The Royal College of Anaesthetists

The College of Emergency Medicine

The Royal College of Paediatrics & Child Health

The Royal College of Physicians

The Royal College of Physicians of Edinburgh

The Royal College of Physician and Surgeons of Glasgow

The Royal College of Surgeons of Edinburgh

The Royal College of Surgeons of England

Part V

The CCT in
Intensive Care Medicine

Special Skills Training

The Faculty of
Intensive Care Medicine

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1. Introduction

In the independent enquiry into Modernising Medical Careers, Professor Sir John Tooke identified a need to *Aspire to Excellence*, advocating "increased flexibility, the valuing of experience and the promotion of excellence"[1]. Intensive Care Medicine has a history of practitioners from many different backgrounds bringing skills and competencies into the Intensive Care Unit – these skills are of direct patient benefit and contribute to the construction of a comprehensive team. The GMC's 'Good Medical Practice' requires doctors to commit to life-long learning in order to maintain and improve performance; the foundations for this set of attitudes and behaviours must be established during training through aspiration to excellence, manifest by the acquisition of special skills and interests.

As such, all trainees in ICM are expected to develop a 'Special Skill,' which is directly relevant to ICM practice and of direct benefit to the service and patient care. Up to 12 months of Stage 2 training can be used to develop this special area of expertise – this is the 'Special Skills Year' [SSY].

During these blocks, trainees must continue to develop their patient-orientated intensive care skills. Trainees should continue with a substantial clinical workload to maintain and develop clinical skills. This should include regular supervised daytime and out of hours work.

1.1 Choice of Special Skills module

The choice of Special Skill should be guided by the Programme Director to reflect the career intentions of the trainee and is entirely dependent on local availability within the trainee's particular region. For example, a trainee intending to practice in a more remote area may wish to develop greater paediatric expertise as these skills may be required more regularly in such an environment than in a large central hospital. Acquisition of this expertise must be as part of an FICM-approved, competency-based training programme.

1.2 Local availability of Special Skills modules

The choice of Special Skill modules open to trainees will depend on the local capability to deliver those modules. For example, if a trainee has a keen interest in undertaking a SSY in Echo training, this will be dependent on their deanery/LETB having the required facilities and educational capacity to offer that training module.

Any inter-deanery/LETB secondments to other regions able to offer different Special Skills modules are entirely at the discretion of local trainers and deaneries.

1.3 Duration of Special Skills modules

It is expected that a single Special Skills Year will normally consist of a single 12 month module. However, it is recognised that some modules may have unique requirements or provisions – these are detailed within the respective modules herein.

Trainees should ensure that the FICM secretariat is kept informed at all times of their planned Special Skills training; any training undertaken without approval of the Faculty cannot count toward CCT and may result in an extension of overall training time.

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[1] *Aspiring To Excellence: Findings and Final Recommendations of the Independent Enquiry into Modernising Medical* Careers. MMC Inquiry, London, 2008, p.7.

1.4 Dual CCTs trainees and the Special Skills Year

For trainees undertaking Dual CCTs in ICM and another specialty it is expected that their Special Skills Year will be undertaken in the other specialty, as this is the area of special expertise that they are developing. Therefore, a trainee undertaking Dual CCTs in ICM and Anaesthesia would spend 12 months acquiring their higher-level anaesthetic competencies. The indicative 8.5 year minimum timeframe for Dual CCTs programmes and competency-mapping between specialties is predicated upon this concept. Detailed guidance documents on Dual CCTs for ICM and its partner specialties can be found online[2]. The specialties encompassed in this mapping are:

- Acute Internal Medicine
- Anaesthetics
- Emergency Medicine
- Renal Medicine
- Respiratory Medicine

The indicative timeframe for each of these Dual CCTs programmes is 8.5 years. Trainees from other specialties may apply for dual training with ICM; however selection panels must be aware that appointment to an ICM CCT programme for trainees outside the currently mapped dual schemes may result in considerable prolongation of training to allow acquisition of all requisite competencies. The above list is correct at time of publication; any further specialties undertaking Dual CCTs mapping with ICM will be added to future revised editions of this curriculum and noted as such online.

Any Dual CCTs trainee wishing to undertake an additional Special Skills module beyond that of their partner specialty would need the express **prospective** support of their postgraduate deanery/LETB, local trainers, and the FICMTAC to do so. Their deanery/LETB must be fully aware that this will involve a 12 month extension to the Dual CCTs programme, with the attendant cost implications. Such trainees should apply in writing to the FICMTAC including a detailed explanation of the reasons for their additional Special Skills module, along with documentary support from their postgraduate dean, ICM RA and TPD.

The shared competencies and forms of assessment of Dual CCTs programmes have been identified by a joint working group between the relevant college (i.e. the JRCPTB, the Royal College of Anaesthetists and the College of Emergency Medicine) and the FICM, and are documented in the Dual CCTs guidance produced by the relevant college and the Faculty of Intensive Care Medicine. Appointment to Dual CCTs programmes "must be through open competition" and "both potential trainees and selection panels must be clear whether the appointment is for single or Dual CCT/s", as per GMC guidance[3]. All appointments should adhere to this guidance and to the ICM and respective partner specialty CCT person specifications.

1.5 CoBaTrICE competency mapping

Each competence is mapped, where appropriate, to the competencies described within the CoBaTrICE framework in Part III of *The CCT in Intensive Care Medicine* (2011). In many cases, the competencies described in each module will be a development of existing competencies within the CoBaTrICE framework, allowing trainees to achieve at a greater Level than would normally be described in the Training Progression Grid for general ICM trainees (see 1.8, below).

However, due to the nature of special skills training, some modules inevitably contain competencies that are entirely new to their respective special skills area and are not present at all in the wider CoBaTrICE competency list. These competencies are denoted as such below:

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2 http://www.ficm.ac.uk/icm-cct-curriculum/dual-ccts

3 http://www.gmc-uk.org/education/postgraduate/6790.asp

CoBaTrICE Competency Mapping	
Code	**Full name**
E	**Extended Competency** Exists within CoBaTrICE in core form but is further developed and extended during the special skills module – the original CoBa competency number is listed
A	**Additional Competency** Is not present within CoBaTrICE as not required of general ICM trainees, but will be developed during the course of the particular special skills module

1.6 Assessment Tools Key

Each competence is mapped to the relevant assessment tools as follows:

Assessment Tools	
Code	**Full name**
D	Direct Observation of procedural Skills [DOPS]
I	ICM Mini- Clinical Evaluation Exercise [ICM-CEX]
C	Case Based Discussion [CBD]
M	Multisource Feedback [MSF]
T	Acute Care Assessment Tool [ACAT]
S	Simulation
E	Examination

Completion of a full SSY module should be denoted by a Special Skills Year Completion Form (see *Part II*). Trainees may keep this within their paper-based portfolio or scan and upload to the ICM ePortfolio.

1.6.1 Additional Assessments

The FICM accepts that some Special Skills modules may not lend themselves easily to the use of WPBA, or will require the use of additional, specific assessments (for example a *viva voce* assessment for an academic dissertation or thesis). However all special skills modules are expected to be mapped to WPBA where appropriate, and any additional requirements are clearly stated within each module.

1.7 Good Medical Practice

Each core and common competence is also mapped to the four domains of Good Medical Practice:

Domains of Good Medical Practice	
Domain	**Descriptor**
1	Knowledge, skills and performance
2	Safety and quality
3	Communication, partnership and teamwork
4	Maintaining trust

1.8 Competency level descriptors

Both trainees and trainers need to ensure that training is both comprehensive and that progression of training is occurring at a satisfactory rate. The curriculum uses a Training Progression Grid, which includes the CoBaTrICE domains, to both define and measure progress. This is combined with a simple and intuitive measure of level of competence which uses the intensity of supervision required to identify achievement.

By the completion of the ICM training programme all trainees will be expected to have achieved level 4 competency in the majority of the CoBaTrICE competences, as detailed on the grid. The grid acknowledges that in general trainees will not reach Level 4 in some highly specialised areas of intensive care (e.g. Paediatric Intensive Care Medicine, burns). Trainees may, in their special skills year, develop competencies in certain areas beyond those expected in the curriculum's training grid, or indeed develop further special skills in areas of practice in which they would in any case be expected to attain the level of independent consultant practice.

The level descriptors are as follows:

Level	Task orientated competence	Knowledge orientated competence	Patient management competence
1	Performs task under direct supervision.	Very limited knowledge; requires considerable guidance to solve a problem within the area.	Can take history, examine and arrange investigations for straightforward case (limited differential diagnosis). Can initiate emergency management and continue a management plan, recognising acute divergences from the plan. Will need help to deal with these.
2	Performs task in straightforward circumstances, requires help for more difficult situations. Understands indications and complications of task.	Sound basic knowledge; requires some guidance to solve a problem within the area. Will have knowledge of appropriate guidelines and protocols.	Can take history, examine and arrange investigations in a more complicated case. Can initiate emergency management. In a straightforward case, can plan management and manage any divergences in short term. Will need help with more complicated cases.
3	Performs task in most circumstances, will need some guidance in complex situations. Can manage most complications, has a good understanding of contraindications and alternatives.	Advanced knowledge and understanding; only requires occasional advice and assistance to solve a problem. Will be able to assess evidence critically.	Can take history, examine and arrange investigations in a more complex case in a focused manner. Can initiate emergency management. In a most cases, can plan management and manage any divergences. May need specialist help for some cases.
4	Independent (consultant) practice.	Expert level of knowledge.	Specialist.

1.9 Additional general ICM in the Special Skills Year

Trainees may wish to spend their Special Skills Year enhancing their training in Intensive Care Medicine by undertaking additional ICM blocks that would allow them to achieve a higher level of competency in some areas of general ICM practice then that would be achieved through generalist intensive care training.

1.10 Completion of SSY module

Upon completion of their SSY module, trainees should complete the Special Skills Year Completion Form (available in *Part II: Assessment System* and reproduced at the end of this manual for ease of reference). Trainees must complete a SSY module in order to progress to Stage 3 training.

1.11 Further Special Skills modules

Trainees wishing to undertake Special Skills modules beyond those detailed within this manual may do so, provided that they have the prospective written approval of the FICMTAQ Committee. However, **these modules must be prospectively approved by the FICM and GMC before being undertaken by any trainee**.

Submissions for additional Special Skills modules must include details of:

- Overall Aim of the module
- Educational objectives of the module
- Educational attachments and training scheme of the module
- Supervision requirements of the module and how they will be delivered
- Competencies to be covered within the module, including mapping to Good Medical Practice and the ICM CoBaTrICE competency framework (where appropriate)
- The level of competency to be achieved, as measured against the FICM competency level descriptors
- Suitable Assessment Methods for use within the module
- Detail on any other module-specific assessments which may be required

The FICM would also expect the submission to be endorsed by the local ICM Regional Advisor and ICM Training Programme Director. **Any submission made without the endorsement of the ICM RA and TPD will not be considered**. Trainees wishing to submit additional Special Skills modules for consideration should do so well in advance of the planned start of such modules in order to allow for the approvals process – a full 24 months is recommended as the submission will need to be considered not only by the Faculty but ultimately by the GMC as part of its standardised curriculum review process.

Prospective approval by the FICM and GMC is essential; any training undertaken without approval cannot count toward CCT and may result in an extension of overall training time.

Special Skills training in ICM Partner Specialties

ICM Partner Specialties

There are specific acute medical specialties where areas of competence overlap with those of Intensive Care Medicine. The specialties encompassed in this mapping are:

- Acute Internal Medicine
- Anaesthetics
- Emergency Medicine
- Renal Medicine
- Respiratory Medicine

The above list is correct at time of publication; any further specialties undertaking Dual CCTs mapping with ICM will be added to future revised editions of this curriculum and noted as such online.

Dual CCTs trainees

For trainees undertaking Dual CCTs in ICM and another specialty it is expected that their Special Skills year will be undertaken in the other specialty, as this is the area of special expertise that they are developing (see section 1.4).

Single ICM CCT trainees

Single ICM CCT trainees may develop their Special Skills in an ICM partner specialty if this meets the career intentions of the trainee as well as local training capacity and workforce requirements. As with all Special Skills modules, this training will be dependent on their deanery/LETB having the required facilities and educational capacity to offer that training module.

The partner specialties all have GMC approved CCT curricula. ICM trainees should follow those curricula as appropriate to their level of prior training and experience in the respective specialty. For example, a standalone ICM trainee who entered intensive care via Core Anaesthetic Training would be able to undertake Special Skills training in that specialty at Intermediate level; however if that trainee had entered ICM via Core Medical Training they would only have undertaken 12 months of Anaesthesia as part of their Stage 1 training; as such if they wished to further develop their anaesthetic skills during their Special Skills year they would only be able to work and train in Anaesthesia at Core level.

Supervision and assessment of these trainees would be carried out as established in the partner specialties. Trainees in ICM would be required to demonstrate progression in the partner specialty as per that specialty's assessment system and include this evidence as part of their portfolio to be review by their ICM Educational Supervisor before they can be signed off for Stage 2 training.

For reasons of space, the partner specialty curricula and their individual competencies have not been reproduced within this guidance manual. In addition, the curricula are maintained by the respective colleges and faculties; whilst the principle of ICM trainees following these curricula is maintained, it is not pragmatic to update this guidance document to match every individual change in each external curriculum.

Academic Research

Aim

Research training is an essential component in creating a high quality specialist workforce for intensive care medicine. The Health and Social Care Act (2012) identifies research as a core responsibility of the NHS[4]. Academic activity within ICM can contribute to high quality recruitment to the specialty, enrich the professional lives of trained clinicians, and ensure continuous improvement of the care that we deliver.

Academic training in ICM falls into three broad categories: These categories of research training can stratified by a rubric that has been used in the past to provide shorthand labels for each level: Research Aware – Research Ready – Research Active.

The **first category** of these is core academic training, which ensures that all trainees who achieve accreditation are *Research Aware*, and needs to be provided for all trainees, regardless of whether or not they elect to undertake a period of research. The provision of such basic research skills should precede a Special Skills module - the purpose of a SSM in research is to provide research training which is more advanced.

The **second category** is access to a formal period of training which ensures that a newly appointed consultant is *Research Ready*. This training will often lead to a Masters level qualification, which provides the interface between core academic training and formal research training. Progress in clinical medicine depends on research and the translation of research findings into effective changes in the way clinical care and treatment is delivered. Until recently there was a widening division between research, as increasingly performed by professional researchers within university institutions, and the delivery of clinical care within the National Health Service. The detrimental effect of these changes has been recognised at a national level and one of the aims of the National Institute of Health Research (NIHR) has been to promote clinical research within the framework of the National Health Service. This initiative has led to real changes in the way clinical research is conducted and delivered within our hospitals.

The formation of Comprehensive Local Research Network (CLRN) led local research networks, with dedicated funding, has increased both the quantity and quality of clinical trial research that is now being undertaken in critical care. Complementing this approach has been significant work conducted by the Intensive Care Society via its Foundation and the Faculty of Intensive Care Medicine to promote clinical research in critical care. As a result there are a significant number of randomised controlled trials being conducted in the United Kingdom in critical care units.

A Special Skills Module in Research represents one vehicle through which training programs can provide access to this second level of research training. Such a module aims to equip individuals with the competencies to deliver multicentre clinical research within their critical care units following appointment as NHS consultants, and also initiate local research, if individual aspirations and local resources support this. The broad objectives of the module are to allow trainees to gain an understanding of research within the context of the National Health Service, to gain insight into clinical trial design and management, to understand the somewhat complex regulatory environment in which research is conducted and to enable them to undertake CLRN portfolio research within their future units.

Finally, the SSM also needs to provide trainees with an opportunity to enter a **third category of** formal research training, which aims to develop future clinical academics who are *Research Active* when appointed. Trainees who aspire to a formal clinical academic career will undertake a longer period of research, typically leading to a PhD, and funded by a Clinical Research Training Fellowship (CRTF). However, a successful CRTF application needs

[4] http://www.dh.gov.uk/health/files/2012/06/C8.-Research-270412.pdf

considerable preparation, and usually need to preceded by a period of initial training which allows them to acquire key research skills, pilot data and regulatory approval.

Duration

It is envisaged that trainees undertaking this module will spend the full 12 months of their special skills year engaged in research. It is desirable that trainees spend no more than 20% of this time in non-research activities, including maintaining and developing their clinical skills. However, where this is not achievable, a minimum of 50% of daytime activity must be allocated to core research activity.

Educational objectives

- To understand the process of obtaining NHS permissions for research
- To understand the principles of GCP
- To understand the principles of good RCT design
- To understand the governance framework of NHS research

Educational attachments and training scheme

- Attendance at GCP course
- Attachment to Regional clinical trials unit

Assessments

- GCP certificate denoting completion of course
- Mock-up of research application for funding
- Mock-up of NHS permissions application
- Log-book detailing formal exposure to core training elements (method used by University of Cambridge to assess transferable skills for research students)
- A *viva voce* examination of the project thesis organised by the supervisor (conducted by two individuals not directly involved in the research project).
- Presentation at a national research meeting (as a minimum)
- Peer reviewed publication

A Masters qualification (e.g. MPH, MRes, MSc, MPhil) related to ICM research would satisfy the majority of these elements, with the exception of the requirement to present work at a national research meeting. Such a qualification may be offered by several Higher Education Institutions. A report of the examination (a candidate should have successfully defended their thesis to be able to complete the module), along with the log-book and details of presentations/publications achieved should be sent to the local RA for final sign-off. One alternative output which would meet the demands of a successful SSM would be success in a CRTF application, *providing the individual had collected pilot data for this grant application and written this up as a research output*.

