectives consider the following clinical conditions which may affect the pregnant woman: congenital heart disease, acquired valve disease, prosthetic valves, coronary artery disease, cardiomyopathies, arrhythmias, hypertension, Marfan's syndrome,
- Aortic dissection Define cardiac contraindications to pregnancy (or which justify early termination)
- Indications for genetic counselling for inheritable diseases
- Identify women who have a high risk of pregnancy-related cardiac complications and who may need intervention before considering pregnancy
- Outline cardiac follow-up of pregnant women
- Identify situations requiring medical therapy
- Outline treatment of arterial hypertension and its complications
- Identify situations in which cardiac intervention may be required
- Define the modalities of delivery
- Management of anticoagulation therapy
- Follow-up modalities during the post-partum period
- Diagnose and treat post-partum cardiomyopathy

### SKILLS

- Perform clinical evaluation and interpret the results of diagnostic procedures to assess the cardiac risk of pregnancy
- Indicate preventive cardiac intervention if needed
- Recognise the importance of education for women with heart disease on the potential risks of pregnancy
- Co-operate with obstetricians and midwives to detect pregnant women with unknown heart disease and to identify those at high risk
- Perform clinical and non-invasive evaluation of the cardiac tolerance of pregnancy
- Select which drug therapies can be used during pregnancy
- Evaluate the foetal and maternal risk of different cardiac interventions
- Assess the foetal prognosis in association with Obstetrician/Paediatrician
- Recognise the importance of patient education on the symptoms of poor cardiac tolerance
- Educate obstetricians and midwives on symptoms of undiagnosed heart disease enabling the prompt identification of situations requiring rapid cardiac management
- Co-operate with obstetricians and anaesthesiologists to plan delivery (date, method, drug therapy, medical environment)
- Analyse cardiac condition after pregnancy
- Assess the cardiac risk of subsequent pregnancies
- Inform obstetricians and midwives on the risk of worsening of cardiac status during the early post-partum period

- Recall efficacy, risks, and contraindications to the various contraceptive methods according to type of heart disease
- Co-operate with gynaecologists and obstetricians with regard to recommendations on contraception

## **ASSESSMENT & LEARNING METHODS**

- Study Day

### **References**

- ESC Guidelines
- Expert consensus document on management of cardiovascular diseases during pregnancy. (European Heart Journal 2003; 24: 761-781)
- Details of the latest ESC Guidelines can be found at: [www.escardio.org/guidelines](http://www.escardio.org/guidelines)

## Valvular Heart Disease

**Objectives:** *To be able to perform a specialist assessment and treatment of patients with the following valvular pathologies:*

- *Aortic stenosis*
- *Aortic regurgitation*
- *Mitral valve stenosis*
- *Mitral valve regurgitation*
- *Tricuspid stenosis*
- *Tricuspid regurgitation*
- *Pulmonary valve disease*

*To be able to perform follow up after valve surgery or percutaneous intervention, including immediate post-operative care and long term management of patients with prosthetic valves*

### KNOWLEDGE

- Pathology and pathophysiology
- Natural history and progression.
- Strengths and limitations of diagnostic techniques, in particular echocardiography, and recognize the value of additional techniques such as magnetic resonance imaging or and invasive hemodynamics in cases of discrepant findings
- Indications, benefits, and risks of medical therapy, and surgical or percutaneous interventions
- Indications for and management of anticoagulation
- Role of concomitant coronary heart disease in valvular heart disease and its impact on surgical management
- Post operative care
- Postoperative pathophysiology
- Postoperative management of anticoagulants, diuretics and other drugs, prophylaxis against infective endocarditis, management of pregnancy and non-cardiac surgery in the patient with prosthetic valves

### SKILLS

- Select the appropriate use of invasive or non-invasive diagnostic techniques
- Interpret results of diagnostic procedures
- Be able to decide when to indicate surgery
- Co-operate with cardiovascular surgeons, interventional cardiologists, and radiologists
- Recognise importance of patient education, with respect to the natural history of valvular heart disease, management of anticoagulation, prophylaxis of bacterial endocarditis and choice of valve prosthesis when appropriate
- Convey to the patient the importance of monitoring of symptoms and signs of valvular heart disease and of periodic follow-up by the cardiologist
- Recognise and manage the complications which may occur in patients with prosthetic valves or after valvular interventions
- Co-operate with cardiac surgeons and anaesthetists
- Recognise the appropriate frequency of follow up with specific reference to the clinical condition following surgery or intervention.

