# Cardiothoracic Surgery Curriculum

4 August 2021 (VERSION 2 / AUGUST 2026)

VERTICAL LINE INDICATES UPDATES

## THE INTERCOLLEGIATE SURGICAL CURRICULUM PROGRAMME

*Educating the surgeons of the future*

## Acknowledgements

You can also find the curriculum on the ISCP website at **www.iscp.ac.uk**

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# 1 Introduction

The Cardiothoracic Surgery curriculum provides the approved United Kingdom (UK) framework for the training of doctors to the level of independent consultant practice in cardiac, thoracic or cardiothoracic surgery, addressing the requirements of patients, the population and the strategic health services.

The curriculum will also be followed for training in the Republic of Ireland. General Medical Council (GMC) approval of the curriculum pertains to UK training programmes while those in the Republic of Ireland are governed by the Royal College of Surgeons in Ireland (RCSI) and the Medical Council of Ireland.

# 2 Purpose

## 2.1 Purpose of the curriculum

The purpose of the curriculum for Cardiothoracic Surgery is to produce, at certification, competent doctors, able to deliver excellent outcomes for patients as consultant surgeons in the UK and Republic of Ireland. Evidence from the last decade indicates a significant improvement in outcomes with surgeons being trained in a special interest (either cardiac or thoracic surgery) rather than Cardiothoracic Surgery. The majority of service needs relate to providing cardiac or thoracic surgeons, rather than Cardiothoracic Surgeons except in a few areas, as indicated by the SCTS-SAC Cardiothoracic Workforce Report 2025 (a report by the Society for Cardiothoracic Surgery in Great Britain and Ireland and the Specialty Advisory Committee). [1]

The Cardiothoracic Surgery curriculum will provide consultant surgeons with the generic professional and specialty-specific capabilities needed to manage patients presenting with the full range of acute cardiothoracic conditions up to the point of operation and to manage the full range of acute and elective conditions in the generality of their chosen special interest of cardiac or thoracic surgery, including the operation. Trainees will be entrusted to undertake the role of the general Cardiothoracic Specialty Registrar (StR) during training and will be qualified at certification to apply for consultant posts in Cardiothoracic Surgery in the UK or Republic of Ireland with a special interest in cardiac or thoracic surgery.

Patient safety and competent practice are both essential and the curriculum has been designed so that the learning experience itself should not affect patient safety. Patient safety is the first priority of training demonstrated through safety-critical content, expected levels of performance, critical progression points, required breadth of experience and levels of trainer supervision needed for safe and professional practice. Upon satisfactory completion of training programmes, we expect trainees to be able to work safely and competently in the defined area of practice and to be able to manage or mitigate relevant risks effectively. A feature of the curriculum is that it promotes and encourages excellence through the setting of high-level outcomes, supervision levels for excellence, and tailored assessment and feedback, allowing trainees to progress at their own rate.

This purpose statement has been endorsed by the GMC's Curriculum Oversight Group and confirmed as meeting the needs of the health services of the countries of the UK.

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[1] https://scts.org/_userfiles/pages/files/workforce_report_18032025_44.pdf

## 2.2 Rationale and development of a new curriculum

The *Shape of Training* (SoT) review[2] and *Excellence by design: standards for postgraduate curricula*[3] provided opportunities to reform postgraduate training. The Cardiothoracic Surgery curriculum will produce a workforce fit for the needs of patients, producing doctors who are more patient-focused, more general and who have more flexibility in their career structure. The GMC's introduction of updated standards for curricula and assessment processes laid out in *Excellence by Design* requires all medical curricula to be based on high-level outcomes. The high-level outcomes in this curriculum are called Capabilities in Practice (CiPs) and integrate parts of the syllabus to describe the professional tasks within the scope of specialty practice. At the centre of each of these groups of tasks are Generic Professional Capabilities[4] (GPCs), interdependent essential capabilities that underpin professional medical practice and are common to all who practise medicine. The GPCs are in keeping with Good Medical Practice (GMP)[5]. Equipping all trainees with these transferable capabilities should result in a more flexible, adaptable workforce.

All the shared CiPs are transferable to other surgical specialties and some may be transferable to non-surgical specialties. In addition, core knowledge and skills gained in any surgical specialty training programme are transferable for entry into Cardiothoracic Surgery. Trainees who choose to move from a different speciality training programme having previously gained skills transferable to Cardiothoracic Surgery therefore may be able to have a shorter than usual training pathway in their new training programme. While most of the specialty syllabus is not transferable because the knowledge and detailed technical skills are specific to Cardiothoracic Surgery, some limited areas of the syllabus may be transferable e.g. critical care skills. This flexible approach, with acquisition of transferable capabilities, allows surgical training to adapt to current and future patient and workforce needs and change in the requirements of surgery with the advent of new treatments and technologies.

## 2.3 The training pathway and duration of training

Trainees will enter Cardiothoracic Surgery training via a national selection process following foundation training for run-through or following core surgical training for uncoupled programmes. Cardiothoracic Surgery training is outcome-based rather than time-based. It will, however, normally be completed in an indicative time of seven years (three years in phase 1, two years in phase 2, and two years in phase 3) for those entering run-through training. For uncoupled trainees, who spent two years as a core surgical trainee, it would normally be completed in an indicative time of six years (two years in phase 1, two years in phase 2, and two years in phase 3).

The programme will be divided into 3 phases (figure 1):

- Phase 1 will take an indicative time of three years to complete for run-through trainees, during which trainees will gain many of the GPCs and the knowledge, clinical and technical skills in both cardiac and thoracic surgery, as defined in the CiPs and syllabus. Uncoupled trainees will have acquired generic skills, both technical and non-technical, during core surgical training, and it is anticipated that an indicative time of two years will be required to achieve the competencies for completion of phase 1. At the end of phase 1, there is a critical progression point for phase 2 entry, assessed at the Annual Review of Competence Progression (ARCP), where trainees will

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[2] Shape of training: Securing the future of excellent patient care
[3] Excellence by design: standards for postgraduate curricula
[4] Generic professional capabilities framework
[5] Good Medical Practice

demonstrate competencies in knowledge, clinical skills and professional behaviours commensurate with the CiPs and GPCs.

By the end of phase 1, trainees will follow a special interest in either cardiac or thoracic surgery after discussion with their Training Programme Director (TPD). The special interest choice will be facilitated based on the needs of the service, the preference of the trainee, the trainee's skills and the ability of the programme to support the trainee in that special interest. Where a programme cannot facilitate the agreed special interest needs of trainees, Out of Programme Training (OOPT) can be utilised. In exceptional cases, and with specific TPD and Deanery support, Cardiothoracic Surgery may be chosen as the special interest. Trainees will need careful counselling before following this route as it is likely to require extra training time. There are few geographical areas within the UK and Republic of Ireland requiring such surgeons and central monitoring of these posts will be undertaken by the SAC and the SCTS to ensure supply matches demand.

- Phase 2 will take an indicative time of two years to complete during which trainees will train predominantly in either cardiac or thoracic surgery with the exception of a small number who may train in Cardiothoracic Surgery to fulfil local requirements. During phase 2 of training, it is expected that trainees will continue to be involved in the care of both cardiac and thoracic patients whilst on-call to continue gaining the knowledge and clinical skills in the generality of Cardiothoracic Surgery. Trainees will continue to develop GPCs and knowledge, clinical and technical skills in their special interest as described in the CiPs and the syllabus.

To apply for a first sitting of the Intercollegiate Specialty Board (ISB) examination in Cardiothoracic Surgery, a trainee will need to have demonstrated the knowledge and clinical and professional skills equivalent of a day-one consultant in Cardiothoracic Surgery as defined by CiPs and the syllabus. It is anticipated that all trainees will reach this level by the end of phase 2.

Training in the sub-specialty of Congenital Cardiac Surgery will be available after the end of phase 2 for a small number of trainees, who will be able to apply through a national selection process after passing the ISB in Cardiothoracic Surgery. Training in the sub-specialty will take an indicative time of two years.

- During phase 3 (indicative time two years) of training, trainees may continue to be involved in the care of both Cardiac and Thoracic patients whilst on-call to continue gaining the knowledge and clinical skills in the generality of Cardiothoracic Surgery. Other trainees may focus on their special interest in Cardiac or Thoracic Surgery and this may be as resident on-call or shadowing consultants following achievements of all of end of phase 2 competencies. Trainees will continue to develop GPCs and knowledge, clinical and technical skills in their special interest as described in the CiPs and the syllabus.

Trainees who demonstrate exceptionally rapid development in knowledge, technical skills and acquisition of capabilities can complete training more rapidly than this indicative time. There may also be a small number of trainees who develop more slowly and require an extension of training in line with *A Reference Guide for Postgraduate Foundation and Specialty Training in the*

*UK* (The Gold Guide)[6].  Trainees who opt for training less than full time (LTFT) have their indicative training time extended on a pro-rata basis.

On successful completion of phase 3, including successful completion of the ISB examination, trainees become eligible for certification and for recommendation to enter the specialist register.
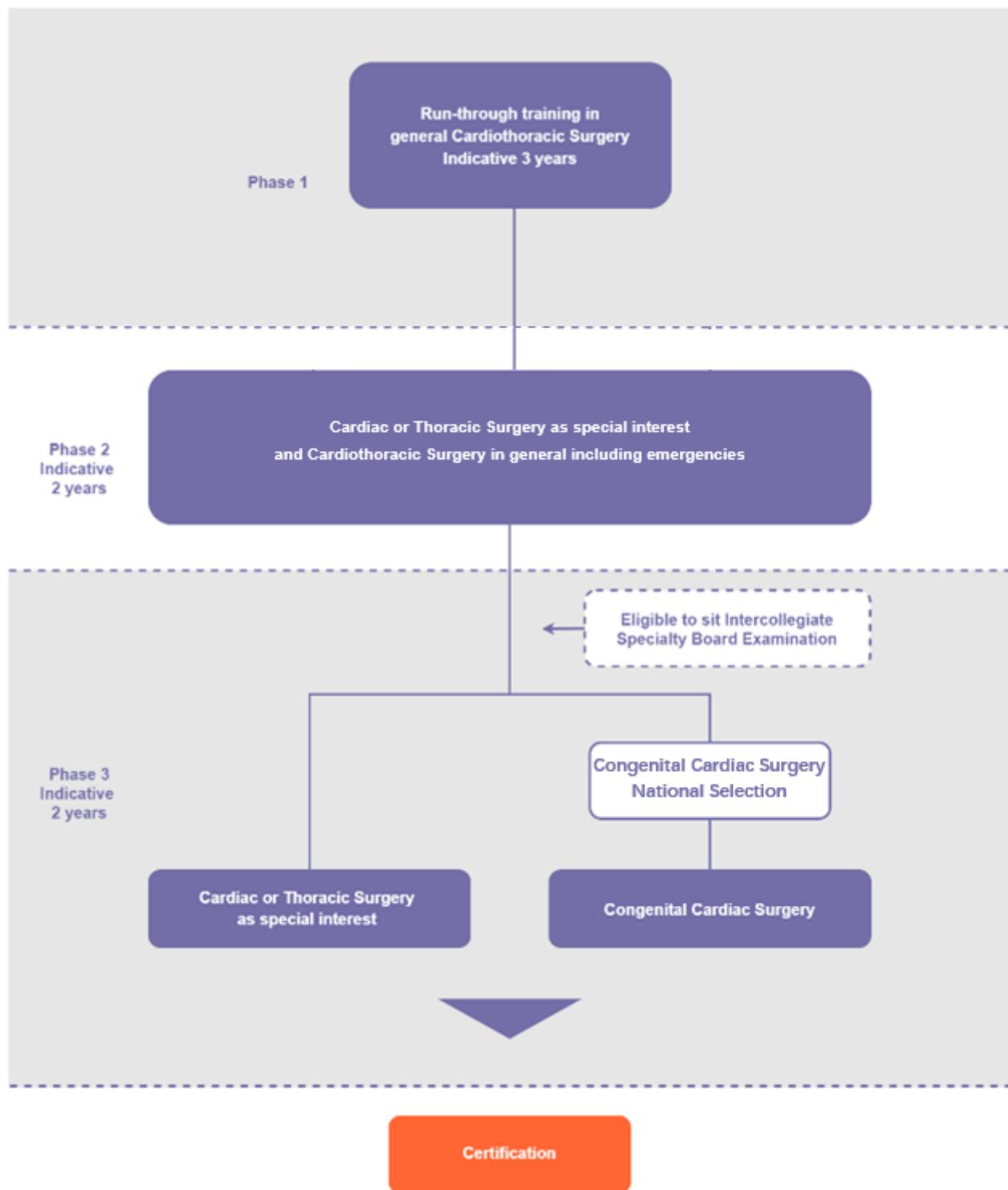


Figure 1. Cardiothoracic Surgery training pathway.

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[6] Gold Guide 10th edition

# 3 Programme of Learning

This section covers the expected learning outcomes, learning methods, breadth of experience and levels of performance at critical progression points in the training programme and the levels of performance expected of those completing training.

### 3.1 What has to be learnt to complete the Cardiothoracic Surgery curriculum

The practice of cardiac and thoracic surgery requires the generic and specialty knowledge, clinical and technical skills and behaviours to manage patients presenting with a wide range of heart and lung disorders. It involves development of competence in diagnostic reasoning, managing uncertainty, dealing with co-morbidities, and recognising when another specialty opinion or care is required (as well as developing technical skills in the areas and to the level described in the syllabus as shown in appendix 2). The main areas for learning are described by the CiPs which are the high-level learning outcomes for training in Cardiothoracic Surgery described below and shown in full in appendix 1.

### 3.2 Capabilities in Practice (the high-level outcomes of training)

Training is designed to produce a person capable of safely and effectively performing the role of a first day consultant surgeon. The role of a consultant surgeon can be thought of as a sum of all the various tasks which need to be performed through a working week. These tasks are the high-level outcomes of the curriculum and grouping these together describe the role of a consultant surgeon. To perform a high level clinical task as a consultant surgeon requires trainees to be able to integrate areas of learning from all parts of the syllabus, including knowledge, clinical skills, professional skills and technical skills. In addition, a surgeon will need to have acquired the generic skills, behaviours and values shared by all doctors in order to perform this task safely and well. A capability is a set of skills that can be developed through training from novice to expert and, therefore, these high-level clinical outcomes are known as Capabilities in Practice. They are common across all surgical specialties and are delivered within the context of the GPCs and the specialty syllabus.

There are five CiPs which are shared between all surgical specialties:

1) Manages an out-patient clinic
2) Manages the unselected emergency take
3) Manages ward rounds and the on-going care of in-patients
4) Manages an operating list
5) Manages multi-disciplinary working

In addition to these, the specialty-specific Cardiothoracic Surgery CiPs are:

6) Manages patients within the critical care area
7) Assesses surgical outcomes both at a personal and unit level

The generic knowledge, skills, behaviours and values shared by all doctors are described in the GPC framework. The GPCs are essential components and have equal weight to the CiPs in the training and assessment of clinical capabilities and responsibilities in the training programme.

The GPC framework has nine domains:

Domain 1:    Professional values and behaviours

Domain 2:    Professional skills
             *Practical skills*
             *Communication and interpersonal skills*
             *Dealing with complexity and uncertainty*
             *Clinical skills*

Domain 3:    Professional knowledge
             *Professional requirements*
             *National legislative requirements*
             *The health service and healthcare system in the four countries*

Domain 4:    Capabilities in health promotion and illness prevention

Domain 5:    Capabilities in leadership and team working

Domain 6:    Capabilities in patient safety and quality improvement
             *Patient safety*
             *Quality improvement*

Domain 7:    Capabilities in safeguarding vulnerable groups

Domain 8:    Capabilities in education and training

Domain 9:    Capabilities in research and scholarship

Simply put, the CiPs and GPCs are the constituent parts of the role of a consultant cardiac or thoracic surgeon. Each part is as important as the next and doctors are required to be capable in all parts of the role in order to be able to practice independently. In order to complete training and be recommended to the GMC for certification and entry to the specialist register, the doctor must demonstrate that they are capable of unsupervised practice in all the CiPs and GPCs. For example, managing the unselected emergency take (CiP 2), requires the integration of knowledge, clinical and diagnostic skills, and technical skills described in the syllabus as well as communication and interpersonal skills, time management skills and many other generic skills described in the GPCs in order to be delivered safely, professionally and effectively. This will be assessed using the Multiple Consultant Report (MCR) as described below. The full content of the seven CiPs can be found in appendix 1.
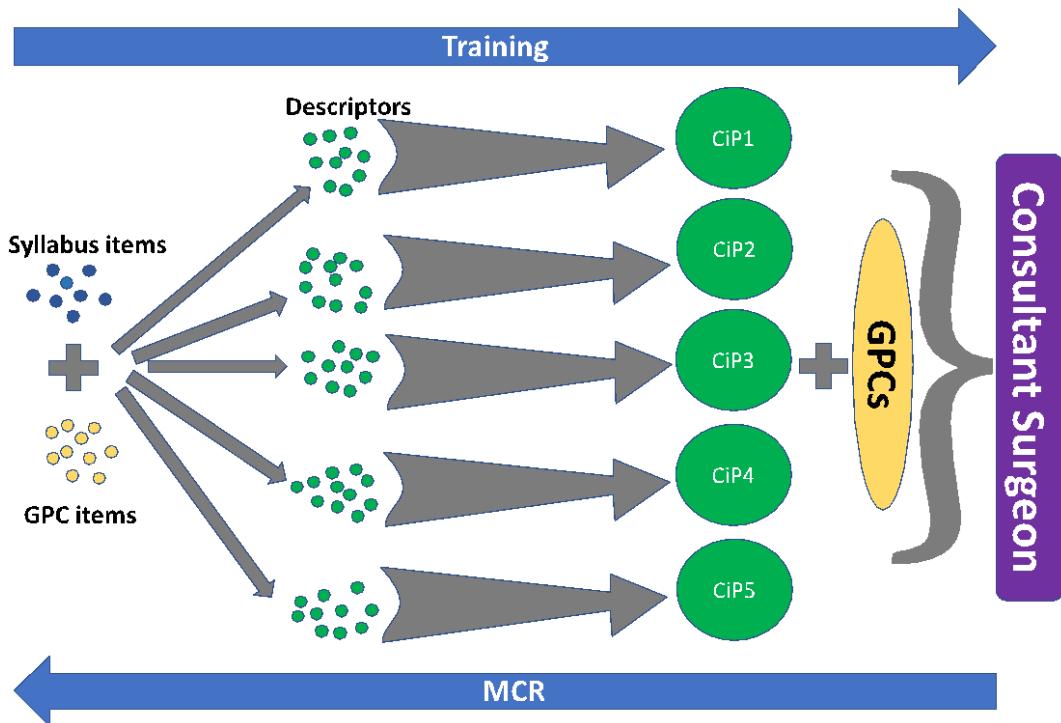
Figure 2 - The interrelationship of the GPCs, the syllabus, the CiPs and their descriptors to the role of a consultant surgeon. Items from the syllabus are combined with items taken from the GPC framework to form the small tasks which are the CiP descriptors. When the small tasks of the descriptors are integrated they comprise the constituent parts of the role of a consultant surgeon (the CiPs). When the CiPs are taken together, along with the GPCs, the role of a consultant surgeon (the overall outcome of the curriculum), is described. Each of these CiPs will be developed through training until the level required of a day-one consultant is reached. Assessment in an outcomes-based curriculum through the MCR examines the trainee from the perspective of the outcome (a consultant surgeon), and compares performance in each CiP and in the GPCs to that level. If the outcome level is not reached, then targeted feedback and development plans can be made with reference to the CiP descriptors and beyond to the syllabus items and GPC items that combine to form the descriptors.

## 3.3 Descriptors for CiPs

The seven CiPs taken together describe the role of a consultant cardiac or thoracic surgeon but more detail is needed to help trainees develop that capability through training via detailed feedback and focused development goals.

We can break the CiPs down into smaller tasks. Each of these smaller tasks is a CiP descriptor. For example, managing the unselected emergency take (CiP 2), includes the need to promptly assess acutely unwell and deteriorating patients and deliver resuscitative treatment and initial management and ensure sepsis is recognised and treated in compliance with protocol (see appendix 1). If a trainee has not yet reached the level required of a new consultant in a CiP then the descriptors can be used to describe in standard language what needs to be improved through learning and training to allow the trainee to get closer towards the outcome of training. By describing the component parts of a CiP, descriptors also aid decisions on assessment of the level of supervision required by a trainee at the time of that assessment, providing prompts for feedback of performance by allowing identification of areas of excellence or specific detail on areas for development, including in behavioural and professional domains. Descriptors can, therefore, help

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trainees identify where to focus their efforts to become competent and safe independent practitioners. More detail about assessment and feedback is given in section 5, Programme of Assessment.

Each CiP is judged against a scale that describes the level of supervision required to perform the CiP to the standard of certification. The level of supervision changes in line with the trainee's progression, consistent with safe and effective care for the patient. Typically, there should be a gradual reduction in the level of supervision required and an increase in the complexity of cases managed until the level of competence for independent practice is acquired. In the early years, therefore, it would be normal for trainees to achieve a lower supervision level and progress as experience is gained.

The supervision levels are:

Level I:     Able to observe only
Level II:    Able and trusted to act with direct supervision:
             a) Supervisor present throughout
             b) Supervisor present for part
Level III:   Able and trusted to act with indirect supervision
Level IV:    Able and trusted to act at the level expected of a day-one consultant
Level V:     Able and trusted to act at a level beyond that expected of a day-one consultant

## 3.4 Critical progression points

At the end of phase 1 there is a critical progression point for phase 2 entry assessed at the ARCP, where trainees will demonstrate competencies in knowledge, clinical skills and professional behaviours commensurate with the CiPs and defined syllabus.  To move from phase 2 to phase 3 trainees must demonstrate knowledge, clinical skills and professional behaviours commensurate with certification and, therefore, become eligible to sit the ISB examination in Cardiothoracic Surgery. Table 1 shows indicative supervision levels for the end of phase 2 and the supervision levels required by the end of phase 3. A trainee becomes eligible for certification when supervision level IV has been achieved in each shared and specialty-specific CiPs as well as acquiring all of the skills described in the GPC framework (in addition to the other certification requirements shown in section 5.4) as confirmed by an ARCP panel.

Excellence will be recognised by:

a)   Achievement of Level V in any of the CiPs
b)   Exceeding the supervision level expected for the end of phase 1-3
c)    Achievement of a supervision level at an earlier stage than would normally be expected
d)   Recognition of particularly good performance in any of the descriptors within a CiP.

| Capability in practice (shared) | Supervision Level (end of phase 1) | Indicative Supervision Level (end of phase 2) | Supervision Level (end of phase 3 and certification) |
|---|---|---|---|
| 1. Manages an out-patient clinic | Level II | Level III | Level IV |
| 2. Manages the unselected emergency take | Level III | Level III | Level IV |
| 3. Manages ward rounds and the on-going care of in-patients | Level III | Level IV | Level IV |
| 4. Manages an operating list | Level II | Level II | Level IV |
| 5. Manages multi-disciplinary working | Level II | Level III | Level IV |

Specialty-specific CiPs:

| Capability in practice (specialty-specific) | Supervision Level (end of phase 1) | Indicative Supervision Level (end of phase 2) | Supervision Level (end of phase 3 and certification) |
|---|---|---|---|
| 6. Manages patients within the critical care area | Level III | Level III | Level IV |
| 7. Assesses surgical outcomes both at a personal and unit level | Level II | Level III | Level IV |

Table 1: Supervision levels to be achieved by the end of each phase of training

### 3.5 Breadth of experience required during training in Cardiothoracic Surgery

The curriculum requires trainees to accrue a rich experience that promotes deep learning of knowledge, clinical skills, technical skills, professional behaviour, leadership and all other generic professional skills that are considered necessary to ensure patient safety throughout the training process and specifically at the end of training. The scope of practice of a day-one consultant in Cardiothoracic Surgery is described in the syllabus. In addition, there are certain skills and conditions

within the syllabus that are of such central and fundamental importance to the safe practice of cardiac and thoracic surgeons that they are highlighted as critical conditions and index procedures.