Project based Discussion (PbD)

Project based Discussion (PbD) is a long-standing assessment tool within the field of Clinical Pharmacology and Therapeutics which has been adapted for use in academic intensive care. The PbD assesses the performance of a trainee in their use of clinical ICM knowledge in practice to provide an indication of competence in areas such as reasoning, decision-making and application of knowledge. It also serves as a method to document conversations about, and presentations of, projects by trainees. The PbD should include discussion about a written or formal verbal report (such as analysis of a published paper at a journal club, an application to a research ethics committee, a presentation at a Medicines Management Committee, a formal trial protocol designed by the trainee, a draft paper for publication or presentation at a scientific meeting, written case notes, out-patient letter, discharge summary).

The PbD is a structured narrative-based instrument for assessment of areas of application, learning, competency and performance related to non-standard project(s) being undertaken by the trainee at a point in time. Given that departments may be small it is important that in this specific assessment of activity assessment does not rely on a single supervisor and access to an independent expert supervisor from outside the trainee's department might be necessary.

It enables the trainee to include reflective commentary and self-assessment in relation to such structured questions as:

- What did you do?
- What supporting documents are available (evidence)?
- What have you learned from this project (so far)?
- How does this project fulfil the requirements (all or partial) of the curriculum
- Modules/Items listed?

It enables the assessor to comment critically on areas of trainee performance on this occasion:

- Summary of what was described and the evidence available to support this
- Was the evidence presented satisfactory?
- Does the Project fulfil the requirements (all or partial) of the module items listed?
- Key points covered by the discussion
- If so, which competencies were assessed?

ICM trainees should complete one PbD assessment during their academic SSY.

Evaluation of SSM at ARCP

The assessment of progress and achievement of training objectives in the SSM will occur at the ARCP that follows the SSM year. This ARCP panel should include a research active clinician, and the progress of the trainee will be assessed against the target competencies outlined in the table in the next section. The research active clinician participating in the ARCP could be a clinical university academic or research active NHS consultant. While, in practice, many of these individuals will be ICM clinicians, this is not essential – the aim here is to provide a credible assessment of research progress that complements the clinical ARCP, and this role could be served by a research active clinician in a partner specialty or from a laboratory or group where the trainee has undertaken research.

Supervision Requirements

The supervisor must hold an Academic post in a relevant area with experience in research methods and implementation, as shown by publications, grants and supervision of researchers. An alternative supervisor would be the lead of a Critical Care Research Network. In any case, the supervisor needs to have credibility through having an appropriate track record and research outputs.

Competencies

The academic research module should comprise a combination of core training elements and a research project.

AR1 Academic Research				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Demonstrates understanding the difference between research and audit	PbD	1	12.15(E)	4
Demonstrates understanding the difference between plagiarism and quoting other author's work	PbD	4	12.15(E)	4
Demonstrates understanding of different types of research (epidemiology, health services, clinical trials, experimental, etc)	PbD	1	12.15(E)	4

Understanding of ethical principles involved in conducting research (including subject protection, consent, confidentiality and competing interests)	PbD	3.4	12.12(E)	4
IRAS and national ethical approval processes (e.g. through observing an ethics committee meeting, submitting an IRAS application, etc)	Completes real or shadow IRAS process	1,4	12.15(E)	4
Completing a Good Clinical Practice (GCP) course leading to knowledge of relevant legislation and regulation, including the following areas: • Consent and assent in the conscious and unconscious patient (Mental Capacity Act) • Confidentiality and data protection issues (Data Protection Act) • Interventional trials of both medicinal products and other interventions (Medicines and Healthcare products Regulatory Agency (MHRA); Clinical Trials Directive (CTD))	GCP certificate	1, 3, 4	12.15(E)	4
The main funding bodies available to support research in the UK and their application processes	PbD	1, 3	12.15(E)	4
The provision of critical care research support in the UK, in particular, the role of NIHR and the Critical Care Specialty groups, and the NIHR research portfolio	Attendance at local or national CLRN meeting or equivalent	1, 3	12.15(E)	4
Identification and critical appraisal of literature	Case study with extended literature search	1, 2	12.15(E)	4
Principles of appraisal of evidence: levels of evidence; interventions; diagnostic tests; prognosis; integrative literature (meta-analyses, practice guidelines, decision and economic analyses)	Course attendance, topic discussion, Production of short practice guideline	1, 2	12.15(E)	4
Biomedical statistics and study design: • Types of study (experimental, observational, randomised, non-randomised) • Defining a study question • Determination of sample size (including power analyses) and randomisation methods (random, stratified, systematic, multistage cluster) • Types of data (qualitative (nominal, ordinal, ranked), quantitative (continuous, discrete) • Sources of bias • Summarising and presenting data (measures of location and spread; pictorial representation of data) • Describing bivariate data (contingency tables, scatter plots, measures of association, regression analysis) • Confidence intervals • Hypothesis testing (null hypothesis, p values, one and two sided tests, Type I and Type II errors) • Non-parametric methods and their appropriate use	Course attendance	1	12.15(E)	3
Understanding the management of clinical trials (e.g. attending trial steering committee and/or safety/oversight committee meeting)	PbD, Attending trial steering committee or safety/ oversight committee meeting	1, 2, 4	(A)	3

Writing for medical journals: • The principle of peer review process • EQUATOR Guidelines (Enhancing the Quality and Transparency Of health Research) o PRISMA requirements (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) o CONSORT requirements (Consolidated Standards of Reporting Trials) o TREND requirements (Transparent Reporting of Evaluations with Non-randomized Design) o STARD requirements (Standards for Reporting of Diagnostic Accuracy) o STROBE requirements (Strengthening the Reporting of Observational studies in Epidemiology)	Course attendance, Supervised peer review of article	1, 3	(A)	4
Skills & Behaviours				
Use electronic retrieval tools (e.g. PubMed) to access information from medical and scientific literature	Production of search including search strategies used	1	(A)	4
Use a systematic approach to locate, appraise, and assimilate evidence from scientific studies relevant to a focused problem	Production of search including search strategies used	1,2	12.15(E)	4
To define a focused research question	PbD	1,2	12.15(E)	4
Use statistical software in an appropriate manner, to analyse data	Course attendance Production of analysed data set (real or simulation)	1	12.15(E)	3
To participate in the completion of an ethics application for a research study	Real or shadow application	1, 4	(A)	4
Obtain consent/assent for participation in research studies	I	3, 4	12.15(E)	4
Present data collected as part of a research study in both verbal and written formats (oral presentation and paper for peer reviewed publication)	Presentation at regional, national or international meeting	3	(A)	4
To have participated in a research study, according to Good Clinical Practice (GCP) principles, including the reporting of adverse events (having successfully completed a GCP course)	Copy of investigator log, PbD	2, 4	(A)	4
Attitudes				
Integrity and honesty	M	4	8	4
Recognises the fundamental importance of research in delivering to high-quality health-care	M	2	12.15	4
Desire and willingness to share knowledge	M	3	8	4
Well-being of the patient takes precedence over the needs of society or research	I	4	12.15	4
Desire to contribute to the development of new knowledge	M	2	12.15	4

AR2 Research Project				
While it is desirable that the project is related to ICM, trainees should be allowed wide latitude in this area – the aim is to access the best possible research training.				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Undertakes a significant period of research (minimum 12 weeks) resulting in a thesis or publication in a peer-reviewed, indexed journal	*Viva voce,* Report review	1, 2, 3	(A)	3
Presentation of thesis or publication at a national research meeting	Meeting programme	1, 2, 3	(A)	3

Cardiac Intensive Care Medicine

Aim

The aim of this special skills module is to build upon the knowledge, skills, attitudes and behaviours gained in Stage 2 of ICM training and equip individuals with the competencies required to work as a consultant in a specialist cardiothoracic intensive care unit.

The broad objectives of the module are to develop and consolidate understanding of the management of patients with congenital and acquired heart and lung disease and the range of specialist supportive and curative therapeutic techniques available.

In the spirit of inspiring excellence trainees will also be encouraged to work towards accreditation in either transthoracic, transoesphageal or critical care echocardiography and to contribute to quality and innovation in cardiothoracic intensive care.

Educational objectives

To understand the specialist management of patients with heart and lung disease. This will include:

- The management and associated complications of patients following cardiac and thoracic surgery.
- The management of patients with acute cardiological problems requiring interventional procedures and intensive care
- The management of patients with acute respiratory failure, pulmonary hypertension and associated therapies
- The management of patients with large airway disease requiring intervention

Educational attachments and training scheme

Whilst some competencies can be attained in a general ICU many will require placement in a specialist cardiothoracic unit. For those trainees who have little experience of cardiac anaesthesia and surgery, some time following patients through the cardiac theatres to understand problems specific to various cardiac procedures, cardiopulmonary bypass and anaesthesia would be valuable.

Supervision Requirements

Supervisors need to be experienced Consultant Intensivists working in a specialist Cardiothoracic Intensive Care Unit.

Competencies

CICM1 Cardiac Intensive Care Medicine				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Manages cardiopulmonary arrest following cardiac surgery in accordance with Cardiac Surgery Advanced Life Support Guidelines (CALS)	I, M, T, S	1	1.2	4
Uses focused transthoracic echocardiography in Advanced Life Support (ALS) compliant manner to identify potentially reversible causes of cardiac arrest	I, M, T, S	1	(A)	4
Manages the care of the patient following resuscitation from cardiac arrest and institutes temperature management when indicated	I, M, T, S	1	1.3	4
Obtains a cardiac history and performs an accurate cardiac examination	I, M	1	2.1	4
Performs electrocardiography (ECG / EKG) and interprets the results	D, I, C	1	2.3	4
Performs a focused transthoracic echo and interprets the results	D, I, C	1	(A)	4

Describes the indications for transoesophageal echocardiography and understands the main imaging planes and common pathology	D, C, S	1	(A)	3
Inserts cardiac output monitoring (oesphageal doppler, uncalibrated / calibrated pulse contour analysis, thermal / dye dilution) and interprets the results	D, I, C	1	5.14	3
Obtains and interprets the results from blood gas samples – including arterial and central / mixed venous	D, I, C	1	2.5 5.8	4
Obtains appropriate microbiological samples in patients with suspected endocarditis and interprets results	D, C	1	2.2	4
Interprets data from right and left heart catheterisation	I, C	1	2.6	3
Interprets imaging studies: coronary angiogram, resting and stress echocardiography, computed tomography coronary angiogram, cardiac magnetic resonance imaging	I, C	1	2.6	3
Knows when to use and how to interpret biomarkers of cardiovascular disease	I, C	1	2.6	4
Performs a chest ultrasound to identify a pleural collection and features of consolidated lung	D, I, C	1	(A)	4
Manages the care of the critically ill patient in cardiogenic shock	D, I, C, M, T, S	1	3.1 3.3	3
Manages the care of the critically ill patient with heart failure – systolic / diastolic, left,/ right / bi – ventricular failure	D, I, C, M, T	1	3.1 3.3	3
Manages the care of the critically ill patient with acute coronary syndromes	D, I, C, M, T	1	3.1 3.3	3
Manages the care of the critically ill patient with valvular heart disease – including endocarditis	D, I, C, M, T	1	3.1 3.3	3
Manages the care of the critically ill patient with acute aortic syndrome	D, I, C, M, T	1	3.1 3.3	3
Manages the care of the critically ill patient with arrhythmia	D, I, C, M, T, S	1	3.1 3.3	3
Manages the care of the critically ill patient with cardiomyopathy	D, I, C, M, T	1	3.1 3.3	3
Manages the care of the critically ill patient with pulmonary hypertension	D, I, C, M, T	1	3.1 3.3	3
Manages the care of the critically ill patient with heart disease during pregnancy	D, I, C, M, T	1	3.1 3.3 3.11	3
Describes the care of the critically ill patient who has thoracic solid organ transplant (heart, lung, heart-lung)	D, I, C, M, T	1	3.1 6.4	3
Manages the care of the critically ill patient with adult congenital heart disease	D, I, C, M, T	1	3.1 3.3	3
Manages the care of patients with cardiac disease who have critical illness due to non-cardiac causes	D, I, C, M, T	1	3	3
Manages the care of the patient following cardiothoracic trauma	D, I, C, M, T	1		3
Manages the care of the critically ill cardiac patient with acute lung injury	D, I, C, M, T	1	3.3 3.8	3
Manages the care of the critically ill patient with malfunctioning pacemaker / ICD	D, I, C, M, T	1	(A)	3
Manages the care of the critically ill patient with a bronchopleural fistula	D, I, C, M, T	1	6.2	3
Prescribes vasoactive / inotropic drugs and therapies safely	D, C, M	1	4.4	4
Uses fluids, vasoactive / inotropic drugs / renal replacement therapy to support the circulation and failing heart	I, C	1	4.4 4.7	4
Uses Intra-aortic balloon counterpulsation	I, C	1	4.5	3
Describes the use of other cardiopulmonary mechanical support devices VAD, ECMO	C, E	1	4.5	3
Describes how to ventilate a patient with an air-leak		1	6.2	3
Performs chest drain insertion	D	1, 4	5.7	4
Performs arterial catheterisation	D, C	1, 4	5.8	4
Performs ultrasound techniques for vascular localisation	C	1, 4	5.9	4
Performs central venous catheterisation	D, C	1, 4	5.10	4
Performs pulmonary artery catheterisation	D, C	1, 4	5.14	4

Performs defibrillation and cardioversion	D, C, S	1, 4	5.11	4
Performs transthoracic cardiac pacing and describes epicardial and transvenous pacing	D, C	1, 4	5.12	4
Checks pacing thresholds / sensitivities and selects appropriate settings	D, C	1, 4	5.12	4
Describes how to perform pericardiocentesis	C	1, 4	5.13	4
Describes initiation of flow based cardiac output monitoring	C	1, 4	5.14	4
Performs diagnostic and therapeutic fibreoptic bronchoscopy in a mechanically ventilated patient	C	1, 4	5.5	4
Manages the perioperative care of the patient undergoing coronary artery surgery	C, M, T	1	6.2	4
Manages the perioperative care of the patient undergoing mitral valve surgery	C, M, T	1	6.2	4
Manages the perioperative care of the patient undergoing aortic valve and left ventricular outflow tract surgery	C, M, T	1	6.2	4
Manages the perioperative care of the patient undergoing tricuspid and pulmonary valve surgery	C, M, T	1	6.2	4
Manages the perioperative care of the patient undergoing surgery on the thoracic aorta	C, M, T	1	6.2	4
Manages the perioperative care of the patient undergoing surgery for intracardiac lesions	C, M, T	1	6.2	4
Manages the perioperative care of the patient undergoing surgery for pericardial disease	C, M, T	1	6.2	4
Manages the care of patients following interventional cardiology procedures including percutaneous valve procedures	C, M, T	1	6.2	4
Describes the care of the patient prior to and following thoracic solid organ transplantation (heart, lung, heart-lung)	C	1	6.2 6.4	3
Manages the care of patients with major haemorrhage following cardiac surgery including diagnosis of cardiac tamponade and management of emergency resternotomy	D, C, M, T	1	6.2	4
Manages the care of patients with cardiothoracic disease undergoing non-cardiothoracic surgery	C	1	6.1	4
Manages the pre- and post-operative care of the patient undergoing thoracic surgery	C	1	6.1(E)	4
Manages the assessment, prevention and treatment of cardiac and thoracic pain	D, I, C, M, T	1	7.2	4
Manages the palliative care of the patient with end stage heart or lung disease	C, M, T	1, 3, 4	8.3	4
Describes the management of common congenital heart conditions	I, C, S	1	3.2 6.1 6.2	3
Undertakes transport of the critically ill patient in cardiogenic shock outside the ICU	D, I, C, M	1, 3	10.1	4
Describes risk scoring systems such as EuroSCORE, Thoracoscore	C	1	3.2 6.1 6.2	4
Describes the relevance of ICU risk scoring systems to cardiothoracic intensive care	C	1	3.3	4
Attitudes				
Multidisciplinary working with anaesthetic, surgical and cardiological teams and understanding of roles and responsibilities	C, M	3	12.2	4
Attendance at multidisciplinary meetings to plan postoperative intensive care management	Attendance records MSF	3	12.2	3
Participation in multidisciplinary mortality and morbidity meetings	Attendance records, MSF	3	12.2	3

Echo

Aim

- To train an individual to echocardiography competence at the level of Advanced Critical Care Echocardiography (ACCE) Accreditation.
- To equip an individual with the knowledge, skills and attitudes to be Clinical Lead for Echocardiography on a Critical Care Unit.
- Accreditation in ACCE examined by the British Society of Echocardiography (BSE) is designed to take place over a two year period.
- Trainees will require a minimum of one day per week dedicated to echo training during their SSY.
- In order to complete the accreditation process trainees will require a minimum of a further half day per week in year two to complete the accreditation process: this is similar to the time required to finish 'writing up' research work.
- It is for this reason that competence in echocardiography to ACCE level is mandated within the SSY but completion of the accreditation process is not.

It is vital when considering implementation of this module that local interested parties, including specialist critical care echocardiography trainers, consider how to balance a significant level of accredited echocardiography expertise with the requirement that training must be attainable to the vast majority of trainees in the time available.

Educational objectives

- To achieve robust echocardiography skills commensurate with ACCE accreditation.
- To gain the technical knowledge required to run a Critical Care Echo Service.
- To understand, plan and apply Clinical Governance to a Critical Care Echo Service.
- To "aspire to excellence" in Echocardiography by committing to a process of life-long learning.

