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Cardiothoracic Anaesthesiology  
and Intensive Care

## European Association of Cardiothoracic Anesthesiology and Intensive Care (EACTAIC) Fellowship Curriculum: Second Edition

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## **Abstract**

This document represents the first update of the Cardiothoracic and Vascular Anaesthesia Fellowship Curriculum of the European Association of Cardiothoracic Anaesthesiology and Intensive Care (EACTAIC). After obtaining feedback from exit interviews with Fellows in training, graduate Fellows, and program directors, two modified online Delphi procedures with questionnaires were conducted. Consensus was reached when two-thirds of responding committee members gave green or yellow ratings on a traffic light system and more than 70% indicated strong agreement or agreement on a 5-point Likert scale. New regulations include the following: (a) more flexibility in Fellows' rotation, as long as the total number of days, rotations, and cases are completed during the training year; (b) recommendation for strict compliance with national working-time guidelines; (c) no extension of Fellowship training to compensate for annual and/ or sick leave, unless the required minimum number of cases and rotations are not reached; (d) interruption of Fellowship training for less than 12 months is allowed for personal or medical reasons; (e) introduction of a checklist for quantitative assessment of standard clinical skills; (f) recommendations for an uniform structure of exit interviews; (g) possibility of one-month training rotation in a post-anesthesia care unit instead of an intensive care unit and (h) provided all other requirements have been met, allowance of progression from the basic training year to the advanced Fellowship training year without first passing the transesophageal echocardiography exam.



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## Introduction

Cardiothoracic and vascular anesthesiology is a subspecialty of anesthesiology that is dedicated to perioperative care of patients undergoing cardiac, thoracic and vascular surgery and related interventional procedures. The European Association of Cardiothoracic Anaesthesiology and Intensive Care (EACTAIC) supports a well-grounded training in cardiac, thoracic and vascular anesthesia and critical care, in the form of the *Adult Cardiothoracic and Vascular Anaesthesia and Intensive Care [CTVAIC] Fellowship Program*, which comprises of basic and advanced training and certification at EACTAIC-accredited educational institutions. The aim of the EACTAIC CTVAIC Fellowship Program is to improve the quality of perioperative patient care by promoting and harmonizing both training and education in cardiac, thoracic and vascular anesthesia and critical care within Europe and beyond.

## Methods

Based on resolutions passed at the 2020 and 2021 Annual Meetings of the EACTAIC Education Subcommittee (EduCom), a working group was established to gather input from Fellows and program directors to update the first curriculum, [1] which had been created in April 2019. Beginning in September 2020, two-years' information was collected from a variety of sources, including emails, communications to members, annual meetings of program directors and members of EduCom, evaluation of exit interviews with candidates at the end of their Fellowship years and feedback from graduating Fellows. Changes to the initial curriculum were captured through several internet-based questionnaires created using SurveyMonkey® (<https://www.surveymonkey.com>), the URL links to which were emailed to all EACTAIC EduCom and task force members. Reminder emails were sent at specified intervals during the conduct of the surveys to encourage participation of as many members as possible.

The first part of each questionnaire measured respondents' agreement with the issues and was scored using a traffic light system of green, yellow, and red to represent agreement or disagreement with the proposed changes to the updated curriculum. For proposals to be adopted, they had to be rated green or yellow by at least two-thirds of the responding members to be considered a consensus between the EACTAIC EduCom and the task force. The second part of the questionnaire quantitatively assessed members' responses using a five-point Likert scale ranging from 1 to 5 and representing "strongly agree," "agree," "neither agree nor disagree," "disagree," and "disagree at all". Agreement was defined as more than 70% of member responding either strongly agree or agree with each statement. All members gave consent to participate in the questionnaires and data analysis as well as disclosing any conflicts of interest. Completion of the questionnaires was voluntary. In accordance with the general data protection regulations in the EU, all data collected were anonymized, secured, and will be retained in the EACTAIC archiving system for 10 years from the date of questionnaire completion.