## ASSESSMENT & LEARNING METHODS

- Study Day

### Assessment at SpR years 1-4

#### References

- ESC Guidelines
- Guidelines on the Management of Valvular Heart Disease (European Heart Journal 2007; 28: 230-268)
- Details of the latest ESC Guidelines can be found at: [www.escardio.org/guidelines](http://www.escardio.org/guidelines)

# Infective Endocarditis

**Objectives:** Assess, diagnose and treat patients with infective endocarditis (of native and prosthetic valves as well as due to indwelling devices such as pacemakers and catheters)

## KNOWLEDGE

- Epidemiology, pathology, pathogenesis and microbiology of infective endocarditis
- Clinical features
- Laboratory investigations including microbiological results. Use of cardiac imaging and the importance of transoesophageal echocardiography to detect complications such as abscesses
- Selection and management of antibiotic therapy
- Role of valve surgery in patients with endocarditis
- Management of complications
- High-risk patients and situations
- Indications for antibiotic prophylaxis

## SKILLS

- Select the appropriate use of laboratory investigations and diagnostic procedures, in particular echocardiography
- Select appropriate antibiotic regimen
- Determine the need for, and timing of surgery
- Manage complications
- Prescribe appropriate antibiotic agents for prophylaxis
- Develop a multidisciplinary approach with cardiac surgeons, and microbiologists for diagnosis and management
- Recognise the importance of patient and physician education on prophylaxis

## ASSESSMENT & LEARNING METHODS

- Study Day

### Assessment at SpR years one - four

#### References

- ESC Guidelines
- Guidelines on the prevention, diagnosis and treatment of infective endocarditis – Executive Summary. (European Heart Journal 2004; 25: 267-276)
- Details of the latest ESC Guidelines can be found at: [www.escardio.org/guidelines](http://www.escardio.org/guidelines)

## Heart Failure (HF)

**Objectives:** *To recognise the impact of heart failure on morbidity and mortality in the local and general population*

*To be able to recognise the different underlying causes of heart failure*

*To be able to perform specialist assessment and treatment of patients with heart failure*

### KNOWLEDGE

- Epidemiology, pathophysiology and prognosis of heart failure
- Recognise complications
- International classifications of functional limitation ( for example NYHA classes)
- Diagnostic procedures in the patient with known or suspected HF including Natriuretic peptides, Echo, ECG, ambulatory ECG, stress testing, cardiac catheterisation
- Medical management of acute and chronic HF (neurohumoral blockade)
- Device management of HF: Cardiac Resynchronisation Therapy, ICD
- Role of cardiac surgery including transplantation
- Role of exercise training programs in HF patients
- Multidisciplinary care, including home based nursing in HF
- Complications of HFpatients
- Appropriate follow up of HF-patients
- Volemic status and the evaluation of renal function and electrolytes in HF patient
- Indications and contraindications for heart transplantation
- Follow up of patients following heart transplantation

### SKILLS

- Select and use diagnostic techniques to differentiate the underlying causes of HF
- Deliver lifestyle advice and home based treatment strategy to patients
- Risk stratify HF patients and select appropriate drug and other therapies (Implantable Cardiac Defibrillator (ICD), Cardiac Resynchronisation therapy (CRT), surgery)
- Evaluate HF patients during follow up and appropriately and continuously adjust the treatment plan.
- Emphasise the importance of lifestyle, exercise and weight loss. Help patients to understand the need for long-term complex drug therapy
- Appreciate the importance of rehabilitation
- Develop and sustain supportive relationships with patients with chronic heart failure
- Teach patients, relatives and special nurses in HF treatment.
- Recognise the advantages and limitations of specific heart failure therapies
- Explain, negotiate and overcome the barriers to compliance with heart failure treatments
- Recognise the importance of supportive and palliative care in the heart failure population

### ASSESSMENT & LEARNING METHODS

- Study Day

## References

- ESC Guidelines
- Guidelines for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2008 (European Heart Journal 2008) doi:10.1093/eurheartj/ehn309
- Details of the latest ESC Guidelines can be found at: [www.escardio.org/guidelines](http://www.escardio.org/guidelines)

# Pulmonary Arterial Hypertension

**Objectives:** *To be able to diagnose pulmonary arterial hypertension (PAH)*

*To be able to provide optimal management for patients with PAH*

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

## KNOWLEDGE

- Pulmonary hypertension and its functional classification
- Epidemiology of PAH (incidence, prevalence, aetiology, genetics, high-risk groups)
- Pathology and pathophysiology of PAH
- Clinical features and diagnostic criteria of PAH
- Identify prognostic markers
- Management of PAH (medical, surgical and interventional including balloon atrial septostomy, indications, contraindications and possible adverse effects)

## SKILLS

- Recognise clinical signs suggestive of PAH
- Differentiate between pulmonary hypertension and other diseases with similar symptoms
- Perform and interpret accurate medical assessment (using laboratory analyses including arterial blood gases, cardiac biomarkers; pulmonary function test, ECG, Echocardiography, cardiopulmonary stress-testing, ventilation-perfusion lung scan, spiral CT, magnetic resonance imaging, cardiac catheterisation and pulmonary angiography, lung biopsy)
- Prescribe appropriate medical or invasive (surgical or interventional) management
- Evaluate clinical and haemodynamic prognostic markers
- Establish cooperation with family physicians and other health care professionals for early recognition of primary pulmonary hypertension;
- Effectively collaborate with other medical specialists (family medicine, thoracic surgery, invasive cardiology, imaging) for differential diagnosis of pulmonary hypertension and timely referral to surgical treatment
- Provide genetic counseling to families affected by familial PAH
- Maintain long-term involvement of patients and their family members in supportive activities for healthy life-style adherence and treatment compliance
- Appreciate the increased prevalence of PAH in other medical conditions, such as scleroderma
- Refer to Specialists in PAH when appropriate