The cornerstone of the year is successful ACCE accreditation. Based on practical experience in the clinical and education environment and the fact that the SSY may coincide with sitting the FFICM examination for some trainees, it is expected that this accreditation will take 12-18 months to complete.

This does mean that some trainees will be finalising their ACCE accreditation after the end of the year, just as some out of programme research trainees are "writing up" for the first few months after returning to clinical training. **It is for this reason that competence to ACCE level is a mandated competency within the year but completion of the accreditation process is not.**

Educational attachments and training scheme

- Appointment to a training unit with an established Critical Care Echo Service.
- Availability of at least 12.5% of working hours as dedicated echocardiography training with access to regular departmental echocardiography lists as required.
- Availability of administrative support for outpatient lists.
- Appropriate time for preparation for and sitting the written component of ACCE.
- Appropriate time to take an active part in echocardiography clinical governance.
- Access to appropriate and high quality platforms to enable practice of echocardiography skills in the critical care environment.
- Appropriate time allocation for the collection of five selected recorded cases to complete submission for the ACCE accreditation.

Competencies

ECHO1 Echocardiography				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Demonstrates technical knowledge of portable echocardiography platforms available in critical care areas	D, I	1	2.6(E)	3
Demonstrates understanding of the clinical governance structure of a high quality echocardiography service	C, M, I, T	2, 3, 4	11.8 12.11	2
Demonstrates broad echocardiography knowledge as defined by the ACCE syllabus	C, M, T Exam, Logbook	1	2.6(E)	3
Skills & Behaviours				
Performs and optimises trans-thoracic echocardiography views in the critically ill patients as requires	D, I, T	1	2.2 2.6(E)	3
Records clinical findings of echocardiography studies clearly and accurately	D, C, M, I, T	3, 4	12.2 12.3 12.8	3
Demonstrates the skills to safely store and recall scans, care for equipment and supervise others using it	D, I, M, T	2, 4	11.2 12.3 12.10	3
Applies critical care knowledge to accurately interpret echocardiography findings	D, I, C, M, T	1	2.6(E) 2.8 5.14	3
Attitudes				
Integrity and honesty	M, T	3, 4	12.2 12.6	3
Applies adequate standards of clinical governance to personal echocardiography practice	I, T, M	2, 4	12.11 12.13	4
Engages with the local echocardiography community, and collaborates to aid personal development	C, I, M, T	2, 3	12.2 12.7(E) 12.13	4

ECHO2 Research Project				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Undertakes echocardiography research resulting in presentation at a national meeting or publication in a peer-reviewed journal	Peer review	1	12.15	3

Assessments

- Successful completion of the written component of the ACCE.
- Completion of a log-book to an acceptable standard.
- Successful submission of five recorded echocardiograms to the standard required by the BSE.

Supervision Requirements

- The supervisor must be an accredited echocardiography trainer with sessions in Critical Care Medicine.
- The supervisor should either be the local Clinical lead for the Critical Care Echo Service or approved by him/her.
- The supervisor must be have adequate identified time as a training commitment with the trainee.
- The training department must hold a formal link with the local cardiology department to unify reporting processes and quality.

ECMO (Extra-Corporeal Membrane Oxygenation)

Aim

The aim of this module is to equip an individual with the knowledge and skills to provide ECMO (Extra-Corporeal Membrane Oxygenation) as part of a team in a specialist Critical Care Unit.

Educational objectives

- To understand the indications/contra-indications and limitations of ECMO.
- To assist in the assessment of patients for ECMO.
- To participate in the retrieval of patients with severe cardiorespiratory failure who may require ECMO.
- To assist with at least 10 ECMO cannulations.
- To understand and assist with the day-to-day management of patients requiring ECMO.
- To independently manage intra-hospital transport of the ECMO patient.
- To assist in the management of patients with complex problems on ECMO, including major haemorrhage and surgery.
- To gain the technical knowledge required to participate in an ECMO.
- To understand and apply Clinical Governance to an ECMO Service.
- To "aspire to excellence" in extra-corporeal support by committing to a process of life-long learning.

Educational attachments and training scheme

- Appointment to a training unit with a nationally commissioned ECMO Service.
- Availability of at least 50% of working hours as dedicated ECMO trainee.
- Availability of local training for ECMO, including the provision of simulation.
- Appropriate time for preparation for and attendance at national and international conferences.
- Appropriate time to take an active part in ECMO clinical governance.

Competencies

ECMO1 Extra-Corporeal Membrane Oxygenation				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Demonstrates technical knowledge of ECMO for cardiorespiratory failure	D, M	1	4.5(E) 4.6(E)	4
Demonstrates understanding of the role of the multidisciplinary team in the provision of ECMO	C, I, M, T	1	7.5(E)	4
Demonstrates understanding of the principles of intra-and inter-hospital transport for patients requiring ECMO	D, M, T	1	10.1(E)	4
Demonstrates understanding of the role of ECMO in the provision of organ support	C, I, M, T	1	3.3(E) 3.8(E) 12.7(E) 12.8(E) 12.9(E) 12.10(E)	4
Demonstrates understanding of the clinical governance structure of a high quality ECMO service	C, I, T, Logbook	2, 3, 4	11.4(E) 11.8(E)	4

Skills & Behaviours				
Assesses critically ill patients for the provision of ECMO	D, I, T	1	3.1(E) 3.2(E) 3.8(E)	4
Assists at cannulation and decannulation from ECMO	D, I, T	1,2	4.6(E) 5.10(E)	4
Assists with the daily management of patients on ECMO	D, I, T	1	11.1(E)	4
Attendance at clinical and non-clinical meetings of the ECMO service	D, I, T	1,2,3,4	11.1(E) 11.4(E) 11.5(E)	4
Assists with the transport of patients on ECMO (inter and intra hospital)	D, I, T	1,2,3	12.10(E) 12.11(E)	4
Assists with the management of complex problems on ECMO, including surgery and major haemorrhage	D, I, T	1	6.1(E) 6.2(E)	4
Attitudes				
Integrity and honesty	M, T	3,4	8	4
Applies adequate standards of clinical governance to personal practice	I, T, M	2,4	12.11(E)	4
Works with the multidisciplinary team to manage patients on ECMO	C, I, T, M	1,2,3,4	12.2(E) 12.7(E)	4
Engages with the national ECMO community, and collaborates to aid personal development	C, I, M, T	2,3	11.8(E)	4

ECMO2 ECMO Project				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Undertakes ECMO quality improvement project resulting in presentation at a national meeting or publication in a peer-reviewed journal	C, M	1,2,3	11.6(E) 12.15(E)	3

Assessments

- Successful completion of a theoretical ECMO course including written assessment
- Successful completion of an ECMO simulation course
- Completion of a log-book to an acceptable standard with evidence of:
    - Assistance at 10 cannulations and 10 decannulations
    - Assistance at 10 inter-hospital transports
    - Assistance at 10 intra-hospital transports

Supervision Requirements

- The supervisor must be an accredited ECMO consultant with sessions in Critical Care Medicine.
- The supervisor should either be the local Clinical lead for the Critical Care ECMO Service or approved by him/her.
- The supervisor must be have adequate identified time as a training commitment with the trainee.

Home Ventilation

There has been a significant increase in the number of patients receiving long-term ventilation in the last 15 years, outside of traditional hospital inpatient settings. A pan-European survey, published in 2005, reported that over 27,000 patients were receiving such support with an estimated prevalence of 6.6 patients per 100,000 people[5]. In countries where home ventilation has been established for a long period of time the estimated prevalence was higher suggesting that in a number of countries there is still a gap between the need for home ventilation services and the actual provision[6]. In England there is currently no national registry of home ventilation services but an informal database, collected by a working group, identified 42 English NHS trusts that were offering this service in 2013[7].

There is good evidence that home ventilation is effective in both improving quality of life of users and in prolonging the duration of their lives[8]. For example cohort studies have shown a significant improvement in life expectancy in Duchenne Muscular Dystrophy following the introduction of home ventilation as a standard of care. Duchenne muscular dystrophy is a condition that inevitably results in respiratory failure. A randomised controlled trial and a number of observational studies have also shown improvement in both survival and quality of life in patients with Motor Neurone Disease who received home ventilatory support once they reached the stage of ventilatory failure. In addition to patients with slowly progressive neuromuscular disease there are an increasing number of home ventilation users with both obstructive sleep apnoea/obesity hypoventilation syndrome and COPD.

Both the FICM and the British Thoracic Society [BTS] identified home ventilation as an area where formal training is necessary. Currently both the Intensive Care Medicine CCT and the Respiratory Medicine CCT contain some training relevant to home ventilation. In addition, the BTS has produced a brief outline of home ventilation training. Following discussion between the FICM and the BTS a joint working group was constituted and a competency-based curriculum was created by this expert group using a modified Delphi process. Following the development of the draft curriculum the views of home ventilation providers and PPI input was sought and finally the curriculum was approved by the FICM and BTS training committees before submission to the GMC.

Aim

To train an individual in the management of patients with respiratory failure who require domiciliary ventilatory support. In addition these individuals would become experts in the weaning of complex patients and in particular those that are likely to transition to domically ventilation. These individuals could then join regional home ventilation services.

Educational objectives

These are covered in a series of competency domains:

- **Domain 1 (HV1):** The trainee will understand the pathophysiology of chronic respiratory failure (CRF) and will recognise the various ways that patients present to domiciliary ventilation services.

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5 Lloyd-Owen SJ, Donaldson GC, Ambrosino N, Escarabill J, Farre R, Fauroux B, et al. Patterns of home mechanical ventilation use in Europe: results from the Eurovent survey. *Eur Respir J* 2005;25(6):1025-31.

6 Garner DJ, Berlowitz DJ, Douglas J, Harkness N, Howard M, McArdle N, et al. Home mechanical ventilation in Australia and New Zealand. *Eur Respir J* 2013;41(1):39-45.

7 Mandal S, Suh E, Davies M, Smith I, Maher TM, Elliott MW, et al. Provision of home mechanical ventilation and sleep services for England survey. *Thorax* 2013;68(9):880-1.

8 Hannan LM, Dominelli GS, Chen YW, Darlene Reid W, Road J. Systematic review of non-invasive positive pressure ventilation for chronic respiratory failure. *Respir Med* 2014;108(2):229-43.

- **Domain 2 (HV2):** The trainee will be familiar with a number of conditions that can cause CRF, including their cause, presentation and natural history.
- **Domain 3 (HV3):** The trainee will be able to perform an initial assessment of the patient with CRF. This will include knowledge of the tests available, the ability to choose a relevant range of investigations and competence in the assessment of various investigations.
- **Domain 4 (HV4):** The trainee will have knowledge of and be competent in the use of a range of ventilators, interfaces and adjunct devices used in the treatment of CRF including tracheostomy.
- **Domain 5 (HV5):** The trainee will be able to assess and develop a weaning strategy for difficult to wean patients including their rehabilitation needs.
- **Domain 6 (HV6):** The trainee will understand the role of multi-disciplinary teams in the management of patients with CRF.
- **Domain 7 (HV7):** End of life care: the trainee will be able to provide end of life care to patients with CRF who are dying.
- **Domain 8 (HV8):** Models of service organisation: the trainee will understand the different organisational models of home ventilation provision in the context of the NHS.

Educational attachments and training scheme

The trainee will be attached to a regional home ventilation service or services during the 1 year attachment. An attachment to a sleep service is also required if the trainee has no previous training in sleep medicine (applicable to most ICM CCT trainees). They will continue to maintain their general critical care or Respiratory Medicine skills also with some participation in general rotas during this period.

Additional Assessments

One patient satisfaction survey using either a GMC approved or BTS approved survey tool.

Supervision Requirements

The trainee should be supervised by a Consultant with expertise in Home Ventilation who is a member of a regional home ventilation service.

Competencies

HV1	**The trainee will understand the pathophysiology of chronic respiratory failure (CRF) and will recognise the various ways that patients present to domiciliary ventilation services**			
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Understands the causes of CRF including those produced by lung, thoracic cage, obesity and neuromuscular problems	C, I, E	1	Basic Science 5.1; 3.6	4
Understands the pathophysiology of CRF including alterations in lung mechanics, respiratory muscle function, control of breathing and cardiac effect including 'cor pulmonale'	C, I, E	1	Basic Science 5.1; 4.6	4
Understands the effect of CRF on arterial blood gases and the causes of elevated $PaCO_2$ including the role of hypoventilation. V/Q mismatch and increased dead-space.	C, I, E	1	Basic Science 5.1; 2.5	4
Understands the presenting symptoms of CRF	C, I, E	1	2.1; 3.6; 4.6	4
Understands the referral pathways to domiciliary ventilation services	C, I, E	1, 3	(A)	4
Understands the overlap between sleep related breathing disorders and CRF	C, I, E	1	(A)	4

Understands the physiology of cough and secretion clearance and alterations in disease	C, I, E	1	(A)	4
Skills & Behaviours				
Takes a focused and relevant history eliciting symptoms of CRF	I, C, T	1 3	2.1(E)	4
Takes a focused history of disability including neuromuscular, swallowing and dietary, secretion clearance, care needs and care arrangements	I, C, T	1 3	(A)	4
Takes a focused 'sleep' history where relevant and can elicit symptoms of OSA	I, C, T	1 3	(A)	4
Performs a focused examination looking for causes of CRF including a neurological examination	I, C, T	1	(A)	4
Attitudes				
Assess patients with chronic disability in a non-judgmental manner	I, C, M, T	3 4	(A)	4
Accepts that quality of life is a personal and close family/carer judgment	I, C, M, T	4	12.4(E)	4
Is positive about the quality of life of disabled patients	I, C, M, T	3 4	12.4(E)	4

HV2	**The trainee will be familiar with a number of conditions that can cause CRF, including their cause, presentation and natural history**			
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Has an in depth knowledge of the symptoms, signs, clinical presentations, natural history and general treatments of a number of conditions that can cause CRF. These will include: **OBSTRUCTIVE VENTILATORY DEFECT** • Obstructive Pulmonary Disease o COPD o Bronchiectasis o Cystic fibrosis	C, I, E	1	4.6(E)	4
RESTRICTIVE VENTILATORY DEFECT • Neuromuscular disease • Congenital muscular dystrophy including: o Spinal muscular atrophy o Duchenne muscular dystrophy o Myotonic dystrophy • Acquired conditions including: o Motor neurone disease o Myasthenia gravis o Diaphragm palsy o Spinal cord injury o Brachial neuritis o Multiple sclerosis • Chest wall disease o Scoliosis o Previous thoracoplasty • Obesity Related Respiratory Failure o OSA o Lone OHS o Combined OSA & OHS	C, I, E	1	4.6(E)	4
OTHER IMPORTANT & RELEVANT CONDITIONS • Central drive o Central hypoventilation syndromes (congenital and acquired) • Periodic breathing o CHF o Stroke • Non-Respiratory sleep problems o RLS o PLMD	C, I, E	1	4.6(E)	4

o Narcolepsy o Cataplexy • Metabolic disorders • Iatrogenic causes of hypoventilation including drugs Adult congenital heart disease with breathing disorders				
Skills & Behaviours				
Able to obtain a history focused on the above conditions	I, C, T	1 3	4.6(E)	4
Able to determine the impact of specific conditions on the respiratory and general health of the patient	I, C, T	1 3	4.6(E)	4
Able to construct a differential diagnosis of likely causes of CRF based on the above conditions	I, C, T	1 3	4.6(E)	4
Attitudes				
Aware that many patients have multiple co-morbidites	I, C, M, T	1	3.2	4
Aware that a patient rather than condition centred approach is important	I, C, M, T	1 3 4	(A)	4
Is sensitive to the fact that many patients with chronic progressive disease and their carers are experts on their condition	I, C, M, T	3 4	(A)	4
Aware that patients increasingly have "researched" their condition and possible treatments before medical consultation	I, C, M, T	3 4	(A)	4
Aware that a number of well-informed specialist patient groups exist	I, C, M, T	3	(A)	4
Aware that there can be significant gaps between subjective patient symptoms and objective measures	I, C, M, T	3	(A)	4

HV3	**The trainee will be able to perform an initial assessment of the patient with CRF. This will include knowledge of the tests available, the ability to choose a relevant range of investigations and competence in the assessment of various investigations**			
Competence		*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Understands the role of investigations in both the initial assessment and the follow up of patients with CRF. In particular has a good knowledge of: • Lung function tests o Spirometry – including supine o Lung volumes o Diffusion capacity o Respiratory muscle strength o Peak cough flow		I, C, E	1, 2	Basic Science; 2.2(E)	4
• Blood gas analysis including the interpretation of both arterial, capillary and venous samples		I, C, E	1, 2	2.5	4
• Assessment of nocturnal ventilation in both the hospital and domiciliary setting o Oximetry o Transcutaneous carbon dioxide o Limited respiratory polygraphy ▪ 3 channel SpO_2, $TcCO_2$ and HR ▪ 6 channel SpO_2, $TcCO_2$, HR, airflow, thoracic and abdominal movement		I, C, E	1, 2	(A)	4
• Imaging o CXR o CT o US		I, C, E	1, 2	2.6	4
• Neurophysiological o EMG/NCS o Phrenic nerve and diaphragm stimulation		I C E	1, 2	(A)	3