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The first round of questionnaires included 54 questions about the 21 changes proposed by graduate Fellows and program directors. The first questionnaire was distributed to the 33 members on October 17, 2021, followed by reminder emails to those who had not responded, and ended on November 23, 2021. The second round of questionnaires included 14 questions on agreement with the introduction of a checklist in the direct observation of procedural skills (DOPS) form to assess the seven minimum skills required in the first edition of the EACTAIC curriculum, [2-3] as well as recommendations on standardization of the topics and structure of the final exit interviews with Fellows. In addition, two of the 13 statements that did not meet with agreement in the first questionnaire were clarified and included in the second questionnaire. The first related question pertained to allowing substitution at institutions with fast-track cardiac anesthesia programs, of a 1-month rotation in their postoperative anesthesia care unit (PACU) instead of an intensive care unit (ICU) rotation, for training in care of postoperative patients following cardiothoracic and vascular surgery. The second question related to the provision by program directors of more explicit communication on the learning objectives to Fellows prior to each of their training rotations and modules.

The working group strictly adhered to the EACTAIC regulations for the Adult CTVAIC Curriculum, [1] the White Paper prepared by the Board, [4] the assignments required of the EACTAIC host centers, [5] and other EACTAIC regulations for Fellowship programs [6-10]. The results of the questionnaires were circulated to all members of EduCom. A manuscript was then drafted by the working group before being circulated to all members of the EduCom and EACTAIC Board of Directors for revision and subsequent approval before the final paper was written, edited and submitted for publication.

## Results

### ***First questionnaire round***

Thirty-one members of the EduCom completed the first questionnaire which corresponded to a response rate of 94%. Two members of the EduCom failed to answer some questions. In the traffic light section, more than 92% of respondents indicated green or yellow lights to rate the importance to adopt 20 of the 21 proposed changes into the second version of the EACTAIC CTVAIC Fellowship Curriculum [Table 1a]. The following changes ([summary of answers with *strongly agree* and *agree* rating in percentages]; *previous text as used in the first edition*) were agreed upon by the survey participants with an agreement rate of more than 70% [Table 1b]:

a) Before being accepted as a Fellow, candidates must have both a valid license to practice medicine and a specialist degree examination in anesthesiology which are recognized in the host country ([87%]; *Before being accepted as a Fellow, candidates must provide evidence of a valid license to practice medicine and a specialist degree examination in anesthesiology at their national level*);





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- b) EACTAIC allows flexibility in the rotation of the Fellow between the various training rotations so as not to overburden host centers' scheduling. However, the Fellow should complete the total number of days by the end of the training year to meet the minimum required durations of the basic and advanced training rotations ([100%]; *unaddressed in the first edition*);
- c) Alternatively, host centers may be accredited to offer training only in cardiac, cardiothoracic, cardiovascular, or thoracic and vascular anesthesia. In such cases, the 12 months of basic training should be devoted to the specialties offered ([84%]; *Alternatively, host centers can be accredited to offer only training in either cardiac, cardiothoracic, cardiovascular or thoracic and vascular anesthesia*);
- d) Working time directives should be observed in accordance with applicable national law. Overtime must be compensated ([87%]; *unaddressed in first edition*);
- e) The CTVAIC Fellowship Program should be completed within a 24-month training period and should be uninterrupted by frequent and/or extended absences due to illness or personal circumstances. No extension of training is required to compensate for annual and sick leave as outlined in the signed employment agreements, unless the Fellow does not meet the training objectives and the required minimum number of cases and rotations ([94%]; *The CTVAIC Fellowship Program should be completed in a continuous 24-month period of training and uninterrupted by frequent and/or prolonged periods of absence because of illness or personal circumstances. Prolonged and/or frequent absences from training for sick leave or personal circumstances requires proportionate extension of the training period*);
- f) Extended absence from training resulting from sick leave or personal circumstances will require a proportionate extension of the training period to meet the required minimum training rotations, caseload, and competency levels. The EACTAIC Education Chair can allow where there are legitimate reasons for personal or medical leave, suspension of training but for no more than 12 months ([86%]; *Absence from training for sick leave or personal circumstances requires proportionate extension of the training period*);
- g) EACTAIC will recognize completion of basic EACTAIC Fellowship by certification. Completion of the EACTAIC basic Fellowship training is a prerequisite for progression into the EACTAIC advanced Fellowship training program. EACTAIC will issue a certificate of basic training as soon as possible after completion of the training period and passing the exit interview ([86%]; *EACTAIC will recognize this period of training with certification for a basic EACTAIC Fellowship in adult cardiothoracic and vascular anesthesia. Basic certification is a pre-requisite for entry into the advanced training program. Fellows may then proceed into the advanced training period either at the same host center where basic training had been completed or at any of the other institutions accredited by EACTAIC. After completion of a cardiac anaesthesia based advanced training and successful completion of the certification process for the European Association of Cardiovascular Imaging (EACVI) transesophageal echocardiography*