### 3.5.1 The syllabus

The syllabus, shown in appendix 2, provides a detailed description of the specialty-specific knowledge, clinical and technical skills required for each phase of training and for certification in Cardiothoracic Surgery. The syllabus is organised by topics which are the presenting conditions of patients in relation to the specialty. Trainees are expected to have exposure to all topics in phase 2 of training.

As surgical practice continues to evolve, it is essential for trainees to develop competencies in areas that are shaping the future of healthcare. The following three areas of practice are becoming increasingly relevant to the delivery of surgery and patient care. While these areas are not written into the syllabus in detail, they are recognised as critical aspects of practice that trainees should be aware of and integrate where appropriate. Given that surgical specialties and healthcare systems adopt these advancements at different rates, trainees are expected to stay informed and adapt their practice accordingly.

Whilst these areas are of growing importance and relevance, they are not expected to be fully evidenced by all trainees at this stage due to current disparities in training opportunities. Where feasible, trainee engagement in these emerging areas is encouraged, with continued focus on demonstrating the essential skills and behaviours in the GPC framework.

*Genomics*

Knowledge of genomics is increasingly important for surgical trainees, aiding them in patient screening, enhancing diagnostics and treatments leading to better targeted care. Genomic technologies allow for the identification of genetic mutations and variations that contribute to disease, enabling treatment plans tailored to individual genetic profiles. Additionally, it is important for understanding hereditary and familial conditions, allowing surgeons to provide better-informed consent and management options for patients and their families. Although some specialties are likely to adopt genomic medicine into their clinical practice sooner than others, trainees will be expected to stay current with these developments and integrate genetic insights into their own clinical practice where appropriate. Trainees can demonstrate their application of genomics to patient care using workplace-based assessment methods such as the CEX, CBD, AoA and through presentations and quality improvement projects [7] [8] [9].

*Clinical Informatics*

The use of Clinical informatics is a critical area of knowledge for surgical trainees as it encompasses the use of information technology to improve patient care. Proficiency in clinical informatics enables surgeons to efficiently manage electronic health records, use clinical decision support systems, and analyse health data to enhance surgical outcomes. Furthermore, clinical informatics supports

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[7] https://www.aomrc.org.uk/wp-content/uploads/2021/11/Genomics_syllabus_1121.pdf

[8] https://www.england.nhs.uk/long-read/accelerating-genomic-medicine-in-the-nhs/

[9] https://www.nationalhealthexecutive.com/articles/nhs-scotland-first-genomic-medicine-strategy-launches

evidence-based practice by providing access to the latest research and guidelines, facilitating continuous learning and improvement. Trainees will be expected to demonstrate the use of digital applications and the ability to access critical information for administrative efficiency, making informed surgical decisions and improving patient care. Trainees can demonstrate their knowledge, understanding and application of clinical informatics to patient care using workplace-based assessment methods such as the CEX, CBD, AoA, OoT and through presentations, research, quality improvement projects and health service management related activity [10] [11] [12].

*Sustainability*

The use of sustainable practices is an increasingly important consideration in surgery, given the environmental impact of healthcare activities. By adopting sustainable practices, surgeons can contribute to the broader effort of making healthcare more environmentally friendly while still providing high-quality patient care. Trainees will be expected to keep up to date with knowledge of sustainable practices, including an understanding of the environmental implications of surgical procedures, the use of sustainable materials, and the implementation of energy-efficient practices within the operating room. Trainees should demonstrate that they can incorporate sustainability into their own practice and encourage a culture of environmental responsibility and stewardship. Trainees can demonstrate their commitment to sustainability using workplace-based assessment methods such as DOPS, PBA, CEX, CBD, OoT, AoA and through quality improvement projects, and reflective practice [13].

### 3.5.2 Critical conditions

From the syllabus, a list of critical conditions has been identified which are of significant importance for patient safety and demonstration of a safe breadth of practice. Across surgery, these are defined as any condition where a misdiagnosis could be associated with devastating consequences for life or limb. These critical conditions are assessed individually by means of the Case Based Discussion (CBD) and Clinical Evaluation Exercise (CEX), which both include an assessment of clinical judgement and decision-making. They provide formative feedback to the trainee and feed into the summative assessment of the Assigned Educational Supervisor (AES) via the AES report for the ARCP. A list of critical conditions for Cardiothoracic Surgery is given in appendix 3 and is included in the certification requirements in this curriculum. These critical conditions were decided following wide consultation with clinicians and trainers in the specialty.

### 3.5.3 Index procedures

In addition to the critical conditions, a list of index procedures has been identified. Index procedures are common but important operations central to the specialty, competence in which is essential to the delivery of safe patient care. Taken together they form a representative sample of the breadth

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[10] https://www.england.nhs.uk/long-read/digital-skills-health-informatics-competency-standards-frameworks-and-tools-for-healthcare-professionals/

[11] https://digital-transformation.hee.nhs.uk/

[12] https://www.aomrc.org.uk/wp-content/uploads/2020/09/Doctors_Download_exploring_doctors_digital_priorities-_for-_action_0320.pdf

[13] https://www.aomrc.org.uk/publication/sustainability-resources/

of operative procedures in the specialty. Learning in the index procedures is indicative of learning in the broad range of technical procedures in the syllabus and surgical logbook and is, therefore of significant importance for patient safety and demonstration of a safe breadth of practice. Each of these index procedures is assessed individually by means of the Procedure Based Assessment (PBA) which provides formative feedback to the trainee and feeds into the summative AES report for the ARCP. A list of index procedures for cardiac / thoracic surgery is given in appendix 4. These include indicative numbers of cases necessary before certification as trainees would not normally be expected to have achieved sufficient experience to be able to manage the range of pathology they encounter unless these numbers were met. It is recognised that competence could be achieved with fewer cases, if supported by evidence from other assessments. Meeting the numbers does not, in itself, imply competence. These index procedures and indicative numbers were decided following wide consultation with clinicians and trainers in the specialty.

The certification requirements, shown in section 5.4, summarise the experience trainees need to achieve by the end of the training programme.


# 4 Teaching and Learning

### 4.1 How the Cardiothoracic Surgery curriculum is delivered

The curriculum is used to help design training programmes locally that ensure all trainees can develop the necessary skills and knowledge in a variety of settings and situations. The curriculum is designed to ensure it can be applied in a flexible manner, meeting service needs as well as supporting each trainee's own tailored learning and development plan. The requirements for curriculum delivery have not changed as a result of this new curriculum. All training must comply with the GMC requirements presented in *Promoting excellence: standards for medical education and training*[14] (2017). This stipulates that all training must comply with the following ten standards:

*Theme 1: learning environment and culture*

S1.1 The learning environment is safe for patients and supportive for learners and educators. The culture is caring, compassionate and provides a good standard of care and experience for patients, carers and families.

S1.2 The learning environment and organisational culture value and support education and training, so that learners are able to demonstrate what is expected in Good Medical Practice and to achieve the learning outcomes required by their curriculum.

*Theme 2: educational governance and leadership*

S2.1 The educational governance system continuously improves the quality and outcomes of education and training by measuring performance against the standards, demonstrating accountability and responding when standards are not being met.

S2.2 The educational and clinical governance systems are integrated, allowing organisations to address concerns about patient safety, the standard of care, and the standard of education and training.

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[14] Promoting excellence: standards for medical education and training

S2.3 The educational governance system makes sure that education and training is fair and is based on the principles of equality and diversity.

*Theme 3: supporting learners*

S3.1 Learners receive educational and pastoral support to be able to demonstrate what is expected in Good Medical Practice, and to achieve the learning outcomes required by their curriculum.

*Theme 4: supporting educators*

S4.1 Educators are selected, inducted, trained, and appraised to reflect their education and training responsibilities.

S4.2 Educators receive the support, resources and time to meet their education and training responsibilities.

*Theme 5: developing and implementing curricula and assessments*

S5.1 Medical school curricula and assessments are developed and implemented so that medical students are able to achieve the learning outcomes required for graduates.

S5.2 Postgraduate curricula and assessments are implemented so that doctors in training are able to demonstrate what is expected in Good Medical Practice, and to achieve the learning outcomes required by their curriculum.

It is the responsibility of NHS England, NHS Education for Scotland (NES), Health Education and Improvement Wales (HEIW), the Northern Ireland Medical and Dental Training Agency (NIMDTA) and the Health Service Executive (HSE) in the Republic of Ireland to ensure compliance with these standards for Cardiothoracic training. Training delivery must also comply with the latest edition of the Gold Guide. Appendix 7 outlines the quality management arrangements for the curriculum.

## 4.2 Learning opportunities

A variety of educational approaches are used by education providers in order to help trainees develop the knowledge, clinical and technical skills, professional judgement, values and behaviours required by the curriculum. Taken together, these educational approaches ensure that the CiPs and GPCs are taught appropriately in order that the purpose of the curriculum is met. These educational approaches divide into three areas:

- Self-directed learning
- Learning from practice
- Learning from formal situations

### 4.2.1 Self-directed learning

The curriculum is trainee-led and self-directed learning is encouraged. Trainees are expected to take a proactive approach to learning and development and towards working as a member of a multi-professional team. Trainees are encouraged to establish study groups, journal clubs and conduct peer reviews. They should take the opportunity of learning with peers at a local level through postgraduate teaching and discussion sessions, and nationally with examination preparation courses. Trainees are expected to undertake personal study in addition to attending formal and informal teaching. This includes using study materials and publications and reflective practice.

Trainees are expected to use the developmental feedback they get from their trainers in learning agreement meetings and from assessments to focus further research and practice.

Reflective practice is an important part of self-directed learning and of continuing professional development. It is an educational exercise that enables trainees to explore, with rigour, the complexities and underpinning elements of their actions in order to refine and improve them. Reflection in the oral form is very much an activity that surgeons engage in and find useful and developmental. Writing reflectively adds more to the oral process by deepening the understanding of practice. Written reflection offers different benefits to oral reflection which include: a record for later review, a reference point to demonstrate development and a starting point for shared discussion. Whatever the modality of reflection, it is important that it takes place and that there is a record of it having taken place, whether or not the specific subject or content of the reflection is recorded[15]. Self-directed learning permits development in all seven CiPs and the GPCs, especially when there is effective reflection on all aspects of learning at the centre of self-directed learning.

### 4.2.2 Learning from clinical practice

Surgical learning is largely experiential in nature with any interaction in the workplace having the potential to become a learning episode. The workplace provides learning opportunities on a daily basis for surgical trainees, based on what they see and what they do. Trainees are placed in clinical placements, determined locally by Training Programme Directors (TPDs), which provide teaching and learning opportunities. The placements must be in units that are able to provide sufficient clinical resource and have sufficient trainer capacity.

While in the workplace, trainees are involved in supervised clinical practice, primarily in a hospital environment in wards, clinics or theatre. There are strong links to practitioners working in primary care and training environments may include private settings and, where available for training, a variety of community settings where the necessary facilities and governance arrangements are in place. The trainee role in these contexts determines the nature of the learning experience.

Learning begins with observation of a trainer (not necessarily a doctor) and progresses to assisting a trainer; the trainer assisting/supervising the trainee and then the trainee managing a case independently but with access to their supervisor. The level of supervision changes in line with the trainee's progression through the phases of the curriculum. As training progresses, trainees should have the opportunity for increased autonomy, consistent with safe and effective care for the patient. Typically, there should be a gradual reduction in the level of supervision required and an increase in the complexity of cases managed until the level of competence for independent practice is acquired.

The CiPs are best taught, particularly in the early phases of training, by a specifically selected trainer directly watching and supervising while the trainee carries out the activity. This type of training is known as Professionalised Training and requires more time (and so, consequently, a reduced clinical workload) than conventional methods. It permits more thorough teaching, more rapid achievement of skill and earlier recognition of difficulties. Continuous systematic feedback and reflection are integral to learning from clinical practice. The CiP and GPC descriptors through the MCR assessment provide detailed feedback and identify specific, timely and relevant goals for development through

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[15] Improving feedback and reflection to improve learning. A practical guide for trainees and trainers

training. Education providers should make every attempt to ensure that each trainee has exposure to Professionalised Training appropriate to their phase of progression through the curriculum. It is recommended that this be one session per week per trainee in the early years. Trainees are required to keep a surgical logbook to support their reflection and the assessment of their operative skills.

### 4.2.3 Learning from formal situations

Learning from clinical practice is supplemented by an educational programme of courses and teaching sessions arranged at local, regional and national levels. These should be mapped to the CiPs and the Cardiothoracic Surgery syllabus and may include a mixture of formal talks including attendance at national conferences relevant to the specialty, small group discussion, case review, morbidity and mortality meetings, literature review and skills teaching. Mandatory courses for trainees are shown in the certification requirements (section 5.4 below) and appendix 5.

### 4.2.4 Simulation

Teaching in formal situations often involves the use of simulation. In this context simulation can be any reproduction or approximation of a real event, process or set of conditions or problems e.g. taking a history in clinic, performing a procedure or managing post-operative care. Trainees have the opportunity of learning in the same way as they would in the real situation but in a patient-free environment. Simulation can be used for the development of both individuals and teams. The realism of the simulation may reflect the environment in which simulation takes place, the instruments used or the emotional and behavioural features of the real situation. Simulation training does not necessarily depend on the use of expensive equipment or complex environments e.g. it may only require a suturing aid or a role play with scenarios.

Simulation training has several purposes:

- supporting learning and keeping up to date
- addressing specific learning needs
- situational awareness of human factors which can influence people and their behaviour
- enabling the refining or exploration of practice in a patient-safe environment
- promoting the development of excellence
- improving patient care.

The use of simulation in surgical training is part of a blended approach to managing teaching and learning concurrent with supervised clinical practice. The use of simulation on its own cannot replace supervised clinical practice and experience or authorise a doctor to practice unsupervised. Provision of feedback and performance debriefing are integral and essential parts of simulation-based training. Simulation training broadly follows the same pattern of learning opportunities offering insight into the development of technical skills, team-working, leadership, judgement and professionalism. Education providers should use all teaching methods available, including simulation teaching, to ensure that the full breadth of the syllabus is covered. Where there is a need for specific intensive courses to meet specific learning outcomes, there may be a number of equivalent providers.

### 4.3 Supervision

Supervision is fundamental in the delivery of safe and effective training. It takes advantage of the experience, knowledge and skills of expert clinicians and ensures interaction between an experienced clinician and a trainee. The ultimate responsibility for the quality of patient care and

the quality of training lies with the supervisor. Supervision is designed to ensure the safety of the patient by encouraging safe and effective practice and professional conduct. A number of people from a range of professional groups are involved in teaching and training with subject areas of the curriculum being taught by staff with relevant specialist expertise and knowledge. Those involved in the supervision of trainees must have the relevant qualifications, experience and training to undertake the role. Specialist skills and knowledge are usually taught by consultants and senior trainees whereas the more generic aspects of practice can also be taught by the wider multi-disciplinary team (MDT).

The key roles involved in teaching and learning are the Training Programme Director, Assigned Educational Supervisor, Clinical Supervisor, Assessor and Trainee. Their responsibilities are described in appendix 6 and further information is given in the Gold Guide.

In the UK, the GMC's process for the recognition and approval of trainers[16] enables Deaneries to formally recognise AESs and Clinical Supervisors (CSs) and ensure they meet the specified criteria. Trainees must be placed in approved placements that meet the required training and educational standards of the curriculum. In each placement, trainees have a named AES and one or more CS, responsible for overseeing their education. Depending on local arrangements, these roles may be combined into a single role of AES.

All elements of work in training posts must be supervised. The level of supervision varies according to the experience of the trainee, the clinical exposure and the case mix undertaken. As training progresses trainees should have the opportunity for increased autonomy, consistent with safe and effective care for the patient. Achievement of supervision level IV in any of the seven CiPs indicates that a trainee is able to work at an independent level, with advice from their trainer at this level being equivalent to a consultant receiving advice from senior colleagues within an MDT. However, within the context of a training system, trainees are always under the educational and clinical governance structures of the Health Service.

The key roles involved in teaching and learning are the Training Programme Director, Assigned Educational Supervisor, Clinical Supervisor, Assessor and Trainee. Their responsibilities are described in appendix 6.

## 4.4 Supporting feedback and reflection

Effective feedback is known to enhance learning, and combining self-reflection[7] with feedback promotes deeper learning. Trainees are encouraged to seek feedback on all they do, either informally, through verbal feedback at the end of a learning event, or formally through workplace-based assessments (WBAs). The MCR and use of the CiP and GPC descriptors provide regular opportunities for detailed and specific feedback. Trainee self-assessment of CiPs provides a regular opportunity for focused and structured reflection and development of self-directed goals for learning as well as developing these goals through dialogue with trainers. All the assessments in the curriculum are designed to include a feedback element as well as to identify concerns in multiple ways:

- *Learning agreement:* appraisal meetings with the AES at the beginning, middle and end of each placement
- *WBA:* immediate verbal dialogue after a learning episode

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[16] GMC recognition and approval of trainers

- *CBD:* meeting with a consultant trainer to discuss the management of a patient case
- *MSF:* meeting with the AES to discuss the trainee's self-assessment and team views
- *MCR (mid-point formative):* meeting with the AES or CS to discuss the trainee's self-assessment and CSs' views on CiPs
- *MCR (final formative, contributing to the AES's summative Report):* meeting with the AES or CS to discuss the trainee's self-assessment and CSs' views on CiPs
- *Formal examinations:* summative feedback on key areas of knowledge and skills
- *ARCP:* a feedback meeting with the TPD or their representative following an ARCP.

Constructive feedback is expected to include three elements i) a reflection on performance ii) identification of the trainee's achievements, challenges and aspirations and iii) an action plan.

## 4.5 Academic training

All trainees are required to satisfy the learning outcomes in domain 9 of the GPC framework: *Capabilities in research and scholarship*. Trainees are encouraged to participate in clinical research and collaborative trials to achieve these outcomes, as well as in journal clubs, literature review and systematic review and to make a major contribution to the publication of novel findings in peer reviewed journals. An understanding of the principles of research, its interpretation and safe implementation of evidenced-based new methods, processes and techniques is essential for the modern, progressive practice of surgery and in the interests of patients and the service. Some trainees choose to take time out of training for a formal period of research, as specified in the Gold Guide[7]. For the majority, this leads to the award of a higher degree in an area related to their chosen specialty. Some also choose to focus a significant part of their training time on academic medicine, but need to complete all the essential elements of their specialty curriculum satisfactorily in order to achieve certification. The rate of progression through the clinical component of their training is determined by the ARCP process to ensure that all clinical requirements are met in keeping with the curriculum. Arrangements for academic training differ in detail across the nations of the UK and Republic of Ireland. Details of arrangements can be found on the webpages of the relevant National Health Education body.

# 5 Programme of Assessment

## 5.1 Purpose of assessment

Assessment of learning is an essential component of any curriculum. This section describes the assessment system and the purpose of its individual components which are blueprinted to the curriculum as shown in appendix 9. The focus is on good practice, based on fair and robust assessment principles and processes in order to ensure a positive educational impact on learners and to support assessors in making valid and reliable judgements. The programme of assessment comprises an integrated framework of examinations, assessments in the workplace and judgements made about a learner during their approved programme of training. Its purpose is to robustly evidence, ensure and clearly communicate the expected levels of performance at critical progression points in, and to demonstrate satisfactory completion of, training as required by the curriculum. The assessment programme is shown in figure 3 below.

Assessments can be described as *helping* learning or *testing* learning - referred to as formative and summative respectively. There is a link between the two; some assessments are purely formative (shown in green in figure 3), others are explicitly summative with a feedback element (shown in

blue) while others provide formative feedback while contributing to summative assessment (shown in orange).

The purposes of formative assessment are to:

- assess trainees' actual performance in the workplace.
- enhance learning by enabling trainees to receive immediate feedback, understand their own performance and identify areas for development.
- drive learning and enhance the training process by making it clear what is required of trainees and motivating them to ensure they receive suitable training and experience.
- enable supervisors to reflect on trainee needs in order to tailor their approach accordingly.

The purposes of summative assessment are to:

- provide robust, summative evidence that trainees are meeting the curriculum requirements during the training programme.
- ensure that trainees possess the essential underlying knowledge required for their specialty, including the GPCs to meet the requirements of GMP.
- inform the ARCP, identifying any requirements for targeted or additional training where necessary and facilitating decisions regarding progression through the training programme.
- identify trainees who should be advised to consider changes of career direction.
- provide information for the quality assurance of the curriculum.

**Assessment system**

**Portfolio evidence**

| | |
|---|---|
| Optional Workplace-Based Assessment (WBA) | Mandatory WBA for Index Procedures Critical Conditions |

| | | |
|---|---|---|
| Multisource Feedback (MSF) | Trainee Self-Assessment of GPCs and CiPs | Examinations: Intercollegiate Specialty Board |

Multiple Consultant Report (MCR)

↓

AES Report

↓

Annual Review of Competence Progression (ARCP)

**Key**
- ■ Assessments providing formative feedback whilst contributing to summative feedback
- ■ Formative assessments
- ■ Summative assessments or mechanism with a feedback element

Figure 3: Assessment framework

## 5.2 Delivery of the programme of assessment

The programme of assessment is comprised of several different types of assessment needed to meet the requirements of the curriculum. These together generate the evidence required for global judgements to be made about satisfactory trainee performance, progression in, and completion of, training. These include the ISB examination and WBAs. The primary assessment in the workplace is the MCR, which, together with other portfolio evidence, contributes to the AES report for the ARCP. Central to the assessment framework is professional judgement. Assessors are responsible and accountable for these judgements and these judgements are supported by structured feedback to trainees. Assessment takes place throughout the training programme to allow trainees to continually gather evidence of learning and to provide formative feedback to the trainee to aid progression.

Reflection and feedback are also integral components of all WBAs. In order for trainees to maximise the benefit of WBA, reflection and feedback should take place as soon as possible after the event. Feedback should be of high quality that should include a verbal dialogue between trainee and assessor in reflection on the learning episode, attention to the trainee's specific questions, learning needs and achievements as well as an action plan for the trainee's future development. Both trainees and trainers should recognise and respect cultural differences when giving and receiving feedback[17]. The assessment framework is also designed to identify where trainees may be running into difficulties. Where possible, these are resolved through targeted training, practise and assessment with specific trainers and, if necessary, with the involvement of the AES and TPD to provide specific remedial placements, additional time and additional resources.

## 5.3 Assessment framework components

Each of the components of the assessment framework are described below.

### 5.3.1 The sequence of assessment

Training and assessment take place within placements of six to twelve months' duration throughout each phase of training (figure 4). Assessments are carried out by relevant qualified members of the trainee's multi-professional team whose roles and responsibilities are described in appendix 6. Trainee progress is monitored primarily by the trainee's AES through learning agreement meetings with the trainee. Throughout the placement trainees must undertake WBAs while specialty examinations are undertaken towards at the higher end of the programme after satisfactory completion of phase 2. The trainee's CSs must assess the trainee on the seven CiPs and nine GPC domains using the MCR. This must be undertaken towards the mid-point of each placement in a formative way and at the end of the placement when the formative assessment will contribute to the AES's summative assessment at the final review meeting of the learning agreement. The placement culminates with the AES report of the trainee's progress for the ARCP. The ARCP makes the final decision about whether a trainee can progress to the next level or phase of training. It bases its decision on the evidence that has been gathered in the trainee's learning portfolio during the period between ARCP reviews, particularly the AES report in each training placement.