Has knowledge of the more common diagnostic tests used to diagnose neuromuscular conditions that lead to CRF, including genetic and immunological investigations.	I C E	1	(A)	3
Skills & Behaviours				
Can interpret respiratory function tests in the context of the diagnosis and follow up of CRF	I, C, T	1	2.2(E)	4
Can interpret blood gases and differentiate between acute, chronic and acute on chronic respiratory failure	I, C, T	1	2.6	4
Can interpret overnight oximetry and transcutaneous CO2 measurements. Recognises common patterns of OSA and nocturnal hypoventilation.	I, C, T	1	(A)	4
Can interpret limited polysomnographic studies (Non EEG) and distinguish between obstructive and central events.	I, C, T	1	(A)	3
Can interpret plain chest radiographs in the context of CRF	I, C, T	1	2.6(E)	4
Can interpret thoracic CT scans in the context of CRF	I, C, T	1	2.6(E)	3
Attitudes				
Is aware that tests can increase as well as reduce diagnostic uncertainty	I, C, M, T	2, 3, 4	2.2	4
Is aware of the importance of a priori diagnostic probabilities in the role of diagnostic testing	I, C, M, T	2	2.2	4
Is aware that the burden of testing can be significant for disabled patients	I, C, M, T	2, 3, 4	2.2	4
Is aware that testing is only one part of patient assessment	I, C, M, T	3, 4	2.2	4

HV4 The trainee will have knowledge of and be competent in the use of a range of ventilators, interfaces and adjunct devices used in the treatment of CRF including tracheostomy				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Understands the history of long term assisted ventilation including the historic use of negative pressure ventilation	I, C, E	1	4.6(E)	4
Describe the range of commonly used domiciliary ventilators in the UK and is familiar with the physics and mechanics of ventilators.	I, C, E	1	4.6(E)	4
Understands the indications and use of CPAP in both an outpatient and inpatient setting	I, C, E	1	4.6(E)	4
Describe the different modes of ventilation and indications for these modes	I, C, E	1	4.6	4
Understands the various ventilator circuits available including single and dual limb, leak and valve circuits	I, C, E	1	4.6(E)	4
Understands the various safety features and alarms including the limitations and disadvantages of different alarm functions in the domiciliary setting	I, C, E	1, 2	4.6(E)	4
Understands the reasons for “failure” of non-invasive ventilation including interface and machine problems.	I, C, E	1, 2	4.6(E)	4
Is aware of the various interfaces available and has knowledge of factors influencing choice of interface	I, C, E	1	4.6(E)	4
Understands the surgical anatomy of tracheostomy, indications, benefits, risks and longer term complications of the procedure	I, C, E	1	5.2; 5.6; 7.5	4
Understands the care needs at home of ventilator assisted and ventilator dependent patients	I, C, E	1, 3	(A)	4
Understands the longer term care implications of ventilation by tracheostomy at home including safety issues and care team skills required	I, C, E	1, 2, 3	7.5(E)	4
Understands the use of pharmacological agents as treatment adjuncts including: • Bronchodilators • Mucolytics • Drying agents • Antibiotic prophylaxis • Steroids	I, C, E	1	4.1(E)	4

• Riluzole				
Understands the indications for phrenic nerve and diaphragm pacing	I, C, E	1	(A)	3
Understands the physiology and pathophysiology of coughing and secretion clearance. Has knowledge of techniques and devices to assist in secretion clearance including manual techniques, suctioning and mechanical assisted coughing	I, C, E	1	5.4(E)	4
Skills & Behaviours				
Can set up a range of ventilators suitable for home use and is able to adjust/titrate the settings including alarm settings	D, I, C	1, 2	4.6(E)	4
Can fit and adjust common NIV mask interfaces	D, I, C	1, 2	4.6(E)	4
Can troubleshoot ventilator problems and respond appropriately to alarms	D, I, C	1, 2	4.6(E)	4
Can adjust settings depending on patient response and monitoring	D, I, C	1, 2, 3	4.6(E)	4
Can respond to tracheostomy emergencies	D, I, C	1, 2	4.6; 5.2	4
Understands the principle and use of cough assistance and lung recruitment devices	D, I, C	1	(A)	4
Can develop a strategy for excessive secretion control which may include pharmacological approaches	I, C	1, 3	(A)	4
Attitudes				
Takes heed of patient preferences for support/interfaces and tracheostomy	I, C, M, T	3, 4	5.6	4
Involves the patient and care team in decisions about ventilator care	I, C, M, T	3, 4	4.6	4

HV5	**The trainee will be able to assess and develop a weaning strategy for difficult to wean patients including their rehabilitation needs**			
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Understands the epidemiology of weaning failure and delay	I, C, E	1	3.8; 4.6	4
Understands that successful weaning include mobilisation and exercise programmes	I, C, E	1	7.4	4
Understands the pathophysiology of weaning failure	I, C, E	1	4.6	4
Is familiar with clinical conditions that result in weaning failure and the natural history of these diseases	I, C, E	1	4.6	4
Understands the causes of chronic debilitation in the group with weaning failure and possible approaches to preventing and reversing these changes	I, C, E	1	7.4	4
Understands the role of NIV as a bridge to full weaning and as a transition mechanism to allow extubation	I, C, E	1	4.6	4
Understands the various methods of weaning patients from invasive ventilation and the evidence supporting these approaches	I, C, E	1	4.6	4
Understands the various models of provision of weaning services both nationally and internationally	I, C, E	2, 3	7.4(E)	4
Understands the importance of communication with the patient and is familiar with speaking valves and their use	I, C, E	3, 4	7.4	4
Skills & Behaviours				
Can assess a patient with weaning failure and create a weaning and rehabilitation plan	I, C, T	1	4.6; 7.4	4
Can adjust invasive ventilation to assist with weaning	I, C, T	1, 2	4.6	4
Attitudes				
Is aware of the collaborative and multi-disciplinary approach to weaning	I, C, M, T	3	4.6	4
Involves the patient and close carers in weaning	I, C, M, T	3, 4	4.6	4
Is able to set achievable goals and is flexible in their approach to weaning and rehabilitation	I, C, M, T	3 4	4.6	4
Maintains good communications with the Critical care teams directly caring for the patient	I, C, M, T	3, 4	4.6	4

HV6 The trainee will understand the role of multi-disciplinary teams in the long term management of patients with CRF with particular emphasis on the following key areas				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Understands the roles and interactions of various contributors to the multi-disciplinary care of patients with CRF in the following situations: • Perioperative assessment and care o Anaesthetist o Urologist o Spinal orthopaedic surgeon o Gait orthopaedic surgeon • Nutrition and safe swallow o Dietician o Speech and Language o Gastroenterologist o PEG nurse • Mobility independence and travel o Physiotherapist o Occupational therapist o Biomedical engineers o Wheelchair services o Flight assessment • Cardiovascular co-morbidity o Cardiologist • Neuromuscular disease o Neurologist o Clinical geneticist • Psychological support o Psychologist • Pregnancy o Obstetrician o Anaesthetist	I, C, E	1, 3	7,4(E); 11.5; 12	4
Understands the regulatory framework surrounding the care of vulnerable adults and the circumstances where their safety may be put at risk.	I, C, E	1, 3	(A)	4
Skills & Behaviours				
Attends multi-disciplinary care meetings and produces summaries of key decisions and responsibilities	I, C, T	1, 3	7,4(E); 11.5; 12	4
Attitudes				
Interacts well and for the patient's benefit with other health care professionals	I, C, M, T	3, 4	7,4(E); 11.5; 12	4
Is prepared to take the lead in care where appropriate	I, C, M, T	3, 4	7,4(E); 11.5; 12	4
Is prepared to be a supportive team member where appropriate	I, C, M, T	3, 4	7,4(E); 11.5; 12	4
Is a skilled negotiator on behalf of the patient	I, C, M, T	3, 4	7,4(E); 11.5; 12	4
Is prepared to take responsibility for patient care and to facilitate complex and sometimes difficult team decisions	I, C, M, T	3, 4	7,4(E); 11.5; 12	4

HV7 End of life care: the trainee will be able to contribute to end of life care to patients with CRF who are dying				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Understanding of approaches to end of life care including methods of managing common symptoms	I, C, E	1	8.1; 8.2; 8.3	3
Understanding the regulatory framework and practical implications of the mental capacity act of advanced directives and DNR orders	I, C, E	1 2	8.1; 8.2; 8.3	4
Understanding the ethical issues of continuing and withdrawing ventilatory support in patients with advanced CRF	I, C, E	1, 2, 3, 4	8.1; 8.2; 8.3	4
Skills & Behaviours				
Able to successfully palliate symptoms in patients dying of CRF	I, C, T	1 3	8.1; 8.2; 8.3	4
Ability to judge the capacity of patients to make autonomous decisions about end of life care and treatments	I, C, T	1 2 3 4	8.1; 8.2; 8.3	4
Attitudes				
Able to clearly communicate and listen to patients dying of CRF	I, C, M, T	3, 4	8.1; 8.2; 8.3	4
Able to involve and communicate with Palliative care team members	I, C, M, T	3, 4	8.1; 8.2; 8.3	4
Able to support patients, their families and care team members through the dying process	I, C, M, T	3, 4	8.1; 8.2; 8.3	4

HV8 Models of service organisation: the trainee will understand the different organisational models of home ventilation provision in the context of the NHS				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Understands how HV services interface with other NHS and private care providers	I, C, E	1, 3	(A)	4
Understands the funding streams available for care provision of HV patients and methods of access to these funds	I, C, E	1, 3	(A)	4
Understands the importance of transitioning arrangements for paediatric HV patients	I, C, E	1, 3, 4	(A)	4
Understands the role of social services and other community based services	I, C, E	1, 3	(A)	4
Understands the need for carer provision and training and methods of competency assessment and skill retention	I, C, E	1, 3	(A)	4
Understands the possible role of specialist commissioning in HV services	I, C, E	1, 3	(A)	4
Understands the role of audit and quality improvement in improving the service	I, C, E	1, 2, 3	11.8; 12.15	4
Understands the need for assessment and planning of travel including issues around flying and flight assessments	I, C, E	1, 3	(A)	4
Skills & Behaviours				
Participates in an MDT external health care needs assessment meeting	I, C, T	3	11.5(E)	4
Participates in the planning of complex discharge patients from hospital to community/home care	I, C, T	3	(A)	4
Attends a paediatric transitioning MDT	I, C, T	3	(A)	4
Undertakes an audit of HV	C	2	(A)	4
Participates in a HV quality improvement programme	C	2	(A)	4
Attitudes				
Effective organiser and negotiator on behalf of patients	I, C, M, T	3, 4	12.1; 12.2	4
Commitment to ensure high quality service	I, C, M, T	2	11.6	4

Neuro Intensive Care Medicine

Aim

Consultant intensivists with subspecialty training in NICM have a central role in neuro intensive care units. They share the ultimate responsibility of care with the admitting clinical teams and they collaboratively lead the provision of neuro intensive care, coordinating a multi-specialty team of physicians, surgeons and allied health professionals including specialised nurses, physiotherapists, neurophysiologists and clinical scientists.

Educational objectives

After completion of the Neuro ICM SSM trainees should:

- Understand the physiological principles underlying management of critically ill patients with neurological disease
- Be informed about the therapeutic interventions used in neurocritical care
- Be aware of key guidelines and the associated literature related to neurocritical care
- Be able to manage patients with severe acute brain injury, both traumatic and non-traumatic
- Be able to manage post-operative neurosurgical patients following both elective and emergency neurosurgery
- Be able to manage common neurological disorders not requiring neurosurgery
- Be aware of the indications for discussion and transfer of critically ill patients to Regional Neurosurgical Units
- Be able to stabilise and transfer patients with acute neurosurgical conditions
- Be able to care for and manage the potential organ donor and their families

Supervision Requirements

The supervisor must hold a substantive consultant post in neuro intensive care. The Standards of teaching and training essential for the delivery of the special skills module are enshrined in *Good Medical Practice*. Both trainees and trainers must be familiar with this guidance:

15. Teaching, training, appraising and assessing doctors and students are important for the care of patients now and in the future. You should be willing to contribute to these activities.
16. If you are involved in teaching you must develop the skills, attitudes and practices of a competent teacher.
17. You must make sure that all staff for whom you are responsible, including locums and students, are properly supervised.
18. You must be honest and objective when appraising or assessing the performance of colleagues, including locums and students. Patients will be put at risk if you describe as competent someone who has not reached or maintained a satisfactory standard of practice.
19. You must provide only honest, justifiable and accurate comments when giving references for, or writing reports about, colleagues. When providing references you must do so promptly and include all information that is relevant to your colleague's competence, performance or conduct.

Neuro ICM SSM Syllabus structure

The syllabus for the special skills module in neuro ICM is based on the structure of the CoBaTrICE syllabus (Competency Based Training programme in Intensive Care Medicine). It is presented in tables to allow trainees to track the progression of their learning. It is not intended that these tables should be used as checklists for the assessment of competence. No trainee can be expected to have a comprehensive knowledge of every single

aspect of the syllabus. A full description of the CoBaTrICE methodology can be found in section 1.5.1 of Part I of the curriculum for the CCT in Intensive Care Medicine. The syllabus is structured on the following competence domains:

- **Resuscitation and initial management of the patient with acute neurological injury**
  The first contact with a patient with a life threatening neurological injury requires clinicians to take immediate action to prevent or correct physiological deterioration despite uncertainty about the precise underlying diagnosis. Rapid reestablishment of adequate perfusion and oxygen delivery to the central nervous system, prompt identification and treatment of raised intracranial pressure, control of seizure activity and normalization of hypoglycaemia and hyperthermia are paramount. These goals should be achieved urgently - even when the diagnosis is unclear.

  After completion of the module, successful trainees will be expected to understand the unique vulnerability of the CNS, and to be able to rapidly execute strategies aimed at the maintenance of cerebral homeostasis and the prevention of secondary neurological insults. Trainees should also be able to demonstrate their knowledge of pathophysiology, prevention and management of systemic complications of acute CNS injuries, including acute airway compromise in patients with impaired consciousness (especially when associated with brainstem injuries), neurogenic cardiac injury associated with cerebrovascular accidents (especially ruptured cerebral aneurysm), vasoplegic shock associated with spinal trauma, and profound endocrine and electrolyte imbalance associated with cerebral injuries affecting the hypothalamus-hypophysis axis.

- **Diagnosis, assessment, investigation, monitoring**
  The diagnosis and management of patients with life-threatening neurological injuries is informed by a wealth of clinical data acquired by means of imaging techniques (structural and functional) and bedside monitors, such as intracranial pressure (ICP) monitors, cerebral microdialysis, brain tissue oxygenation monitors, transcranial Doppler (TCD), electroencephalography (EEG), etc.

  After completion of the module, successful trainees will be expected to be able to outline a rational diagnostic approach for patients with common neurological and neurosurgical conditions. They will also be expected to understand the fundamental principles, utility, safety and accuracy of imaging techniques and neuromonitoring technologies, and their appropriate use (including contraindications) and interpretation (including pitfalls) in specific clinical conditions.

- **Disease management**
  Adequate resuscitation and accurate diagnosis are the first steps towards achieving the best possible outcome. Appropriate management requires the knowledge of disease-specific pathophysiology and the application of relevant evidence-based guidelines, along with continuous integration of clinical information with laboratory and instrumental data.

  After completion of the module, successful trainees will be expected to know the relevant evidence-base guiding the treatment of traumatic brain and spinal injury, intracranial haemorrhage (including aneurysmal and non-aneurysmal subarachnoid haemorrhage, intraparenchymal, intraventricular, extradural and subdural haemorrhage), stroke (including “malignant” stroke, cerebellar stroke and spinal infarction), infective and autoimmune encephalitis and meningoencephalitis, epileptiform encephalopathy (including status epilepticus), acute hydrocephalus, neuromuscular disease and peripheral neuropathy (including Myasthenia Gravis and Guillain–Barré syndrome).

- **Therapeutic interventions and organ support**
  The central nervous system exerts tonic control and modulates organ-system function. Patients with acute neurological injury often develop organ-system failure as a result of their neurological injury. Conversely, organ-system failure can result in significant secondary brain injury.
  After completion of the module, successful trainees will be able to provide skilled organ-system support, aimed at the maintenance of adequate CNS perfusion, oxygenation, and metabolic homeostasis. They will also be aware of indications and contraindications of ICP-lowering interventions and other neuro-protective

strategies. Trainees will be expected to know the clinical pharmacology of sedatives, antiepileptic drugs and osmotic agents, and the theoretical and practical aspects of therapeutic hypothermia, hyperventilation, CSF drainage and surgical decompression of the cranium. Their competences should include strategies for the prevention of delayed ischaemic neurological deficits in patients at risk, including indications and contraindications of endovascular treatments and arterial blood pressure augmentation.

- **Practical procedures**

  There are a number of practical procedures that are specific to neuro intensive care practice, these include procedures for CSF drainage and sampling, and intrathecal administration of drugs, and the use (insertion and interpretation) of a number of invasive and non-invasive probes and monitors. It is important to stress that "general" practical procedures can present context-specific challenges when performed in patients with neurological injuries, with suboptimal techniques resulting in preventable morbidity and mortality. Airway instrumentation in patients with exhausted intracranial volume-buffering reserve needs to take into account their unique vulnerability to hypercapnia and hypoxia. All procedures requiring sedation should consider the risk and consequences of haemodynamic instability in neurologically injured patients. Renal replacement therapy in patients that had been treated with hypertonic saline and have increased plasma osmolarity should take into account the risk of a brain-plasma water-gradient reversal when standard "isotonic" replacement fluids are used, and the risk of rebound intracranial hypertension.