## ASSESSMENT & LEARNING METHODS

- Study Day

### Assessment at SpR year 1-4

### References

- ESC Guidelines
- Guidelines for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2008 (European Heart Journal 2008) doi:10.1093/eurheartj/ehn309
- Details of the latest ESC Guidelines can be found at: [www.escardio.org/guidelines](http://www.escardio.org/guidelines)

# Rehabilitation and Exercise Physiology

**Objectives:** *To be able to provide appropriate rehabilitation and secondary prevention services to patients with cardiovascular disease, specifically acute coronary syndromes, after revascularisation, with stable angina pectoris, patients with high cardiovascular risk, heart failure, diabetes, and others*

*To be able to evaluate the cardiovascular risk and the exercise capacity of the patients*

*To be able to evaluate “athletes heart” characteristics*

## KNOWLEDGE

- Rehabilitation and secondary prevention as integrated components of cardiac care
- Target populations and risk stratification of patients
- Baseline assessment, exercise testing, exercise training, patient education, lifestyle intervention, risk factor management, psychosocial and vocational support
- Exercise and sports physiology, and benefits of exercise training, recognize safety issues
- Psychological aspects of rehabilitation
- specific population challenges
- Describe programmes for specific populations in appropriate settings

## SKILLS

- Perform and interpret risk stratification, using and/or performing namely the CPX or the conventional exercise test, the echocardiogram or other tests as indicated
- Prescribe exercise programmes, in terms of mode, intensity, duration and progression, and other lifestyle interventions
- Prescribe cardiovascular preventive medications according to best practice guidelines
- Recognize “athlete’s heart” characteristics (ECG, echo) and use the ESC recommendation for eligibility.
- Recognise rehabilitation and secondary prevention as an integrated component of cardiac care
- Recognise the importance of rehabilitation and secondary prevention for professional (work), personal (including driving, travelling, leisure and sex) and social life among patients with heart disease
- Recognise the interplay of physical and psychological aspects of heart disease
- Recognise the importance of patients and partners/families education
- Recognise the role of other professionals including nurse specialists, physiotherapists, psychologists, dieticians and general practitioners in rehabilitation and secondary prevention
- Recognise the role of sports in Cardiology

## ASSESSMENT & LEARNING METHODS

- Study Day

# Arrhythmias

**Objectives:** To be able to assess and treat patients with arrhythmias

**Electrophysiology:** To have a good understanding of diagnostic and therapeutic electrophysiology in relation to patients with arrhythmias

**Pacing:** To be able to assess patients for pacing. Be able to pace patients independently and safely

**Implantable Cardioverter Defibrillator: (ICD)** To be able to assess patients who require ICD implantation

## KNOWLEDGE

- Classification and definition:
  - Bradycardias
  - Tachycardias
    - Supraventricular arrhythmias
    - Ventricular arrhythmias
- Epidemiology, pathophysiology, genetics, diagnosis and clinical features of arrhythmias
- Prognosis including risk evaluation
- Principles of electrocardiography and electrophysiology and relevant findings in different arrhythmias, including high risk features in the resting ECG such as long QT, short QT, and Brugada syndrome
- Pharmacology of antiarrhythmic drug therapy
- Principles of invasive and device management of arrhythmias, including
  - catheter ablation
  - Pacemaker therapy (temporary and permanent)
  - ICD therapy
  - Surgical therapy

## SKILLS

- Be competent in cardio-pulmonary resuscitation
- Classify arrhythmias by standard electrocardiogram
- Manage acute arrhythmias with drugs and cardioversion
- Prescribe appropriate preventative pharmacological therapy
- Perform and interpret electrocardiographic monitoring.
- Interpret electrophysiological study
- Refer patients for catheter ablation and perform follow-up after catheter ablation
- Pacing & ICD
- Appropriately select and refer patients for biventricular pacing
- Manage the follow up of patients with pacemakers including interrogation and programming of the device
- Appreciate the anxiety suffered by patients with arrhythmias and with some methods of management, e.g. catheter ablation, pacing and ICD
- Appreciate the importance of coexisting structural heart diseases, including coronary artery disease in relation to the outcome and management of arrhythmias
- Appreciate the limitations and potential risks of anti-arrhythmic drug therapy
- Use history, examination and cardiac imaging to determine which patients require an ICD.