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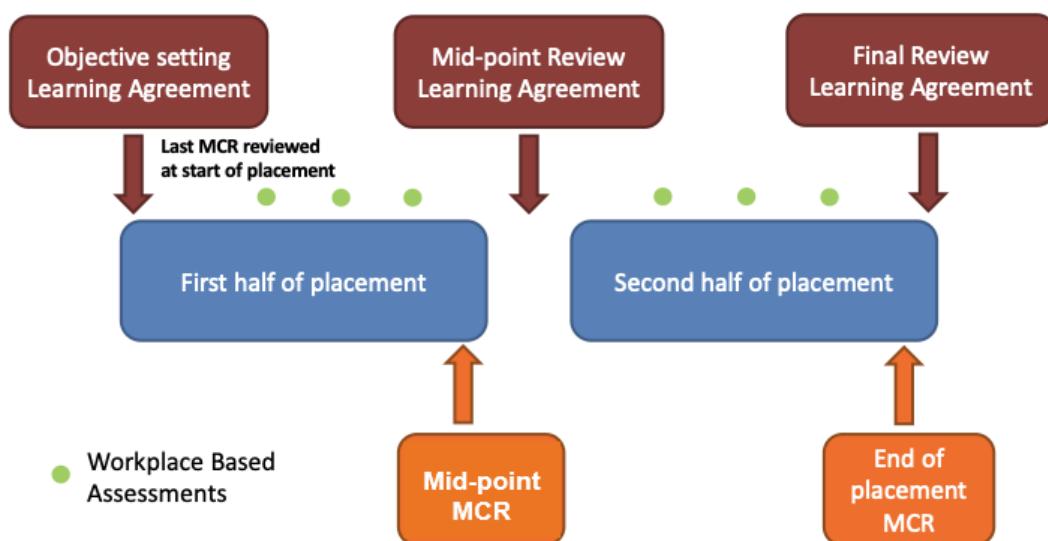
[17] ISCP Cultural Awareness elearning modules

Figure 4: The sequence of assessment through a placement.

## 5.3.2 The learning agreement

The learning agreement is a formal process of goal setting and review meetings that underpin training and is formulated through discussion. The process ensures adequate supervision during training, provides continuity between different placements and supervisors and is one of the main ways of providing feedback to trainees. There are three learning agreement meetings in each placement and these are recorded in the trainee's learning portfolio. Any significant concerns arising from the meetings should be fed back to the TPD at each point in the learning agreement.

*Objective-setting meeting*

At the start of each placement the AES and trainee must meet to review the trainee's progress so far, agree learning objectives for the placement ahead and identify the learning opportunities presented by the placement. The learning agreement is constructively aligned towards achievement of the high-level outcomes (the CiPs and GPCs) and, therefore, the CiPs and GPCs are the primary reference point for planning how trainees will be assessed and whether they have attained the learning required. The learning agreement is also tailored to the trainee's progress, phase of training and learning needs. The MCR from the previous placement will be reviewed alongside the most recent trainee self-assessment and the action plan for training. Any specific targeted training objectives from the previous ARCP should also be considered and addressed though this meeting and form part of the learning agreement.

*Mid-point review meeting*

A meeting between the AES and the trainee must take place at the mid-point of a placement (or each three months within a placement that is longer than six months). The learning agreement must be reviewed, along with other portfolio evidence of training such as WBAs, the logbook and the formative mid-point MCR, including the trainee's self-assessment of CiPs. This meeting ensures training opportunities appropriate to the trainee's own needs are being presented in the placement, and are adjusted if necessary in response to the areas for development identified through the MCR. Particular attention must be paid to progress against targeted training objectives and a specific plan for the remaining part of the placement made if these are not yet achieved. There should be a dialogue between the AES and CSs if adequate opportunities have not been presented to the trainee, and the TPD informed if there has been no resolution. Discussion should also take place if the scope and nature of opportunities should change in the remaining portion of the placement in response to areas for development identified through the MCR.

*Final review meeting*

Shortly before the end of each placement trainees should meet with their AES to review portfolio evidence including the final MCR. The dialogue between the trainee and AES should cover the overall progress made in the placement and the AES's view of the placement outcome.

*AES report*

The AES must write an end of placement report which informs the ARCP. The report includes details of any significant concerns and provides the AES's view about whether the trainee is on track in the phase of training for completion within the indicative time. If necessary, the AES must also explain any gaps and resolve any differences in supervision levels which came to light through the MCR.

### 5.3.3 The Multiple Consultant Report

The assessment of the CiPs and GPCs (high-level outcomes of the curriculum) involves a global professional judgement of a range of different skills and behaviours to make decisions about a learner's suitability to take on particular responsibilities or tasks that are essential to consultant practice at the standard of certification. The MCR assessment must be carried out by the consultant CSs involved with a trainee, with the AES contributing as necessary to some domains (e.g. *Quality Improvement, Research and Scholarship*). The number of CSs taking part reflects the size of the specialty unit and is expected to be no fewer than two. The exercise reflects what many consultant trainers do regularly as part of a faculty group.

The MCR includes a global rating in order to indicate how the trainee is progressing in each of the seven CiPs. This global rating is expressed as a supervision level recommendation described in table 2 below. Supervision levels are behaviourally anchored ordinal scales based on progression to competence and reflect a judgment that has clinical meaning for assessors. Using the scale, CSs must make an overall, holistic judgement of a trainee's performance on each CiP. Levels IV and V, shaded in grey, equate to the level required for certification and the level of practice expected of a day-one consultant in the Health Service (level IV) or beyond (level V). Figures 5 and 6 show how the MCR examines performance from the perspective of the outcome of the curriculum, the day-one consultant surgeon, in the GPCs and CiPs. If not at the level required for certification the MCR can identify areas for improvement by using the CiP or GPC descriptors or, if further detail is required, through free text. The assessment of the GPCs can be performed by CSs, whilst GPC domains 6-9 might be more relevant to assessment by the AES in some placements.

CSs will be able to best recommend supervision levels because they observe the performance of the trainee in person on a day-to-day basis. The CS group, led by a Lead CS, should meet at the mid-point and towards the end of a placement to conduct a formative MCR. Through the MCR, they agree which supervision level best describes the performance of a trainee at that time in each of the seven CiPs and also identify any areas of the nine GPC domains that require development. It is possible for those who cannot attend the group meeting, or who disagree with the report of the group as a whole, to add their own section (anonymously) to the MCR for consideration by the AES. The AES will provide an overview at the end of the process, adding comments and signing off the MCR.

The MCR uses the principle of highlight reporting, where CSs do not need to comment on every descriptor within each CiP but use them to highlight areas that are above or below the expected level of performance. The MCR can describe areas where the trainee might need to focus development or areas of particular excellence. Feedback must be given for any CiP that is not rated as level IV and in any GPC domain where development is required. Feedback must be given to the trainee in person after each MCR and, therefore, includes a specific feedback meeting with the trainee using the highlighted descriptors within the MCR and/or free text comments.

The mid-point MCR feeds into the mid-point learning agreement meeting. At the mid-point it allows goals to be agreed for the second half of the placement, with an opportunity to specifically address areas where development is required. Towards the end of the placement the MCR feeds into the final review learning agreement meeting, helping to inform the AES report (figure 4). It also feeds into the objective-setting meeting of the next placement to facilitate discussion between the trainee and the next AES.

The MCR, therefore, gives valuable insight into how well the trainee is performing, highlighting areas of excellence, areas of support required and concerns. It forms an important part of detailed, structured feedback to the trainee at the mid-point and before the end of the placement, and can trigger any appropriate modifications for the focus of training as required. The final formative MCR, together with other portfolio evidence, feeds into the AES report which in turn feeds into the ARCP. The ARCP uses all presented evidence to make the definitive decision on progression.

| MCR Rating Scale (CiPs) | Anchor statements | Trainer input at each supervision level | | | |
|---|---|---|---|---|---|
| | | Does the trainee perform part or all of the task? | Is guidance required? | Is it necessary for a trainer to be present for the task? | Is the trainee performing at a level beyond that expected of a day one consultant? [c] |
| **Supervision Level I:** | Able to observe only: no execution. | no | n/a | n/a | n/a |
| **Supervision Level IIa:** | Able and trusted to act with direct supervision: The supervisor needs to be physically present throughout the activity to provide direct supervision. | yes | all aspects | throughout | n/a |
| **Supervision Level IIb:** | Able and trusted to act with direct supervision: The supervisor needs to be physically present for part of the activity. The supervisor needs to guide all aspects of the activity. This guidance may partly be given from another setting. | yes | all aspects | will be necessary for part | n/a |
| **Supervision Level III**: | Able and trusted to act with indirect supervision: The supervisor may be required to be physically present on occasion. | yes | some aspects | may be necessary for part | n/a |

| | | | | | |
|---|---|---|---|---|---|
| | The supervisor does not need to guide all aspects of the activity. For those aspects which do need guidance, this may be given from another setting. | | | | |
| **Supervision Level IV:** | Able and trusted to act at the level of a day-one consultant. | yes | None [a,b] | None [a, b] | n/a |
| **Supervision Level V**: | Able and trusted to act at a level beyond that expected of a day-one consultant. | yes | None [a] | None [a] | yes |

Table 2: MCR anchor statements and guide to recommendation of appropriate supervision level in each CiP.

a. This equates to the level of practice expected of a day-one consultant in the Health Service. It is recognised that advice from senior colleagues within an MDT is an important part of consultant practice. Achievement of supervision level IV indicates that a trainee is able to work at this level, with advice from their trainer at this level being equivalent to a consultant receiving advice from senior colleagues within an MDT. It is recognised that within the context of a training system that trainees are always under the educational and clinical governance structures of the Health Service.
b. Where the PBA level required by the syllabus is less than level 4 for an operative procedure, it would be expected that mentorship is sought for such procedures and this would fall within the scope of being able to carry out this activity without supervision (level IV), i.e. be a level commensurate with that of a day-one consultant.
c. Achievement of this level across the entirety of an activity would be rare, although free text could describe aspects of an activity where this level has been reached.

In making a supervision level recommendation, CSs should take into account their experience of working with the trainee and the degree of autonomy they were prepared to give the trainee during the placement. They should also take into account all the descriptors of the activities, knowledge and skills listed in the detailed descriptions of the CiPs. If, after taking all this into account, the CSs feel the trainee is able to carry out the activity without supervision (level IV) then no further detail of this assessment is required, unless any points of excellence are noted. If the trainee requires a degree of supervision to carry out the activity then the CSs should indicate which of the descriptors of the activities, knowledge and skills require further development (to a limit of five items per CiP, so as to allow targets set at feedback to be timely, relevant and achievable). Similarly, if a trainee excels in one or more areas, the relevant descriptors should be indicated. Examples of how the

online MCR will look are shown in figures 5 and 6. Figure 7 describes the MCR as an iterative process involving the trainee, CSs, the AES and the development of specific, relevant, timely and achievable action plans.

*Multiple Consultant Report – assessment of the GPCs*

### 1. Professional values and behaviours

| Appropriate for phase | Your comments... | Descriptors |
|---|---|---|
| Area for development | | |

### 2. Professional skills

| Appropriate for phase | Your comments... | Descriptors |
|---|---|---|
| Area for development | | |

### 3. Professional knowledge

| Appropriate for phase | Your comments... | Descriptors |
|---|---|---|
| Area for development | | |

### 4. Capabilities in health promotion and illness prevention

| Appropriate for phase | Your comments... | Descriptors |
|---|---|---|
| Area for development | | |

### 5. Capabilities in leadership and team working

| Appropriate for phase | Your comments, including your development plan for certification... | Descriptors |
|---|---|---|
| Area for development | | |

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## 6. Capabilities in patient safety and quality improvement

| Appropriate for phase | Your comments, including your development plan for certification... | Descriptors |
| --- | --- | --- |
| Area for development | | |

## 7. Capabilities in safeguarding vulnerable groups

| Appropriate for phase | Your comments... | Descriptors |
| --- | --- | --- |
| Area for development | | |

## 8. Capabilities in education and training

| Appropriate for phase | Your comments, including your development plan for certification... | Descriptors |
| --- | --- | --- |
| Area for development | | |

## 9. Capabilities in research and scholarship

| Appropriate for phase | Your comments, including your development plan for certification... | Descriptors |
| --- | --- | --- |
| Area for development | | |

Figure 5: An example of how the GPCs are assessed through the MCR. CSs would consider whether there are areas for development in any of the nine GPC domains. If not, then nothing further need be recorded. If there are areas for development identified, then CSs are obliged to provide feedback through the MCR. This feedback can be recorded as free text in the comments box indicated. The Descriptors box expands to reveal descriptors taken from the GPC framework. These can be used as prompts for free text feedback or verbatim as standardised language used to describe professional capabilities.

*Multiple Consultant Report – assessment of the CiPs*

### 1. Manages an out-patient clinic

| Supervision level Please select | Your comments... | Descriptors |

### 2. Manages the unselected emergency take

| Supervision level Please select | Your comments... | Descriptors |

### 3. Manages ward rounds and the ongoing care of in patients

| Supervision level Please select | Your comments... | Descriptors |

### 4. Manages an operating list

| Supervision level Please select | Your comments... | Descriptors |

### 5. Manages multi-disciplinary working

| Supervision level Please select | Your comments... | Descriptors |

Figure 6: An example of how the CiPs are assessed through the MCR. The CSs would decide what supervision level to recommend for each of the CiPs and record this for each through the Supervision Level box. If the level recommended is IV or V then no further comment need be recorded, unless the CSs wished to capture areas of particular excellence for feedback. If levels I to III are recommended, then the CSs are obliged to provide feedback through the MCR. This feedback can be recorded as free text in the comments box indicated. The Descriptors box expands to reveal CiP descriptors. These can be used as prompts for free text feedback or verbatim as standardised language to describe the clinical capabilities.

## 5.3.4 Trainee self-assessment

Trainees should complete the self-assessment in the same way as CSs complete the MCR, using the same form and describing self-identified areas for development with free text or using CiP or GPC descriptors. Reflection for insight on performance is an important development tool and self-recognition of the level of supervision needed at any point in training enhances patient safety. Self-assessments are part of the evidence reviewed when meeting the AES at the mid-point and end of a placement. Wide discrepancy between the self-assessment and the recommendation by CSs in the MCR allows identification of over or under confidence and for support to given accordingly.
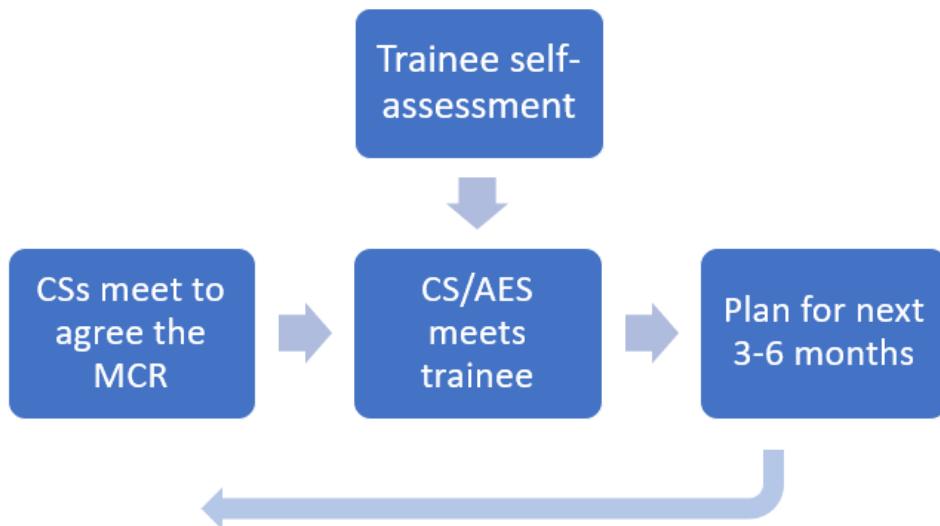
Figure 7: The iterative process of the MCR, showing the involvement of CSs, self-assessment by trainees, face to face meetings between trainees and supervisors and the development of an action plan focused on identified learning needs over the next three to six months of training. Progress against these action plans is reviewed by the AES and at the subsequent MCRs.

### 5.3.5 Workplace-based Assessment (WBA)

Each individual WBA is designed to assess a range of important aspects of performance in different training situations. Taken together the WBAs can assess the breadth of knowledge, skills and performance described in the curriculum. They also constructively align with the clinical CiPs and GPCs (as shown in appendix 9) and will be used to underpin assessment in those areas of the syllabus central to the specialty i.e. the critical conditions and index procedures, as well as being available for other conditions and operations as determined by the trainee and supervisors and especially where needed in the assessment of a remediation package to evidence progress in areas of training targeted by a non-standard ARCP outcome. The WBAs described in this curriculum have been in use for over ten years and are now an established component of training.

The WBA methodology is designed to meet the following criteria:

- *Validity* – the assessment actually does test what is intended; that methods are relevant to actual clinical practice; that performance in increasingly complex tasks is reflected in the assessment outcome
- *Reliability* - multiple measures of performance using different assessors in different training situations produce a consistent picture of performance over time
- *Feasibility* – methods are designed to be practical by fitting into the training and working environment
- *Cost-effectiveness* – the only significant additional costs should be in the training of trainers and the time investment needed for feedback and regular appraisal, this should be factored into trainer job plans
- *Opportunities for feedback* – structured feedback is a fundamental component
- *Impact on learning* – the educational feedback from trainers should lead to trainees' reflections on practice in order to address learning needs.

WBAs use different trainers' direct observations of trainees to assess the actual performance of trainees as they manage different clinical situations in different clinical settings and provide more granular formative assessment in the crucial areas of the curriculum than does the more global

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assessment of CiPs in the MCR. WBAs are primarily aimed at providing constructive feedback to trainees in important areas of the syllabus throughout each placement in all phases of training. Trainees undertake each task according to their training phase and ability level and the assessor must intervene if patient safety is at risk. It would be normal for trainees to have some assessments which identify areas for development because their performance is not yet at the standard for the completion of that training.

Each WBA is recorded on a structured form to help assessors distinguish between levels of performance and prompt areas for their verbal developmental feedback to trainees immediately after the observation. Each WBA includes the trainee's and assessor's individual comments, ratings of individual competencies (e.g. *Satisfactory*, *Needs Development* or *Outstanding*) and global rating (using anchor statements mapped to phases of training). Rating scales support the drive towards excellence in practice, enabling learners to be recognised for achievements above the level expected for a level or phase of training. They may also be used to target areas of under-performance. As they accumulate, the WBAs for the critical conditions and index procedures also contribute to the AES report for the ARCP.

WBAs are formative and may be used to assess and provide feedback on all clinical activity. Trainees can use any of the assessments described below to gather feedback or provide evidence of their progression in a particular area. WBAs are only mandatory for the assessment of the critical conditions and index procedures (see appendices 3 and 4). They may also be useful to evidence progress in targeted training where this is required e.g. for any areas of concern.

WBAs for index procedures and critical conditions will inform the AES report along with a range of other evidence to aid the decision about the trainee's progress. All trainees are required to use WBAs to evidence that they have achieved the learning in the index procedures or critical conditions by certification. However, it is recognised that trainees will develop at different rates, and failure to attain a specific level at a given point will not necessarily prevent progression if other evidence shows satisfactory progress.

The assessment blueprint (appendix 9) indicates how the assessment programme provides coverage of the CiPs, the GPC framework and the syllabus. It is not expected that the assessment methods will be used to evidence each competency and additional evidence may be used to help make a supervision level recommendation. The principle of assessment is holistic; individual GPC and CiP descriptors and syllabus items should not be assessed, other than in the critical conditions and index procedures or if an area of concern is identified. The programme of assessment provides a variety of tools to feedback to and assess the trainee.

*Case Based Discussion (CBD)*

The CBD assesses the performance of a trainee in their management of a patient case to provide an indication of competence in areas such as clinical judgement, decision-making and application of medical knowledge in relation to patient care. The CBD process is a structured, in-depth discussion between the trainee and a consultant supervisor. The method is particularly designed to test higher order thinking and synthesis as it allows the assessor to explore deeper understanding of how trainees compile, prioritise and apply knowledge. By using clinical cases that offer a challenge to trainees, rather than routine cases, trainees are able to explain the complexities involved and the reasoning behind choices they made. It also enables the discussion of the ethical and legal framework of practice. It uses patient records as the basis for dialogue, for systematic assessment

and structured feedback. As the actual record is the focus for the discussion, the assessor can also evaluate the quality of record keeping and the presentation of cases. The CBD is important for assessing the critical conditions (appendix 3). Trainees are assessed against the standard for the completion of their phase of training.

*Clinical Evaluation Exercise (CEX) / CEX for Consent (CEX(C))*

The CEX or CEX(C) assesses a clinical encounter with a patient to provide an indication of competence in skills essential for good clinical care such as communication, history taking, examination and clinical reasoning. These can be used at any time and in any setting when there is a trainee and patient interaction and an assessor is available. The CEX or CEX(C) is important for assessing the critical conditions (appendix 3). Trainees are assessed against the standard for the completion of their phase of training.

*Direct Observation of Procedural Skills (DOPS)*

The DOPS assesses the trainee's technical, operative and professional skills in a range of basic diagnostic and interventional procedures during routine surgical practice in wards, out-patient clinics and operating theatres. The procedures reflect common and important procedures. Trainees are assessed against the standard for the completion of core surgical training.

*Multi-source Feedback (MSF)*

The MSF assesses professional competence within a team working environment. It comprises a self-assessment and the assessments of the trainee's performance from a range colleagues covering different grades and environments (e.g. ward, theatre, out-patients) including the AES. The competencies map to the standards of GMP and enable serious concerns, such as those about a trainee's probity and health, to be highlighted in confidence to the AES, enabling appropriate action to be taken. Feedback is in the form of a peer assessment chart, enabling comparison of the self-assessment with the collated views received from the team and includes their anonymised but verbatim written comments. The AES should meet with the trainee to discuss the feedback on performance in the MSF. Trainees are assessed against the standard for the completion of their training level.

*Procedure Based Assessment (PBA)*

The PBA assesses advanced technical, operative and professional skills in a range of specialty procedures or parts of procedures during routine surgical practice in which trainees are usually scrubbed in theatre. The assessment covers pre-operative planning and preparation; exposure and closure; intra-operative elements specific to each procedure and post-operative management. The procedures reflect the routine or index procedures relevant to the specialty. The PBA is used particularly to assess the index procedures (appendix 4). Trainees are assessed against the standard for certification.

*Surgical logbook*

The logbook is tailored to each specialty and allows the trainee's competence as assessed by the DOPS and PBA to be placed in context. It is not a formal assessment in its own right, but trainees are required to keep a log of all operative procedures they have undertaken including the level of supervision required on each occasion using the key below. The logbook demonstrates breadth of experience which can be compared with procedural competence using the DOPS and the PBA and

will be compared with the indicative numbers of index procedures defined in the curriculum (appendix 4).

Observed (O)
Assisted (A)
Supervised - trainer scrubbed (S-TS)
Supervised - trainer unscrubbed (S-TU)
Performed (P)
Training more junior trainee (T)

The following WBAs may also be used to further collect evidence of achievement, particularly in the GPC domains of *Quality improvement*, *Education and training* and *Leadership and team working*:

*Assessment of Audit (AoA)*

The AoA reviews a trainee's competence in completing an audit or quality improvement project. It can be based on documentation or a presentation of a project. Trainees are assessed against the standard for the completion of their phase of training.

*Observation of Teaching (OoT)*

The OoT assesses the trainee's ability to provide formal teaching. It can be based on any instance of formalised teaching by the trainee which has been observed by the assessor. Trainees are assessed against the standard for the completion of their phase of training.

The forms and guidance for each WBA method can be found on the ISCP website (see section 7).

### 5.3.6 Intercollegiate Specialty Board Examination

The ISB examination is governed by the Joint Committee on Intercollegiate Examinations (JCIE, www.jcie.org.uk) on behalf of the four surgical Royal Colleges. The JCIE is served by an Intercollegiate Specialty Board in each specialty. The examination is a powerful driver for knowledge and clinical skill acquisition. It has been in existence for over thirty years and is accepted as an important, necessary and proportionate test of knowledge, clinical skill and the ability to demonstrate the behaviours required by the curriculum. The examination is taken after successful completion of phase 2 and the standard is set at the level of a day-one consultant in the generality of the specialty, and must be passed in order to complete the curriculum. The examination components have been chosen to test the application of knowledge, clinical skills, interpretation of findings, clinical judgement, decision making, professionalism, and communication skills described within the curriculum. The examination also assesses components of the CiPs and GPCs (as shown in appendix 9) and feeds into the same process as WBA for review by the AES and ARCP.