  After completion of the module, successful trainees will be expected to safely perform a range of practical procedures in patients at risk of neurological injury, including strict control of arterial carbon dioxide and oxygen during airway instrumentation and mechanical ventilation, the maintenance of adequate haemodynamic stability during procedures requiring sedation, and the ability to appropriately modify sodium concentration of dialysis replacement fluid to prevent rebound intracranial hypertension in patients requiring renal replacement therapy. Trainees should be competent in the use of external ventricular drainage systems for controlled CSF drainage, CSF sampling and the administration of intrathecal medications. They should also be able to perform a lumbar puncture to provide an accurate estimate of CSF opening pressure and to appropriately drain CSF in patients with communicating hydrocephalus. Trainees may also be required to establish and/or to interpret bedside neurological monitors in particular Intracranial pressure (ICP), and in some centres brain tissue oxygen, microdialysis and jugular oxygen monitoring and to perform instrumental evaluation of cerebral blood flow (transcranial Doppler) and EEG monitoring.

- **Perioperative care**

  Neuro intensive care practice includes the provision of perioperative care to patients undergoing major neurosurgical procedures or to neurosurgical patients at risk of significant complications, or requiring organ support.

  After completion of the module, successful trainees will be expected to be able to provide physiological optimisation and monitoring, and to be aware, prevent and manage the main complications of common neurosurgical procedures, including the risk of airway compromise in patients undergoing posterior fossa surgery, common disturbances of the hypothalamic pituitary axis in patients undergoing pituitary surgery, etc.

- **Comfort and recovery**

  The process of rehabilitation of patients with life-threatening neurological injuries should be initiated in intensive care, and it is usually continued for months and years following discharge from hospital. Patients admitted with neurological injuries are at very high risk of experiencing physical and psychological suffering. Doctors and allied healthcare professionals practicing in NICM need to be extremely vigilant in order to prevent unnecessary distress in patients that are cognitively intact but are unable to communicate or interact with the outside world, for example in patients with expressive dysphasia, severe neuropathy, or locked-in syndrome.

  Trainees are expected to treat patient with dignity and respect on all occasions. Bearing in mind the recent evidence based on fMRI studies showing that patients (wrongly) diagnosed as being in persistent vegetative

state can retain superior cognitive functions, trainees should always interact with neurologically impaired patients under the assumption that they may be cognitively intact. After completion of the module, trainees will be expected to be able to safely provide analgesia in patients with a variety of neurological conditions (including neuropathies and neuropathic pain), to formulate prognoses and to communicate with other members of the clinical team, patients and their families regarding realistic expectations for recovery, and to appropriately refer patients for rehabilitation and long-term management.

Competencies

NICM1 Resuscitation and initial management of the patient with acute neurological injury				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Causes, pathophysiology, prevention and treatment of secondary neurological injury	D, I, C, T, E	1, 2	1.1(E)	4
Early recognition of intracranial hypertension (common causes and treatment)	D, I, C, T, E	1, 2	1.1(E)	4
Acute management of traumatic brain injury and spinal injury	D, I, C, T, E	1, 2	1.1, 1.5	4
Damage-control strategies, priorities in the management of polytrauma	D, I, C, T, E	1, 2	1.5(E)	4
Early management of intracranial haemorrhage (SAH, EDH, SDH, intraparenchymal and intraventricular haematoma), including correction of coagulopathy	D, I, C, T, E	1, 2	1.1(E), 3.6(E)	4
Early management of stroke	D, I, C, T, E	1, 2	1.1(E), 3.6(E)	4
Acute management of seizures (including status epilepticus)	D, I, C, T, E	1, 2	1.1(E), 3.6(E)	4
Skills & Behaviours				
Conduct a primary survey	D, I, S	1, 2, 3	1.1	4
Assess conscious level (GCS), secure airway, protect the spine, assess and support organ function in patients with neurological injury	D, I, S	1, 2	1.1, 3.6	4
Administer ICP-lowering treatments	D, I, S	1, 2	1.1, 3.6(E)	4
Correct coagulopathy and metabolic derangement	D, I, S	1, 2	1.1, 3.6	3
Consider and administer thrombolytic treatment	D, I, S	1, 2	1.1, 3.6	3
Control seizures	D, I, S	1, 2	1.1, 3.6	4
Prioritise treatments and investigations	D, I, S, T	1, 2, 3	1.1, 3.6	4
Perform a secondary survey and formulate a differential diagnosis	D, I, S, T	1, 2, 3	1.1, 3.6	3
Attitudes				
Rapid response to resuscitation	D, I, S	1, 2	1.1	4
Appreciates the vulnerability of the CNS to hypoxia, hypoperfusion and hypoglycaemia	D, I, S, T	1, 2	1.1, 3.6	4
Communicates effectively with patients, relatives and staff	D, I, S, T	3	12.1, 12.2	4
Recognises personal limitations and seeks support	D, M	2, 3, 4	12.2	4

NICM2 Diagnosis, assessment, investigation, monitoring and data interpretation				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
History and neurological evaluation	I, C, T, E	1	2.1, 3.6	4
Diagnostic strategy for the patient with impaired consciousness or abnormal neurology	I, C, T, E	1	2.1, 3.6	4
Principles, indications, and limitations of X-ray imaging (including DSA) of the CNS	D, I, C, T, E	1, 2	2.2(E), 2.8(E)	4
Principles, indications, and limitations of CT imaging of the CNS	D, I, C, T, E	1, 2	2.2(E), 2.8(E)	3

Principles, indications, and limitations of MR imaging of the CNS	D, I, C, T, E	1, 2	2.2(E), 2.8(E)	3
Principles, indications, and limitations of ICP monitoring	D, I, C, T, E	1, 2	2.9(E)	4
Indications, and limitations of Sjo2, microdialysis and brain oxygenation monitoring	D, I, C, T, E	1, 2	2.9(E)	3
Principles, indications, and limitations of EEG monitoring	D, I, C, T, E	1, 2	2.9(E)	3
Principles, indications, and limitations of TCD (and autoregulation) monitoring	D, I, C, T, E	1, 2	2.9(E)	3
Multimodal monitoring and signal analysis	D, I, C, T, E	1	2.9(E)	3
Skills & Behaviours				
Obtain a full history and perform a clinical assessment	D, C, E	1	2.1	4
Interpret imaging and formulate a differential diagnosis	D, C, E	1	2.8, 2.9	4
Set up appropriate monitoring and interpret data	D, C, E	1	2.8, 2.9	4
Attitudes				
Always promotes patient privacy, dignity and confidentiality	D, C, E	4	12.6	4
Avoids unnecessary investigations	D, C, E	2, 4	2.8	4
Responds rapidly and appropriately to changes in monitored variables	D, C, E	1, 2	2.9	4
Communicates effectively with other members of the team	D, C, E	3	12.1	4

NICM3 Disease management				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Intracranial hypertension and cerebral herniation syndromes	I, C, E	1	3.6(E)	4
Hydrocephalus and disturbances of CSF dynamics	I, C, E	1	3.6(E)	3
Coma and altered consciousness states	I, C, E	1	3.6(E)	4
Traumatic brain injury	I, C, E	1	3.6(E)	4
Spinal injury	I, C, E	1	3.6(E)	4
CNS infarction and ischemia (including: malignant stroke, posterior fossa and spinal infarction, cerebrovascular dissection and occlusive vasculopathies)	I, C, E	1	3.6(E)	4
Extradural, subdural and intraparenchymal haemorrhage	I, C, E	1	3.6(E)	4
Subarachnoid haemorrhage (aneurysmal and non aneurysmal)	I, C, E	1	3.6(E)	4
Cerebral venous thrombosis	I, C, E	1	3.6(E)	3
Seizures and epilepsy (including: status epilepticus)	I, C, E	1	3.6(E)	4
Infective encephalitis, meningoencephalitis and ventriculitis; CNS abscesses	I, C, E	1	3.6(E)	4
Autoimmune encephalopathies (including: paraneoplastic, non-paraneoplastic and CNS vasculitis)	I, C, E	1	3.6(E)	3
Inflammatory demyelinating disease (including: MS and ADEM)	I, C, E	1	3.6(E)	3
Toxic encephalopathies (including: uremic, hepatic and iatrogenic)	I, C, E	1	3.6(E)	3
Hypoxic-ischemic encephalopathy	I, C, E	1	3.6(E)	4
Neuroendocrine disorders (including: panhypopituitarism, diabetes insipidus, myxedematous coma)	I, C, E	1	3.6(E)	3
Neuromuscular disease (including: Guillain Barre syndrome and its variants, myasthenia gravis, CRIMYNE, motor neuron disease)	I, C, E	1	3.6 (E)	4
Skills & Behaviours				
Recognise and diagnose commonly encountered conditions	I, C, E	1	2.1, 2.2, 3.6	4
Determine prognostic spectrum	I, C, E	1	2.1, 2.2, 3.6	3
Establish a management plan	I, C, T, E	1	3.6	3
Order and prioritise appropriate investigations	I, C, T, E	1	2.2	4
Set up appropriate neuromonitoring	D, I, C, E	1	2.9(E)	3
Attitudes				
Appreciates the importance of timely intervention	I, C, E	1, 2	3.6	4

Appreciates the differences between organ-system support and specific treatment	I, C, E	1	3.6	4
Understands the need for condition-specific and patient-specific physiological targets	I, C, E	1	3.6	4
Understands the importance of evidence-based practice	I, C, E	1, 2	3.6, 12.13	4
Recognises personal limitations and works as an effective member of the team	I, C, E, M	4	3.6, 12.2	4

NICM4 Therapeutic interventions and organ support				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Principles of neuroprotection	C, E	1, 2	3.1(E), 3.6(E)	4
Neuropharmacology	C, E	1, 2	3.6 (E), 4.1(E)	4
Sedatives and anaesthetic agents	C, E	1, 2	3.6, 4.1	4
Osmotic agents	C, E	1, 2	3.6(E), 4.1(E)	4
Anti-epileptic drugs	C, E	1, 2	3.6(E), 4.1(E)	4
Corticosteroid and other hormone preparations (including: arginine-vasopressin analogues, triiodothyronine and insulin therapy)	C, E	1, 2	3.6(E), 4.1(E)	4
Vasoactive and antihypertensive drugs (including: effects on cerebral perfusion and cerebral blood volume)	C, E	1, 2	3.6(E), 4.4(E)	4
Plasma volume expanders (including: repercussions of osmotic changes and haemodilution on ICP and oxygen delivery to the brain)	C, E	1, 2	3.6(E), 4.4(E)	4
Principles of blood and blood-product-component therapy in encephalopathic patients	C, E	1, 2	3.6(E), 4.3(E)	4
MAP augmentation (including: systemic and neurological complications)	D, C, E	1, 2	3.6(E), 4.4(E)	4
Principles and thrombolysis and anticoagulation in patients with thrombotic and thromboembolic CNS disease	D, C, E	1, 2	3.6(E), 4.1(E)	4
Principles of thromboprophylaxis in neurosurgical patients and patients with CNS injury (including: indications and risks of venous caval filters)	C, E	1, 2	3.6(E), 4.1(E)	4
Therapeutic hypothermia	D, C, E	1, 2	3.6(E)	4
Antibiotics and treatment of CNS infective disease (including: bacterial, viral, fungal and parasitic CNS disease)	D, C, E	1, 2	3.6(E), 4.2(E)	4
Intravenous immunoglobulines in neurological disease	C, E	1, 2	3.6(E), 4.1(E)	3
Plasma exchange in neuroimmunological disorders	C, E	1, 2	3.6(E), 4.1(E)	3
CNS pathophysiological consequences and treatment of disordered fluid, electrolyte and acid-base balance	D, C, E	1, 2	3.6(E), 4.8(E)	4
Principles of airway management, including indication for tracheostomy	D, C, E	1, 2	4.6	4
Principles and strategies of mechanical ventilation, including indications and risks of hyperventilation and hyperoxia	D, C, E	1, 2	3.6(E), 4.6(E)	4
Indications and risks of renal replacement therapy in patients with acute encephalopathy (including: dialysis disequilibrium syndrome)	D, C, E	1, 2	3.6(E), 4.7(E)	4
Nutrition and glycemic control (including: enteral and parenteral nutrition, and risks related to the placement of naso-gastric devices in patients with base-of-skull fracture)	D, C, E	1, 2	3.6(E), 4.9(E)	4
Principles of physiotherapy and early rehabilitation for the neurologically-injured patient	C, E	1, 2	3.6(E)	4
Skills & Behaviours				
Establish a management plan based on clinical information, neuromonitoring, laboratory findings and imaging	D, I, C	1, 2	4.1(E)	4

Consider drug interactions and systemic repercussions of neuroprotective strategies	D, I, C	1, 2	4.1	4
Consider risk-benefit and cost-benefit of alternative drugs and therapies	D, I, C	1, 2	4.1	4
Obtain informed consent or assent from the patient where appropriate	D, I, C	1, 2	12.1	4
Evidence-based approach to treatment	D, I, C	1, 2	12.11, 12.13	4
Define and review targets of therapy	D, I, C	1, 2	4.1	4
Recognise when treatment is unnecessary or futile	D, I, C	1, 2	12.4, 12.6	4
Rational approach to cardiovascular support and MAP augmentation	D, I, C	1, 2	3.6(E), 4.1(E), 4.4(E)	4
Order, check, verify and administer blood products according to local protocols	D, I, C	1, 2	4.3	4
Identify risk-benefits of alternative ventilatory support strategies (including: risks of non-invasive ventilatory support in patients with base-of skull fractures)	D, I, C	1, 2	4.6	4
Manage renal replacement therapy, setting rational exchange and fluid balance rates	D, I, C	1, 2	4.7	3
Attitudes				
Appreciates the timely institution of organ support and prompt normalisation of physiological variables for the prevention of secondary brain injury	D, T, M	1, 2	4.8	4
Responds rapidly to acute changes in monitored variables	D, T, M	1, 2	4.1	4
Consults, communicates and collaborates effectively with patients, relatives and the health care team	D, T, M	3	12.1, 12.2, 12.3	4
Demonstrates compassionate care of patients and relatives	D, T, M	4	12.12	4
Leads, delegates and supervises others (according to experience and role)	D, T, M	3	12.10	4
Recognises personal limitations	D, T, M	2, 4	12.7, 12.11	4

NICM5 Therapeutic interventions and organ support				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Airway management of patients with or at risk of cervical injury	D, M	1	5.2(E), 5.3(E)	4
Bronchoscopy and airway management in patients with or at risk of intracranial hypertension (including: fibreoptic intubation, awake and asleep)	D, M	1	5.2(E), 5.6(E)	3
Sedation (including: haemodynamic support and strict control of physiological variables) in patients at risk of secondary neurological injury	D, M, E	1	4.1(E), 4.4(E)	4
Indications and technique of tracheostomy (percutaneous and surgical) in patients with neurological injury	D, M, C, E	1	5.7(E)	3
Indications, technique and risks of central venous cannulation in patients at risk of intracranial hypertension	D, M, C, E	1	5.12, 5.13	4
Indications, technique and risks of arterial cannulation and arterial pressure monitoring	D, M, C, E	1	5.10	4
ICP monitoring with intraparenchymal devices, set up and interpretation	D, M, E	1	2.9(E), 3.6(E)	4
Set up and management of ventricular and lumbar drainage systems (including: CSF pressure monitoring, CSF sampling and intrathecal administration of drugs)	D, M, E	1	3.6(E), 4.1(E)	4
Cerebral microdialysis (set up and interpretation)	D, M, E	1	2.9(E), 3.6(E)	3

Parenchymal tissue oxygenation monitoring (set up and interpretation)	D, M, E	1	2.9(E), 3.6(E)	3
Jugular oxygen saturation monitoring (set up and interpretation)	D, M, E	1	2.9(E), 3.6(E)	3
Set up and interpretation of multimodality neuromonitoring (including: derived indices of cerebral autoregulation and cerebrovascular reactivity)	D, M, E	1	2.9(E), 3.6(E)	3
Near Infrared Spectroscopy (set up and interpretation)	D, M, E	1	2.9(E), 3.6(E)	3
Electrophysiological monitors (set up and interpretation)	D, M, E	1	2.9(E), 3.6(E)	3
Transcranial Doppler (interpretation)	D, M, E	1	2.9(E), 3.6(E)	3
Indications, risks and technique of lumbar puncture (including: evaluation of opening pressure, CSF sampling and CSF drainage)	D, M, C, E	1	3.6(E), 5.18(E)	4
Abdominal pressure monitoring (set up and interpretation)	D, M, E	1	2.9, 5.24	3
Skills & Behaviours				
Obtain informed consent or assent from the patient where appropriate	D, I, C	1, 2	12.1	4
Perform the procedure in a way that minimises the risk of complications	D, I, C	1, 2	4.1	4
Extubate neurologically-injured patients safely (including: management of inadequate airway protection and prevention of hypercapnia)	D, I, C	1, 2	4.1, 5.2	4
Manage monitors and invasive devices, and titrate treatment based on individualised targets	D, I, C, E	1, 2	4.1	4
Attitudes				
Recognises personal limitations and seeks appropriate support and supervision	D, T, M	2, 4	12.7 12.11	4
Consults, communicates and collaborates effectively with patients, relatives and the health care team	D, T, M	3	12.1, 12.2, 12.3	4
Demonstrates compassionate care, respects patient privacy, dignity and confidentiality	D, T, M	4	12.12	4
Leads, delegates and supervises others (according to experience and role)	D, T, M	3	12.10	4