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*(TEE) certification, Fellows become eligible to be certified for an advanced EACTAIC Fellowship in adult cardiac anesthesia);*

h) Specification of techniques: for example, extracorporeal circulation including extracorporeal membrane oxygenation (ECMO), mechanical circulatory support, and ventricular assist devices ([81%]; *unaddressed in first edition*);

i) Specification of training in echocardiography: training in transthoracic echocardiography (TTE) and transesophageal echocardiography (TEE) in accordance with EACVI through training courses, didactic teaching and simulation-based training whenever possible ([87%]; *unaddressed in first edition*);

j) Exchange programs: Fellows may participate in exchange programs with other institutions accredited by EACTAIC, to gain specific clinical experience in certain subspecialties that are underrepresented in their host centers, for example anesthesia for heart and lung transplantation ([78%]; *If appropriate facilities are lacking, or host centers cannot guarantee sufficient numbers of patients in a selected patient group for example, heart transplantations in advanced training with cardiac anesthesia focus, to fulfill the training requirements, the CTVAIC Fellowship program allows for collaboration between host centers that are certified by EACTAIC, to exchange Fellows for pre-determined periods of the advanced cardiothoracic and vascular anesthesia training program*).

### **Second questionnaire round**

The period of the second survey was January 8-22, 2022. By the end of the survey, 32 responses had been received (97% response rate). All members completed the questionnaire and more than 70% of respondents gave a green or yellow traffic lights ratings to the importance of including five of the six proposed changes in the second edition of the EACTAIC CVTAIC Fellowship Curriculum [Table 2a]. The following changes ([summary of answers with *strongly agree* and *agree*, in percentages]; *previous text included in the first edition*) were agreed upon by the survey participants with an agreement rate of more than 70% [Table 2b]:

a) A checklist should be included as a quantitative assessment of the standard steps for each of the seven clinical skills to ensure transparency and equity in the assessment of clinical skills among the different Fellows at the different host institutions and to provide an objective assessment tool ([88%]; *unaddressed in first edition*);

b) Recommendations were developed for the structure of the exit interview at the end of each year of the EACTAIC CTVAIC Fellowship program to ensure transparency and equity in the assessment of Fellows by different interviewers and to eliminate potential bias or conflicts of interest as well as provide a template for future interviewers ([91%]; *unaddressed in first edition*);



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c) At the end of the basic training year, Fellows may progress into the advanced training year, even if they have not passed the theoretical part of the EACVI/EACTAIC TEE exam, provided they meet all other requirements, including case numbers, basic rotations, scientific presentations, research, and passing their exit interview. In such cases, EACTAIC will not issue a certificate of completion of the Fellowship until the Fellow has passed the theoretical part of the EACVI/EACTAIC TEE exam ([77%]; *unaddressed in first edition*)

d) Fellows should receive clear learning objectives before the start of each basic and advanced training rotation and before the start of each 3-month evaluation period ([94%]; *unaddressed in first edition*)

e) A one-month training rotation in the PACU treating patients who have undergone cardiac, thoracic, and vascular surgery may be substituted for an ICU rotation ([87%]; *unaddressed in first edition*).

## **Discussion**

### **Curriculum design and certification**

The CTVAIC curriculum is open to all physicians irrespective of their country of origin, religion, gender or sexual orientation. Before being accepted as a Fellow, candidates must have both a valid license to practice medicine, and a specialist degree qualification in anesthesiology which is recognized, in the host country. Candidates must also be members of EACTAIC in good standing. Appropriate language skills as defined by the host centers are required in accordance with national and international regulations (generally level B2 or as per the national regulations).

The CTVAIC Fellowship Program has two sequential and complementary levels of training, referred to as basic and advanced. Each level comprises 12-months of continuous training, resulting in a CTVAIC Fellowship Program with an overall duration of 24-months.

### **Basic training program**

The basic training period focuses on the anesthetic management of patients undergoing cardiac, thoracic and vascular surgery and related procedures. This includes preoperative patient assessment - with special focus on cardiac, thoracic and vascular diseases - and familiarization with surgical techniques, procedures and associated problems. During the basic CTVAIC program period, Fellows should optimize their ability to determine perioperative morbidity and establish an appropriate perioperative management plan which carefully considers patient- and procedure-related factors.