There are two sections to the exam:

- Section 1 is a computer-based assessment comprising two papers taken on the same day. These are both Single Best Answer (SBA) papers designed to test the application of knowledge and clinical reasoning.
- Section 2 comprises the clinical component of the examination. It consists of a series of carefully designed and structured interviews on clinical topics – some scenario-based and others patient-based. The construct of section 2 allows assessment of the application of knowledge, clinical interpretation, decision-making, clinical judgement and professionalism.

Standard setting:

- Section 1 is standard set by the modified Angoff method with one set being added to the Angoff cut score to generate the eligibility to proceed mark.  Section 1 is computer marked.  Any questions identified as anomalous (possible wrong answers, negative discriminators etc.) are discussed at the standard setting meeting prior to the Angoff and, if necessary, removed.
- The Section 2 clinical and oral components are calibrated prior to the start of each diet. It is independently marked by examiners working in pairs but with reference to the marking descriptors and the standard agreed at the calibration meeting.

Feedback:

Following section 1, candidates will receive a formal letter from the Board Chair confirming the result and a Final Performance Report which shows:

Paper 1 (Single Best Answer) Score %
Paper 2 (Single Best Answer) Score %
Combined Score %

Following section 2, candidates will receive a formal letter from the Board Chair confirming the result. Unsuccessful candidates will also receive a Final Performance Report showing the name of each station and its pass mark, and the mark achieved by a candidate in each of the stations.

Attempts:

Trainees have a maximum of four attempts at each section of the examination with no re-entry. A pass in section 1 is required to proceed to section 2 and must be achieved within two years of the first attempt.  The time limit for completion of the entire examination process is seven years. Pro-rata adjustments are permissible to these timescales for less than full time (LTFT) trainees. Trainees in Cardiothoracic Surgery become eligible to sit section 1 following an ARCP outcome 1 at the end of phase 2 of specialty training. Further details can be found at
https://www.jcie.org.uk/content/content.aspx?ID=12

### 5.3.7 Annual Review of Competence Progression (ARCP)

The ARCP is a formal Deanery process overseen and led by the TPD. It scrutinises the trainee's suitability to progress through the training programme. It bases its decisions on the evidence that has been gathered in the trainee's learning portfolio during the period between ARCP reviews, particularly the AES report in each training placement. The ARCP would normally be undertaken on an annual basis for all trainees in surgical training. A panel may be convened more frequently for an interim review or to deal with progression issues (either accelerated or delayed) outside the normal schedule. The ARCP panel makes the final summative decision that determines whether trainees are making appropriate progress to be able to move to the next level or phase of training or to achieve certification.

### 5.4 Completion of training in Cardiothoracic Surgery

The following requirements are applied to all trainees completing the curriculum and applying for certification and entry to the specialist register

All seeking certification in Cardiothoracic Surgery must:

a) be fully registered with the GMC and have a licence to practise (UK trainees) or be registered with the Medical Council in Ireland (Republic of Ireland trainees)
b) have successfully passed the ISB examination
c) have achieved level IV or V in all the CiPs
d) have achieved the competencies described in the nine domains of the GPC framework
e) have been awarded an outcome 6 at a final ARCP (if applying for specialist registration through certification).

In order to be awarded an outcome 6 at the final ARCP trainees must be able to satisfy the following specialty-specific certification requirements:

a) Generic requirements shared between surgical specialities

| | |
|---|---|
| **Research** - Trainees must provide evidence of having met the relevant requirements for research and scholarship. For UK trainees, this can be found in the GMC's GPC framework. Broadly, this includes capabilities in 4 areas:<br><br>1. The demonstration of evidence-based practice<br>2. Understanding how to critically appraise literature and conduct literature searches and reviews<br>3. Understanding and applying basic research principles<br>4. Understanding the basic principles of research governance and how to apply relevant ethical guidelines to research activities. | |
| **Quality Improvement** - evidence of an understanding of, and participation in, audit or service improvement as defined in the curriculum | Trainees must complete or supervise an indicative number of three audit or quality improvement projects during specialty training. In one or more of these, the cycle should be completed. |
| **Medical Education and training** - evidence of an understanding of, and participation in, medical education and training as defined in the curriculum | Trainees must provide evidence of being trained in the training of others and present written structured feedback on their teaching uploaded to the ISCP portfolio. |
| **Management and leadership** - evidence of an understanding of management structures and challenges of the health service across relevant health services and the variations between nations | Trainees must provide evidence of training in health service management and leadership and having taken part in a management related activity e.g. rota administration, trainee representative, membership of working party etc. or of having shadowed a management role within the hospital. |

b) Requirements specific to Cardiothoracic Surgery

| | |
|---|---|
| **Additional courses / qualifications** - evidence of having attended specific courses/gained specific qualifications as defined in the curriculum | The Advanced Trauma Life Support® (ATLS®), European Trauma Course, Definitive Surgical Trauma Skills course or equivalent locally provided course(s) meeting the outcomes described. |
| **Specialist conferences** - evidence of having attended conferences and meetings as defined in the curriculum appropriate to the specialty | It is recommended that trainees attend national or international meetings during training (e.g. annual meetings of specialty associations or major international equivalents). |
| **Clinical experience** - evidence of the breadth of clinical experience defined in the specialty syllabus, and experience in one specialty interests. | To ensure opportunities to acquire the breadth of curricular competencies in a variety of learning environments and cultures, trainees should, where geographically possible, complete a training programme that includes rotation through multiple units or sites. This recognises the importance of an ability to constructively compare different approaches to delivering surgical patient care and work-based cultures.<br><br>Trainees must be able to provide evidence of managing patients presenting with the full range of acute cardiothoracic conditions up to the point of operation and to manage the full range of acute and elective conditions in the generality of their chosen special interest of Cardiac or Thoracic Surgery, including the operation. |
| **Operative experience** - consolidated logbook evidence of the breadth of operative experience defined in the specialty syllabus | An indicative number of 250 major cases with the majority in the area of special interest (please see appendix 1).<br><br>Trainees with fewer numbers of operations may be considered for certification only if they have other evidence of operative competence e.g. multiple PBAs at level 4a/b for each of the operative groups listed here index procedures. |
| **Index Procedures**<br>Index procedures are of significant importance for patient safety and to demonstrate a safe breadth of practice. | The Cardiac Surgery index procedures are:<br>1. Isolated first time CABG<br>2. Isolated uncomplicated Aortic Valve Replacement |

| | |
|---|---|
| | 3. Combined AVR + CABG<br>4. Isolated uncomplicated Mitral Valve Replacement<br><br>The Thoracic Surgery index procedures are:<br>1. Anatomical lung resection (VATS / Open / Robotic)<br>2. Decortication and/or washout of empyema<br>3. Pneumothorax surgery (VATS / Open)<br>4. Resection of mediastinal lesion<br><br>By certification there should be documented evidence of performance at the level of a day-one consultant in the portfolio by means of the PBA (typically to level 4a/b as shown in appendix 4). |
| **Critical Conditions** - To ensure that trainees have the necessary skills to manage the defined critical conditions. | Trainees must be able to demonstrate knowledge and understanding of the management of the following critical conditions:<br><br>1. Aortic dissection<br>2. Stridor<br>3. Secondary / tension pneumothorax<br>4. Cardiac tamponade<br>5. Acute haemothorax<br>6. Low cardiac output following Cardiac Surgery<br>7. Endocarditis of the native or prosthetic valve<br>8. Respiratory failure following Thoracic Surgery<br>9. Myocardial ischaemia / infarction<br><br>By certification there should be documented evidence of performance in the critical conditions at the level of a day-one consultant in the portfolio by means of the CEX or CBD as appropriate (to level 4 as shown in appendix 3). |

Table 3: Requirements for completion of training in Cardiothoracic Surgery: a) generic requirements shared between all surgical specialties and b) requirements specific to Cardiothoracic Surgery. Attainment of these requirements contribute to evidence that outcomes of training have been met.

Once these requirements have been met, the ARCP panel may consider the award of outcome 6 having reviewed the portfolio and AES report. Award of outcome 6 allows the trainee to seek recommendation for certification and entry onto the specialist register.

# 6 Recording progress in the ISCP learning portfolio

This curriculum is available through the JCST's Intercollegiate Surgical Curriculum Programme (ISCP) training management system at www.iscp.ac.uk. Trainees and all involved with training must register with the ISCP and use the curriculum as the basis of their discussion and to record assessments and appraisals. Both trainers and trainees are expected to have a good knowledge of the curriculum and should use it as a guide for their training programme. Each trainee must maintain their learning portfolio by developing learning objectives, undergoing assessments, recording training experiences and reflecting on their learning and feedback.

The ISCP learning portfolio can be used to build a training record of trainee conduct and practice as follows:

- Trainees can initiate the learning agreement and WBAs directly with supervisors. They can record logbook procedures and other evidence using a variety of forms. They can also link WBAs with critical conditions and index procedures.
- TPDs can validate trainees in their placements, monitor training and manage the ARCP.
- Deanery administrators can support the TPD, JCST trainee enrolment and ARCP process.
- AESs can complete trainee appraisal through the learning agreement, monitor trainee portfolios and provide end of placement AES reports.
- CSs can complete the MCR at the mid-point and end of each placement.
- Assessors can record feedback and validate WBAs.
- Other people involved in training can access trainee portfolios according to their role and function.

**Appendix 1: Capabilities in Practice**

In each of the CiPs the word 'manage' is defined as clinical assessment, diagnosis, investigation and treatment (both operative and non-operative) and recognising when referral to more specialised or experienced surgeons is required for definitive treatment. Trainees are expected to apply syllabus defined knowledge and skills in straightforward and unusual cases across the breadth of the specialty across all CiPs.

| **Shared Capability in Practice 1:** |
| :--- |
| **Manages an out-patient clinic** |
| **Good Medical Practice Domains 1,2,3,4** |

**Description**

Manages all the administrative and clinical tasks required of a consultant surgeon in order that all patients presenting as out-patients in the specialty are cared for safely and appropriately.

**Example descriptors:**

- Assesses and prioritises GP and inter-departmental referrals and deals correctly with inappropriate referrals
- Assesses new and review patients using a structured history and a focused clinical examination to perform a full clinical assessment, and determines the appropriate plan of action, explains it to the patient and carries out the plan
- Carries out syllabus defined practical investigations or procedures within the out-patient setting
- Adapts approach to accommodate all channels of communication (e.g. interpreter, sign language), communicates using language understandable to the patient, and demonstrates communication skills with particular regard to breaking bad news. Appropriately involves relatives and friends
- Takes co-morbidities into account
- Requests appropriate investigations, does not investigate when not necessary, and interprets results of investigations in context
- Selects patients with urgent conditions who should be admitted from clinic
- Manages potentially difficult or challenging interpersonal situations, including breaking bad news and complaints
- Completes all required documentation
- Makes good use of time
- Uses consultation to emphasise health promotion

**Specialty specific requirements:**

See critical conditions (appendix 3 of the curriculum)

**Supervision levels:**

Level I:     Able to observe only

Level II:    Able and trusted to act with direct supervision:

            a) Supervisor present throughout

b)  Supervisor present for part

Level III:    Able and trusted to act with indirect supervision

Level IV:    Able and trusted to act at the level expected of a day-one consultant

Level V:    Able and trusted to act at a level beyond that expected of a day-one consultant

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**Shared Capability in Practice 2:**

**Manages the unselected emergency take**

**Good Medical Practice Domains 1,2,3,4**

**Description**

Manages all patients with an emergency condition requiring management within the specialty. Able to perform all the administrative and clinical tasks required of a consultant surgeon in order that all patients presenting as emergencies in the specialty are cared for safely and appropriately.

**Example descriptors:**

- Promptly assesses acutely unwell and deteriorating patients, delivers resuscitative treatment and initial management, and ensures sepsis is recognised and treated in compliance with protocol
- Makes a full assessment of patients by taking a structured history and by performing a focused clinical examination, and requests, interprets and discusses appropriate investigations to synthesise findings into an appropriate overall impression, management plan and diagnosis
- Identifies, accounts for and manages co-morbidity in the context of the surgical presentation, referring for specialist advice when necessary
- Selects patients for conservative and operative treatment plans as appropriate, explaining these to the patient, and carrying them out
- Demonstrates effective communication with colleagues, patients and relatives
- Makes appropriate peri- and post-operative management plans in conjunction with anaesthetic colleagues
- Delivers ongoing post-operative surgical care in ward and critical care settings, recognising and appropriately managing medical and surgical complications, and referring for specialist care when necessary
- Makes appropriate discharge and follow up arrangements
- Carries out all operative procedures as described in the syllabus
- Manages potentially difficult or challenging interpersonal situations
- Gives and receives appropriate handover

**Specialty specific requirements:**

- See critical conditions (appendix 3 of the curriculum)
- Trauma course (ATLS or equivalent)

**Supervision levels:**

Level I:      Able to observe only

Level II:     Able and trusted to act with direct supervision:

      a) Supervisor present throughout
      b) Supervisor present for part

Level III:    Able and trusted to act with indirect supervision

Level IV:    Able and trusted to act at the level expected of a day-one consultant

Level V:     Able and trusted to act at a level beyond that expected of a day-one consultant

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**Shared Capability in Practice 3:**

**Manages ward rounds and the on-going care of in-patients**

**Good Medical Practice Domains 1,2,3,4**

**Description**

Manages all hospital in-patients with conditions requiring management within the specialty. Able to perform all the administrative and clinical tasks required of a consultant surgeon in order that all in-patients requiring care within the specialty are cared for safely and appropriately.

**Example descriptors:**

- Identifies at the start of a ward round if there are acutely unwell patients who require immediate attention
- Ensures that all necessary members of the multi-disciplinary team are present, knows what is expected of them and what each other's roles and contributions will be, and contributes effectively to cross specialty working
- Ensures that all documentation (including results of investigations) will be available when required and interprets them appropriately
- Makes a full assessment of patients by taking a structured history and by performing a focused clinical examination, and requests, interprets and discusses appropriate investigations to synthesise findings into an appropriate overall impression, management plan and diagnosis
- Identifies when the clinical course is progressing as expected and when medical or surgical complications are developing, and recognises when operative intervention or re-intervention is required and ensures this is carried out
- Identifies and initially manages co-morbidity and medical complications, referring on to other specialties as appropriate
- Contributes effectively to level 2 and level 3 care
- Makes good use of time, ensuring all necessary assessments are made and discussions held, while continuing to make progress with the overall workload of the ward round
- Identifies when further therapeutic manoeuvres are not in the patient's best interests, initiates palliative care, refers for specialist advice as required, and discusses plans with the patient and their family

- Summarises important points at the end of the ward rounds and ensures all members of the multi-disciplinary team understand the management plans and their roles within them
- Gives appropriate advice for discharge documentation and follow-up

**Specialty specific requirements:**

See critical conditions (appendix 3 of the curriculum)

**Supervision levels:**

Level I:     Able to observe only

Level II:    Able and trusted to act with direct supervision:

a) Supervisor present throughout
b) Supervisor present for part

Level III:   Able and trusted to act with indirect supervision

Level IV:    Able and trusted to act at the level expected of a day-one consultant

Level V:     Able and trusted to act at a level beyond that expected of a day-one consultant

**Shared Capability in Practice 4:**

**Manages an operating list**

**Good Medical Practice Domains 1,2,3,4**

**Description**

Manages all patients with conditions requiring operative treatment within the specialty. Able to perform all the administrative and clinical tasks required of a consultant surgeon in order that all patients requiring operative treatment receive it safely and appropriately.

**Example descriptors:**

- Selects patients appropriately for surgery, taking the surgical condition, co-morbidities, medication and investigations into account, and adds the patient to the waiting list with appropriate priority
- Negotiates reasonable treatment options and shares decision-making with patients
- Takes informed consent in line with national legislation or applies national legislation for patients who are not competent to give consent
- Arranges anaesthetic assessment as required
- Undertakes the appropriate process to list the patient for surgery
- Prepares the operating list, accounting for case mix, skill mix, operating time, clinical priorities, and patient co-morbidity
- Leads the brief and debrief and ensures all relevant points are covered for all patients on the operating list
- Ensures the WHO checklist (or equivalent) is completed for each patient at both the beginning and end of each procedure
- Understands when prophylactic antibiotics should be prescribed and follows local protocol

- Synthesises the patient's surgical condition, the technical details of the operation, co-morbidities and medication into an appropriate operative plan for the patient
- Carries out the operative procedures to the required level for the phase of training as described in the specialty syllabus
- Uses good judgement to adapt operative strategy to take account of pathological findings and any changes in clinical condition
- Undertakes the operation in a technically safe manner, using time efficiently
- Demonstrates good application of knowledge and non-technical skills in the operating theatre, including situation awareness, decision-making, communication, leadership, and teamwork
- Writes a full operation note for each patient, ensuring inclusion of all post-operative instructions
- Reviews all patients post-operatively
- Manages complications safely, requesting help from colleagues where required

**Specialty specific requirements:**

- Trainees should have the operative experience described in the index procedures (appendix 4 of the curriculum) and the indicative number of 250 major cases with the majority in the area of special interest.
- Trainees with fewer numbers of operations may be considered for certification only if they have other evidence of operative competence e.g. multiple PBAs at level 4 for each of the operative groups listed in the index procedures.

**Supervision levels:**

Level I:     Able to observe only

Level II:     Able and trusted to act with direct supervision:

      a) Supervisor present throughout
      b) Supervisor present for part

Level III:     Able and trusted to act with indirect supervision

Level IV:     Able and trusted to act at the level expected of a day-one consultant

Level V:     Able and trusted to act at a level beyond that expected of a day-one consultant

**Description**

Manages all patients with conditions requiring inter-disciplinary management (or multi-consultant input as in trauma or fracture meetings in Trauma and Orthopaedic Surgery) including care within the specialty. Able to perform all the administrative and clinical tasks required of a consultant surgeon in order that safe and appropriate multi-disciplinary decisions are made on all patients with such conditions requiring care within the specialty.

**Example Descriptors:**

Appropriately selects patients who require discussion at the multi-disciplinary team

Follows the appropriate administrative process

Deals correctly with inappropriate referrals for discussion (e.g. postpones discussion if information is incomplete or out-of-date)

Presents relevant case history, recognising important clinical features, co-morbidities and investigations

Identifies patients with unusual, serious or urgent conditions

Engages constructively with all members of the multi-disciplinary team in reaching an agreed management decision, taking co-morbidities into account, recognising when uncertainty exists, and being able to manage this

Effectively manages potentially challenging situations such as conflicting opinions

Develops a clear management plan and communicates discussion outcomes and subsequent plans by appropriate means to the patient, GP and administrative staff as appropriate

Manages time to ensure the case list is discussed in the time available

Arranges follow up investigations when appropriate and knows indications for follow up

**Specialty specific requirements:** None

**Supervision levels:**

Level I:      Able to observe only

Level II:     Able and trusted to act with direct supervision:

      a) Supervisor present throughout
      b) Supervisor present for part

Level III:    Able and trusted to act with indirect supervision

Level IV:    Able and trusted to act at the level expected of a day-one consultant

Level V:     Able and trusted to act at a level beyond that expected of a day-one consultant

**Specialty-specific Capability in Practice 6:**

**Manages patients within the critical care area**

**Good Medical Practice Domains 1,2,3,4**

**Description**

Able to perform all administrative and clinical tasks required of a consultant surgeon for all patients within the intensive care and high dependency settings in both cardiac and thoracic surgery to ensure they receive safe and appropriate care.

**Example Descriptors:**

- Assesses referrals to ICU or HDU, and  regularly reviews patients
- Arranges urgent investigations as necessary and reviews in a timely fashion
- Works with appropriate specialties in the management of critically ill patients, referring on to other specialties as appropriate
- Leads on surgical decisions for post-operative patients
- Supports nursing and anaesthetic staff in managing patients
- Plans discharges in a timely fashion to maintain patient flow
- Communicates appropriately with family and next of kin
- Communicates appropriately with consultant, nursing and anaesthetic colleagues
- Delegates and trains other staff members on appropriate cases
- Applies syllabus defined knowledge and clinical skills in all cases
- Carries out syllabus defined practical investigations or procedures within HDU and ICU
- Exercises good judgement in deciding on management plans and executes these within appropriate timescales
- Effectively manages potentially challenging situations in patients

**Supervision levels:**

Level I:       Able to observe only

Level II:      Able and trusted to act with direct supervision:

   a) Supervisor present throughout
   b) Supervisor present for part

Level III:     Able and trusted to act with indirect supervision

Level IV:     Able and trusted to act at the level expected of a day-one consultant

Level V:      Able and trusted to act at a level beyond that expected of a day-one consultant

**Specialty-specific Capability in Practice 7:**

**Assesses surgical outcomes both at a personal and unit level**

**Good Medical Practice Domains 1,2,3,4**

**Description**

Able to assess surgical outcomes in the specialty at a personal and unit level, and to respond to or adapt practice, where appropriate, without compromising patient care.

**Example Descriptors:**

- Assesses pre-operative investigations to collect risk factors
- Collects data at the time of surgery about patient demographics, procedure performed and risk factors
- Enters data into local and national datasets as appropriate
- Collects post-operative data of outcomes following surgery
- Analyses and presents surgical outcome data at local audit meetings
- Describes both personal and unit outcomes during a prescribed audit period
- Describes risk adjusted outcomes at personal and unit level
- Demonstrates ability to recognise acceptable variations in practice as well as excellent and poor performance in self and others
- Promotes excellence in meeting standards to improve the quality and outcomes of surgical practice
- Demonstrates ability to analyse reasons for poor performance and suggest means for adapting practice to improve patient care
- Demonstrates knowledge of risk factors, current risk models (such as EuroSCORE, Thoracoscore etc.), and risk adjustment
- Demonstrates knowledge of national and local audits (SCTS, NICOR, cancer registries etc.)
- Demonstrates skills in using IT and databases

**Supervision levels:**

Level I:     Able to observe only

Level II:    Able and trusted to act with direct supervision:

     a) Supervisor present throughout
     b) Supervisor present for part

Level III:   Able and trusted to act with indirect supervision

Level IV:   Able and trusted to act at the level expected of a day-one consultant

Level V:    Able and trusted to act at a level beyond that expected of a day-one consultant

**Appendix 2: Cardiothoracic Surgery Syllabus**

The syllabus contains the specialty topics that must be covered in the training programme Each of these topics includes one or more learning objectives. Formative WBAs may be used to assess and provide feedback on any areas of clinical activity. However, other than for the critical conditions, index procedures or where they have been identified to address a concern, WBAs are optional and trainees, therefore, do not need to use WBAs to evidence their learning against each syllabus topic.

In the three phases of specialty training the following methodology is used to define the level of performance/competence to be achieved at completion of each phase in the domains of:

- specialty-based knowledge
- clinical skills and judgement
- technical and operative skills

**Standards for knowledge**

The standard of knowledge which is assessed by the ISB is set at the level of a day-one consultant in the generality of the specialty.

Some topics for a level or phase of training also have a competence level ascribed to them for knowledge ranging from 1 to 4 which indicates the depth of knowledge required:

1. knows of
2. knows basic concepts
3. knows generally
4. knows specifically and broadly

**Standards for clinical and technical skills**

The practical application of knowledge is evidenced through clinical and technical skills. Each topic has a competence level ascribed to it in the areas of clinical and technical skills ranging from 1 to 4:

1. Has observed

Exit descriptor; at this level the trainee:

- has adequate knowledge of the steps through direct observation
- can handle instruments relevant to the procedure appropriately and safely
- can perform some parts of the procedure with reasonable fluency.

2. Can do with assistance

Exit descriptor; at this level the trainee:

- knows all the steps - and the reasons that lie behind the methodology
- can carry out a straightforward procedure fluently from start to finish under direct supervision

- knows and demonstrates when to call for assistance/advice from the supervisor (knows personal limitations).

3. Can do whole but may need assistance
Exit descriptor; at this level the trainee:

- can adapt to well-known variations in the procedure encountered, without direct input from the trainer
- recognises and makes a correct assessment of common problems that are encountered
- is able to deal with most of the common problems
- knows when help is needed
- requires advice rather than help that requires the trainer to scrub.