NICM6 Perioperative care				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Criteria for ICU and HDU admission (elective and emergency) of neurosurgical patients	I, C, T, E	1	1.4	4
Principles of perioperative neurosurgical optimisation	I, C, T, E	1, 2	6.1(E), 6.3(E), 6.5(E)	4
Emergence from anaesthesia following major neurosurgical procedures (including: safe administration of transitional analgesia and airway management)	I, C, T, E	1, 2	6.1(E), 6.3(E), 6.5(E)	4
Thromboembolic prophylaxis for the neurosurgical patient	I, C, T, E	1, 2	6.1(E), 6.3(E)	4
Antibiotic prophylaxis for the neurosurgical patient	I, C, T, E	1, 2	6.1(E), 6.3(E)	4
Diagnosis and management of common postoperative neurosurgical complications (including: post-operative impaired consciousness and coma, seizures, airway obstruction, stroke, intracranial bleed, intracranial hypertension, pneumoencephalus, CNS sepsis, haemodynamic instability, disturbances of sodium and water balance, spinal cord injury and ischemia)	I, C, T, E	1	6.1(E), 6.3(E)	4
Perioperative care of patients with (or at risk of) intracranial hypertension undergoing non-neurosurgical procedures	I, C, T, E	1	6.1(E)	4

Perioperative care: craniotomy for space occupying lesions (including: highly vascularised tumours requiring massive transfusion of blood and blood products)	I, C, T, E	1	6.3(E)	4
Perioperative care: craniotomy for clipping of cerebral aneurysm (including: management of vasospasm, hydrocephalus and other common complications of SAH)	I, C, T, E	1	6.3(E)	4
Perioperative care: interventional radiology for coiling of cerebral aneurysm and embolisation of arteriovenous malformation (including: perioperative heparinisation)	I, C, T, E	1	6.1(E)	4
Perioperative care: emergency bleed evacuation	I, C, T, E	1	6.3(E)	4
Perioperative care: emergency decompressive craniectomy	I, C, T, E	1	6.3	4
Perioperative care: posterior fossa surgery	I, C, T, E	1	6.3(E)	4
Perioperative care: functional neurosurgery (with and without craniotomy)	I, C, T, E	1	6.1(E), 6.3(E)	3
Perioperative care: CSF drainage and shunt procedures	I, C, T, E	1	6.1(E)	4
Perioperative care: pituitary surgery (including: management of endocrine disturbances)	I, C, T, E	1	6.1(E), 6.3(E)	4
Perioperative care: spinal surgery	I, C, T, E	1	6.1(E)	4
Skills & Behaviours				
Assess and triage neurosurgical patients for admission to neuro ICU/HDU	I, C, M, T	1	1.4, 6.1	4
Optimise high-risk neurosurgical patients	D, C, T	1	6.1, 6.3	4
Communicate risks of neurosurgical procedures to patient and relatives	D, M, C	1	12.1	4
Manage difficult airway (including: awake fiberoptic intubation)	D, M, C, S	1	5.2(E), 6.1(E)	4
Provide safe and adequate perioperative analgesia	D, M, C	1	6.1, 7.2	4
Identify and manage perioperative neurosurgical complications	D, M, C, S, E	1	4.1, 6.1	4
Attitudes				
Recognises personal limitations and seeks appropriate support and supervision	D, T, M	2, 4	12.7, 12.11	4
Consults, communicates and collaborates effectively with the neurosurgical team, anaesthetist and nursing staff	D, T, M	3	12.2	4
Demonstrates compassionate care, respects patient privacy, dignity and confidentiality	D, T, M	4	12.12	4

NICM7 Comfort and recovery				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Physiological effects of pain and anxiety in patients with neurological injury	I, C, E	1	7.1(E)	4
Recognition of pain and anxiety in patients with neurological impairment (including: locked-in syndrome and minimally responsive states)	I, C, E	1	7.2(E)	4
Methods of communication with patients with impaired speech	D, I, C, E	1	12.1(E)	4
Principles of acute pain management (including: neuropathic pain)	D, I, C, E	1	7.2	4
Recognition and treatment of acute confusional states in patients with neurological injury (including: effects of antipsychotic drugs on cognitive recovery following neurological injury)	D, I, C, E	1	7.2(E), 7.3(E)	4
Prevention and management of critical illness myopathy and neuropathy	I, C, E	1, 2	4.1, 7.1, 7.3	4
Prevention and management of complications of prolonged immobilisation	I, C, E	1, 2	7.1	4
Principles of rehabilitation following brain injury and stroke	I, C, E	1	3.6(E), 7.1(E)	3

Principles of rehabilitation following spinal injury (including: recognition and management of autonomic dysreflexia, medical management of orthostatic hypotension, spasticity and neurogenic bladder)	I, C, E	1	3.6(E), 7.1(E)	3
Post-traumatic stress disorder	I, C, E	1	7.1	3
Supportive services (physiotherapy, orthotics, clinical psychology, social services) and resources	I, C, T	1	7.4	3
In-patient and out-patient facilities for patients requiring prolonged neuro-rehabilitation	I, C, T	1	7.4	3
Impact of inter-hospital transfer and family dislocation on patients and carers	I, C, T	1	7.4	4
Methods for assessment of quality of life	I, C, E	1	7.1	3
Tracheostomy management (including: one-way "speaking" valve)	D, I, C, E	1	5.7, 7.1	3
Principles and devices for home ventilatory support	I, C, E	1	7.5	3
Skills & Behaviours				
Anticipate, recognise and minimise patient distress	D, I, C, M	1, 2	7.1	4
Interact appropriately with patients with neurological injury	D, I, C, M	1	7.1, 12.1, 12.4	4
Communicate with relatives and carers	D, C, M	1	12.1	4
Appropriately refer patients to rehabilitation team	D, C, M	1	12.2	4
Ensure adequate psychological support	D, I, C, M	1	7.1, 12.2	4
De-escalate of intravenous infusions to allow early mobilisation (including: use of oral midodrine and fludrocortisone to facilitate weaning from noradrenaline in patients with spinal injury)	D, C, E	1, 2	4.1, 7.1	4
Assess airway protection and down-size tracheal cannula / decannulate tracheostomy as appropriate	D, C, E	1	7.1	4
Identify discharge criteria and risks of readmission to ICU for patients with neurological injury	D, C, E	1	7.5	4
Ensure adequate communication with medical and nursing staff prior to discharge	D, C, M	2, 3	7.4	4
Follow up patients in wards and follow-up clinics	D, C, M	2	7.1, 12.9, 12.11	3
Anticipate, recognise and minimise patient distress	D, I, C, M	1, 2	7.1	4
Attitudes				
Respects patients and carers	D, C, M	4	12.4, 12.5, 12.6	4
Always provides compassionate care	D, C, M	4	7.1, 12.12	4
Establishes trusting relationship with patients and relatives	D, C, M	3, 4	12.1, 12.4	4
Appreciates the special needs of patients with neurological injuries and regards each patient as an individual	D, C, M	4	3.6, 12.12	4
Interacts and collaborates with the rehabilitation team and supportive services to maximise the chances of achieving the best functional outcome	D, C, M	3	12.2	4

Paediatric Intensive Care Medicine

PICM within the CCT in Intensive Care Medicine

General ICM training contains a 3 month block of Paediatric Intensive Care Medicine in Stage 2 training. Specialists in ICM will often obtain consultant posts in district general hospitals without paediatric services and expertise immediately available on site. They must therefore be able to contribute with other disciplines to the stabilisation and initial management of the critically ill child before and during transfer to a paediatric centre.

At the end of the 3 month block the trainee will:

- Be able to resuscitate, stabilise and transfer an acutely ill child
- Understand the fundamentals of paediatric intensive care including post-operative care following surgery
- Be aware of the indications for discussion and transfer of critically ill children to Regional Paediatric Intensive Care units

These outcomes may be achieved in a variety of situations which facilitate familiarity with children and allow development of knowledge of the physiological differences seen in babies and children and competence in management of for example small airways, lungs, veins, and circulation. Situations could include paediatric anaesthesia, a paediatric unit admitting acutely unwell children and babies as well as a PICU. Some but not all skills may be practised in simulation. Structured visits to a PICU to become aware of the particular problems faced by children will be necessary if a formal attachment to a PICU is not included in the training programme.

It is also possible for single CCT ICM trainees to undertake a further 3 months of PICM in their Stage 2 programme if they have scope within the remainder of Stage 2 and there is local capacity to deliver the training.

The PICM subspecialty curriculum

In October 2018, Paediatric Intensive Care Medicine became a GMC recognised subspecialty of Intensive Care Medicine. See *Part I, section 2.7 of the ICM CCT curriculum for further details.*

The approved subspecialty curriculum[9] and training requirements for PICM have been written and set by the Paediatric Intensive Care Medicine Intercollegiate Specialty Advisory Committee [PICMISAC], with representation from the Royal College of Paediatrics and Child Health (RCPCH), FICM, RCoA and Paediatric Intensive Care Society. The RCPCH are the GMC-designated Lead College for the subspecialty of PICM. The application process for entry to PICM CCT subspecialty training is overseen entirely by the RCPCH and runs as part of their NTN Grid training programme[10].

Trainees that are successfully recruited to the PICM subspecialty NTN Grid training programme will have their progression monitored through the RCPCH's PICM curriculum by their Paediatric Educational Supervisor and will record their progress in the RCPCH's ePortfolio system.

On successful completion of the PICM subspecialty training programme, the College Specialty Advisory Committees (CSAC) progression form will be signed off by the Chair of the RCPCH's PICMISAC. This form should be scanned and uploaded to the trainee's personal library in their ICM ePortfolio in conjunction with a Special Skills Year completion form (initiated and completed by their Educational Supervisor in the ICM ePortfolio) in Stage 2 of their training, for ARCP purposes and progression to Stage 3 (for single ICM CCT trainees only).

[9] https://www.rcpch.ac.uk/sites/default/files/2018-03/paediatric_intensive_care_medicine_syllabus_final.pdf
[10] https://www.rcpch.ac.uk/resources/apply-sub-specialty-training-ntn-grid-guidance

Special Skills training in PICM

Trainees who are unsuccessful in applying or do not want to apply for the PICM NTN Grid may still undertake a Special Skills Year in PICM (dependent not only on the trainee's career aspirations but on the deanery/LETB having the required facilities and educational capacity to offer that training) but will **not** receive any official CCT subspecialty recognition for doing so (i.e. a notation on their CCT that they are officially trained in the subspecialty of Paediatric Intensive Care Medicine). GMC regulations state that a trainee **must** have undertaken their PICM training via the RCPCH NTN Grid (entered via a competitive national application and interview) in order for that training to count towards CCT subspecialty recognition.[11]

Within the Special Skills Year, ICM trainees should follow the approved PICM training curriculum as appropriate to their level of prior training and experience in the subspecialty. The modules and years within Stage 2 ICM are interchangeable in terms of their arrangement; a trainee may therefore undertake their Special Skills Year in ST5 and their specialist area modules (PICM, Neuro ICM, Cardiac ICM) in ST6, or vice-versa. In either case, single ICM trainees should begin their PICM SSY following the Basic level PICM curriculum; whilst it may be appropriate, depending on their level of previous PICM training, for them to begin to achieve some Advanced level competencies, this will be at the discretion of local PICM trainers in liaison with the trainee's ICM Educational Supervisor.

Supervision and assessment of these trainees would be carried out as established in PICM training. Trainees in ICM would be required to demonstrate progression in PICM as per the established assessment system and include this evidence as part of their portfolio to be review by their ICM Educational Supervisor before they can be signed off for Stage 2 training.

The full PICM subspecialty curriculum is available on the RCPCH's website[12]. For reasons of space, the curriculum and its competencies have not been reproduced within this guidance manual. In addition, the curriculum is maintained by the Royal College of Paediatrics and Child Health; whilst the principle of ICM trainees following this curriculum is maintained, it is not pragmatic to update this guidance document to match every individual change to the external PICM curriculum.

[11] https://www.rcoa.ac.uk/sites/default/files/FICM-RCPCH-GRID-STATEMENT.pdf

[12] https://www.rcpch.ac.uk/sites/default/files/2018-03/paediatric_intensive_care_medicine_syllabus_final.pdf

PHEM (Pre-Hospital Emergency Medicine)

Please Note: *This guidance is reproduced from Part I, section 2.6 of this curriculum for ease of reference.*

Trainees have the option of completing their CCT in Intensive Care Medicine with sub-specialty accreditation in Pre-hospital Emergency Medicine (PHEM). Entry into the PHEM sub-specialty programme is via a competitive national application process during Stage 1 training (either ST3 or 4 for single ICM trainees) for a programme commencement in Stage 2 training (ST5 or 6). Trainees would then undertake PHEM as their Special Skills year within ICM training.

Undertaking PHEM sub-specialty training is separate to undertaking an ICM Special Skills module in Transfer; whilst PHEM and the Transfer module in Special Skills contain some competency crossover they are by no means identical and do not have the same learning outcomes. In addition, the PHEM programme has additional eligibility criteria (see *Part I, 2.6.1*) and must be entered via competitive national application and interview.

The full syllabus for PHEM training is not reproduced within this manual; trainees should refer to the full PHEM curriculum available via IBTPHEM at www.ibtphem.org.uk. Assessment should be completed and documented as required by the PHEM subspecialty curriculum.

Eligibility for PHEM programme

Trainees must have 6 months basic Emergency Medicine (EM) and 6 months core Anaesthetic training to be eligible to apply for PHEM. For ICM trainees entering from one of three approved core programmes with an interest in PHEM, methods of meeting this requirement are:

Core	6/12 Emergency Medicine	6/12 Anaesthesia
ACCS (any route)	Completed in ACCS.	Completed in ACCS.
Core Anaesthesia Training (CAT)	Not completed – trainee must either undertake 6/12 EM as part of remaining 12/12 ICM Stage 1 medicine requirements, or undertake 6/12 OOPE in EM.	Completed in CAT.
Core Medical Training (CMT)	Not completed – however trainee will already have completed the full 12/12 medicine requirement of ICM Stage 1 so will require OOPE to achieve 6/12 EM.	Completed after recruitment to ICM in remainder of Stage 1 training.

It is also recommended that trainees should have completed the higher neuro, paediatric and cardiac modules of Stage 2 ICM before commencing the PHEM training; however it is recognised by the Faculty and IBTPHEM that this will not always be possible and is a matter for local organisation.

ICM CCT and PHEM

Pre-hospital Emergency Medicine is a 12 month whole time equivalent [WTE] programme which can if necessary be broken into two 6 month WTE blocks. The actual proportion of a training period reserved for PHEM and ICM training will depend on the programme delivered by the deanery/LETB in consultation with the Intercollegiate Board for Training in Pre-hospital Emergency Medicine [IBTPHEM]. Competencies achieved in the PHEM

programme can be double counted against the required competencies for ICM Domain 10: Transport at Stage 2 and 3. It may be possible for trainees to complete the PHEM component of training within the indicative 7 years programme for ICM or 7.5 years if OOPE is required (see *2.6.1*). The actual training programme length will be governed by the career aspirations of the trainee and the requirements for a CCT in ICM. Trainees should contact the FICM (contact@ficm.ac.uk) for an assessment of expected programme length.

For more details on Pre-hospital Emergency Medicine, contact the Faculty Tutor or the Intercollegiate Board for Training in Pre-hospital Emergency Medicine at www.ibtphem.org.uk.

Dual CCTs and PHEM

Trainees undertaking Dual CCTs in ICM/Anaesthesia or ICM/Emergency Medicine may also wish to apply for the PHEM sub-specialty programme. Whilst this is possible as long as the trainee meets the eligibility criteria for the PHEM programme, it should be considered that undertaking Dual CCTs *and* sub-specialty recognition will result in a significantly prolonged period of training. The indicative minimum duration for ICM Dual CCTs programmes is 8.5 years; these programmes have been agreed by the Faculty and its partner colleges based on the mapping of competencies between the respective curricula. For these programmes to be kept to manageable length, the ICM Special Skills year within a Dual CCTs programme is undertaken within the partner specialty. Therefore the Special Skills year is not available to trainees to undertake PHEM and an additional 12 months of training would be required.

As such, any trainee already undertaking Dual CCTs in ICM and a partner specialty who **also** wished to apply for PHEM sub-specialty recognition should have the explicit support of their Postgraduate Dean **before** applying for PHEM. Postgraduate Deans should also be made aware of the funding implications of Dual CCTs trainees undertaking PHEM, and the Training Programme Directors for each of the dual specialties of the possible impact on training rotations.

In addition, trainees should also be aware of the need to revalidate in dual specialties and an additional sub-specialty.

Quality Improvement in Healthcare

Aim

Quality is at the heart of the NHS Constitution. The AoMRC and NHS Institute for Innovation and Improvement have collaborated to create a Medical Leadership Framework that supports the concept of innovation, improved patient care and increased organisational flexibility and responsiveness. Quality underlies several of the domains within this framework, namely:

- Working with others
- Managing services
- Improving services
- Setting direction

Learning about quality improvement and change management begins with core training provided to all trainees within the ICM curriculum.

This SSM will occur during Stage 2 training. It is necessary that the relevant core competencies be embedded within this module so that candidates can demonstrate they have attained them as well as the extended and additional competencies outlined in this supplement. This module covers the competences required to adopt a logical, scientific and analytical approach to quality improvement. It encourages the development of leadership skills to allow trainees a platform to influence change in future practice. It aims to develop expertise to share with other members of the healthcare team. The candidate may supplement this module with study towards a relevant postgraduate qualification.

The SSY should allow the trainee to develop skills and a portfolio of QI activity that may support application for further experience in a national leadership fellowship/programme with the Faculty of Medical Leadership and Management or NHS Leadership Academy.