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Basic CTVAIC training includes modules related to cardiac, thoracic and vascular anesthesia as well as postoperative care (ICU and/ or PACU) with a focus on cardiac, thoracic and vascular surgery. As well as modules related to adult TEE, interventional cardiology procedures, for example transcatheter aortic valve replacement [TAVR], MitraClip, TriClip, left atrial appendage occlusion, patent foramen ovale closure or electrophysiology procedures including pulmonary vein isolation, pacemaker or defibrillator implantation. In addition, modules on techniques of extracorporeal circulation including conventional cardiopulmonary bypass and its modifications minimal invasive extracorporeal techniques as proposed by the Minimal Invasive Extracorporeal Technologies International Society [MiECTis] [11], extracorporeal membrane oxygenation [ECMO] and extracorporeal cardiac life support [ECLS], mechanical circulatory support, and ventricular assist devices [VAD] (Table 3.). Training rotation in the ICU or PACU should be well-structured so as to gain the required knowledge, skills, and competencies levels. A one-month training rotation in the PACU to treat patients who have undergone cardiac, thoracic, and vascular surgery may be substituted for an ICU rotation.

The basic CTVAIC Fellowship training also includes active and passive participation in scientific rounds such as interactive seminars, case discussions, morbidity and mortality conferences, journal club meetings, and multidisciplinary team discussions. Participation in clinical or experimental research is encouraged but is not considered a mandatory part of basic training.

EACTAIC allows flexibility in the rotation of the Fellow through the various training rotations so as not to overburden the scheduling of host centers. However, Fellows should complete the total number of days and cases by the end of the training year so as to meet the minimum required durations of the basic and advanced training rotations, and case numbers. The basic training period is completed under the close supervision of a mentor who may be the local CTVAIC program director or a designated member of the department. The program director and faculty members involved in the training program should all be EACTAIC members in good standing. A mentor who may be the program director, a faculty member, or a supervising consultant in charge, must personally provide the Fellow with one-on-one clinical supervision during the first four-months of the period of basic training. Supervision of the Fellow by a mentor should then become more remote, however, with the mentor available within a reasonable period of time.

### **Advanced training program**

The advanced training period is offered in a similar structure to the basic program in order to comply with the differing national health care needs and requirements of the 58 countries represented in EACTAIC. Host centers and Fellows have the option to adapt the advanced part of the training period



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to match the local conditions at their training facilities, as well as the Fellows personal future career plans.

Primarily, the advanced training period is intended to deepen and to extend the clinical and non-technical skills that Fellows have acquired during their basic CTVAIC Fellowship training. The advanced training period can also be used for training in different but complementary subareas and associated disciplines, provided they align with the core intention of the CTVAIC Fellowship program. The advanced training period should deliver a high level of training in specific aspects of cardiac, thoracic and vascular anesthesia. Further modules that are complementary to clinical training, may be included but are not the focus in the advanced training period (Table 4.). However, such modules must be completed in no more than six months in total and must be individually accredited with an official agreement between Fellows and their host centers. If appropriate facilities are lacking, or host centers cannot guarantee sufficient patients in a selected group as for example, heart transplantations in advanced training with cardiac anesthesia focus, to fulfill Fellowship training requirements, the program allows for collaboration between certified host centers to exchange Fellows for predetermined periods of their advanced cardiac, thoracic and vascular anesthesia training program. Alternatively, host centers may be accredited to offer training only in cardiac, cardiothoracic, cardiovascular, or thoracic and vascular anesthesia. In these cases, the 12 months of basic training should be devoted to the specialties offered. These solutions apply for the basic as well as the advanced CTVAIC Fellowship program and different Fellowship pathways are shown in Figure 1. A compound training plan involving more than one host center should be discussed with all parties involved before the Fellowship is initiated and must be approved in advance, by the EduCom Chair.

### **Intraoperative transesophageal echocardiography**

Interpretation and communication of pathological findings related to adult TEE are integral parts of cardiac anesthesia. Thus, EACTAIC and the CTVAIC Fellowship program directors consider the acquisition of advanced TEE knowledge and skills an obligatory requirement for CTVAIC Fellows with core training in advanced cardiac anesthesia. The CTVAIC Fellowship program with focus on cardiac anesthesia can only be completed when all the EACVI prerequisites for TEE certification, have been fulfilled including passing the theoretical TEE certification exam which is preferably undertaken during basic training, and successful completion of an e-logbook with the required number of cases, by the end of advanced cardiac training period.