4. Competent to do without assistance, including complications

Exit descriptor, at this level the trainee:

- with regard to the common clinical situations in the specialty, can deal with straightforward and difficult cases to a satisfactory level and without the requirement for external input
- is at the level at which one would expect a day-one UK consultant surgeon to function
- is capable of supervising trainees.


**Syllabus**

**Cardiac Surgery**

| | Phase 1 | Phase 2 Card | Phase 3 Card | Phase 2 Thor | Phase 3 Thor | Critical Condition | Index Proc |
|---|---|---|---|---|---|---|---|
| **Cardiopulmonary Bypass** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To manage with supervision the clinical and technical aspects of cardiopulmonary bypass (CPB) | | | | | | | |
| KNOWLEDGE | | | | | | | |
| Physiology of cardiopulmonary bypass | | | | | | | |
| Haemodynamics: physiology and measurement | | | | | | | |
| Haemostasis, thrombosis and bleeding | | | | | | | |
| Pharmacology and drugs used during cardiopulmonary bypass | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Inotropes, vasodilators and vasoconstrictors | | | | | | | |
| Haemostatic drugs | | | | | | | |
| | | | | | | | |
| Antiplatelet, anticoagulant and thrombolytic drugs | | | | | | | |
| Principles and practice of CPB | | | | | | | |
| Relevant equipment and technology and its application | | | | | | | |
| Monitoring during CPB | | | | | | | |
| Inflammatory and pathophysiological response to bypass | | | | | | | |
| Pulsatile and nonpulsatile flow | | | | | | | |
| Effect of CPB on pharmacokinetics | | | | | | | |
| Priming fluids and haemodilution | | | | | | | |
| Acid base balance - pH and alpha stat | | | | | | | |
| Neuropsychological consequences of CPB | | | | | | | |
| Cell salvage and blood conservation | | | | | | | |
| Minimal Access Incisions for coronary, aortic and mitral valve surgery | 2 | 3 | 3 | 2 | 2 | | |
| **CLINICAL SKILLS** | | | | | | | |
| N/A | | | | | | | |
| **TECHNICAL SKILLS AND PROCEDURES** | | | | | | | |
| Median sternotomy open and close | 3 | 4 | 4 | 4 | 4 | | |
| Minimal Access Incisions for coronary, aortic and mitral valve surgery | 1 | 2 | 2 | 1 | 1 | | |
| Cannulation and institution of cardiopulmonary bypass | 3 | 4 | 4 | 3 | 3 | | |
| Safe conduct of CPB - problem solving and troubleshooting | 2 | 4 | 4 | 3 | 3 | | |
| Weaning from bypass and decannulation | 3 | 4 | 4 | 3 | 3 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Femoral cannulation and decannulation | 2 | 3 | 4 | 2 | 2 | | |
| Repeat sternotomy, with pericardial dissection, cardiac mobilisation and cannulation | 1 | 3 | 4 | 1 | 1 | | |

| **Myocardial Protection** | | | | | | | |
|---|---|---|---|---|---|---|---|
| OBJECTIVE | | | | | | | |
| To manage with supervision the clinical and technical aspects of intraoperative myocardial protection. | | | | | | | |
| KNOWLEDGE | | | | | | | |
| Scientific foundations of myocardial preservation | | | | | | | |
| Principles and practice of myocardial preservation | | | | | | | |
| Cardioplegia solutions and delivery modes. | | | | | | | |
| Non-cardioplegic techniques of preservation | | | | | | | |
| CLINICAL SKILLS | | | | | | | |
| Myocardial management throughout the perioperative period | | | | | | | |
| Ability to adapt preservation technique to clinical situation | | | | | | | |
| TECHNICAL SKILLS AND PROCEDURES | | | | | | | |
| Relevant cannulation techniques and appropriate delivery of cardioplegia | 2 | 3 | 4 | 2 | 2 | | |
| | | | | | | | |
| **Circulatory Support** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To manage with supervision the clinical and technical aspects of circulatory support. | | | | | | | |
| KNOWLEDGE | | | | | | | |

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|---|---|---|---|---|---|---|---|
| Inotropes, vasodilators and vasoconstrictors | | | | | | | |
| Mechanical circulatory support in the pre-operative, perioperative and post-operative periods | | | | | | | |
| Intra-aortic balloon pump - indications for use, patient selection and complications | | | | | | | |
| Physiology of the intra-aortic balloon pump | | | | | | | |
| Understanding of relevant equipment and technology ( IABP / VAD etc ) | | | | | | | |
| Ventricular assist devices, indications for use, patient selection and complications | | | | | | | |
| CLINICAL SKILLS | | | | | | | |
| Patient selection for mechanical circulatory support | | | | | | | |
| Management of the balloon pump including timing and troubleshooting | | | | | | | |
| Care of the patient with intra-aortic balloon pump, including recognition and management of complications | | | | | | | |
| TECHNICAL SKILLS AND PROCEDURES | | | | | | | |
| Insertion and positioning of an intra-aortic balloon pump | 3 | 4 | 4 | 4 | 4 | | |
| | | | | | | | |
| **Ischaemic Heart Disease** | | | | | | | |
| | | | | | | | |
| OBJECTIVE | | | | | | | |
| To evaluate and manage with appropriate supervision the surgical aspects of a patient with ischaemic heart disease including the complications of ischaemic heart disease (IHD). | | | | | | | |
| KNOWLEDGE | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Anatomy of the heart and coronary arteries and anomalies of the coronary arteries | | | | | | | |
| Diagnosis investigation and assessment of IHD | | | | | | | |
| Risk stratification of patients undergoing coronary surgery | | | | | | | |
| Operative treatment - Off pump and on pump surgery | | | | | | | |
| Results of surgery, survival, graft patency, short and long term complications | | | | | | | |
| Choice of conduits for grafting | | | | | | | |
| Arterial revascularisation | | | | | | | |
| Redo coronary artery surgery | | | | | | | |
| Role of PCI and non-operative treatment in IHD | | | | | | | |
| Management of cardiovascular risk factors | | | | | | | |
| Acute complications of myocardial infarction and ischaemic heart disease | | | | | | | |
| Chronic complications of IHD - including VSD, mitral regurgitation, LV aneurysm. | | | | | | | |
| Cardiac rehabilitation following surgery for IHD | | | | | | | |
| Minimal Access Saphenous Vein Harvest | 2 | 3 | 4 | 2 | 2 | | |
| Minimal Access Incisions for coronary surgery | 2 | 3 | 3 | 2 | 2 | | |
| CLINICAL SKILLS | | | | | | | |
| Cardiovascular system - general history and examination, including conduit, drug history, identification of comorbidity and risk assessment | | | | | | | |
| Interpretation of Coronary Angiography (including invasive flow measures | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| (FFR etc.) and Intravenous Ultrasound (IVUS) | | | | | | | |
| Interpretation of Cardiac Catheterisation data | | | | | | | |
| Interpretation of echocardiography (transthoracic and transesophageal) including 2D, Doppler, 3D and stress echo | | | | | | | |
| Interpretation of nuclear cardiology | | | | | | | |
| Management of post cardiac surgical patient | | | | | | | |
| Management of complications of coronary surgery | 3 | 4 | 4 | 4 | 4 | Yes | |
| **TECHNICAL SKILLS AND PROCEDURES** | | | | | | | |
| Saphenous vein harvest | 4 | 4 | 4 | 4 | 4 | | |
| Internal mammary artery harvest | 3 | 4 | 4 | 3 | 3 | | |
| Radial artery harvest | 3 | 4 | 4 | 3 | 3 | | |
| Minimal Access Saphenous Vein Harvest | 2 | 3 | 4 | 2 | 2 | | |
| Minimal Access Incisions for coronary surgery | 1 | 2 | 2 | 1 | 1 | | |
| Proximal coronary anastomosis | 3 | 4 | 4 | 3 | 3 | | |
| Distal coronary anastomosis | 2 | 4 | 4 | 2 | 2 | | |
| Isolated, first time coronary surgery on pump | 2 | 3 | 4 | N/A | N/A | | Index |
| Isolated, first time coronary artery surgery off pump (OPCAB) | 1 | 3 | 3 | N/A | N/A | | |
| Minimally invasive surgical coronary artery surgery techniques (including MIDCAB) | 1 | 1 | 2 | N/A | N/A | | |
| Redo coronary artery surgery | 1 | 2 | 3 | N/A | N/A | | |
| Surgery for acute complications of ischaemic heart disease (including post infarction VSD, mitral regurgitation) | 1 | 1 | 2 | N/A | N/A | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Surgery for chronic complications of ischaemic heart disease (including ischaemic mitral regurgitation and left ventricular aneurysm) | 1 | 1 | 2 | N/A | N/A | | |
| | | | | | | | |
| **Heart Valve Disease** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To evaluate and manage, with appropriate supervision, a patient with both uncomplicated heart valve disease, including operative management. | | | | | | | |
| KNOWLEDGE | | | | | | | |
| Anatomy of the heart, chambers, valves and their anomalies | | | | | | | |
| Cardiovascular physiology, including valve physiology and haemodynamics | | | | | | | |
| Electrophysiology, including conduction disorders | | | | | | | |
| Pathophysiology of valve incompetence and stenosis. | | | | | | | |
| Consequences of valve disease on cardiac function and morphology | | | | | | | |
| Pathophysiology of mixed valve disease and combined valve pathology (e.g. aortic and mitral) | | | | | | | |
| Combined valvular and ischaemic heart disease | | | | | | | |
| Atrial fibrillation and other arrhythmias | | | | | | | |
| Endocarditis - native and prosthetic valve | 3 | 4 | 4 | 4 | 4 | Yes | |
| Diagnosis, investigation and assessment of valvular heart disease | | | | | | | |
| Timing of surgical intervention in valve disease | | | | | | | |

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|---|---|---|---|---|---|---|---|
| Risk stratification of patients undergoing valve surgery | | | | | | | |
| Options for operative management, including: Valve replacement/repair (mechanical, biological stented and stentless grafts, homografts and autografts) | | | | | | | |
| Valve design: materials, configuration and biomechanics. | | | | | | | |
| Results of valve surgery – survival, valve thrombosis, endocarditis, bleeding. | | | | | | | |
| Surgery for disease of the conduction system | | | | | | | |
| Surgical treatment of arrhythmias | | | | | | | |
| **CLINICAL SKILLS** | | | | | | | |
| Cardiovascular system - general history and examination including drug history, identification of co-morbidity and risk assessment | | | | | | | |
| Interpretation of coronary angiography | | | | | | | |
| Interpretation of cardiac catheterisation data, including left and right heart data | | | | | | | |
| Interpretation of echocardiography (transthoracic and transesophageal) including 2D, Doppler, 3D and stress echo | | | | | | | |
| Non-operative management of endocarditis | 2 | 4 | 4 | 4 | 4 | Yes | |
| Management of the complications of valve surgery | 3 | 4 | 4 | 4 | 4 | Yes | |
| Anticoagulation management including complications. | | | | | | | |

| TECHNICAL SKILLS AND PROCEDURES | | | | | | | |
|---|---|---|---|---|---|---|---|
| Minimal Access Incisions for coronary, aortic and mitral valve surgery | 1 | 2 | 2 | 1 | 1 | | |
| Isolated, uncomplicated aortic valve replacement (biological or mechanical) | 2 | 3 | 4 | 2 | 2 | | Index |
| Isolated uncomplicated mitral valve replacement | 1 | 2 | 3 | 2 | 2 | | Index |
| Tricuspid valve surgery | 1 | 2 | 3 | 1 | 1 | | |
| Aortic valve and graft surgery | 1 | 3 | 4 | 1 | 1 | | Index |
| Mitral valve and graft surgery | 1 | 2 | 3 | 1 | 1 | | |
| Surgical strategies for managing the small aortic root | 1 | 2 | 3 | 1 | 1 | | |
| Redo Valve surgery | 1 | 2 | 3 | 1 | 1 | | |
| Valve surgery for endocarditis | 1 | 2 | 3 | 1 | 1 | | |
| Techniques for surgical ablation of arrhythmias (+/- occlusion of the LA appendage) | 2 | 3 | 4 | 1 | 1 | | |
| Mitral valve repair | 1 | 2 | 3 | 1 | 1 | | |
| Isolated, uncomplicated aortic valve replacement (sutureless) | 1 | 2 | 3 | N/A | N/A | | |
| Minimally invasive aortic valve replacement | 1 | 2 | 2 | N/A | N/A | | |
| Minimally invasive mitral valve repair/replacement | 1 | 1 | 2 | N/A | N/A | | |
| Transcatheter treatment of aortic valve disease (including non-transfemoral TAVI) | 1 | 1 | 2 | N/A | N/A | | |
| Transcatheter treatment of structural heart valve disease (transfemoral TAVI, mitral valve etc.) | 1 | 1 | 1 | N/A | N/A | | |
| **Aorta Vascular Disease** | | | | | | | |
| OBJECTIVE | | | | | | | |

To evaluate and manage uncomplicated surgical aspects of a patient with aorta vascular disease, including operative management where appropriate and up to the defined competence. This module provides intermediate training in a complex sub-speciality.

| KNOWLEDGE | | | | | | | |
|---|---|---|---|---|---|---|---|
| Pathophysiology and of hypothermia including the effects upon haemoglobin, metabolic rate and pH with their management | | | | | | | |
| Anatomy of the heart, pericardium and great vessels and their anomalies | | | | | | | |
| Anatomy of the peripheral vascular system | | | | | | | |
| Blood supply of the spinal cord | | | | | | | |
| Pathology of aortic disease | | | | | | | |
| Natural history of aortic disease | | | | | | | |
| Diagnosis, investigation and assessment of aortic disease | | | | | | | |
| Knowledge of operative treatment, including spinal cord and cerebral preservation strategies. | | | | | | | |
| Acute Aortic Syndromes (including Type A & B aortic dissection, intramural haematoma and penetrating aortic ulcers) | 3 | 4 | 4 | 4 | 4 | Yes | |
| Traumatic aortic rupture | | | | | | | |
| Thoracoabdominal aneurysm | | | | | | | |
| Aortic dissection non A non B dissection management | 2 | 3 | 4 | 2 | 2 | | |
| Frozen Elephant Trunk Procedure | 2 | 2 | 3 | 1 | 1 | | |
| Debranching of head and neck vessels | 1 | 2 | 2 | 1 | 1 | | |
| Results of major aorta vascular surgery – survival, complication rates | | | | | | | |
| Non-surgical management including the role of endovascular stenting | | | | | | | |

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|---|---|---|---|---|---|---|---|
| Management of cardiovascular and non-cardiovascular risk factors | | | | | | | |
| **CLINICAL SKILLS** | | | | | | | |
| Cardiovascular system - general history and examination including assessment of pre-operative complications, drug history, identification of co-morbidity and risk assessment | | | | | | | |
| Interpretation of angiography and aortography | | | | | | | |
| Interpretation of echocardiography (transthoracic and transesophageal) including 2D, Doppler, 3D and stress echo | | | | | | | |
| Interpretation of CT scanning | | | | | | | |
| Interpretation of MRI scanning | | | | | | | |
| Management of post cardiac surgical patient after major aortic surgery | | | | | | | |
| Management of the complications of major aortic surgery | | | | | | | |
| **TECHNICAL SKILLS AND PROCEDURES** | | | | | | | |
| Preparation for and management of cardiopulmonary bypass, including alternative, non-bypass strategies for descending aortic surgery | 1 | **2** | **3** | **1** | **1** | | |
| Organ protection strategies including: Hypothermic Circulatory Arrest (HCA), Retrograde Cerebral Perfusion (RCP) and Selective Antegrade Cerebral Perfusion (SACP) | 1 | **2** | **3** | **1** | **1** | | |
| Axillary cannulation | 1 | **2** | **3** | **1** | **1** | | |
| Surgery for acute dissection of the ascending aorta | 1 | **2** | **3** | **1** | **1** | | |
| Aortic root replacement | 1 | **2** | **3** | **1** | **1** | | |
| Complex aortic surgery including arch surgery, | 1 | **1** | **2** | **1** | **1** | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| descending aortic and thoracoabdominal aortic surgery | | | | | | | |
| Replacement of the Ascending Aorta (Interposition graft) +/- AVR | 1 | **2** | **3** | **1** | **1** | | |
| Valve-sparing aortic root replacement | 1 | 1 | 2 | **1** | **1** | | |
| | | | | | | | |
| **Miscellaneous Cardiac Conditions** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To manage with supervision the clinical and technical aspects of various cardiothoracic conditions not included elsewhere in curriculum | | | | | | | |
| KNOWLEDGE | | | | | | | |
| Pathophysiology, diagnosis and management of primary and secondary cardiac tumours | | | | | | | |
| Pathophysiology, diagnosis and management of acute pulmonary embolus | | | | | | | |
| Pathophysiology, diagnosis and management of chronic thromboembolic pulmonary disease | | | | | | | |
| Alternatives to endocardial pacing and the complications of conventional pacing/rhythm management devices | | | | | | | |
| Pathophysiology, diagnosis and management of hypertrophic obstructive cardiomyopathy | | | | | | | |
| Pathophysiology of Atrial Fibrillation | 2 | **3** | **4** | **2** | **2** | | |
| | | | | | | | |
| CLINICAL SKILLS | | | | | | | |
| Management of patients with cardiac tumours | | | | | | | |

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|---|---|---|---|---|---|---|---|
| Management of patients with acute pulmonary embolus | | | | | | | |
| Management of patients with complications of conventional endocardial pacing | | | | | | | |
| Management of patients with hypertrophic obstructive cardiomyopathy | | | | | | | |
| TECHNICAL SKILLS AND PROCEDURES | | | | | | | |
| Surgery for removal of cardiac tumour (including atrial myxoma) | 1 | 2 | 3 | 1 | 1 | | |
| Pulmonary embolectomy | 1 | 1 | 2 | 1 | 1 | | |
| Insertion of permanent epicardial pacing lead | 1 | 2 | 3 | 1 | 1 | | |
| Removal of infected pacing system | 1 | 1 | 2 | 1 | 1 | | |
| Surgery for hypertrophic obstructive cardiomyopathies (including myomectomy) | 1 | 1 | 2 | 1 | 1 | | |
| Standalone surgical options for management of Atrial Fibrillation | 1 | 2 | 2 | 1 | 1 | | |

**Thoracic Surgery**

| | Phase 1 | Phase 2 Card | Phase 3 Card | Phase 2 Thor | Phase 3 Thor | Critical Condition | Index Proc |
|---|---|---|---|---|---|---|---|
| **General Management of a Patient Undergoing Thoracic Surgery** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To be competent in the evaluation and management of a patient undergoing Thoracic surgery including operative management, with appropriate supervision. The knowledge and clinical skills are common to all Thoracic surgical conditions, and should be read in conjunction with the curriculum for specific surgical conditions. | | | | | | | |
| KNOWLEDGE | | | | | | | |
| BASIC KNOWLEDGE | | | | | | | |
| Physiology | | | | | | | |
| Pulmonary physiology, ventilation and gas exchange | | | | | | | |
| Haemostasis, thrombosis and bleeding | | | | | | | |
| Acid base balance | | | | | | | |

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|---|---|---|---|---|---|---|---|
| Metabolic response to trauma | | | | | | | |
| Digestive, renal and hepatic physiology | | | | | | | |
| Nutrition | | | | | | | |
| <u>Anatomy</u> | | | | | | | |
| Tracheobronchial tree and lungs | | | | | | | |
| Thoracic inlet, neck and mediastinum | | | | | | | |
| Oesophagus and upper GI tract | | | | | | | |
| Chest wall and diaphragm | | | | | | | |
| <u>Pathology</u> | | | | | | | |
| Inflammation and wound healing | | | | | | | |
| Bronchopulmonary infections | | | | | | | |
| ARDS | | | | | | | |
| Emphysema | | | | | | | |
| Pulmonary fibrosis | | | | | | | |
| Pulmonary manifestations of systemic disease | | | | | | | |
| Systemic manifestations of pulmonary disease | | | | | | | |
| Benign and malignant tumours of trachea, bronchus and lung parenchyma | | | | | | | |
| <u>Pharmacology</u> | | | | | | | |
| Bronchodilators | | | | | | | |
| H2 antagonists and proton pump inhibitors | | | | | | | |
| Haemostatic drugs | | | | | | | |
| Analgesics | | | | | | | |
| Antibiotics | | | | | | | |
| Anaesthetic agents, local and general | | | | | | | |
| <u>Microbiology</u> | | | | | | | |
| Organisms involved in respiratory infection including TB | | | | | | | |
| Organisms involved in wound infection | | | | | | | |
| Antibiotic usage and prophylaxis | | | | | | | |
| Antisepsis | | | | | | | |

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|---|---|---|---|---|---|---|---|
| Management of intra pleural sepsis | | | | | | | |
| CLINICAL KNOWLEDGE | | | | | | | |
| Thoracic Incisions | | | | | | | |
| Types of incisions and appropriate use, including lateral, anterior, muscle sparing, video-assisted and robotic approaches. | | | | | | | |
| Sternotomy | | | | | | | |
| Difficult access and improving exposure. | | | | | | | |
| Early and late complications of thoracic incisions | | | | | | | |
| Analgesia including pharmacology, effectiveness, side effects and use in combination regimens | | | | | | | |
| Post-operative analgesia, including epidural, PCAS and paravertebral catheter techniques. | | | | | | | |
| Bronchoscopy | | | | | | | |
| The role of rigid and flexible bronchoscopy in the investigation of airway and pulmonary disease. | | | | | | | |
| The anaesthetic, airway and ventilatory management during rigid and flexible bronchoscopy | | | | | | | |
| Mediastinal exploration | | | | | | | |
| Endoscopic, radiological and surgical approaches used to evaluate and diagnose mediastinal disease of benign, infective, primary and malignant aetiology. | | | | | | | |
| Equipment for mediastinal exploration | | | | | | | |
| Relevant imaging techniques, and influence on surgical approach. | | | | | | | |
| CLINICAL SKILLS | | | | | | | |
| HISTORY AND EXAMINATION | | | | | | | |
| System specific and general history and examination, including | | | | | | | |

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|---|---|---|---|---|---|---|---|
| drug history, identification of comorbidity and functional status. | | | | | | | |
| DATA INTERPRETATION | | | | | | | |
| Routine haematology and biochemical investigations | | | | | | | |
| Chest radiograph and ECG | | | | | | | |
| CT, including contrast enhanced CT | | | | | | | |
| Interpretation of imaging of the mediastinum. | | | | | | | |
| MRI and PET | | | | | | | |
| Respiratory function tests | | | | | | | |
| Ventilation/perfusion scan | | | | | | | |
| Blood gases | | | | | | | |
| Oesophageal function tests and contrast studies | | | | | | | |
| PATIENT MANAGEMENT | | | | | | | |
| Cardiopulmonary resuscitation | | | | | | | |
| Risk assessment, stratification and management of thoracic operations | | | | | | | |
| Management of patients making an uncomplicated or complicated recovery from thoracic operations. | 3 | 4 | 4 | 4 | 4 | Yes | |
| Post-operative management of pain control, respiratory failure, sputum retention, haemodynamic instability and low urine output. | 3 | 4 | 4 | 4 | 4 | Yes | |
| Treatment of cardiac arrhythmias | | | | | | | |
| Pain control | | | | | | | |
| Wound infection and disruption | | | | | | | |
| Blood transfusion and blood products | | | | | | | |
| Physiotherapy and rehabilitation | | | | | | | |
| Palliative care | | | | | | | |
| TECHNICAL SKILLS AND PROCEDURES | | | | | | | |
| Tracheostomy | | | | | | | |
| Fibreoptic bronchoscopy | | | | | | | |