Duration

Trainees undertaking this module will spend the full 12 months of their special skills year engaged in quality improvement activity; however, trainees can spend up to 50% of this time maintaining and developing their clinical skills.

Educational objectives

- Trainees will be expected to achieve the knowledge and competences in Domain 11 as part of their normal ICM training.
- To train an individual to become a lead contributor to quality improvement in healthcare through project work, teaching and supervision of other trainees.
- To train an individual to develop their leadership and collaborative skills prior to completion of ICM specialty training.

Educational attachments and training scheme

- Attendance at local, regional and national quality improvement meetings.
- Attachment to an ICU, clinical network and/or trust that will encourage trainee contribution and provide feedback for reflective learning.
- There should be provision within the chosen institution to deliver the knowledge required for the trainee to develop their skills in quality improvement.

Additional Assessments

- A portfolio of quality improvement activity including project work and contributions to teaching and supervising others.
- Presentation of a completed project at a meeting (as a minimum).
- The candidate is encouraged to submit their project(s) to a peer reviewed publication.

There are various postgraduate qualifications (for example PGCert, PGDip, MSc) related to quality improvement in healthcare that would support the trainee's acquisition of competencies during the SSY. Such qualifications are offered by several Higher Education institutions. The trainee should submit their portfolio for appraisal by their QI lead supervisor who will forward this with their recommendations to the local RA for final sign-off.

Supervision Requirements

The supervisor should be experienced in quality improvement methodology and implementation. They could be a clinician or a lead member of a quality improvement department. The trainee should also have a separate supervisor to oversee their educational and clinical work. Engagement of an appropriate supervisor should be done in consultation with the Regional Advisor in ICM.

Competencies

QIC Quality improvement core syllabus and competencies				
The following represent the core syllabus and competencies that a trainee following the ICM curriculum should have before completion of training. This forms a foundation for SSM study.				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Purpose and process of quality improvement activities such as evidence based practice, best practice guidelines & benchmarking and change management	C, E	1, 2, 3, 4	11.6, 12	4
Statistical concepts (see basic sciences)	C, E	1	11.6	3
Principles of local / national health care provision; strategic planning of the ICU service (structure, function, financing) within the wider health care environment	C, M, E	1, 3	11.8	3
The non-clinical role of the ICU specialist and how these activities contribute to the efficacy of the ICU, the profile of the ICU within the hospital and the quality of patient management	C, M, E	1, 3	11.8	3
Principles of administration and management	C, M, E	1, 3	11.8	3
Principles of health economics, departmental budgeting, financial management and preparation of a business plan	C. M, E	1, 3	11.8	3
Strategies to communicate to the general population critical care issues and their impact on the maintenance and improvement of healthcare	D, M, S, E	3	12.2	4
Management of information	M, E	1, 3, 4	12.7, 12.13, 12.14	4
Skills				
Demonstrate an interest quality control, quality improvement and reflective practice			11	
Implement and evaluate protocols and guidelines	C, E	1	11.6	3
Propose realistic initiatives / projects to promote improvement	D, C, M, T, E	1, 3	11.6, 11.8, 12.11, 12.13	4
Participate in the processes of clinical audit, quality improvement, peer review and continuing medical education	M, E	1	11.6, 12.14	4

Recognise the need for clinical audit and quality improvement activities to be non-threatening and non-punative to individuals	C, E	1	11.6	
Contribute to departmental / ICU activities	M, E	1, 4	11.8, 12.13, 12.15	4
Manage resistance to change in the ICU / hospital environment to optimize the outcome of a task	C, M, E	1, 3	11.8	3
Respect, acknowledge and encourage the work of others	C, M, E	1, 3	11.8, 12.7	4
Collaborate with other team members to achieve common goals	T, C, I, M	1, 2, 3, 4	11, 12	4
Lead, delegate and supervise others according to experience and role	T, C, I, M	1, 2, 3, 4	11, 12	4
Participate appropriately in educational activities and teaching medical and non-medical members of the health care team	T, C, I, M	1, 2, 3, 4	12	4
Manage inter-personal conflicts which arise between different sectors of the organisation, professionals, patients or relatives	T, C, I, M	1, 2, 3, 4	12	4
Contribute to professional meetings- understand their rules, structure and etiquette	M, E	3	12.7	4
Listen effectively	M, E	3	12.7	4
Attitudes				
Generates enthusiasm amongst others	T, C, I, M	1, 2, 3, 4	12	4
Participates in, and promotes continuing education of members of the multi-disciplinary health care team	T, C, I, M	1, 2, 3, 4	12	4
Contributes effectively to interdisciplinary team activities	T, C, I, M	1, 2, 3, 4	12	4
Desire and willingness to share knowledge	T, C, I, M	1, 2, 3, 4	12	4
Contributes changes in priority to others	D, M, S, E	3	12.2	4

QI1 Understand concepts underpinning quality improvement and change in healthcare

Practitioners must have an in-depth understanding of the science that underpins quality improvement and change in healthcare.

Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Describe Deming's System of Profound Knowledge and the Chain Reaction	I, C	1	A	4
Describes the 70 general change concepts	I, C	1	A	4
Describes reliability concepts	I, C	1	A	4
Describes lean concepts	I, C	1	A	4
Skills				
Applies science of change management to implement quality improvement	D, I	1, 2	A	4
Attitudes				
Encourages and shares knowledge of the science underpinning quality improvement with others	M,D, I	1, 2, 3	12.13(E), 12.14(E)	4

QI2 Applying the model for Improvement

The trainee should be able to understand the model for improvement and apply it rigorously in practice as an expert

Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Understands the learning structure of an organisation	I, C	1	A	4
Understands how to spread and scale-up change	I, C	1	A	3
Identifies other roadmaps for projects	I, C	1	A	3
Skills				
Develops a charter	D, I, C	1	A	4

Implements a PDSA cycle	D, I, C	1	A	4
Uses basic statistics	D, I, C	1	11.6(E)	4
Develops, tests and implements change	D, I, C	1	A	4
Attitudes				
Applies the model rigorously and shares expertise with others	M, D, I	1, 2, 3	A	4

QI3 Leading on quality improvement and change management

Implementation of change requires the development of appropriate leadership skills and ability to collaborate within an organisation

Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Understands quality as a business strategy	I, C	1, 2	11.8(E)	3
Skills				
Conducts, leads and chairs meetings	D, I, C	1, 3	11.8(E), 12.2(E), 12.7(E)	4
Understands the principals of group dynamics and working within groups.	M, D, I, C	1, 3	11.8(E), 12.2(E), 12.7(E)	4
Demonstrates an ability to establish and communicate the purpose of the organisation	M, D, I	1, 3	11.8(E), 12.2(E)	3
Attitudes				
Views the organisation as a system	M, D, I	1	11.8(E)	4

QI4 Handling information to implement change

In order to understand and implement change, the trainee must have the ability to logically gather, organise and interpret information

Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Understands the role of benchmarking in quality improvement	I, C	1	11.6(E) 11.8(E)	4
Understands different sampling and creativity methods	D, I, C	1	11.6(E)	4
Skills				
Can view a system through the creation of flow diagrams and linkage of processes	D	1	11.8(E)	4
Creates an operational definition	D	1	11.6(E)	4
Creates forms for data collection	D	1	12.13(E)	4
Designs a test of change	D	1, 2	11.6(E)	4
Constructs appropriate diagrams to organise information	D, I	1, 2	12.13(E)	4
Applies various analyses to organise information	D, I	1, 2	11.6(E)	4
Applies advanced methods to understand variance	D, I	1,2	11.6(E)	4
Studies relationships using various graphical and analytical methods	D, I, C	1, 2	11.6(E)	4
Attitudes				
Demonstrates confident information handling and teaches others	M, D, I,	1, 2, 3	12(E)	4

Transfer Medicine

Aim

The ICM Curriculum already contains a section covering Transport – Domain 10. All trainees will need to achieve a certain competence in transfer medicine as part of their training. However, for most trainees the majority of transfers will be intra-hospital; transferring the critically ill from wards or the ED to the ICU, or transferring critically ill patients from the ICU to theatre or radiology for further treatment or investigation. Inter-hospital transfers will constitute only a small proportion of the trainee's transfer experience. The commonest reason for transfer of a critically ill patient at the moment is for specialist treatment in a regional centre (for example for neurosurgery, vascular surgery, cardiothoracic surgery, interventional radiology). There may also be transfers to supra-regional centres for treatments such as liver, lung or cardiac transplantation. In the future, there may be an expansion in the need for transfers of critically ill patients with re-configuration of Critical Care services, trauma services and ECMO centres.

This Transfer module is different to the set year of training which comprises Pre-Hospital Emergency Medicine sub-specialty training; however the competencies described in this module are in part derived from 'Theme 5' within the PHEM curriculum. Whilst PHEM training programmes are run by several Deaneries and trainees will have to compete nationally for places, the FICM recognises that there are very limited numbers of PHEM training posts and that not all regions are able to run PHEM programmes; however, such regions may be able to run more broad-based transfer-oriented training modules as described herein. The FICMTAQ also recognises that trainees with enhanced training in transfer/retrieval medicine would provide benefits to ICUs when they become consultants.

This module covers the competences required to make transfer decisions, select the most appropriate transport platform, provide safe, effective and focused in-transit critical care and ensure that the patients' condition and immediate needs are communicated to receiving hospital clinical staff.

Educational objectives

- Trainees will be expected to achieve the knowledge and competences in Domain 10 as part of their normal ICM training;
- To train an individual to be the Hospital Transfer Lead (recognising that transfers will include patients from all parts of the hospital, not just from the Intensive Care Unit);
- To train an individual to become a Network Transfer Lead;
- To train an individual to work as part of a Critical Care Retrieval Team (for example from an ECMO Centre or as part of the regional or national configuration of Critical Care services)

Educational attachments and training scheme

- Attend Network Transfer meetings
- Attachments to local air ambulance to acquire an understanding of the capabilities, limitations of and safety aspects of air transport (this will mostly be helicopters).
- Attachment to a Retrieval Team (in some Regions this may need to be a Paediatric Retrieval Service as there may be no others).
- Potentially trainees from the Armed Forces could count some of their deployment time/experience.
- There are a couple of courses that will be very relevant to aero-medical aspects of transfer.
- Clinical Considerations in Aero Medical Transport (CCAT) Foundation level, which is a 6 day course, and
- Helicopter Medical Flight Crew (HFMC) a 3 day course, which usually follows the CCAT.

Additional Assessments

- An audit of transfer standards locally or at a regional or Network level.
- There are two "qualifications" the Safe Transfer and Retrieval [STaR] course run through ALSG and the Diploma in Retrieval and Transfer Medicine [DRTM], run by the RCS Edinburgh. The STaR course is evolving; it started as a two-day course but there are very few centres running the courses now. As with many other courses, part of the course will be delivered online with only one day of practical work. It may still be reasonable to expect Transfer SSY trainees to complete it provides a sensible structured approach to the organisation of transfers. The Diploma appears to be a bigger challenge but does not mandate any specific clinical attachments and so is an option for the interested trainee.
- The DRTM suggests 20-30 retrievals/secondary or tertiary transfers as an appropriate level of exposure. This might be a reasonable aspiration for trainees during this SSY.

Supervision Requirements

Supervision would depend on the sorts of attachments undertaken. There will be a role for TPDs as not all deaneries will be able to offer this form of enhanced training. The audit would need local/Network supervision.

Competencies

TM1 Understand the concepts underpinning transfer medicine				
Practitioners must have an in-depth understanding of transfer medicine. This is focused on secondary or tertiary transfers rather than primary transfers as these are really the remit of PHEM and HEMS practitioners rather than ICM practitioners.				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Define transfer	C, T, S	1	10.1	4
Classify types of transfer	C, T, S	1	10.1	4
Describe the policies and procedures for emergent inter-facility (inter-hospital) transfer within the EMS system	C, T, S	1	(A)	4
Critique the need for pre-hospital and emergent inter-facility transfer within the EMS system	C, T, S	1	10.1(E)	4
Contrast the risks and benefits associated with emergent inter-facility transfer	C, T, S	1, 2	10.1(E)	4
Cite the evidence related to the risks and benefits of emergency inter-facility transfer	C, T, S	1, 2	10.1(E)	4
Describe lines of accountability and responsibility in relation to emergent inter-facility transfer (may also need to consider international transfers)	C, T, S	1, 3	(A)	3
Describe the roles and responsibilities of all staff accompanying the patient during transfer	C, T, S	1, 3	10.1(E)	4
Analyse the ethical and legal issues related to patient transfer. This will include capacity issues, such as the need to transfer out the least sick patient.	C, T, S	1, 4	10.1	3
Behaviours				
Demonstrate a professional approach to transfer medicine	D, I, S	1	10.1	4

TM2 Understand the applied physiology of patient transfer				
Critically unwell patients often have low physiological reserves and are prone to deterioration when subjected to physical movement				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Describe the physiological and physical effects of movement of patients	C, T, S	1	10.1(E)	4
Describe the physiological and physical effects of transfer on attendants	C, T, S	1	10.1(E)	4
Describe the physiological effects of altitude on patients during transfer	C, T, S	1	10.1(E)	4
Skills				
Demonstrate ability to integrate patient diagnosis with the physiological effects of transport	D, I, C, T, S	1	10.1(E)	4
Behaviours				
Demonstrate resilience when undertaking patient transfer	D, S	1, 3, 4	10.1(E)	3

TM3 Co-ordinate and plan patient transfer				
Safe patient transfer requires effective co-ordination and planning.				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Describe the principles of planning and co-ordinating patient transfer	D, C, T, S	1	10.1	4
Describe the principles determining destination hospital selection	D, C, T, S	1	10.1	4
List the equipment required for inter-facility transfer	D, C, T, S	1	10.1	4
Skills				
Demonstrate the ability to reconcile the risks and benefits of transfer	D, C, T, S	1	10.1	4
Demonstrate the ability to determine consumable resource requirements (e.g. medicines, medical gases, power) for transfer	D, C, T, S	1	10.1(E)	4
Co-ordinate emergency inter-facility transfer	D, C, T, S	1, 3	10.1(E)	4
Behaviours				
Demonstrate a professional approach to the planning and co-ordination of patient transfer	D, C, T, S	1, 2, 3	10.1	4
Demonstrate the ability to acknowledge futility and avoid inappropriate inter-facility transfer	D, C, T, S	1, 3, 4	10.1(E)	3

TM4 Prepare patients for transport				
Adequate preparation of patients for transport will reduce the risk of complications, adverse events and physiological compromise				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
List strategies for optimising a patient's physiology prior to transfer	D, C, T, S	1	10.1	4
Describe pre-transfer measures to minimise risks to patients during transfer	D, C, T, S	1, 2	10.1(E)	4
Skills				
Demonstrate ability to determine when patients are in their optimum clinical condition for transfer	D, I, C, T, S	1, 2	10.1(E)	4
Demonstrate correct preparation of patients for safe inter-facility transfer	D, I, C, T, S	1, 2	10.1(E)	4
Behaviours				
Demonstrate a professional approach to preparation of patients for transfer	D, I, S	1, 2, 3	10.1	4

TM5 Use a range of patient transport modalities				
Transferring critically ill patients requires the appropriate and safe use of a range of transport platforms				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Classify patient transport modalities	C, T, S	1	10.1(E)	4
Differentiate the risks and benefits of road, helicopter, fixed wing and other transport modalities	C, T, S	1, 2	10.1(E)	4
Describe the training requirements for personnel escorting patients according to transport modality	C, T, S	1, 3	10.1(E)	4
Describe the risks, benefits and legal constraints pertaining to transporting relatives	C, T, S	1, 2	10.1(E)	4
Skills				
Demonstrate the ability to transfer patients using a range of modalities	D, C, T, S	1	10.1(E)	4
Behaviours				
Demonstrate a professional approach to the use of different transport modalities	D, S	1	10.1(E)	4

TM6 Clinically manage patients during transport				
Specialist practitioners must be confident in their ability to manage a wide range of clinical conditions and patients throughout transfer				
Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Critique the minimum standards for monitoring during transfer	C, T, S	1	10.1(E)	4
Describe the interventions which can be undertaken during transfer	C, T, S	1	10.1(E)	4
Describe the common problems experienced during patient transfer	C, T, S	1	10.1(E)	4
Describe the specific clinical management of the following patient groups before and during emergency inter-facility transfer: • Patients with major head injuries • Patients with contagious diseases • Patients with unstable spinal or pelvic fractures • Patients with major burns • Patients with single organ/system failure – to include o ARDS with and without interventional Lung Assist or ECMO o end-stage cardiac failure with or without IABP or LVAD pre-transplant o end-stage liver failure with or without MARS liver dialysis pre-transplant o repatriation after such specialist treatment • Patients with multiple organ/system failure • Patients who are pregnant • Patients who are children • Patients who are infants • Patients who are neonates • Patients with acute behavioural disturbance	D, I, C, T, S	1, 2	10.1(E)	4
Skills				
Determine appropriate choices of sedation, muscle relaxation and analgesia to maintain the patient's clinical status during transfer (for all age groups)	D, I, C, T, S	1	4.1, 5.2	4
Demonstrate the safe inter-facility transfer of all age groups of ventilated patients	D, I, C, T, S	1, 2	10.1(E)	4
Maintain accurate clinical records before, during and after transfer	D, M, T	1, 2, 3, 4	12.3	4
Demonstrate the ability to maintain monitoring of vital signs throughout transfer	D, S	1, 2	10.1	4
Demonstrate the ability to manage sudden in-transit loss of:	D, C, T, S	1, 2		4

• airway • vascular access • monitoring • power • oxygen • (f) infusions				
Behaviours				
Demonstrate a professional approach to the clinical management of patients undergoing emergent inter-facility transfer	D, S	1, 2, 3	10.1	4

Education

Aim

This special skills module is intended for trainees who are considering developing a special interest in medical education in their consultant career. It intends to further a trainee's professional development as an educator through taking part in a wide-variety of educational activities, self-evaluation and utilising frameworks in which to describe their own development as a trainer.