## ASSESSMENT & LEARNING METHODS

- Study Day
- 
- Document 50 cases
  - Insert temporary pacing electrodes
  - Implantation of permanent single chamber
  - Dual chamber pacemakers

### Assessment at SpR years 1-4

#### References

- ESC Guidelines
- Guidelines on Cardiac Pacing and Cardiac Resynchronization Therapy (European Heart Journal 2007 - doi: 10.1093/eurheartj/ehm305)
- ACC/AHA/ESC guidelines for the management of patients with Ventricular Arrhythmias and the Prevention of Sudden Cardiac Death – Executive Summary. (European Heart Journal 2006; 27: 2099-2140) and Full Text (Europace 2006)
- ACC/AHA/ESC Guidelines for the Management of Patients with Atrial Fibrillation, Executive Summary (European Heart Journal, 2006; 27: 1979-2030) and Full Text (Europace 2006 doi: 10.1093/europace/eul097)
- Details of the latest ESC Guidelines can be found at: [www.escardio.org/guidelines](http://www.escardio.org/guidelines)

# Atrial Fibrillation

**Objectives:** To be able to carry out specialist assessment and treatment of patients with Atrial Fibrillation (AF)

## KNOWLEDGE

- Epidemiology, prognosis, and pathophysiology of atrial fibrillation
- Classify atrial fibrillation
- 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

## SKILLS

- Perform or interpret:
  - electrocardiogram
  - echocardiogram
  - transoesophageal echocardiography
  - prolonged ECG monitoring (e.g. Holter monitoring) - exercise testing

### Management

- Develop appropriate anti-thrombotic strategies for prevention of ischemic stroke and systemic embolism
- Select patients appropriately for cardioversion and perform competently: pharmacological electrical
- Perform rhythm control therapy: pharmacological
- Perform rate control therapy: pharmacological
- Select and refer patients for
  - electrophysiological studies
  - atrial catheter ablation
  - surgical ablation
  - pacemaker and defibrillator implantation
  - AV junction ablation and pacing
- Appreciate the anxiety patients suffer with AF, particularly in case of certain methods of management, e.g. catheter ablation and pacing
- Recognise the importance of coexisting structural heart diseases for the outcome and management of AF
- Appreciate the limitations and potential risks of antiarrhythmic drug therapy of AF
- Appreciate the importance of anticoagulant therapy

- Appreciate the palliative nature and potential adverse effects of nonpharmacological therapies
- Appreciate newer methods for treating Atrial Fibrillation and how to refer patients for specialist treatment when appropriate, such as percutaneous or surgical ablation.

#### **ASSESSMENT & LEARNING METHODS**

- Study Day

#### **References**

- ESC Guidelines
- ACC/AHA/ESC guidelines on the management of patients with atrial fibrillation - Executive Summary. (European Heart Journal 2006; 27: 1979-2030). Europace 2006
- Details of the latest ESC Guidelines can be found at: [www.escardio.org/guidelines](http://www.escardio.org/guidelines)

# Syncope

**Objectives:** *To define syncope*

*To differentiate syncope from the other causes of loss of consciousness*

*To assess and treat of patients with syncope*

## KNOWLEDGE

- Epidemiology and pathophysiology and prevalence of different causes of syncope
- Causes of loss of consciousness (e.g. Neurally-mediated reflex syncope, Stokes Adams attack, orthostatic hypotension)
- Prognosis
- Diagnostic evaluation
  - Strategy of evaluation
  - Initial evaluation (history, physical examination, baseline ECG)
  - Echocardiogram
  - Exercise stress testing
  - Tilt testing
  - Electrocardiographic monitoring (Long term ECG, external and implantable loop recorders)
  - Electrophysiological testing
- Treatments: device based or pharmacological for
  - Neurally-mediated (reflex) syncope
  - Orthostatic hypotension
  - Cardiac arrhythmias as primary cause
  - Structural cardiac or cardiopulmonary disease

## SKILLS

### Diagnosis

- Perform or interpret:
  - electrocardiogram
  - echocardiogram
  - carotid sinus massage
  - tilt testing
  - electrocardiographic monitoring (Long term ECG, external and implantable loop recorder)
  - electrophysiological test
  - exercise stress testing
  - cardiac catheterization and coronary angiography
- Perform risk stratification

### Treatment

- Select appropriate treatment:
  - Education and reassurance
  - Physical manoeuvres
  - Drug therapy
  - Device implantation
- Appreciate the impact of syncope on the patients lifestyle
- Appreciate that syncope is a transient symptom and not a disease
- Consult with other specialists
- Recognise the diagnostic criteria for the causes of syncope
- Recognise appropriate investigations in the various subgroups of patients with syncope

- Recognise how patients with syncope should be risk stratified
- Appreciate how patients with syncope should be hospitalized.
- Recognise treatments that are likely to be effective in preventing syncopal recurrences