Fellows may progress to advanced training at the end of the basic training period, even if they have not passed the EACVI/EACTAIC TEE exam, provided they have met all other requirements, including case numbers, basic rotations, scientific presentations, research activities, and passing the exit interview. In

such cases, EACTAIC will not issue the certificate of completion of the basic Fellowship program until the Fellow has passed the theoretical part of the TEE exam. The Fellow must then have passed both the theoretical exam and practical parts of the EACVI/EACTAIC TEE certification by the end of their advanced training year, before they may apply for an exit interview.

### **CTVAIC Certification**

The CTVAIC Fellowship Program starts with 12 months of broad-based training in adult cardiac, thoracic and vascular anesthesia. EACTAIC recognizes completion of this training period as a *basic EACTAIC Fellowship*. Completion of the EACTAIC basic Fellowship training is a prerequisite for progression to the EACTAIC advanced Fellowship training program. EACTAIC will issue the certificate of basic training after completion of the period of basic training and passing the exit interview. Fellows may continue for their advanced training period either in the same host center where basic training had been completed or at any of the other institutions accredited by EACTAIC. After completion of a cardiac anesthesia based advanced training and obtaining EACVI TEE certification, Fellows become eligible to be certified as an advanced *EACTAIC Fellowship*. If advanced training was focused on thoracic and/or vascular anesthesia only, Fellows are not required to undertake EACVI TEE Certification.

The CTVAIC Fellowship program should be completed within a 24-month training period and should be uninterrupted by frequent and/or extended absences due to illness or personal circumstances. Unless the Fellow fails to reach the training objectives and/or the minimum number of cases and rotations required, no significant extension of training period is required to compensate for annual and sick leave as outlined in the signed employment agreements. Extended absence from training due to sick leave or personal circumstances will require a proportionate extension of the training period to meet the required minimum training rotations, caseload, and competency levels. In cases of legitimate prolonged sick or personal leave of absence, EACTAIC EduCom Chair may allow suspension of the training program for a maximum of 12 months. Annual and maternity leave will be regulated in accordance with local contractual requirements. Working Time Directives should always be observed in accordance with applicable national law. Overtime work must be compensated.

Documentation of 12 or 24 months of training is a mandatory requirement for certification of basic or advanced CTVAIC Fellowship Programs. Appeals for exceptional circumstances because of illness or personal circumstances that have resulted in repeated or prolonged interruption of training will be reviewed by the EduCom Chair or forwarded to his/her delegates for arbitration. Table 5 summarizes common and differing aspects of the basic and advanced training periods. The members of the Board of Directors and EduCom have approved a list of suggested solutions for mitigation of the interruption in Fellowship training by the task force. [Appendix (A)]



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## **Maintenance of competence after the Fellowship Program**

EACTAIC undertakes indirect measures for: (1) quality assurance after completion of the Fellowship Program including the collection of feedback from all graduates; (2) a graduate questionnaire to facilitate the search for suitable post-graduate job opportunities and; (3) re-accreditation of host centers every 4 years to ensure maintenance of their programs at the required educational standard.

### **Relevant competencies**

In accordance with the CanMEDS competency framework [2, 3, 12] relevant competencies for general and specific medical and non-medical skills are defined as follows:

- Medical expert (defined in accordance with [9, 13, 14])

#### The Fellow

- has gained general and specific knowledge of anatomy and the pathophysiology of all cardiac, thoracic and vascular diseases.
- is able to adequately plan the anesthesia and perioperative care for patients scheduled for a cardiac, thoracic, or major vascular surgery, including individual risk estimation.
- is able to safely provide anesthesia to patients undergoing cardiac, thoracic, or major vascular surgical procedures.
- is competent in basic and advanced vascular access techniques and hemodynamic monitoring.
- is able to interpret the results of common diagnostic tools including imaging (radiographic, computerized tomography scanning, magnetic resonance, echocardiography and coronary angiography), electrocardiogram, standard and point-of-care laboratory testing including biochemistry, hematology, conventional coagulation parameters, thromboelastography/thrombo-elastometry.
- is familiar with the principles of intraoperative neurophysiological monitoring including electroencephalographic estimates of depth of anesthesia such as bispectral index (BIS), near-infrared spectroscopy (NIRS), motor evoked potentials (MEP), somatosensory evoked potentials (SSEP), and intracerebral pressure monitoring (ICP) in procedures with cerebrospinal fluid (CSF) drainage.
- is competent in airway management, including techniques of lung isolation and one-lung ventilation.
- is familiar with the principles and guidelines of patient blood management (PBM).
- is familiar with the principles of extracorporeal circulation and in particular, cardiopulmonary bypass (CPB) and other forms of mechanical cardiocirculatory and respiratory support systems.