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|---|---|---|---|---|---|---|
| Chest aspiration | | | | | | |
| Chest drain insertion | | | | | | |
| Chest drain management | | | | | | |
| OPERATIVE MANAGEMENT | | | | | | |
| Incisions | | | | | | |
| Correct positioning of patient for Thoracic surgery | | | | | | |
| Perform and repair thoracic incisions, including lateral, anterior, muscle sparing, VATS and robotic incisions. | | | | | | |
| Difficult thoracic access and improving exposure | | | | | | |
| Perform and close sternotomy incision | | | | | | |
| OPERATIVE MANAGEMENT | | | | | | |
| Bronchoscopy | | | | | | |
| Diagnostic & therapeutic bronchoscopy including biopsy - rigid and flexible. | | | | | | |
| Mediastinal Exploration | | | | | | |
| Surgical evaluation of the mediastinum using cervical, anterior, VATS and robotic approaches. | | | | | | |
| | | | | | | |
| **Neoplasms of the Lung** | | | | | | |
| OBJECTIVE | | | | | | |
| To assess and manage a patient with a neoplasm of the lung, including operative management and with appropriate supervision. Appreciation of the multidisciplinary, multimodality approach to the management of the condition. | | | | | | |
| KNOWLEDGE | | | | | | |
| Benign and malignant tumours of trachea, bronchus and lung parenchyma | | | | | | |
| Epidemiology, presentation, diagnosis, staging (pre-operative, intraoperative and pathological) and treatment of lung cancer and lung metastases. | | | | | | |
| Neoadjuvant and adjuvant treatment of lung cancer | | | | | | |

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|---|---|---|---|---|---|---|
| Results of treating thoracic malignancy by surgery, medical or oncological techniques, including multimodality management. | | | | | | |
| Survival, recurrence rates and relapse patterns after surgical treatment and the investigation and management of relapse. | | | | | | |
| Knowledge of palliative care techniques. | | | | | | |
| Treatment of post-operative complications of pulmonary resection such as empyema and bronchopleural fistula. | | | | | | |
| Role of repeat surgery in recurrent and second primary malignancies of the lung. | | | | | | |
| Medical and surgical options to deal with recurrent or problematic complications of pulmonary resection. | | | | | | |
| **CLINICAL SKILLS** | | | | | | |
| Clinical history and examination | | | | | | |
| Interpretation of laboratory, physiological and imaging techniques. | | | | | | |
| Interpretation of endoscopic findings. | | | | | | |
| Patient selection with assessment of function and risk. | | | | | | |
| **TECHNICAL SKILLS AND PROCEDURES** | | | | | | |
| Bronchoscopic assessment including biopsy | 3 | 3 | 3 | 4 | 4 | |
| Endoscopic and surgical techniques of lung biopsy | 2 | 2 | 2 | 4 | 4 | |
| Mediastinal assessment and biopsy | 2 | 2 | 2 | 4 | 4 | |
| Intraoperative diagnosis and staging | 2 | 2 | 2 | 3 | 4 | |

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|---|---|---|---|---|---|---|---|
| Endoscopic management of tumours using laser and stenting | 1 | 1 | 1 | 2 | 4 | | |
| Surgery for benign and malignant conditions of the lungs | 2 | 2 | 2 | 3 | 4 | | Index |
| Minimally invasive anatomical lung resection (VATS, Uniportal or Robotic) | 1 | 1 | 1 | 3 | 4 | | Index |
| Segmentectomy and lobectomy for benign and malignant disease | 2 | 2 | 2 | 3 | 4 | | |
| Redo operations for lung metastases | 1 | 1 | 1 | 3 | 4 | | |
| Advanced resections for lung cancer, including sleeve lobectomy, pneumonectomy and extended resections involving chest wall and diaphragm. | 1 | 1 | 1 | 2 | 3 | | |
| Management of post-operative complications such as empyema and bronchopleural fistula. | 2 | 2 | 2 | 3 | 4 | | |
| | | | | | | | |
| **Disorders of the Pleura** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To evaluate and manage surgical conditions of the pleura and the pleural space, including operative management and with appropriate supervision | | | | | | | |
| KNOWLEDGE | | | | | | | |
| Anatomy and physiology of the pleura | | | | | | | |
| Inflammatory, infective and malignant disease of the visceral and parietal pleura. | | | | | | | |
| Pneumothorax | 3 | 4 | 4 | 4 | 4 | Yes | |
| Pleural effusion | | | | | | | |
| Empyema | | | | | | | |
| Mesothelioma | | | | | | | |
| Haemothorax | 3 | 4 | 4 | 4 | 4 | Yes | |
| Chylothorax | | | | | | | |

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| Conditions of adjacent organs that affect the pleura | | | | | | | |
| Medical and surgical management of pleural disease, including radiological, open and VATS techniques. | | | | | | | |
| Techniques to deal with failures of primary treatment. | | | | | | | |
| Advanced techniques for pleural space obliteration such as thoracoplasty and soft-tissue transfer | | | | | | | |
| CLINICAL SKILLS | | | | | | | |
| Interpretation of imaging of the pleura | | | | | | | |
| Chest drains: insertion, management, removal and treatment of complications. | | | | | | | |
| Management of patients making uncomplicated and complicated recovery from pleural interventions. | | | | | | | |
| TECHNICAL SKILLS AND PROCEDURES | | | | | | | |
| Open procedures for non-complex pleural problems | 2 | 2 | 2 | 3 | 4 | | Index |
| VATS procedures for non-complex pleural problems | 3 | 3 | 3 | 4 | 4 | | Index |
| Open and VATS procedures for empyema, including techniques for decortication. | 2 | 2 | 2 | 3 | 4 | | Index |
| Open and VATS procedures in complex cases. | 1 | 1 | 1 | 2 | 3 | | |
| Advanced techniques of pleural space obliteration. | 1 | 1 | 1 | 2 | 3 | | |
| | | | | | | | |
| **Disorders of the Chest Wall** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To assess and manage a patient with abnormality or disease affecting the chest wall, | | | | | | | |

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| including surgical management where appropriate and with appropriate supervision | | | | | | |
| **KNOWLEDGE** | | | | | | |
| Anatomy of the chest wall | | | | | | |
| Congenital, inflammatory, infective and neoplastic conditions that can affect the components of the chest wall. | | | | | | |
| Clinical, laboratory and imaging techniques used in the evaluation of chest wall pathology. | | | | | | |
| Techniques used in the diagnosis of chest wall disease, including aspiration and core biopsy, and incision and excision biopsy. | | | | | | |
| Pectus deformities: aetiology, physiological and psychological consequences. Surgical options for correction. | | | | | | |
| Techniques used to resect the sternum and chest wall, physiological and cosmetic sequelae. | | | | | | |
| Prosthetic materials used in chest wall surgery | | | | | | |
| The role of repeat surgery to deal with recurrent conditions and the complications of previous surgery. | | | | | | |
| Techniques of complex chest wall reconstruction involving thoracoplasty or soft-tissue reconstruction | | | | | | |
| **CLINICAL SKILLS** | | | | | | |
| Clinical history and examination | | | | | | |
| Interpretation of laboratory, physiological and imaging techniques. | | | | | | |
| Patient selection with assessment of function and risk. | | | | | | |

| TECHNICAL SKILLS AND PROCEDURES | | | | | | | |
|---|---|---|---|---|---|---|---|
| Chest wall biopsy and choice of appropriate technique. | 3 | 3 | 3 | 4 | 4 | | |
| Open and excision biopsy and resection of the chest wall for benign and malignant conditions. | 2 | 2 | 2 | 3 | 4 | | |
| Chest wall resection in combination with resection of the underlying lung. | 1 | 1 | 1 | 2 | 3 | | |
| Selection and insertion of prosthetic materials, and selection of cases in which such materials are required | 2 | 2 | 2 | 3 | 4 | | |
| Pectus correction, by both open and minimally-invasive techniques, including post-operative care and complications | 1 | 1 | 1 | 2 | 3 | | |
| Surgery for the complications of chest wall resection, and repeat surgery to resect recurrent chest wall conditions. | 1 | 1 | 1 | 2 | 3 | | |
| Complex chest wall reconstruction | 1 | 1 | 1 | 2 | 3 | | |
| | | | | | | | |
| **Disorders of the Diaphragm** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To assess and manage a patient with disease or abnormality of the diaphragm, including surgical management where appropriate, and with appropriate supervision. | | | | | | | |
| KNOWLEDGE | | | | | | | |
| Anatomy and physiology of the diaphragm. | | | | | | | |
| Pathology of the diaphragm. | | | | | | | |
| Clinical, physiological and imaging techniques in the assessment of | | | | | | | |

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| diaphragmatic abnormalities. | | | | | | |
| Physiological consequences of diaphragmatic herniation or paresis. | | | | | | |
| Surgical techniques used to biopsy and resect diaphragmatic tumours. | | | | | | |
| Situations in which replacement of the diaphragm is required, the materials used and their value and limitations. | | | | | | |
| Complications of diaphragmatic resection and their management. | | | | | | |
| Techniques used to electrically pace the diaphragm, and the conditions in which such treatment is appropriate. | | | | | | |
| CLINICAL SKILLS | | | | | | |
| Clinical history and examination | | | | | | |
| Interpretation of laboratory, physiological and imaging techniques. | | | | | | |
| Patient selection with assessment of function and risk. | | | | | | |
| Management of patients making an uncomplicated or complicated recovery from diaphragmatic resection. | | | | | | |
| TECHNICAL SKILLS AND PROCEDURES | | | | | | |
| Resection and repair of the diaphragm and adjacent structures | 1 | 1 | 1 | 3 | 4 | |
| Complications of diaphragmatic resection | 1 | 1 | 1 | 3 | 4 | |
| Management of diaphragmatic trauma | 2 | 2 | 2 | 3 | 4 | |
| | | | | | | |
| **Emphysema and Bullae** | | | | | | |
| OBJECTIVE | | | | | | |

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| To fully assess and manage a patient with emphysema and bullae, including surgical management where appropriate, and with appropriate supervision. | | | | | | |
| **KNOWLEDGE** | | | | | | |
| Aetiology, pathology and physiology of chronic obstructive airways disease (COPD) | | | | | | |
| Epidemiology and public health issues | | | | | | |
| Smoking cessation measures. | | | | | | |
| Clinical, laboratory, physiological and imaging techniques. | | | | | | |
| Medical and surgical management of COPD and its complications | | | | | | |
| Selection criteria and pre-operative preparation | | | | | | |
| Surgical techniques used in the treatment of emphysema and bullae and the results of surgical treatment including relevant clinical trials. | | | | | | |
| Lung volume reduction surgery: techniques, complications and management of complications. | | | | | | |
| Endobronchial lung volume reduction | | | | | | |
| Experimental and developmental techniques in lung volume reduction surgery | | | | | | |
| **CLINICAL SKILLS** | | | | | | |
| Clinical history and examination | | | | | | |
| Interpretation of laboratory, physiological and imaging techniques. | | | | | | |
| Patient selection with assessment of function and risk. | | | | | | |
| Post-operative management of patients making an uncomplicated recovery from surgery for | | | | | | |

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| emphysema or the complications of such diseases. | | | | | | | |
| Management of patients following lung volume reduction surgery. | | | | | | | |
| TECHNICAL SKILLS AND PROCEDURES | | | | | | | |
| Procedures to deal with pneumothorax and bullae by open techniques. | 2 | 2 | 2 | 4 | 4 | | Index |
| Procedures to deal with pneumothorax and bullae by VATS techniques. | 2 | 2 | 2 | 4 | 4 | | Index |
| Lung volume reduction surgery using open, VATS and robotic techniques. | 1 | 1 | 1 | 3 | 4 | | |
| | | | | | | | |
| **Disorders of the Pericardium** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To fully assess and manage a patient with disease of the pericardium or pericardial space, including surgical management where appropriate, and with appropriate supervision. | | | | | | | |
| KNOWLEDGE | | | | | | | |
| Anatomy of the pericardium. | | | | | | | |
| Pathology of the pericardium. | | | | | | | |
| Pathophysiological consequences of pericardial constriction and tamponade. | 3 | 4 | 4 | 4 | 4 | Yes | |
| Clinical, echocardiographic and imaging techniques used to detect pericardial disease and assess its consequences. | | | | | | | |
| Techniques for pericardial drainage using guided needle aspiration | | | | | | | |
| Surgical drainage by subxiphoid, thoracotomy or VATS approaches. | | | | | | | |
| Surgical techniques for pericardiectomy. | | | | | | | |
| Materials used for pericardial replacement, | | | | | | | |

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| their value and limitations and the situations in which used. | | | | | | | |
| Post-operative complications following resection of the pericardium and its prosthetic replacement. | | | | | | | |
| CLINICAL SKILLS | | | | | | | |
| Clinical history and examination | | | | | | | |
| Interpretation of laboratory, physiological and imaging techniques, including echocardiography. | | | | | | | |
| Recognition and assessment of pericardial tamponade and constriction. | 3 | 4 | 4 | 4 | 4 | Yes | |
| Techniques for pericardial drainage using guided needle aspiration | | | | | | | |
| Recognition of pericardial herniation and cardiac strangulation. | | | | | | | |
| Patient selection with assessment of function and risk. | | | | | | | |
| TECHNICAL SKILLS AND PROCEDURES | | | | | | | |
| OPERATIVE MANAGEMENT | | | | | | | |
| Non-complex pericardial fenestration procedures | 3 | 4 | 4 | 4 | 4 | | |
| Pericardial fenestration in complex cases | 1 | 3 | 4 | 3 | 4 | | |
| Pericardiectomy for relief of constriction | 1 | 2 | 3 | 1 | 1 | | |
| Resection of the pericardium and replacement with prosthetic materials | 1 | 2 | 2 | 3 | 4 | | |
| | | | | | | | |
| **Disorders of the Mediastinum** | | | | | | | |
| OBJECTIVE | | | | | | | |

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| To fully assess and manage a patient with benign and malignant disease of the mediastinum, including surgical management where appropriate, and with appropriate supervision. | | | | | | | |
| **KNOWLEDGE** | | | | | | | |
| Anatomy of the mediastinum | | | | | | | |
| Congenital, benign, infective and malignant (primary and secondary) conditions of the mediastinum. | | | | | | | |
| Systemic conditions associated with the mediastinum. | | | | | | | |
| Clinical, laboratory, electromyographic and imaging techniques used in the diagnosis and assessment of patients with mediastinal disease | | | | | | | |
| Myasthenia gravis: medical, surgical and perioperative management | | | | | | | |
| Staging of thymoma and grading of myasthenia | | | | | | | |
| Benign and malignant conditions, which do not require surgical biopsy or resection. | | | | | | | |
| Oncological treatment of malignant diseases of the mediastinum, including multidisciplinary care. | | | | | | | |
| Surgical techniques for the treatment of myasthenia gravis, mediastinal cysts and tumours, complications and results. | | | | | | | |
| Retrosternal goitre and its management | | | | | | | |
| **CLINICAL SKILLS** | | | | | | | |
| Clinical history and examination | | | | | | | |
| Interpretation of laboratory, physiological and imaging techniques. | | | | | | | |

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| Patient selection with assessment of function and risk. | | | | | | | |
| Post-operative management of patients including recognition and management of post-operative complications. | | | | | | | |
| **TECHNICAL SKILLS AND PROCEDURES** | | | | | | | |
| Biopsy of mediastinal masses using appropriate techniques | 3 | 3 | 3 | 4 | 4 | | |
| Excision of the thymus | 2 | 3 | 3 | 4 | 4 | | Index |
| Isolated resection of mediastinal cysts and tumours | 2 | 2 | 2 | 4 | 4 | | Index |
| Resection of mediastinal cysts and tumours, including extended resections involving adjacent structures | 2 | 2 | 2 | 3 | 4 | | Index |
| | | | | | | | |
| **Disorders of the Airway** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To assess and manage a patient with disease of the major airways, including surgical management where appropriate, and with appropriate supervision. | | | | | | | |
| KNOWLEDGE | | | | | | | |
| Anatomy of the larynx, trachea and bronchus. | | | | | | | |
| Physiology of the normal airway. | | | | | | | |
| Pathophysiology of disease and its effects on lung function. | | | | | | | |
| Endoscopic appearances in health and disease. | | | | | | | |
| Congenital, inflammatory, infective, benign and neoplastic diseases of the airways. | | | | | | | |
| Symptoms, signs of airway disease. | | | | | | | |
| Clinical, physiological and imaging tests undertaken | | | | | | | |

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| to diagnose and assess airway disease. | | | | | | | |
| Techniques for surgical resection of the trachea. | | | | | | | |
| Bronchoplastic procedures and the limitations of these techniques. | | | | | | | |
| Medical and oncological treatments available to deal with airway diseases. | | | | | | | |
| Endoscopic techniques used to deal with benign and malignant conditions, including disobliteration and stenting. | | | | | | | |
| Presentation, investigation and management of anastomotic complications following airway surgery. | | | | | | | |
| Presentation, evaluation and treatment of fistulae in the aerodigestive tract, due to benign, malignant and iatrogenic causes. | | | | | | | |
| Role of open and endoscopic procedures in dealing with problems. | | | | | | | |
| **CLINICAL SKILLS** | | | | | | | |
| Clinical history and examination | | | | | | | |
| Interpretation of laboratory, physiological and imaging techniques. | | | | | | | |
| Recognition, diagnosis and assessment of airway obstruction. | 3 | 4 | 4 | 4 | 4 | Yes | |
| Patient selection with assessment of function and risk. | | | | | | | |
| Post-operative care of patients making an uncomplicated recovery from major airway surgery. | | | | | | | |
| Post-operative care of patients making a | | | | | | | |

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| complicated recovery from airway surgery. | | | | | | | |
| TECHNICAL SKILLS AND PROCEDURES | | | | | | | |
| Endoscopic assessment of a patient with airways disease | 2 | 2 | 2 | 3 | 4 | | |
| Sleeve resection of the trachea for simple benign conditions | 1 | 1 | 1 | 2 | 3 | | |
| Sleeve resection of the main bronchi, including lobectomy where appropriate, for malignant disease | 1 | 1 | 1 | 2 | 4 | | |
| Techniques for the relief of major airways obstruction including stenting | 1 | 1 | 1 | 2 | 4 | | |
| Airway resection for tumours and complex benign conditions and techniques for airway reconstruction and anastomosis | 1 | 1 | 1 | 2 | 3 | | |
| Repeat resections for recurrence and the complications of prior resection. | 1 | 1 | 1 | 2 | 3 | | |
| Management of fistulae in the aerodigestive tract by surgical and endoscopic techniques | 1 | 1 | 1 | 2 | 3 | | |

**Transplantation**

| | Phase 1 | Phase 2 Card | Phase 3 Card | Phase 2 Thor | Phase 3 Thor | Critical Condition | Index Proc |
|---|---|---|---|---|---|---|---|
| **Intrathoracic transplantation and surgery for heart failure** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To be able to evaluate and manage, with appropriate supervision, some of the aspects of patients with heart failure, including operative management where appropriate. This module is intended for a trainee to gain initial exposure to this sub-speciality either as part of general cardiothoracic training or as an introduction to further advanced training in this area. | | | | | | | |
| KNOWLEDGE | | | | | | | |

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|---|---|---|---|---|---|---|---|
| Pathophysiology and causes of heart failure. | | | | | | | |
| Pathophysiology and causes of respiratory failure. | | 79 | | | | | |
| Transplant Immunology. Major and minor histocompatibility antigen systems. Mechanisms of immune activation and pathological consequences for transplanted organs | | | | | | | |
| Pharmacology. Drugs used in cardiac and respiratory failure. Immunosuppression and treatment of rejection. | | | | | | | |
| Indications for, contraindications to and assessment for heart transplantation. | | | | | | | |
| Indications for, contraindications to and assessment for lung and heart/lung transplantation. | | | | | | | |
| Indications for ECMO | | | | | | | |
| Indications for VAD | | | | | | | |
| Criteria for brain stem death, management of the brain-dead donor, criteria for matching donor and recipient. | | | | | | | |
| Management of patients after intrathoracic organ transplantation, including complications | | | | | | | |
| Results of heart transplantation, lung transplantation and non-transplant interventions for heart failure. | | | | | | | |
| Resynchronisation therapy: techniques and indications | | | | | | | |
| CLINICAL SKILLS | | | | | | | |
| Management of brain-dead donor | | | | | | | |
| Assessment and selection of patients for | | | | | | | |

| | Phase 1 | Phase 2 Card | Phase 3 Card | Phase 2 Thor | Phase 3 Thor | Critical Condition | Index Proc |
|---|---|---|---|---|---|---|---|
| cardiothoracic transplantation | | | | | | | |
| Management of post op cardiothoracic transplant patient | | | | | | | |
| Management of complications of cardiothoracic transplant surgery | | | | | | | |
| Management of rejection | | | | | | | |
| **TECHNICAL SKILLS AND PROCEDURES** | | | | | | | |
| <u>Transplantation</u> | | | | | | | |
| Transvenous myocardial biopsy | 1 | 1 | 2 | 1 | 2 | | |
| Donor Retrieval | 1 | 1 | 2 | 1 | 2 | | |
| Ex-vivo donor organ management | 2 | 1 | 2 | 1 | 2 | | |
| Implantation of heart | 1 | 2 | 2 | 2 | 2 | | |
| Implantation of lung | 1 | 2 | 2 | 2 | 2 | | |
| Implantation of heart/lung block | 1 | 2 | 2 | 2 | 2 | | |
| <u>Surgery for heart failure</u> | | | | | | | |
| Surgical revascularisation for ischaemic cardiomyopathy | 2 | 2 | 4 | 2 | 2 | | |
| Ventricular reverse remodelling surgery | 1 | 2 | 3 | 2 | 2 | | |
| Mitral valve repair for cardiac failure | 1 | 2 | 3 | 2 | 2 | | |
| Cannulation for ECMO | 2 | 2 | 4 | 2 | 3 | | |
| Implantation of epicardial electrodes for resynchronisation therapy | 1 | 2 | 4 | 2 | 2 | | |
| Implantation of extracorporeal VAD | 1 | 2 | 2 | 2 | 2 | | |
| Implantation of intracorporeal VAD | 1 | 2 | 2 | 2 | 2 | | |

**Congenital**

| | Phase 1 | Phase 2 Card | Phase 3 Card | Phase 2 Thor | Phase 3 Thor | Critical Condition | Index Proc |
|---|---|---|---|---|---|---|---|
| **Congenital Heart Disease** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To understand and gain experience in some of the aspects of children and adults with heart disease, including operative management where appropriate. This module is intended for a trainee to gain initial | | | | | | | |

exposure to this sub-speciality either as part of general cardiothoracic training or as an introduction to further advanced training in this area.

| KNOWLEDGE | | | | | | | |
|---|---|---|---|---|---|---|---|
| Relevant general physiology of childhood | | | | | | | |
| Fetal circulation and circulatory changes at birth | | | | | | | |
| Haemodynamics; physiology and measurement including shunt calculations | | | | | | | |
| Physiology of pulmonary vasculature | | | | | | | |
| Myocardial cellular physiology in immature myocardium | | | | | | | |
| Physiology of Cardiopulmonary Bypass in children - including low flow and circulatory arrest. | | | | | | | |
| Anatomy and Embryology of the heart | | | | | | | |
| Coronary anatomy and variants | | | | | | | |
| Anatomy of the peripheral vascular system and vascular conduits including aortopulmonary shunts | | | | | | | |
| Sequential cardiac analysis and terminology of cardiac malformations | | | | | | | |
| Effect of growth and pregnancy | | | | | | | |
| Drugs used in the treatment of congenital heart disease, including perioperative management and anaesthesia | | | | | | | |
| Diagnosis, investigation and treatment of congenital heart disease | | | | | | | |
| Results of congenital surgery - survival, | | | | | | | |

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|---|---|---|---|---|---|---|---|
| common complications and management. | | | | | | | |
| Late complications of surgery for congenital heart disease | | | 82 | | | | |
| Role of interventional cardiology in congenital heart disease. | | | | | | | |
| Role of mechanical assist (IABP, VAD and ECMO) | | | | | | | |
| Indications for referral for transplantation in congenital heart disease | | | | | | | |
| Risk assessment and stratification in congenital surgery | | | | | | | |
| Cardiopulmonary resuscitation in children and in patients with congenital heart disease | | | | | | | |
| <u>The anatomy, pathophysiology, natural history and management of the following conditions or procedures:</u> | | | | | | | |
| Patent ductus arteriosus | | | | | | | |
| Aortopulmonary window | | | | | | | |
| Atrial septal defect | | | | | | | |
| Ventricular septal defect | | | | | | | |
| Coarctation | | | | | | | |
| PA banding and shunts | | | | | | | |
| Aortopulmonary and venous shunts | | | | | | | |
| Transposition of the great arteries / switch procedure | | | | | | | |
| Congenitally corrected TGA | | | | | | | |
| Single ventricle/univentricular heart | | | | | | | |
| Tetralogy of Fallot/Pulmonary atresia plus VSD | | | | | | | |
| Fontan procedure | | | | | | | |
| Rastelli procedure | | | | | | | |
| Hypoplastic left heart and Norwood procedure | | | | | | | |