#### **Diagnosis**

- Appreciate that the diagnosis of syncope is often presumptive
- Appreciate that the diagnostic value (sensitivity and specificity) of tests for syncope is imperfect
- Appreciate that observations during the event are of key importance
- Appreciate that the diagnostic yield of the tests depends on their appropriateness of their selection (pretest probability)

#### **Therapy**

- Recognise that most patients do not need any specific treatment apart from education and reassurance
- Recognise that drug therapies are often ineffective
- Recognise the risk-benefit and the cost efficacy of pacemaker, ICD and catheter ablation therapy

### **ASSESSMENT & LEARNING METHODS**

- Study Day

#### **Assessment at SpR years 1-4**

#### **References**

- ESC Guidelines
- Guidelines on Management (diagnosis and treatment) of syncope - update 2004, Executive Summary.
- (European Heart Journal 2004; 25: 2054-2072) and full text (Europace 2004; 6: 467-537)
- Details of the latest ESC Guidelines can be found at: [www.escardio.org/guidelines](http://www.escardio.org/guidelines)

# Sudden Cardiac Death (SCD) and Resuscitation

**Objectives:** *Sudden Cardiac Death: To manage patients with threatened or aborted SCD, including risk stratification, investigation and treatment*

*Resuscitation: To be able to carry out basic and advanced cardiac life support*

## KNOWLEDGE

### Sudden Cardiac Death

- Definition of SCD, epidemiology, aetiology, pathology, pathophysiology and clinical presentation of the different conditions which may lead to SCD
- Principles of acute management of patients with SCD
- Principles of diagnostic work up and risk stratification of survivors; in particular, recognize ECG signs indicative of high SCD risk (e.g., long QT, short QT, Brugada syndrome etc.) and know how to further evaluate patients with these signs and their families
- Appropriate long term therapeutic options
- Current recommendations for secondary prevention of SCD (e.g., indications for preventive ICD implantation in patients with ischemic cardiomyopathy)
- Identify, risk stratify and manage individuals at elevated risk, including family members of SCD patients

### Resuscitation

- Explain the methods and guidelines of basic and advanced life support including airway management, appropriate drug use, defibrillation and pacing

## SKILLS

### Sudden Cardiac Death

- Perform resuscitation (see below)
- Interpret prodromal symptoms, underlying causes and prognosis of a SCD-Survivor
- Perform and interpret risk stratification using the following techniques (Holter-ECG, LV function, Echo, Cath, EP, heart rate variability)
- Follow up SCD-Survivors

### Resuscitation

- Identify the cause of collapse
- Perform BLS (CPR) and ACLS including different skills.
- Lead and coordinate the actions of an ACLS-Team
- Teach basic life support (BLS)

### Sudden Cardiac Death

- Recognise the urgency of the management of cardiac arrest,
- Recognise the importance of prodromal symptoms.
- Appreciate patient and family anxieties
- Appreciate the importance of patient education and secondary prevention
- Understand the medical, psychological, and social problems arising in patients with end-stage heart failure and frequent ICD activation

### Resuscitation

- Appreciate the importance of working in a team with laypersons, paramedics and other medical personnel during resuscitation (BLS and ACLS).
- Understand the importance of regular audit of the basic and advanced life support programme

## ASSESSMENT & LEARNING METHODS

- Study Day
- ACLS

### Assessment at SpR years 1-4

#### References

- ESC Guidelines
- Guidelines on sudden cardiac death – Executive Summary. (Europace 2002; 4: 3-18)
- ACC/AHA/ESC updated guidelines on Ventricular Arrhythmias and Prevention of Sudden Cardiac death – Executive Summary. (European Heart Journal 2006; 27: 2099-2140) and Full Text (Europace 2006)
- Details of the latest ESC Guidelines can be found at: [www.escardio.org/guidelines](http://www.escardio.org/guidelines)

# Diseases of the Aorta and Trauma to the Aorta and Heart

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

## KNOWLEDGE

- Epidemiology, aetiology, pathology, genetics, pathophysiology and clinical presentation of aortic disease, aortic root disease, and trauma to the aorta and heart including:
  - Acute aortic syndromes:
  - Aortic dissection
  - Intramural haematoma
  - Traumatic aortic transection
  - Chronic aortic dissection
  - Aneurysm of the thoracic aorta
  - Aortic atheromatous disease
  - Aortitis
  - Trauma of the heart (including myocardial contusion)
- Strengths and limitations of different imaging modalities
- Appropriate medical, interventional or surgical management strategy

## SKILLS

- Choose, perform and interpret the appropriate imaging studies (transthoracic and transoesophageal echocardiography, magnetic resonance, computed tomography, ultrasound (surface and intravascular) and angiography of the aorta and of the heart to assess aortic disease and traumatic lesions
- Manage different aortic conditions with the appropriate treatment modality in a timely manner
- Cooperate with cardiovascular surgeons and interventional cardiologists as well as radiologists for diagnosis and treatment
- Recognise the potential urgency required in managing patients with diseases of the aorta and cardiac trauma
- Recognize and organize family screening where appropriate
- Recognize the need for and undertake long term follow-up of patients with chronic aortic disease