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- is competent in the assessment of patients who are to undergo cardiac, thoracic and vascular surgery in a pre-operative clinic. In addition, the Fellow is able to provide a competent consultation at the request of colleagues from his/her own or other disciplines.
  - is able to perform a comprehensive TEE examination and pass the theoretical EACVI TEE Certification Exams preferably by the end of the basic CTVAIC Fellowship training period and complete the EACVI TEE Certification by the end of advanced CTVAIC Fellowship training period.
- Communicator  
The Fellow
    - communicates clearly and competently both with patients and with other professionals.
    - accurately elicits and synthesizes relevant information and perspectives of patients and their families, medical colleagues, and other healthcare professionals.
    - effectively communicates information about patients verbally and in writing.
- Collaborator  
The Fellow
    - can discuss perioperative management and patient-related decisions comprehensively within a multi-disciplinary environment.
    - works effectively with other healthcare professionals to prevent, negotiate and resolve professional and interdisciplinary conflicts [8].
- Academic Scholar  
The Fellow
    - has knowledge of innovations and developments in cardiac, thoracic and vascular medicine and is dedicated to updating this knowledge.
    - can critically evaluate medical information and its sources and apply this appropriately to practice decisions, as medical decisions should be based on the best available evidence.
    - actively participates in and promotes clinical research as well as supporting related basic research.
    - develops a teaching portfolio by delivering lectures at local or national cardiac, thoracic and vascular anesthesia educational meetings.
- Professional  
The Fellow
    - acts professionally with respect to the institutional, national and international rules and laws.
    - acts professionally with respect to ethical standards.





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- demonstrates a commitment to physicians health including awareness of burnout syndrome, and sustainable practice.
- **Manager and leader**  
The Fellow
  - demonstrates management and leadership skills in daily practice.
  - remains composed when under pressure, demonstrating effective leadership and supporting other team members.
  - contributes to the improvement of health care delivery in teams, organizations, and systems.
  - works efficiently and engages in the stewardship of available health care resources.
  - develops an understanding of adult cardiac, thoracic and vascular anesthesia in the greater context of cardiac, thoracic and vascular care within the hospital, community and country. [8]
- **Health advocate**  
The Fellow
  - responds to individual patients' health needs and issues as part of patient care.
  - gives high priority to all aspects of patient safety, both inside and outside of the operating room.

### **Learning objectives [Supplement A]**

On completion of the basic training period, Fellows will be competent in cognitive and practical skills required to undertake cardiac along with or without thoracic and vascular, anesthesia and will be qualified to work as anesthesiologists. The minimum duration required for completion of the basic training is 12 months of full-time employment. Successful completion of the basic program entitles the candidate to progress to the advanced program. For each domain, learning objectives are divided into the knowledge, skills and attitudes that are deemed necessary to achieve the required level of competence, as defined by the Union Européenne des Médecins Spécialistes [2, 3, 12]:

- A: observer level (has knowledge of, describes).
- B: performs, manages, demonstrates under direct supervision.
- C: performs, manages, demonstrates under distant supervision.
- D: performs, manages, demonstrates independently

The Fellow should receive clear learning objectives before the start of each basic and advanced training rotation. and before the start of each evaluation period which will be every 4 months. To ensure that all content and skills can be trained sufficiently during the Fellowship, EACTAIC requires a minimum number of procedures and/or patients treated in each domain. The candidate must have met these minimum requirements before applying for the final assessment.

## **Learning and teaching methods**

### **Adult cardiac, thoracic and vascular anesthesia education**

Regular attendance at subspecialty educational meetings including lectures, interactive conferences, hands-on workshops, morbidity and mortality reviews, cardiology and echocardiography conferences, cardiac, thoracic and vascular surgery conferences, journal review clubs, and research seminars that are offered by the training facility, is expected.

### **Active participation**

Active participation in adult cardiac, thoracic and vascular anesthesia will be incorporated into the planning and production of educational activities. The faculty will lead in the majority of sessions.