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| Norwood procedure | | | | | | |
| Truncus arteriosus | | | | | | |
| Double outlet right ventricle | | | | | | |
| Pulmonary atresia plus VSD and MAPCAs | | | | | | |
| Pulmonary atresia and intact septum | | | | | | |
| Single ventricle | | | | | | |
| Partial and complete atrioventricular septal defects | | | | | | |
| Anomalies of the pulmonary venous drainage (partial and total) | | | | | | |
| Anomalies of systemic venous drainage | | | | | | |
| Congenital aortic valve disease (including supra-valve stenosis) | | | | | | |
| LV outflow tract obstruction | | | | | | |
| Sinus of valsalva aneurysm | | | | | | |
| Congenital mitral valve disease | | | | | | |
| Congenital tricuspid valve disease (including Ebstein's abnormality) | | | | | | |
| Anomalies of the coronary arteries (including ALCAPA) | | | | | | |
| Vascular rings | | | | | | |
| Cardiac tumours | | | | | | |
| Pericardial disease | | | | | | |
| Aortic valve disease including Ross procedure | | | | | | |
| Mitral valve disease | | | | | | |
| Tricuspid valve disease including Ebstein's abnormality | | | | | | |
| Extra cardiac conduits | | | | | | |
| Interrupted aortic arch | | | | | | |
| Total anomalous pulmonary venous drainage | | | | | | |
| Extracorporeal Membrane Oxygenation and VAD | | | | | | |

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| Transplantation for congenital heart disease | | | | | | | |
| CLINICAL SKILLS | | | | | | | |
| Cardiovascular system and general history and examination of child or adult with congenital heart disease | | | | | | | |
| Routine haematology and biochemical investigations in children | | | | | | | |
| Cardiac catheterisation data including interpretation of haemodynamic data, shunt and resistance calculations | | | | | | | |
| Echocardiography in congenital heart disease, including 2D, doppler and TOE | | | | | | | |
| Principles of paediatric intensive care | | | | | | | |
| Management of adults and children following congenital heart surgery | | | | | | | |
| Management of complications of congenital surgery | | | | | | | |
| Cardiopulmonary resuscitation in children and congenital heart disease | | | | | | | |
| Diagnosis and treatment of cardiac arrhythmias in congenital heart disease | | | | | | | |
| TECHNICAL SKILLS AND PROCEDURES | | | | | | | |
| Sternotomy - open and close | 2 | 3 | 4 | NA | NA | | |
| Thoracotomy - open and close | 2 | 3 | 4 | NA | NA | | |
| Preparation for and management of cardiopulmonary bypass including partial bypass | 2 | 2 | 3 | NA | NA | | |

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| Approaches for ECMO, cannulation and management | 1 | 2 | 3 | NA | NA |
| Surgical management of the following common uncomplicated conditions (level 1 - a higher level of operative competence is not required during this module): | | | | | |
| Patent ductus arteriosus | 1 | 2 | 3 | NA | NA |
| Atrial septal defect | 1 | 2 | 3 | NA | NA |
| Ventricular septal defect | 1 | 1 | 2 | NA | NA |
| Coarctation | 1 | 2 | 3 | NA | NA |
| PA banding and shunts | 1 | 2 | 3 | NA | NA |
| Aortopulmonary window | 1 | 1 | 2 | NA | NA |
| Vascular ring | 1 | 1 | 3 | NA | NA |
| Aortopulmonary and venous shunts | 1 | 1 | 3 | NA | NA |
| Surgical management of the following conditions requiring advanced procedures: | | | | | |
| Partial atrioventricular septal defect | 1 | 1 | 2 | NA | NA |
| Aortic and mitral valve surgery including Ross procedure | 1 | 1 | 2 | NA | NA |
| Open aortic valvotomy | 1 | 1 | 3 | NA | NA |
| Open pulmonary valvotomy | 1 | 1 | 3 | NA | NA |
| Tricuspid valve surgery including Ebstein's | 1 | 1 | 1 | NA | NA |
| Tetralogy of Fallot/Pulmonary atresia plus VSD | 1 | 1 | 1 | NA | NA |
| Fontan procedures | 1 | 1 | 1 | NA | NA |
| Extra cardiac conduits and their replacement | 1 | 1 | 2 | NA | NA |
| Complete atrioventricular septal defect | 1 | 1 | 1 | NA | NA |
| Surgical management of the following conditions requiring complex procedures: | | | | | |
| Interrupted aortic arch | 1 | 1 | 1 | NA | NA |
| Total anomalous pulmonary venous drainage | 1 | 1 | 1 | NA | NA |

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| Transposition of the great arteries (switch procedure) | 1 | 1 | 1 | NA | NA | | |
| Rastelli procedure | 1 | 1 | 1 | NA | NA | | |
| Norwood procedure | 1 | 1 | 1 | NA | NA | | |
| Truncus arteriosus repair | 1 | 1 | 1 | NA | NA | | |
| Double outlet right ventricle | 1 | 1 | 1 | NA | NA | | |
| Pulmonary atresia plus VSD and MAPCAs | 1 | 1 | 1 | NA | NA | | |

**Generic Cardiothoracic**

| | Phase 1 | Phase 2 Card | Phase 3 Card | Phase 2 Thor | Phase 3 Thor | Critical Condition | Index Proc |
|---|---|---|---|---|---|---|---|
| **Critical Care and Post-operative Management** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To be able to manage a post-surgical patient on the critical care, high dependency and post-operative wards. To work as part of a multi-professional, multidisciplinary team in the management of a patient requiring complex critical care. Competence in the management of uncomplicated situations should be achieved during this period. Management of complicated or difficult situations will require appropriate supervision and guidance. | | | | | | | |
| KNOWLEDGE | | | | | | | |
| BASIC KNOWLEDGE | | | | | | | |
| Physiology | | | | | | | |
| Haemodynamics: physiology and measurement | | | | | | | |
| Cardiac arrhythmia | | | | | | | |
| Haemostasis, thrombosis and bleeding | | | | | | | |
| Acid base balance | | | | | | | |
| Pulmonary physiology, ventilation and gas exchange | | | | | | | |
| Metabolic response to trauma and surgery | | | | | | | |
| GIT, renal and hepatic physiology | | | | | | | |
| Nutrition | | | | | | | |
| Temperature regulation | | | | | | | |
| Anatomy | | | | | | | |
| Heart, pericardium and great vessels | | | | | | | |
| Mediastinum, thoracic inlet and neck | | | | | | | |
| Tracheobronchial tree and lungs | | | | | | | |
| Chest wall and diaphragm | | | | | | | |
| Pathology | | | | | | | |
| Inflammation and wound healing | | | | | | | |
| Myocardial infarction and complications | | | | | | | |
| Endocarditis | 4 | 4 | 4 | 4 | 4 | Yes | |
| Pericarditis | | | | | | | |
| Systemic Inflammatory Response Syndrome | | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Bronchopulmonary infection | | | | | | |
| ARDS | | | | | | |
| Pharmacology | | | | | | |
| Drugs used in the treatment of hypertension, heart failure and angina | | | | | | |
| Inotropes, vasodilators and vasoconstrictors | | | | | | |
| Anti-arrhythmic drugs | | | | | | |
| Haemostatic drugs | | | | | | |
| Antiplatelet, anticoagulant and thrombolytic drugs | | | | | | |
| Analgesics | | | | | | |
| Antibiotics | | | | | | |
| Anaesthetic agents, local and general | | | | | | |
| Microbiology | | | | | | |
| Organisms involved in cardiorespiratory infection | | | | | | |
| Antimicrobial treatment and policies | | | | | | |
| CLINICAL KNOWLEDGE | | | | | | |
| Cardiopulmonary resuscitation | | | | | | |
| Management of cardiac surgical patient | | | | | | |
| Management of thoracic surgical patient | | | | | | |
| Treatment of cardiac arrhythmia | | | | | | |
| Management of complications of surgery | 3 | 4 | 4 | 4 | 4 | Yes |
| Blood transfusion and blood products | | | | | | |
| Wound infection and sternal disruption | | | | | | |
| Neuropsychological consequences of surgery and critical care | | | | | | |
| CLINICAL SKILLS | | | | | | |
| HISTORY AND EXAMINATION | | | | | | |
| History and examination of the post-operative and critically ill patient | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| DATA INTERPRETATION | | | | | | | |
| Analysis and interpretation of post-operative and critical care charts and documentation | | | | | | | |
| Routine haematology and biochemical investigations | | | | | | | |
| Chest radiograph and ECG | | | | | | | |
| Echocardiography including TOE | | | | | | | |
| PATIENT MANAGEMENT | | | | | | | |
| General management of surgical patient | | | | | | | |
| Management of fluid balance and circulating volume | | | | | | | |
| Pain control | | | | | | | |
| Wound management | | | | | | | |
| Management of surgical drains | | | | | | | |
| Antimicrobial policy and prescribing | | | | | | | |
| Management of postoperative haemorrhage | 3 | 4 | 4 | 4 | 4 | Yes | |
| Cardiopulmonary resuscitation (ALS) | 3 | 4 | 4 | 4 | 4 | Yes | |
| Management of complications of surgery | 3 | 4 | 4 | 4 | 4 | Yes | |
| Blood transfusion and blood products | | | | | | | |
| Wound infection and sternal disruption | | | | | | | |
| Recognition, evaluation and treatment of haemodynamic abnormalities | | | | | | | |
| Evaluation and interpretation of haemodynamic data | | | | | | | |
| Practical use of inotropes and vasoactive drugs | | | | | | | |
| Use of an intra-aortic balloon pump (IABP) | | | | | | | |
| Recognition, evaluation and treatment of cardiac arrhythmias | | | | | | | |
| Interpretation of ECG | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Use of antiarrhythmic drugs | | | | | | | |
| Use of defibrillator | | | | | | | |
| Understanding and use of cardiac pacing | | | | | | | |
| Recognition, evaluation and treatment of ventilatory abnormalities | | | | | | | |
| Interpretation of blood gas results | | | | | | | |
| Airway management | | | | | | | |
| Understanding of ventilatory techniques and methods | | | | | | | |
| Understanding of anaesthetic drugs and methods | | | | | | | |
| Recognition, evaluation and treatment of multi-organ dysfunction | | | | | | | |
| Renal dysfunction and support | | | | | | | |
| GIT dysfunction, feeding and nutrition | | | | | | | |
| Recognition and evaluation of cerebral and neuropsychological problems | | | | | | | |
| **TECHNICAL SKILLS AND PROCEDURES** | | | | | | | |
| PRACTICAL SKILLS | | | | | | | |
| Arterial cannulation | 4 | 4 | 4 | 4 | 4 | | |
| Central venous cannulation | 4 | 4 | 4 | 4 | 4 | | |
| Insertion of Swan Ganz PA catheter (including measurement of cardiac outputs and interpretation of results) | 4 | 4 | 4 | 4 | 4 | | |
| IABP insertion | 3 | 4 | 4 | 4 | 4 | | |
| IABP timing and management | 3 | 4 | 4 | 4 | 4 | | |
| Tracheostomy | 1 | 2 | 3 | 3 | 4 | | |
| Fibreoptic bronchoscopy | 2 | 3 | 4 | 3 | 4 | | |
| Chest aspiration | 4 | 4 | 4 | 4 | 4 | | |
| Chest drain insertion | 4 | 4 | 4 | 4 | 4 | | |
| Chest drain management | 4 | 4 | 4 | 4 | 4 | | |
| Establish an airway | 2 | 3 | 4 | 3 | 4 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Internal Cardiac Massage | 2 | 3 | 4 | 3 | 4 | | |
| OPERATIVE MANAGEMENT | | | | | | | |
| Re-exploration for bleeding or tamponade | 2 | 3 | 4 | 3 | 4 | Yes | |
| | | | | | | | |
| **Cardiothoracic Trauma** | | | | | | | |
| OBJECTIVE | | | | | | | |
| To evaluate and manage, including surgical management where appropriate, and as part of a multidisciplinary team, a patient with thoracic trauma. | | | | | | | |
| KNOWLEDGE | | | | | | | |
| GENERAL TRAUMA MANAGEMENT | | | | | | | |
| Principles of trauma management (as defined by   ATLS®) | | | | | | | |
| Principles of emergency resuscitation following cardiac arrest | | | | | | | |
| SPECIFIC KNOWLEDGE | | | | | | | |
| The mechanism and patterns of injury associated with blunt, penetrating, blast and deceleration injuries to the chest | | | | | | | |
| The post- ATLS®, definitive care of blunt, penetrating and deceleration injuries to the chest. | | | | | | | |
| The indications and use of appropriate investigations in thoracic trauma management | | | | | | | |
| Pain relief in chest trauma, including epidural anaesthesia. | | | | | | | |
| Indications for immediate, urgent and delayed thoracotomy in trauma | | | | | | | |
| CLINICAL SKILLS | | | | | | | |
| GENERAL TRAUMA MANAGEMENT ( ATLS®) | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Assessment and management of airway, breathing and circulation | | | | | | | |
| Maintenance of an adequate airway and respiratory support | | | | | | | |
| Protection of the cervical spine | | | | | | | |
| Circulatory resuscitation | | | | | | | |
| Establishment of appropriate monitoring | | | | | | | |
| Assessment and management of pain and anxiety | | | | | | | |
| CARDIOTHORACIC TRAUMA MANAGEMENT | | | | | | | |
| Examination and assessment of the of the chest, including respiratory, cardiovascular and circulatory systems | | | | | | | |
| Recognition and management of immediately life threatening situations: obstructed airway, tension pneumothorax, massive haemothorax, open chest wound, flail chest and cardiac tamponade | 4 | 4 | 4 | 4 | 4 | Yes | |
| Recognition and management of potentially life threatening situations: lung contusion, bronchial rupture, blunt cardiac injury, intrathoracic bleeding, oesophageal injury, simple pneumothorax and major vascular injury | 3 | 4 | 4 | 4 | 4 | Yes | |
| Recognition of potentially life threatening penetrating injuries to the chest and abdomen | 3 | 4 | 4 | 4 | 4 | Yes | |
| Interpretation of chest x-ray, ECG, arterial blood gases and echocardiography | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Detection and treatment of cardiac arrhythmias | | | | | | | |
| Management of the widened mediastinum including appropriate investigations and multidisciplinary consultation | 2 | 4 | 4 | 4 | 4 | Yes | |
| **TECHNICAL SKILLS AND PROCEDURES** | | | | | | | |
| PRACTICAL SKILLS | | | | | | | |
| Establish an emergency airway (surgical and non-surgical) | 2 | 3 | 4 | 3 | 4 | | |
| Insertion and management of thoracic drains | 4 | 4 | 4 | 4 | 4 | | |
| Establish adequate venous access and monitoring. | 2 | 3 | 4 | 3 | 4 | | |
| OPERATIVE MANAGEMENT OF THORACIC TRAUMA | | | | | | | |
| Posterolateral thoracotomy, anterolateral thoracotomy and thoracolaparotomy | 2 | 3 | 4 | 3 | 4 | | |
| Bilateral anterior thoracotomy | 2 | 3 | 4 | 4 | 4 | | |
| Median sternotomy and closure | 3 | 4 | 4 | 4 | 4 | | |
| Repair of cardiac injuries | 2 | 3 | 3 | 3 | 3 | | |
| Repair of pulmonary and bronchial injuries | 1 | 2 | 3 | 3 | 4 | | |
| Operative management of fractured ribs and flail chest | 1 | 2 | 2 | 3 | 4 | | |
| Management of the complications of chest trauma, including retained haemothorax and empyema | 1 | 3 | 3 | 3 | 4 | | |
| Repair of oesophageal injuries | 1 | 1 | 1 | 2 | 2 | | |
| Treatment of aortic transection | 1 | 1 | 2 | 1 | 1 | | |

**Appendix 2a:  Collation of Oesophageal Requirements**

This appendix consolidates the requirements for oesophageal management for certification completion.

| Collation of Oesophageal Requirements |
|---|
| 1. Oesophageal anatomy and physiology<br>2. Oesophageal function tests and contrast studies<br>3. Oesophageal injury<br>4. Repair of oesophageal injuries<br>5. Prevention, evaluation, and treatment of fistulae in the aerodigestive tract due to benign, malignant, and iatrogenic causes<br>6. Management of fistulae in the aerodigestive tract by surgical and endoscopic techniques |

**Appendix 3: Critical Conditions**

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| **Critical Conditions - Cardiothoracic** |
|---|

Each specialty manages a large number of individual conditions as described in the syllabus. Assessment of a trainee's ability to manage these is through the supervision level decisions made when assessing the shared and specialty-specific CiPs. Each specialty also has a list of critical conditions which are felt to be of significant importance for patient safety and to demonstrate a safe breadth of practice. These critical conditions will be assessed individually by means of WBA which will both provide formative feedback to the trainee and feed into the summative assessment of the AES and ARCP.

To ensure that trainees have the necessary skills in the critical conditions, by certification (the end of phase 3) there should be documented evidence of performance at the level of a day-one consultant to level 4 (*Appropriate for certification*) of the CEX or CBD (see CBD/CEX forms for the full list of levels). Please note that there is no requirement for a certain number of CBDs and CEXs), however.

Trainees must be able to demonstrate knowledge and understanding of the management of the following critical conditions:

1. Aortic dissection
2. Stridor
3. Secondary / tension pneumothorax
4. Cardiac tamponade
5. Acute haemothorax
6. Low cardiac output following Cardiac Surgery
7. Endocarditis-native or prosthetic valve
8. Respiratory failure following Thoracic Surgery
9. Myocardial ischaemia / infarction

**Index Procedures - Cardiothoracic surgery**

Each specialty requires technical skills to be achieved across a wide range of operative procedures as described in the syllabus. Assessment of a trainee's ability to carry out this full range of procedures is covered by the supervision level decisions made when assessing the shared and specialty-specific CiPs. These assess not only the necessary technical skills but the totality of capabilities required to carry them out.

The index procedures are of significant importance for patient safety and to demonstrate a safe breadth of practice. They will be assessed individually by means of the PBA which will both provide formative feedback to the trainee and feed into the summative AES report and ARCP.

To ensure that trainees have the necessary skills in the index procedures, by certification (the end of phase 3) there should be documented evidence in the portfolio of performance at the level of a day-one consultant by means of the PBA (typically to level 4a: *Procedure performed fluently without guidance or intervention* / Level 4b: As 4a *and was able to anticipate, avoid and/or deal with common problems/complications*. See the PBA form for the full list of levels). Please note that there is no requirement for a certain number of PBAs, however.

The Cardiac Surgery index procedures are:

1. Isolated first time CABG
2. Isolated uncomplicated Aortic Valve Replacement
3. Combined AVR + CABG
4. Isolated uncomplicated Mitral Valve Replacement (at level 3a/b PBA)

The Thoracic Surgery index procedures are:

1. Anatomical lung resection (VATS / Open / Robotic)
2. Decortication and/or washout of empyema
3. Pneumothorax surgery (VATS / Open)
4. Resection of mediastinal lesion

**Cardiothoracic Surgery indicative numbers**
There are indicative numeric requirements for the number of operations performed. This has been agreed as 250 major cases. The major cases will include index procedures with the majority of procedures in the area of special interest.

Examples of major cases include:

**Cardiac Surgery Major Cases**
● Coronary Artery Bypass Grafting (CABG), either alone or in combination with another procedure, such as valve repair or replacement

- Valve repair or replacement, either alone or in combination with CABG or any other cardiac procedure
- Thoracic aortic surgery
- Other major cardiac surgical cases involving cardiopulmonary bypass (CPB), such as post infarct ventricular septal defect (VSD) repair, excision of atrial myxoma or pericardiectomy.
- Implantation of the heart or lung (transplantation)
- Heart-lung block retrieval
- Any congenital cardiac procedure (atrial septal defect closure, VSD closure, patent ductus arteriosus (PDA) ligation etc.)

**Thoracic Surgery Major Cases**
- Anatomical lung resection (open, video-assisted thoracoscopic surgery (VATS) or Robotic)
- Correction of pectus deformity
- Decortication and/or washout of empyema
- Thoracotomy for trauma
- Chest wall resection and reconstruction
- Tracheal resection
- Surgery of pneumothorax (VATS/open)
- Resection of mediastinal lesion
- Diaphragmatic surgery
- Lung volume reduction surgery

Some knowledge and capabilities are best gained in the formal setting of a taught course. In Cardiothoracic Surgery there is one mandated course.

| **CARDIOTHORACIC SURGERY** | | | | | |
|---|---|---|---|---|---|
| **Mandated Courses** | | | | | |
| **Trauma learning outcomes** | **Rationale for learning by attendance at a course** | **Phase of training** | **GPC** | **CiP** | **Examples of ways to meet trauma learning outcomes** |
| To evaluate and manage, including surgical management where appropriate, and as part of a multi-disciplinary team, a patient with cardiothoracic trauma. | Cannot be learned in the workplace to the level required for patient safety<br><br>Allows a systematic process of teaching a safe and reliable method of immediate management of severely injured patients and comprises a range of comprehensive and adaptable trauma management skills relevant to all specialties | Current throughout training | Domain 2: Professional skills<br><br>Domain 3: Professional knowledge<br><br>Domain 5: Capabilities in leadership and team working | 2) Manages the unselected emergency take | The Advanced Trauma Life Support® (ATLS®), European Trauma Course, Definitive Surgical Trauma Skills course or equivalent locally provided course(s) meeting the outcomes described |

**Appendix 6: Roles and responsibilities for supervision**

**The role of the Training Programme Director (TPD)**

TPDs are responsible for managing the specialty training programmes, ensuring they deliver the specialty curriculum.

TPDs are responsible for:

- Organising, managing and directing the training programmes, ensuring that the programmes meet curriculum requirements
- Identifying, appointing and supporting local faculty i.e. Assigned Educational Supervisors (AESs) and Clinical Supervisors (CSs), providing training as necessary, including training in equality and diversity and providing feedback to AESs and CSs on the quality of their performance
- Ensuring a policy for career management and advice covering the needs of trainees in their placements and programmes
- Overseeing progress of individual trainees through the levels of the curriculum, ensuring learning objectives are set, appropriate assessments are being undertaken and that appropriate levels of supervision and support are in place
- Helping the Postgraduate Dean and AES manage trainees who are running into difficulties by identifying remedial placements and resources where required
- Working with delegated Specialty Advisory Committee (SAC) representatives (SAC Liaison Members) and College representatives (e.g. college tutors) to ensure that programmes deliver the specialty curriculum
- Ensuring that Deanery administrative support is knowledgeable about curriculum delivery and are able to work with NHS and Irish healthcare system employers, SACs, trainees and trainers
- Providing induction for trainees entering specialty programmes
- Administering and chairing the Annual Review of Competence Progression (ARCP) meetings
- Monitoring the quality of the training programme and producing quality reports (including the quality of trainer assessments and feedback) for the Postgraduate Dean
- Ensuring access to trainee data is kept confidential.

**The role of the Assigned Educational Supervisor (AES)**

AESs are consultant surgeons responsible for the management and educational progress of one or more specified trainee(s) in a training placement or series of placements. AESs must be appropriately trained for the role, familiar with the curriculum and have demonstrated an interest and ability in teaching, training, assessing and appraising. They should have gained skills equivalent to courses such as Training the Trainer offered by an appropriate educational institution and must keep up-to-date with developments in training. They must have appropriate access to teaching resources and time for training allocated to their job plan (approx. 0.25 PA per trainee). They must have access to the support and advice of their senior colleagues regarding any issues related to teaching and training and to keep up-to-date with their own professional development.