## ASSESSMENT & LEARNING METHODS

- Study Day

### References

- ESC Guidelines
- Diagnosis and management of aortic dissection. (European Heart Journal 2001; 22: 1642-1681)
- Details of the latest ESC Guidelines can be found at: [www.escardio.org/guidelines](http://www.escardio.org/guidelines)

# Peripheral Arterial Vascular Disease

*Objectives: To be able to assess and treat patients with peripheral arterial vascular disease*

## KNOWLEDGE

- Epidemiology and pathology
- Diagnosis and assessment
- Medical and invasive (interventional and surgical) interventional management and their relative merit in different situations
- Prognosis
- Association of peripheral vascular disease with vascular disease in other territories in particular carotid and renal arteries
- Causes of acute limb ischaemia and the urgency of its management

## SKILLS

- Take a relevant history and perform an appropriate physical examination, especially the examination of peripheral pulses
- Identify the risk factors and select appropriately the management strategy keeping in mind that peripheral vascular disease is a manifestation of generalised atherosclerosis
- Select, use and interpret diagnostic tools appropriately including:
  - Ultrasound (duplex scanning and other Doppler modalities, including ankle brachial index)
  - MR angiography
  - CT angiography
  - Angiography
- Appreciate the systemic nature of atherosclerosis and its implication for a patient with disease manifested within a given territory
- Recognise the importance of risk factor modification in prevention.
- Encourage patients to adopt a healthier lifestyle with specific emphasis on risk factors
- Collaborate with specialists such as interventional cardiologists, radiologists, vascular surgeons and diabetologists.

## ASSESSMENT & LEARNING METHODS

- Study Day

**Assessment at SpR years 1-4**

# Thromboembolic Venous Disease

**Objective:** *To be able to diagnose, treat and prevent:*

- *deep venous thrombosis*
- *pulmonary embolism*

## KNOWLEDGE

- Epidemiology and risk factors for deep venous thrombosis in the clinical settings of: recovery from major surgery or trauma, prolonged immobility, oral contraceptive pill use, pregnancy and air travel
- Increased pulmonary vascular resistance and ventilation perfusion mismatch
- Clinical presentation of deep venous thrombosis and pulmonary embolism
- Diagnosis by:
  - Biomarkers: D-dimer and troponins
  - ECG
  - Echocardiography
  - Ultrasound and Doppler of leg and pelvis veins
  - MDCT
  - Ventilation-perfusion scan
  - MR-angiography
  - Pulmonary angiography
- Treatment: Heparins, Vitamin K antagonists, New anticoagulants, Thrombolysis, Embolectomy and fragmentation

## SKILLS

- Interpret ECG, echocardiography, spiral CT, ventilation-perfusion scanning signs of pulmonary hypertension or pulmonary thromboembolism
- Select appropriate therapy for acute pulmonary embolism
- Diagnose and manage acute and chronic deep venous thrombosis
- Decide upon the duration of anticoagulation therapy for patients with thromboembolic venous disease
- Appreciate the difficulties in diagnosing pulmonary embolism on the basis of symptoms and signs
- Collaborate with other imaging specialists including radiologists and nuclear imaging specialists
- Ensure patient understanding of the disease, the importance of compliance and appropriate precautions required during long term anticoagulant therapy
- Describe preventive measures: Compression stockings, heparins
- Describe management of chronic pulmonary hypertension, including thrombendarterectomy

## ASSESSMENT & LEARNING METHODS

- Study Day

**Assessment at SpR years 1-4**

## References

- ESC Guidelines
- Guidelines on the diagnosis and management of acute pulmonary embolism. (European Heart Journal 2008) doi:10.1093/eurheartj/ehn310
- Expert consensus document on the use of antiplatelet agents. (European Heart Journal 2004; 25: 166-181)
- Details of the latest ESC Guidelines can be found at: [www.escardio.org/guidelines](http://www.escardio.org/guidelines)

## The Cardiac Consult

**Objectives:** *Peri-operative cardiac consult for non-cardiac surgery*

- *To select appropriate preoperative imaging techniques from the following four imaging modalities for cardiac risk evaluation.*
  - *Resting/stress echocardiography*
  - *Resting/stress nuclear perfusion imaging*
  - *Cardiac computed tomography (CT)*
  - *Cardiovascular magnetic resonance (CMR)*
- *To integrate information regarding the estimated effects of surgical stress during operation.*
- *To integrate information on the long-term impact of cardiac disease on outcome in patients should they live long enough to enjoy the benefits of surgery.*
- *Cardiac consult in the patient with ischaemic neurologic symptoms:*
  - *Search for potential sources of cardiac embolism, and advise proper management*
  - *Search for other cardiovascular manifestations of atherosclerosis, in particular coronary heart disease and peripheral arterial disease, and advise proper management*