### **Attendance**

Attendance at multidisciplinary conferences, particularly in cardiovascular medicine and cardiothoracic surgery, will be encouraged.

### **Academic assignment**

The Fellow will complete a minimum of one academic assignment. Academic projects may include presentations at grand rounds, writing and publication of review articles, book chapters, and manuals for teaching or clinical practice, clinical research investigation or other scholarly activities. The project selection will require the advance approval of their program director. A minimum of one of the faculty members at each host center is required to present or publish at least one scientific contribution with the Fellow during their training year, as evidence of scientific engagement or as a part of the training.

### **Exchange with other training facilities**

Fellows may participate in exchange programs with other institutions to gain specific clinical experience in certain subspecialties that are underrepresented in their host centers, for example, anesthesia for heart and lung transplantation. Such exchanges are at the discretion of the program director, but there should be prior communication with, and approval by the Chair of the EACTAIC EduCom.

## **Assessment**

### **General principles of assessment**

At four-month intervals and at the end of each training rotation, the faculty members who are responsible for training, submit a critical evaluation of competencies that Fellows have acquired, to the CTVAIC Program Director using a standardized format. The evaluations will assess essential and acquired character attributes, level of knowledge, clinical judgment and psychomotor skills, as well as specific



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procedural skills needed for patient management and critical analysis of clinical situations. Fellows must obtain a satisfactory overall evaluation on completion of their basic training in order to receive certification.

### **Assessment of Fellows**

The elements listed below will form part of the assessment of Fellows during their training. In addition to evaluation by faculty members or their representatives, including members who are not included in the EACTAIC accredited faculty but have supervised their clinical practice, it will be essential for Fellows to learn from reflection on their training experiences.

Following assessment tools should be used:

- Evaluation discussions held every four months or end of advanced training modules
- During discussions with Fellows, the tutor or Head of Training will address:
  - Results of 360-degree evaluations\* and clinical skills evaluations\*\*
  - Personal reports from the faculty (if available).
  - Reflection and self-assessment by Fellows.
  - Learning goals for the next four months.
  - Feedback from Fellows on the quality of the education and any aspects of the curriculum that are not being addressed by their training.

The mandatory tasks that must be evaluated during the Fellowship are:

- Pre-anesthetic evaluation including age-related alterations and frailty assessment for risk stratification.
- Induction of anesthesia in adult patients undergoing cardiac, thoracic and vascular surgery.
- Placement of central venous lines with or without ultrasonic imaging.
- Placement of arterial lines with or without ultrasonic imaging.
- Management of weaning from CPB.
- Placement/insertion of pulmonary artery balloon catheters.
- Lung isolation techniques and fiberoptic bronchoscopy.

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\*360-degree evaluation of CanMEDS competencies is a diagnostic tool that helps candidates improve their personal competencies and supports their self-assessment. During the basic Fellowship at least one 360-degree feedback must include at least 5 colleagues invited to submit an evaluation of the competencies of the candidate. Feedback is restricted to internal sources including supervising anesthetists, surgeons, intensivists, cardiologists, nurses using a standardized questionnaire based on existing multi-source feedback forms [13].

\*\* Clinical skills evaluation (CSE) is intended to give feedback to Fellows about their ability to plan and perform various clinical tasks. CSE is to be performed by a supervisor, the head of training, or another appropriate person (cardiothoracic anesthetist) based on a standardized form which can be based on already existing forms [3]. With the aim of having an objective tool and through Direct Observation of Procedural Skills (DOPS), the task force developed a checklist for the quantitative assessment of the standard steps for each of seven clinical skills included in the first edition, so as to promote transparency and equality of their assessment across the different Fellows and host centers [Supplement B].

## **Documentation**

Fellows are required to maintain a record of their training in the form of a logbook during their Fellowship. If available, an electronic system such as a computer database may be used. The information required to be documented in the logbook is as follows:

- Anonymized record of patients managed by Fellows during their Fellowship. The data set recorded for each case must include a minimum of age, gender, ASA, type of surgery, anesthetic procedure(s), relevant co-morbidities, and if applicable, EuroSCORE II.
- Reports of TEE exams which must comply with the EACVI reporting requirements (eLogbook).
- Summaries of their four-monthly evaluations and related discussions.
- Results of their clinical skills evaluations.
- 360-degree multi-source feedback.