The learner may enter this Special Skills Year from previous exposure only to the core curriculum for all Intensive Care Medicine trainees with regard to pedagogical knowledge or may have previous knowledge (e.g. hold a Certificate in Medical Education or similar) that this year will build on. The objectives are in addition to those in the core curriculum.

Educational objectives

Over-arching educational objectives are from the GMC supervisor framework originally set out by the Academy of Medical Educators:

- Ensuring safe and effective patient care through training
- Establishing and maintaining an environment for learning
  - Analyse the key features of the learning environment, in particular clinical settings relevant to your professional practice, and identify the teaching skills required to support successful education in these settings
- Teaching and facilitating learning
  - Demonstrate a critical understanding of key principles and methods of curriculum planning and design through application to particular clinical settings and educational contexts
  - Demonstrate experience in utilising a variety of teaching and learning techniques
  - Create and evaluate novel teaching and learning experiences
- Enhancing learning through assessment
- Supporting and monitoring educational progress
  - Support fellow professionals in their development as educators through critical application of professional development processes (such as mentoring, peer review, teamwork and action learning)
- Guiding personal and professional development
- Continuing professional development as an educator
  - Plan and maintain your own continuing development as an educator through critical application of professional development processes (such as reflective practice, peer review, and scholarship of teaching).

Educational attachments and training scheme

A minimum of 50% of protected time is required for specialist module activities (which may take place within or outside of the clinical environment). Supervisor sessions are required monthly to discuss progress and identify any barriers to effective completion of the module.

Additional Assessments

Trainees must develop their own Educational Portfolio (EP) which collects evidence of teaching, evaluation and reflection, demonstrating familiarity with relevant educational theory, and:

- Separate out own learning of education theory and pedagogy from creating or participating in learning events for others;
- Demonstrates:
  - Contents from different educational domains (e.g. curriculum design or planning, teaching and learning, assessment, learner support, educational research, educational management)
  - A variety of types of teaching sessions (e.g. lecturing, small group teaching, one-to-one teaching, skills-based workshops to opportunistic teaching in clinical situations)
  - A variety of different learners (UG/PG/CPD/ IPE/Patients)
  - Both non-clinical teaching and clinical teaching including practical skills training using both part-task trainers and intermediate/ high fidelity simulators if available
  - Supervision of more junior colleagues in clinical situations (and superior completion of Supervised Learning Events or Workplace-based assessments)
- Gives evidence for providing a minimum of 4 teaching or assessment sessions per month
- Gives evidence of quality assurance of education through
  - Reciprocal peer observation of training with feedback and reflection
  - Repeating a teaching session, developing an assessment item or repeating a course with evidence of development from evaluation.
- Aligned with GMC Trainer Recognition

In order to fulfil the required competencies the learner may add to the EP any completed e-learning modules, work towards a recognised certificate in medical education or higher award if already obtained, attendance at any specialist courses or meetings during the year, or attend specific supervisor teaching sessions. (R)

Included in the EP as specified above, with reflections, trainees must complete the following assessments during this Special Skills Year:

Mandatory (Essential)

- Reflect on at least one reciprocal peer observed teaching practice (O)

And

- Write and deliver a presentation for a group of learners that has elements directed at learners of different experiences (e.g. junior and senior doctors) or learners of different backgrounds. Produce a hand-out, a CPD quiz and an evaluation for this. (P)

Or

- Write and pilot an assessment relating to critical care (MCQs, SBA, OSCE, simulation, structured viva), reflection and re-delivery, discuss its validity and reliability. (A)

Or

- Organise an educational meeting or course (minimum 4 hours and 3 faculty) to be held twice demonstrating reflection and development e.g. faculty development, simulation training, clinical (ICU), generic skills relevant to critical care (e.g. careers, interview) or education focus. (EM)

Supervision Requirements

Supervisor holds a Certificate, Diploma or Masters in Medical Education,
Or
Is a Member or Fellow of the Academy of Medical Educators,
Or
An individual with extensive experience in delivery and management of medical education (e.g. is/has been in a LETB appointed post such as TPD, Director of Medical Education or similar).

The supervisor needs to be knowledgeable of educational theory (in accordance with standard 10.4, The relevant professional experience of assessors should be greater than that of candidates being assessed).

NB: M= MSF, S= Simulation

All the competencies may be portrayed through the EP (not added to assessment method column). Other assessment items (A, EM, P, O, S, M) added where they make a good fit.

Competencies

Competence	*Assessment Methods*	*GMP*	*CoBaTrICE*	*SSY Target Level*
Knowledge				
Basic Principles				
Describes relevant educational theories and principles	O, R	1	12.13(E)	4
Curriculum planning and design	P, EM, O, R			
Understand the requirements of ICM training at local and national level	P, EM, O	1	12.14	4
Understand how to develop a curriculum for a teaching/learning task	P, EM, O, R	1	12.14	4
Explain the process of developing learning sessions from the curriculum	P, EM, O, R	1	12.13	4
Understand different learners have different needs and critical care education is pertinent to undergraduates, post-graduates (training and non-training junior doctors), senior doctors (CPD) and the inter-professional team.	EM, O	1	12.14	4
Teaching and Learning				
Outline adult learning principles relevant to medical education	EM, O, R	1	12.13	4
Explain factors that promote learning in adult learners	O, P, R	1, 3	12.13(E)	4
Understand the concept of preferred learning and teaching styles	EM, R	1, 3	12.13(E)	3
Understand how to choose appropriate learning methods for developing specific learning outcomes	P, EM, O, R	1	12.13(E)	4
Understand the processes leading to the acquisition of practical skills	P, O, R	1	12.13(E)	4
Understand the influences of performance in small-group teaching and has knowledge of strategies to enhance learning for different participants	O, EM, R	1, 3	12.14(E)	3
Understand and recognise factors which may contribute to the under-performance of learners	EM, O, R	1, 3	12.9	4
Understand and participates in the processes of clinical audit, quality improvement, peer review and continuing medical education	O, Attendance at local meeting	1, 2	12.15	4
Participate in educational activities and teaching of both medical and non-medical members of the health care team	P, O, EM, Attendance at local meetings	1, 3	12.14	4
Simulation				
Categorise the fidelity of a variety of simulation methods available (E.g. standardised patients, part-task trainers, intermediate and high fidelity).	P, O, EM, A, R	1	(A)	4
List the uses of simulation and discuss its appropriate use in medical education	P, O, EM, A, R	1	(A)	4

Understand when to utilise the variety of simulator methods	P, O, EM, A, R	1	(A)	4
Describe appropriate ways to use simulation in training	P, O, EM, A, R	1	(A)	4
Discuss how adverse incidents occur in clinical practice and how simulator training can help improve patient safety	P, O, EM, A, R	1,2	(A)	4
Describes the use of simulators for team and communication skill training	P, O, EM, A, R	1,3	(A)	4
Feedback and Assessment				
Familiar with the principles of professional appraisal and constructive feedback	A, O, EM, R	1, 4	12.9(E), 12.13(E),	4
Know several different models of feedback practice	A, O, EM, R	1, 3	12.9(E), 12.13(E), 12.14 (E)	4
Differentiate between formative and summative assessment and define their role in medical education	A, O, EM, R	1	12.13(E), 12.14 (E)	4
Outline the role of workplace-based assessments in improving clinical supervision, feedback and tracking learner progress	A, O, EM, R	1	12.13(E)	4
Outline the workplace-based assessment tools in use and their relationship to the curriculum	A, O, EM, R	1	12.13	4
Outline the use of workplace-based assessments in delivering curriculum learning outcomes, how to select the appropriate tool	A, O, EM, R	1	12.13	4
List the features influencing the efficacy of an assessment methodology (E.g. validity, reliability, feasibility)	A, O, EM, R	1	(A)	4
Know what is meant by reliability and discuss its importance and the factors that influence it	A, O, EM, R	1	(A)	4
Understand the five sources of construct validity	A, O, EM, R	1	(A)	4
Understands the difference between feedback and evaluation	A, O, EM, R	1	(A)	4
Education environment and supervision				
Understand the importance of a positive educational environment	O, EM, EP, R	1, 4	(A)	4
Know methodologies for measuring the educational environment	O, EM, R	1	(A)	4
Know methodologies for enhancing the educational environment	O, EM, R	1	(A)	4
Understand the principles and requirements for Clinical and Educational Supervision	O, EM, R	1	(A)	3
Knowledge of the use of coaching and mentoring techniques in educational supervision	O, EM, R	1	(A)	3
Education Research				
Understand the principles of educational research: developing research questions; ethics associated with educational research; quantitative and qualitative methodology; data analysis and interpretation of results; and, professional writing.	R,	1	12.15	2
Understand the importance of research in the development of education practice and achieves competence in understanding the methodology and statistics involved	R,	1	12.15	2
Able to interpret educational research	R, O, EM	1	11.6	3
Understand how educational research is relevant to the critical care learning arena.	R, P, EM	1, 2	A	4
Understands the purpose of quality improvement activities such as evidence based practice, best practice guidelines & benchmarking and change management	R, EM,	1, 2	12.13	4
Identify and critically appraise literature; integration of findings into local clinical practice	R, P, EM, O	1	11.6	4
Education Management				
Know how to organise an educational event	EM,	1	(A)	3
• Discuss the choice of sessions,	EM,	1	(A)	3
• Discuss the choice of speakers	EM,	1	(A)	3
• Discuss the timing and sequence of sessions and breaks	EM,	1	(A)	3
• Discuss the organisation of facilities	EM,	1	(A)	3

• Discuss the arrangements for organising registration	EM,	1	(A)	3
• Understands the need for appropriate evaluation	EM,	1, 2	(A)	3
Education Agenda				
Recognise the importance of the role of the physician as an educator within the multi-professional healthcare team	P, EM, R	1, 3	12.14E	4
Knows how to use medical education to enhance the care of patients	P, EM, R	1,2,3,4	12.11	3
Describe how special training in medical education will contribute to career development	O, R	1	(A)	4
Describe how medical education may develop within the clinical and management contexts of critical care locally	O, EM, R	1	(A)	3
Participate in departmental management discussions that incorporate discussions about training	Attendance at local meetings	1, 2	11.8	4
Attend a national or international medical education meeting	Attendance at meeting	1	(A)	4
Skills				
Basic Principles				
Write own education portfolio in alignment with GMC Trainer recognition	EP	1,2,4	(A)	4
Curriculum planning and design				
Plan a variety of sessions for delivering education using several different methods (e.g. small-group teaching, lecture, one-to-one teaching, workshop, e-learning, simulation)	EM, P, O, EP,	1	12.14(E)	3
Plan teaching sessions on critical care, generic skills and education themes	EM, P, O, EP,	1,3	12.9(E)	4
Teaching and Learning including simulation				
Provide learning opportunities for different learners (e.g. undergraduate, post-graduate, continuing professional development, multi-professional)	EM, P, O, S,	3	12.14(E)	4
Use information technology to optimize patient care through life-long learning	R	1,2	(A)	3
Facilitate small-group discussions	EM, P, O,	1	(A)	4
Provide clinical skills teaching	O, P, EM,	1, 2	12.9, 12.14	4
Undertake teaching within inter-professional events	O, P, EM,	1,3	12.14	4
Present at formal meetings	O, P, EM,	1	12.14	4
Instructional Materials				
Produces visual-aids using Powerpoint or similar programme	O, P, EM,	1	12.14	4
Create a variety of teaching resources for the learner e.g. hand-out, workbook, study guide,	O, P, EM,	1,3	12.14(E)	4
Teaching Aids				
Use critical care equipment for clinical teaching	S, O	1,2	(A)	4
Uses part-task trainers for clinical teaching	S, O	1,2	(A)	4
Use intermediate or high fidelity simulator for clinical teaching (where available)	S, O	1,2	(A)	3
Feedback and Assessment				
Provide structured feedback to a learner containing corrective and reinforcing elements	A, S, M,	1,3	12.9(E)	3
Produce written feedback to a learner	A, M,	1,3	12.9(E)	3
Produce an evaluation form for teaching	S, EM, P,	1,2	(A)	4
Demonstrate improvement in own clinical and non-clinical teaching skills (e.g. lecture, small group, e-learning)	O, EM, EP	2	(A)	4
Education environment and supervision				
Lead, delegate and supervise others appropriately according to experience and role	P, EM,	1,3	12.10	4
Collaborate with other team members to achieve common goals	P, EM, M,	3	12.10	4

Develop, implement and monitor a personal continuing education plan for the next two years	EP	1	(A)	4
Demonstrate a willingness to become involved in the wider medical education activities	M, EP	1	(A)	4
Design an activity to enhance the educational environment within critical care locally	M, P, EM, S,	1,3	(A)	4
Education Research				
Critically evaluate relevant educational literature	P, EM, R	1	11.6	3
Use electronic retrieval tools (e.g. PubMed) to access information from the medical & scientific literature	P, EM, R	1	12.13	4
Contribute to educational research or departmental project	P, R, S	1	12.15	2
Engage in education research	R, S	1	12.15	2
Education Management				
Introduce a new educational event (e.g. course, meeting, assessment)	M, EM, S, A, P,	1,2,3	(A)	3
Organise an educational meeting	EM, S	1	(A)	4
Engages in activities to help others develop their medical education capabilities	M, A, S, EM, P,	1,3	12.9(E)	4
Education Agenda				
Acts as an advocate for education	M, EP, O	1	(A)	4
Encourages enthusiasm for medical education activity in others	M, O	1,3	(A)	4
Behaviours				
Attentive to detail, punctual, reliable, polite and helpful	M	1,4	12	4
Contributor to departmental clinical and educational activities	M, P,	1,2	12.14	4
Shows a desire to contribute to the development of new knowledge	M, R	1	(A)	4
Shows willingness to share knowledge	M	1	(A)	4
Participates in, and promotes continuing education of members of the multi-disciplinary and inter-professional health care team.	M	1,3	12.14, 12.9	4
Recognises and uses teaching and learning opportunities arising from clinical experiences, including errors	M	1,2	12.9	4
Accepts responsibility for patient care and staff supervision	M	1,4	12.10	4
Involving patients in clinical teaching	M	1,4	12.1, 12.4	4
Assuring and maintaining quality in clinical education				
Demonstrates an enquiring mind	M	1	11.6	4
Undertakes critical analysis of published literature	R	1	11.6	4
Exhibits professional behaviour	M	1	12	4
Demonstrates excellent communication skills with patients and colleagues	M	1,3,4	12.1, 12.2	4
Accept the need to participate in national and international practice including membership of specialist societies, reading of relevant specialist journals, and participation in education meetings	Attendance at meeting	1	(A)	4
Accept the responsibilities inherent in the role of advocate of medical education	M, O	1	(A)	4
Accept that specialist training in medical education places a responsibility to understand that others will necessarily be less knowledgeable	M, O	1	(A)	4
Accept that special knowledge and experience of medical education places a responsibility for encouraging teaching and learning	M, O	1	(A)	4
Accept the responsibility of informing colleagues (clinical and non-clinical) of any developments in medical education that may impact on patient safety, quality care and cost of services	M, O	1,2	12.9, 12.11	4

Resources

- FICM: www.ficm.ac.uk
- ICS: www.ics.ac.uk
- GMC: www.gmc-uk.org
- AMEE Guides and BEME Guides: www.amee.org
- AoME: www.medicaleducators.org
- ASME: www.asme.org.uk
- ESICM: www.esicm.org/education (CoBaTrICE and PACT)
- PACT teaching and learning e-Learning
- www.etft.co.uk (e-Learning modules)
- www.faculty.londondeanery.ac.uk (e-Learning modules)

Special Skills Year Completion Form

This form should be completed by a trainee's Educational Supervisor in the ICM ePortfolio following the Special Skills Year in Stage 2. Trainees should store within their paper-based portfolio or scan and upload it to the ePortfolio system.

Name of Trainee _____

ICM NTN _____ ST Year of Training _____ Year within Stage 2 _____

Single ICM CCT ☐ Dual CCTs ☐ Partner Specialty (if Dual): _____

Dates of SSY: From: (DD/MM/YYYY) _____ To: (DD/MM/YYYY) _____

Full Time ☐ LTFT ☐ % if LTFT _____

In Programme ☐ OOPT ☐ Location _____

Absence other than annual/study leave: Yes ☐ (if 'Yes' no. of days) _____ No ☐

SSY Module Title

* Have all Educational Objectives for this module been met? Yes ☐ No ☐
* Have all module competencies been achieved at the appropriate level? Yes ☐ No ☐
* Is there appropriate evidence (WPBA/additional) to support this? Yes ☐ No ☐

If the answer to any of the above 3 questions is 'No', please document what is outstanding and what is required to achieve them (additional training may be required):

Any other qualifications achieved/planned as a result of the SSY? Yes ☐ No ☐

If yes, please detail:

Have any audits/quality improvement projects been undertaken? Yes ☐ No ☐

Please give detail:

If the answer to all questions marked with an asterisk is "yes" the trainee can be signed of as having successfully completed the Special Skills Module.

	Educational Supervisor	Trainee
Signature		
Name (PRINT)		
Date (DD/MM/YYYY)		

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