### KNOWLEDGE

- Understand that preoperative tests should only be done if they will influence perioperative or long-term cardiac treatment and risk management, without delaying surgery if test results will not change management
- Imaging techniques to assess
  - Left ventricular ejection fraction at rest
  - Valve abnormalities (stenosis/insufficiency)
  - Calculation of valve stenosis gradient.
  - Estimation of valvular regurgitation fraction.
- Coronary artery disease, new wall motion abnormalities during stress. The severity, extent and ischemic heart rate threshold during stress testing.
- Intraoperative cardiac monitoring for volume and ischemia status.
- Non-invasive coronary angiogram
- Understand the mechanism, likelihood, and potential treatment options of cardiac and aortic sources of embolism
- Frequency of concomitant coronary and other arterial disease in the presence of ischemic neurologic disease
- Realize the frequency of cardiac symptoms, problems and considerations in other diseases, (e.g. pulmonary disease, connective tissue disorders) and be able to provide proper management advice

### SKILLS

- Consider heart valve replacement in patients with severe stenosis prior to surgery.
- Consider coronary revascularization in selected patients with extensive stress induced ischemia prior to surgery.
- Consider immediate coronary revascularization in patients with intraoperative hemodynamic instability,
- ST-segment changes and new wall motion abnormalities.
- Communicate to patients the implications of the results of preoperative tests on perioperative management. Indicate the potential complications of delaying the index surgical procedure and the benefit of additional (invasive) cardiac therapy.

- Communicate with other specialties involved in perioperative care (anesthesiologist, surgeon, and intensivist) to individualize patient care.
- Recognize strengths and limitations of each imaging modality.
- Use echocardiography, including transoesophageal echocardiography, and other techniques to search for potential sources of embolism
- Propose a diagnostic work-up of the patient for other atherosclerotic manifestations, and devise proper therapy and risk management
- Appreciate that potential sources of embolism are frequently of low probability (in particular, patent foramen ovale) and commonly co-exist
- Understand the importance of diagnosing and treating co-existing cardiovascular atherosclerotic disease
- Anticipate cardiovascular problems accompanying primarily non-cardiac diseases
- Cooperate closely with other disciplines and offer prompt support for their needs and questions

## **ASSESSMENT & LEARNING METHODS**

- miniCEx

### **Assessment at SpR years 1-4**

## Minimum Requirements for Training

Curriculum Requirement	Required/Desirable	Minimum Requirement	Reporting Period	Form Name
<b>Section 1 - Training Plan</b>				
<b>Weekly Timetable</b> (Sample Weekly Timetable for Post/Clinical Attachment)	Required	1	Training Post	Form 045
<b>Personal Goals Plan</b> (Copy of agreed Training Plan for your current training year signed by both Trainee & Trainer)	Required	1	Training Post	Form 052
<b>On Call Rota</b>	Required	1	Training Post	Form 064
<b>Section 2 - Training Activities</b>				
<b>Outpatient Clinics</b>				
Cardiology (minimum 2 per week)	Required	80	Year of Training	Form 001
Sub-Specialty	Desirable	1	Year of Training	Form 001
<b>Ward Rounds/Consultations</b>				
Consultant Led (minimum 1 per week)	Required	40	Year of Training	Form 002
SpR led (1 per week)	Required	40	Year of Training	Form 002
Consultations	Desirable	1	Year of Training	Form 002
<b>Emergencies/Complicated Cases</b>				
(Diagnosis of nature of problem and its presentation, emergency case for investigation)	Desirable	1	Training Programme	Form 003
<b>Procedures/Practical Skills/Surgical Skills</b>				
Exercise ECGs (supervise and analyse 100 per year)	Required	100	Year of Training	Form 004
Holter ECGs (report on 100 per year)	Required	100	Year of Training	Form 004
Basic Echocardiography (Review 200)	Required	200	Training Programme	Form 004
Basic Echocardiography (Perform 50 over training period)	Required	50	Training Programme	Form 004
Basic Electrophysiology (5 EP studies during training)	Required	5	Training Programme	Form 004
Radionuclide investigation (optional)	Desirable	1	Training Programme	Form 004
Basic PTCA (50 cases during training)	Required	50	Training Programme	Form 004