AESs are responsible for:

- Providing induction to the unit (where appropriate)
- Ensuring that trainees are familiar with the curriculum and assessment system relevant to the level/phase of training and undertake it according to requirements
- Ensuring that trainees have appropriate day-to-day supervision appropriate to their phase of training

- Helping trainees with both professional and personal development
- Completing a learning agreement with trainees and undertaking appraisal meetings (typically one at the beginning, middle and end of a placement)
- Ensuring the MCR is completed by CSs, ensuring all the CiPs are addressed, any differences in supervision level are explained and final sign off of the MCR
- Ensuring a record is kept in the portfolio of any serious incidents or concerns and how they have been resolved
- Regularly inspecting trainee learning portfolios and ensuring trainees are making the necessary clinical and educational progress
- Informing trainees of their progress and encouraging trainees to discuss any deficiencies in the training programme, ensuring that records of such discussions are kept
- Ensuring access to trainee data is kept confidential
- Ensuring patient safety in relation to trainee performance by the early recognition and management of those doctors in distress or difficulty
- Keeping the TPD informed of any significant problems that may affect training
- Discussing trainees' progress with each trainer with whom trainees spend a period of training and involving them in the formal reporting process
- Providing an end of placement AES report for the ARCP.

**The role of the Clinical Supervisor (CS)**

CSs are consultant surgeons responsible for delivering teaching and training under the delegated authority of the AES. The training of CSs should be similar to that of the AES.

CSs are responsible for:

- Ensuring patient safety in relation to trainee performance
- Carrying out WBAs on trainees and providing verbal and written feedback
- Liaising closely with other colleagues, with whom the trainee is working, regarding the progress and performance of trainees
- Keeping the AES informed of any significant problems that may affect training
- Ensuring access to trainee data is kept confidential
- Contributing to the MCR as part of the faculty of CSs and providing constructive feedback to the trainee.

The roles of AES and CS come under the umbrella of the Professionalised Trainer outlined in section 3.2.2. The JSCT is supportive of the GMC's moves towards greater recognition and accreditation for clinicians undertaking the roles of AES and CS, and other responsibilities supporting education and training.

**The role of the Assessor**

Assessors carry out a range of WBAs and provide verbal and written feedback trainees. Assessments during training are usually be carried out by CSs, who will be responsible for the MCR, recommending the supervision level and providing detailed formative feedback to trainees with reference to the CiPs. Other members of the surgical team including senior trainees, senior nurses and doctors from other medical disciplines may assess trainees in areas where they have particular expertise (e.g. with the use of the DOPS). Those who are not medically qualified may also act as assessors for the trainee's Multi-source Feedback (MSF). Assessors must be appropriately qualified in the relevant professional discipline and trained in the methodology of WBA. This does not apply to MSF raters.

Assessors are responsible for:

- Carrying out WBA, including the MCR, according to their area of expertise and training
- Providing constructive verbal feedback to trainees, including an action plan, immediately after the event
- Ensuring access to trainee data is kept confidential
- Providing written feedback and/or validating WBAs in a timely manner.

**The role of the Trainee**

Trainees are the learners who have been selected into a specialty training programme. Other surgeons who have registered to use the curriculum and learning portfolio as learners have the same responsibilities. All trainees/learners have a responsibility to recognise and work within the limits of their professional competence and to consult with colleagues as appropriate. Throughout the curriculum, great emphasis is laid on the development of good judgement and this includes the ability to judge when to seek assistance and advice. Trainees/learners must place the well-being and safety of patients above all other considerations. They are required to take responsibility for their own learning and to be proactive in initiating appointments to plan, undertake and receive feedback on learning opportunities.

Trainees/learners are responsible for:

- Engaging with opportunities for learning
- Creating a learning agreement and initiating meetings with the AES
- Raising concerns with the AES and/or TPD about any problems that might affect training
- Initiating regular WBAs with assessors in advance of observations
- Undertaking self and peer assessment
- Undertaking regular reflective practice
- Maintaining an up to date learning portfolio
- Working as part of the surgical and wider multi-professional team.

## Appendix 7: Quality Management of the Curriculum

The Joint Committee on Surgical Training (JCST) works as an advisory body to the four surgical Royal Colleges of the UK and Ireland for all matters related to surgical training. It is the parent body of the Specialty Advisory Committees (SACs) and the Training Interface Groups (TIGs) and works closely with the Surgical Specialty Associations in Great Britain and Ireland. The JCST sets out a curriculum quality framework directed at evaluating and monitoring curriculum delivery against curriculum standards whereby a range of qualitative and quantitative measures inform continuous improvement. The JCST is also the umbrella organisation for the Intercollegiate Surgical Curriculum Programme (ISCP), the curriculum training management system. Through the variety of mechanisms outlined below, the JCST complies, and ensures compliance, with the requirements of equality and diversity legislation set out in the Equality Act 2010.

The quality system includes the following components:

- Quality assurance (QA): the development and maintenance of the curriculum links with the GMC's role in providing standards for training and for curricula.
- Quality management (QM): the implementation of training and curriculum standards by Deaneries through training programmes and post locations approved by the GMC. The system includes processes for recruitment and selection and mechanisms to address concerns. SAC Liaison Members provide externality and support for local quality management.
- Quality control (QC): the implementation of training standards by local education providers (LEPs). The local delivery of curriculum is through the trainers recognised by the GMC.

**Internal Quality Review**

The following mechanisms provide sources of information that, together, provide complementary information which informs quality management and quality improvement.

*Specialty Advisory Committees (SACs)*

There is one SAC for each GMC recognised surgical specialty and a Core Surgical Training Advisory Committee (CSTAC) which oversees core surgical training. Each SAC will comprise appointed Liaison Members to cover all training regions in the UK, the Lead Dean for the specialty, a trainee representative, the Chair of the Intercollegiate Specialty Board (ex officio), the President of the Specialty Association or deputy, a representative of Royal College of Surgeons in Ireland and additional members may be co-opted for a time-limited period to provide specific expertise as necessary. The skill set and experience of SAC members will reflect the breadth of the specialty. The Liaison Members act on behalf of the SAC by overseeing training in a particular region(s) other than their own. Duties include contributing to the local quality management systems, the ARCP and to the regular reporting through first-hand independent knowledge of training programmes.

*Curriculum development*

The SACs, working with their Specialty Associations, are responsible for curriculum development and maintenance. They monitor innovations in clinical practice and, when these become established components of service delivery, they can be incorporated into an approximately three yearly review of the specialty curriculum. Similarly, the JCST, ISCP Management Committee, JCST Quality Assurance Group and the SACs monitor developments in training delivery and incorporate these into formal curriculum reviews. Curriculum updates are made in consultation with all stakeholders, including trainees, trainers, speciality organisations, deans, employers, patient and lay representatives and the GMC including specific trials and pilots when required.

Equality and diversity implications are considered throughout the development of curricula in association with trainees and trainers through specific development events, which feed into impact assessments, noting any potential adverse effects on learners with protected characteristics as defined by the Equality Act 2010. Curricula are also developed through regular meetings with the GMC, helping to refine the curriculum approach and ensuring that the standards for curricula are met and identify future developments.

*GMC Survey*

The GMC undertakes a national training survey of trainee views on their training. The findings of the survey are available by country, postgraduate body, LEP, training level and graduating medical school. The GMC also conducts a survey of educational and clinical supervisors in the UK, which aims to collect evidence on whether trainers are able to undertake their duties as trainers effectively; have support for training including trainer development and the formal recognition of their duties in job plans; are implementing curricula and assessments appropriately.

The JCST analyses the GMC's published reports on these surveys, drawing out the key messages for surgery to feed into each SAC and QA Group meeting. SAC Liaison Members are responsible for consulting on the outcomes of these discussions with those responsible for curriculum delivery in their regions including TPDs and Specialty Training Committees (STCs). They also report key learning points through their Liaison Member Reports. The JCST uses the initial analysis and feedback from these processes to help address ad hoc queries and inform projects, pilots, monitoring and evaluation work. The outcomes of these processes are to report the specialty and national view of postgraduate surgical training through a continuous model of reporting to the GMC at regional and national level.

The GMC also provides a progression data portal, which colleges and faculties can use to consider data on the progression of trainees by specialties and regions. The JCST uses these data to help identify system or policy changes that might need review in order to ensure equality, diversity and fairness. See also below – External Quality Review (the GMC and postgraduate bodies use the GMC survey findings in external quality review).

Quality Indicators

The JCST Quality Indicators are the JCST and SACs' guidance on the attributes of good quality training posts. They are not an assessment for measuring the achievements of individual trainee. They are a tool to monitor the quality of training posts and drive quality improvement.

JCST Survey

The JCST trainee survey measures training post compliance with the JCST Quality Indicators across all UK training programmes. The anonymised survey responses are pivotal to the JCST's quality processes. Trainees complete one survey for each training placement prior to their ARCP. As part of its five-year strategy, the JCST shares this information in the form of annual reports. The JCST also conducts a biennial survey of surgical Assigned Educational Supervisors to gather information on issues particularly relevant to surgical trainers, such as use of the web-based ISCP, time and support available to undertake training and other related activities. Analysis of the findings from these surveys are key to the work of the SACs and QA Group. This informs their meetings and the consultations SAC Liaison Members have with those responsible for curriculum delivery within their regions including TPDs and STCs. The learning points drawn from the analysis and feedback inform all JCST work including projects, pilots and evaluation and help report the specialty and national view of postgraduate surgical training.

*JCST and ISCP data*

Training data collected through the JCST and ISCP are used to review quality. These include curriculum delivery, adherence to quality indicators and equality and diversity issues. The ISCP is used to monitor curriculum delivery, trainee progression and WBA performance. The ISCP Management Committee undertakes and supports qualitative and quantitative research and recruits external Research Fellows to conduct specific studies to support curriculum and assessment change.

*Trainee views*

Representatives of trainee associations are members of the JCST committees and have specific sections of meetings to report on training issues and raise concerns. Trainee representatives are involved in working groups, curriculum review and the development of the ISCP training management system, including, where necessary, cascading training, testing and piloting.

**External Quality Review**

*Postgraduate Deans*

The responsibility for the quality management of specialty training programmes rests with the Deans. They ensure posts and programmes are approved by the GMC, oversee the appointment of trainees and of TPDs. They ensure that training in the regions is implemented in accordance with GMC-approved curricula. Deans work through STCs and Boards, seeking advice from the JCST, the surgical Royal Colleges and SACs on curriculum delivery, the local content of programmes, assessment of trainees, remedial training and the recognition and training of trainers. The Deans contract LEPs through Service Level Agreements to deliver training to agreed standards. Working alongside Postgraduate Deans, education providers must take responsibility for ensuring that clinical governance and health and safety standards are met. This includes the provision of a system of training including in equality and diversity, a process of revalidation and annual appraisals of trainers by employers set against the professional standards for Good Medical Practice.

*Schools of Surgery*

The co-ordination of surgical training is through Schools and their devolved nation equivalents, which are accountable to the Deaneries. They bring together networks of lead providers of postgraduate medical education in a particular specialty or group of specialties to decide how educational initiatives are best delivered and ensure consistency of approach. Each School is led by the Head of School who acts as a workforce adviser to the education commissioners, leads on quality management of surgery, supports and develops lead providers, provides regional representation in national fora and an interface with other disciplines. The Head of School or their devolved nation equivalent also oversees the quality of training posts provided locally. The national Heads of School and their devolved nation equivalents meet through their Confederation of Postgraduate Schools of Surgery (CoPSS), which is also attended by the Chair of the JCST and ISCP Surgical Director.

*Training Programme Directors*

Training programmes are led by TPDs or their designated equivalent. TPDs have responsibility for managing individual specialty training programmes. Their responsibilities include allocating trainees to training placements and rotations, providing systems for career management, flexible training, academic training and remedial training as well as organising the recognition and training of trainers and co-ordinating the ARCP. TPDs, working alongside Heads of School, are also introducing a standardised form for the evaluation of AES reports in order to offer feedback to AESs about the quality of their feedback to trainees, along with mechanisms for development.

*Statutory Education Bodies*

Co-ordination and alignment of policy on medical education is devolved from health ministers to bodies governing the health services in the four nations of the UK (NHS England, NHS Education for Scotland (NES), the Northern Ireland Medical and Dental Training Agency (NIMDTA) and Health Education and Improvement Wales (HEIW)) and Ireland (the Health Service Executive (HSE)). These organisations are responsible for healthcare, education, training and workforce development. They take advice from the JCST and the surgical Royal Colleges in order to ensure consistent regional delivery. These organisations can undertake visits to LEPs and visits can be triggered by specific concerns. They highlight any areas for improvement, agree the timetable for any appropriate action and identify areas of notable practice. SAC Liaison Members may be involved in the visits to provide both specialty-specific input and externality.

*UK Medical Education Reference Group (UKMERG)*

The UKMERG is a forum for discussion, co-ordination and alignment of matters relating to medical education across the UK. It includes representation from the four UK health departments and the four statutory postgraduate medical education bodies.

*General Medical Council*

The GMC is responsible for setting the standards for curricula and approving curricula as well as approval of training programmes and training post locations. The Deanery submits an application for programme and post location approval. Support for an application is available from the relevant surgical SAC. There is regular reporting to the GMC as part of their quality framework. The GMC activities may include document requests, meetings, shadowing, observations, visits and document reviews. The GMC uses the GMC survey results in quality assurance by monitoring that training meets the required standards. It will escalate issues through other QA activity such as an enhanced monitoring process. Triggered visits investigate possible serious educational failures or risks to patient safety as part of the GMC's enhanced monitoring process. The GMC's QA process includes the ability to impose a sanction in response to a failure to meet its standards including imposing conditions which limit the time or scope of approval, refusing approval, and withdrawing recognition for training.
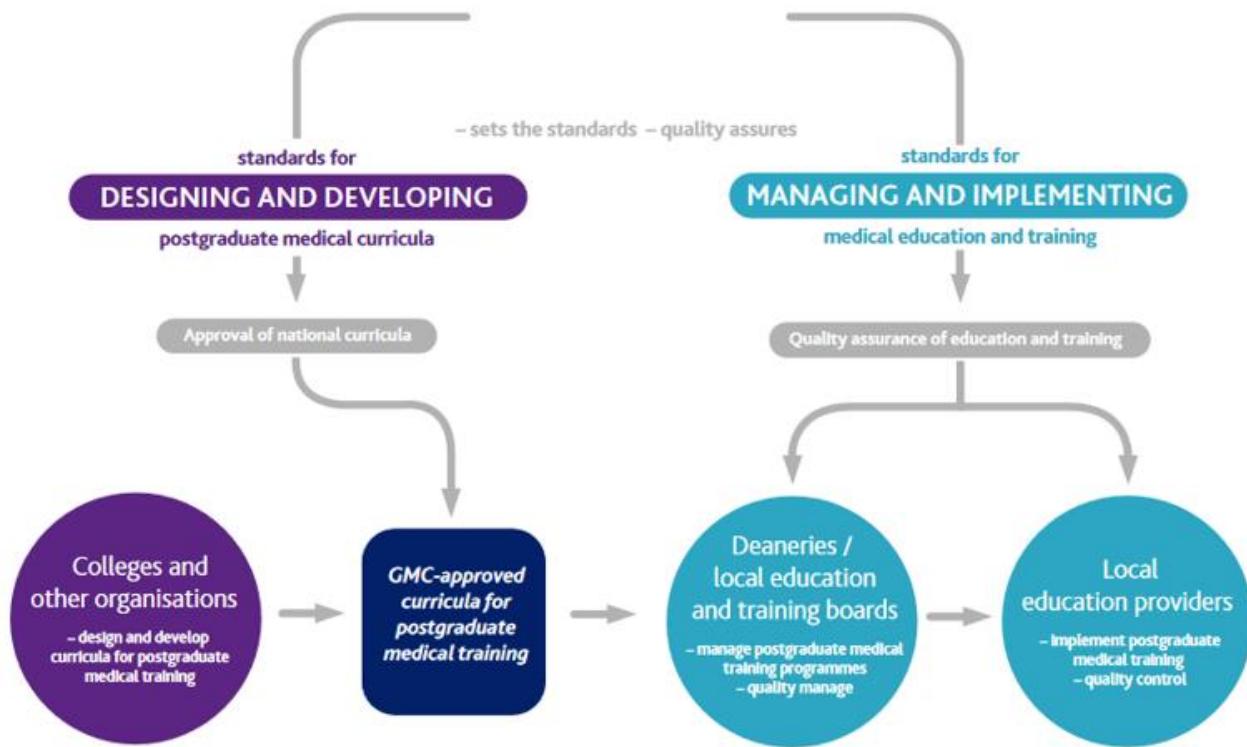
Figure 8: The quality assurance structure of the curriculum (adapted from Excellence by Design, GMC, 2017)

| Term | Definition |
|---|---|
| AES Report | An end of placement report by the trainee's Assigned Educational Supervisor, providing key evidence for the trainee's ARCP. |
| ARCP / ARCP 6 | The Annual Review of Competence Progression (ARCP) panel will recommend one of 8 outcomes to trainees. Outcome 6 sets out that a trainee has gained all required competencies and will be recommended as having completed the training programme. (For further information, please see the Gold Guide). |
| Capability | The ability to be able to perform an activity in a competent way. |
| Capabilities in Practice (CiP) | The high-level learning outcomes of the curriculum.<br><br>Learning outcomes operationalise groups of competencies by describing them in terms of holistic professional activities. In surgery they are aligned to what a day-one consultant will need to be able to know and do. Rather than learning 'inputs' ('what is learned', they set out what the learner must be able to do as a result of the learning at the end of the training programme – a practical skill) and clarify the extent to which trainees should successfully perform to reach certification. |
| Critical Condition | Any condition where a misdiagnosis can be associated with devastating consequences for life or limb. |
| Critical Progression Points | Key points during the curriculum where trainees will transition to a higher level of responsibility or enter a new area of practice. These points are frequently associated with increased risk, and so robust assessment is required. These points are at the end of phase 2 (transition to phase 3), and the end of phase 3 to achieve certification. |
| Core Surgical Training | The early years of surgical training for all ten surgical specialties. |
| Generic | Applicable to *all* trainees regardless of specialty, discipline and level of training, e.g. Generic Professional Capabilities. |
| Generic Professional Capabilities (GPCs) | A framework of educational outcomes that underpin medical professional practice for all doctors in the United Kingdom. |
| Good Medical Practice (GMP) | The core ethical guidance that the General Medical Council (GMC) provides for doctors. |
| High-Level Outcome | See Capability in Practice. |

| | |
|---|---|
| Index Procedure | Operative procedures that refer to some of the more commonly performed clinical interventions and operations in the specialty. They represent evidence of technical competence across the whole range of specialty procedures in supervised settings, ensuring that the required elements of specialty practice are acquired and adequately assessed. Direct Observations of Procedural Skills (DOPS) and Procedure-based Assessments (PBAs) assess trainees carrying out index procedures (whole procedures or specific sections) to evidence learning. |
| Manage | Throughout the curriculum the term 'manage' indicates competence in clinical assessment, diagnosis, investigation and treatment (both operative and non-operative), recognising when referral to more specialised or experienced surgeons is required for definitive treatment. |
| Multiple Consultant Report (MCR) | An assessment by Clinical Supervisors that assesses trainees on the high-level outcomes of the curriculum. The MCR provides a supervision level for each of the five Capabilities in Practice (CiPs) as well as giving outcomes for the nine domains of the Generic Professional Capabilities. The assessment will be at the mid-point and end of a placement. The MCR is a formative assessment, providing trainees with formative feedback. However, the final MCR also contributes to the summative AES report. |
| Phase | An indicative period of training encompassing a number of indicative training levels. Phases are divided by critical progression points to ensure safe transitioning where patient or training risk may increase. Phases have replaced 'stages' of training in previous versions of the curriculum. |
| Placement | A surgical unit in which trainees work in order to gain experiential training and assessment under named supervisors. |
| Run-through training | The route which allows trainees, after a single competitive selection process at ST1 and satisfactory progress, to progress through to specialty training at ST3 onwards (unlike uncoupled training). |
| Specialty Advisory Committee (SAC) | The committee which oversees training in a particular specialty, reporting to the JCST. SAC responsibilities include trainee enrolment and support, certification, out of programme and LTFT training, curriculum development, logbook development, simulation training, quality assurance (including processes for externality via the provision of regional liaison members), national recruitment also credentialing (if appropriate). |

| | |
|---|---|
| Shared | Applicable to all specialties i.e. the five shared CiPs are identical to all ten surgical specialties. In some specialties some additional CiPs may be specialty-specific. |
| Special Interest | Advanced areas of training in the specialty. |
| Supervision level | The level of supervision required by a trainee to undertake an activity, task or group of tasks, ranging from the ability to observe only through direct and indirect supervision to the ability to perform unsupervised. |
| Trainees | Doctors in training programmes. |
| Training programme | A rotation of placements in which training is provided under a Training Programme Director and named supervisors. |
| Uncoupled programme | The route where core surgical training (CT1 and CT2) and specialty training (ST3 onwards) are separated by a national recruitment process (unlike run-through training). |

**Appendix 9: Assessment Blueprint**

All aspects of the curriculum are assessed using one or more of the described components of the assessment system. Some curriculum content can be assessed in more than one component but the emphasis will differ between assessments so that testing is not excessive in any one area. The key assessment is the MCR through which trainees are assessed on the high-level outcomes of the curriculum; the CiPs and GPCs.

| High-level outcomes | Assessment Framework | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | CiP/GPC self-assessment | MCR | MSF | CEX | CBD | PBA | DOPS | AoA | OoT | ISB Exam Section 1 | ISB Exam Section 2 |
| | **Capabilities in Practice** | | | | | | | | | | | |
| | 1. Manages an out-patient clinic | * | * | * | * | * | | | | | | * |
| | 2. Manages the unselected emergency take | * | * | * | * | * | * | * | | | | * |
| | 3. Manages ward rounds and the on-going care of in-patients | * | * | * | * | * | | | | | | * |
| | 4. Managing an operating list | * | * | * | | | * | * | | | | |
| | 5. Managing multi-disciplinary working | * | * | * | | * | | | | | | |
| | 6. Manages patients within the critical care area | * | * | * | * | * | * | * | | | | * |
| | 7. Assesses surgical outcomes both at a personal and unit level | * | * | | | * | | | | | | |

| High-level outcomes | Generic Professional Capabilities | CiP/GPC self-assessment | MCR | MSF | CEX | CBD | PBA | DOPS | AoA | OoT | ISB Exam Section 1 | ISB Exam Section 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Domain 1: Professional values and behaviours | * | * | * | * | * | * | * | * | * |  | * |
|  | Domain 2: Professional skills | * | * | * | * | * | * | * |  | * |  | * |
|  | Domain 3: Professional knowledge | * | * | * | * | * | * | * | * | * | * | * |
|  | Domain 4: Capabilities in health promotion and illness prevention | * | * |  | * | * |  |  |  |  | * |  |
|  | Domain 5: Capabilities in leadership and team working | * | * | * |  | * | * | * | * | * | * |  |
|  | Domain 6: Capabilities in patient safety and quality improvement | * | * |  |  | * |  |  | * |  | * |  |
|  | Domain 7: Capabilities in safeguarding vulnerable groups | * | * |  | * | * | * | * |  |  | * |  |
|  | Domain 8: Capabilities in education and training | * | * |  |  |  |  |  |  | * |  |  |
|  | Domain 9: Capabilities in research and scholarship | * | * |  |  |  |  |  |  |  |  |  |

| Syllabus | | | CiP/GPC self-assessment | MCR | MSF | CEX | CBD | PBA | DOPS | AoA | OoT | ISB Exam Section 1 | ISB Exam Section 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Knowledge | | * | * | * | * | * | * | * | * | * | * | * |
| | Clinical skills | Clinical skills (general) | * | * | * | * | * | | | | | | * |
| | | Critical conditions (mandated CEX/CBD) | * | * | * | * | * | | | | | | * |
| | Technical skills | Technical skills (general) | * | * | | | | * | * | | | | |
| | | Index procedures (mandated PBA/DOPS) | * | * | | | | * | * | | | | |