<b>Curriculum Requirement</b>	<b>Required/Desirable</b>	<b>Minimum Requirement</b>	<b>Reporting Period</b>	<b>Form Name</b>
Basic Cardiac Pacing (20 temporary implantations)	Required	20	Training Programme	Form 004
Basic Cardiac Pacing (Monitor 75 Permanent (including 25 dual) during training)	Required	75	Training Programme	Form 004
Complex Echocardiography (75 transoesophagael, 100 TOE perform and report during training)	Required	175	Training Programme	Form 004
Coronary Angiography (250 cases during training)	Required	250	Training Programme	Form 004
Right and left heart catheterisations (50 during training)	Required	50	Training Programme	Form 004
Defib and BiVent implants (20 during training)	Required	20	Training Programme	Form 004
Investigations of adult with congenital HD ( Optional: include advanced imaging (TOE, MRI) in congenital HD)	Desirable	1	Training Programme	Form 004
Nuclear Studies (Optional: 25 blood pool scans, 75 Perfusion scans, year 1-5)	Desirable	1	Training Programme	Form 004
Nuclear Studies (Optional 50 Blood pool scans, 100 Perfusion scan, year 6)	Desirable	1	Training Programme	Form 004
Advanced Cardiac CT/MRI (Optional)	Desirable	1	Training Programme	Form 004
<b>Additional/Special Experience Gained</b>	Desirable	1	Training Programme	Form 005
<b>Relatively Unusual Cases</b>	Desirable	1	Training Programme	Form 019
<b>Chronic Cases/Long term care</b>	Desirable	1	Training Programme	Form 066
<b>ICU/CCU Cases</b>	Desirable	1	Training Programme	Form 090
<b>Management Experience</b>	Desirable	1	Training Programme	Form 110
<b>Section 3 - Educational Activities</b>				
<b>Mandatory Courses</b>				
Mastering Communications (Year 1)	Required	1	Training Programme	Form 006
Audit (Year 1)	Required	1	Training Programme	Form 006
Leadership Skills (Year 3+)	Required	1	Training Programme	Form 006
Ethics I: Professionalism	Required	1	Training Programme	Form 006
Ethics II: Ethics & Law	Required	1	Training Programme	Form 006
Ethics III: Research	Required	1	Training Programme	Form 006
Ethics IV: End of Life	Required	1	Training Programme	Form 006
ACLS	Required	1	Training Programme	Form 006

<b>Curriculum Requirement</b>	<b>Required/Desirable</b>	<b>Minimum Requirement</b>	<b>Reporting Period</b>	<b>Form Name</b>
Radiation Protection Course	Required	1	Training Programme	Form 006
<b>Non – Mandatory Courses</b>	Desirable	1	Training Programme	Form 007
<b>Study Days</b>	Required	3	Year of Training	Form 008
For Example: (ECGs, Echocardiography, Invasive Imaging, Genetics, Pharmacology, Cardiovascular disease prevention, Acute Coronary Syndrome, Chronic Ischaemic Heart Disease, Myocardial Disease, Pericardial Disease, Cardiac Tumours, Congenital Heart Disease in Adult Patients, Pregnancy and Heart Disease, Valvular Heart Disease, Endocarditis, Heart Failure, Pulmonary Arterial Hypertension, Rehabilitation and Exercise Physiology, Arrhythmias, Atrial Fibrillation, Syncope, Sudden Cardiac Death, Disease of the Aorta and Trauma to the Aorta and Heart, Peripheral Arterial Vascular Disease, Thromboembolic Venous Disease)				
<b>National/International meetings</b> (minimum 1 per year)	Required	1	Year of Training	Form 010
<b>In-house activities</b>				
Grand Rounds (minimum of 1 per month)	Required	10	Year of Training	Form 011
Cardiology Meeting (average 1 per week)	Required	40	Year of Training	Form 011
Other (minimum of 1 per month from the categories below: )				
Journal Club	Required	2	Year of Training	Form 011
Radiology Conferences	Required	2	Year of Training	Form 011
Pathology Conferences	Required	2	Year of Training	Form 011
MDT Meetings	Required	2	Year of Training	Form 011
Seminar	Required	2	Year of Training	Form 011
Lecture	Required	2	Year of Training	Form 011
<b>Examinations</b>	Desirable	1	Training Programme	Form 012
<b>Formal Teaching Activity</b> (minimum 1 formal teaching session per month from the categories below: )	Required	10	Year of Training	Form 013
Lecture				
Tutorial				
Bed side Teaching				
<b>Research Activities</b>	Desirable	1	Training Programme	Form 014

Curriculum Requirement	Required/Desirable	Minimum Requirement	Reporting Period	Form Name
<b>Audit activities</b> (1 audit per year - start or complete)	Required	1	Year of Training	Form 015
<b>Publications</b>	Desirable	1	Year of Training	Form 016
<b>Presentations</b>	Required	1	Year of Training	Form 017
<b>Committee Attendance</b>	Desirable	1	Training Programme	Form 063
<b>Additional Qualifications</b>	Desirable	1	Training Programme	Form 065
<b>Section 4 - Assessments</b>				
<b>CBD</b>	Required	1	Year of Training	Form 020
<b>DOPS</b>				
Stress Test	Required	1	Training Programme	Form 021
Ambulatory ECG	Required	1	Training Programme	Form 021
Transthoracic Echo	Required	1	Training Programme	Form 021
Transoesophageal Echo	Required	1	Training Programme	Form 021
Cardiac Catheterisation	Required	1	Training Programme	Form 021
<b>Mini-CEX</b> (At least two Mini-CEX assessments)	Required	2	Year of Training	Form 023