## **External evaluation and assessment**

At the end of the Fellowship, the logbook and all its contents with the exception the 360-degree multisource feedback, will be sent to the Chair of the EduCom. The Chair of the EduCom will forward it to two EACTAIC representatives who are external to the host center, for assessment. In addition, Fellows are required to undergo an exit interview by an Advisory Committee formed by two external assessors and the program director from the host center. The sequence of steps required to organize the exit interview have previously been published [Appendix B]. [6] Fellows can apply for the interview once they have met the requirements for number of procedures, required internships outside the operating room, clinical skills evaluation (CSE) and 360-degree evaluation.

Recommendations for the structure of the exit interview to be undertaken at the end of each year of the EACTAIC CTVAIC Fellowship Programs have been developed to promote transparency and equality in the assessment of Fellows by different interviewers and to exclude potential bias or conflicts of interest as well as provide a template for future interviewers. [Supplement C]

The external evaluation and assessment is scored pass/ fail or yes/ no (360-degree evaluation). An average score of 70% or more is required to pass [Supplement D; EACTAIC Evaluation Form and Scoring Sheet]. [10] The Advisory Committee will provide feedback to Fellows, describing both the strengths and weaknesses of their documentary evidence. Fellows will be awarded certification if they obtain a 'pass' mark on CSE and complete all other assessment tools e.g., 360-degree evaluation. If this is not the case, training will be deemed incomplete, and the Fellow cannot be awarded certification in the EACTAIC Fellowship Program. These Fellows will have to be enrolled for an additional period of training at the host center under either direct or remote supervision in order to satisfactorily fulfill the requirements.



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Fellows who feel they were unfairly denied certification and wish to appeal (together with the Program Director) against the decision made following the exit interview must inform the EACTAIC EduCom Chair within seven calendar days of the decision or interview with a written statement providing the reasons for the appeal. [7] The appeal must be submitted in the form of a signed and dated letter and sent by registered mail or by email within the expiration period. The decision of the Advisory Committee regarding the appeal will be communicated to Fellows within twenty calendar days. The appeal process is performed according to the defined scheme (Appendix C). [7]

A request by a third party to participate in the exit interview may be made to the Board of Directors, which will consider such requests on a case-by-case basis. The following conditions must be met before a request can be made: 1. a statement signed by all parties that they have no objection to the request; 2. statement by the applicant that his/her presence is solely for the purpose of facilitating the interview, including a detailed explanation of how this will be accomplished; 3. statement by the applicant that all parties have the right to interrupt the conversation and remove the applicant if necessary for the proper conduct of the discussion. In such a case, reasons for the arrived decision will be recorded.

#### **Program assessment and escalating issues**

There will be regular opportunities for Fellows to provide confidential written evaluations of the faculty and program to the EduCom Chair. [8] Fellows who experience difficulty during the training period, may turn for advice to their Program Director, faculty members, or the head of the department at their host center. A Fellow who feels unable to approach any of these people should contact the Chair of the EACTAIC EduCom. The Chair can provide confidential, neutral, independent, and informal advice to help Fellows address their concerns. The Chair of the EACTAIC Education Committee can accompany Fellows in discussions of their problems or issues with faculty or administrators, and act as an informal mediator between the trainee and the faculty or administrators. The Chair can also help effect positive change by providing feedback on patterns of problems and complaints submitted to the Program Director. Fellows can contact the Chair of the EACTAIC Education Committee with general questions either by email, telephone or in person.

Periodic evaluation of patient care for quality assurance, is mandatory. Subspecialty trainee Fellows in cardiac, thoracic, and vascular anesthesia will be involved in ongoing quality improvement and risk management. [15] Fellows in cardiac, thoracic and vascular anesthesia will actively participate in the periodic evaluation and reassessment of their Fellowship training goals and objectives. [8]

Unforeseen circumstances such as a personal conflict between a Fellow and one or more tutors, should be reported immediately to the EduCom. The Board of Directors then has the right to appoint an independent EACTAIC officer as a “mentor” to assist and to help resolve the circumstances as well as to protect both parties. Should any conflict arise for example, between Fellow and Program Director or



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Program Director and EduCom then de-escalating measures will be instituted before any restrictions are considered (Appendix D)



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### **Limitations of the surveys**

The two surveys have some limitations. The ideal Delphi process aims to reach consensus by soliciting the opinions of experts through a series of iterative questionnaires. In contrast, our questionnaires included the rationale for the proposed changes and the concerns of working group members about whether those changes should be included in the second version. However, as despite the concerns expressed and evidenced by the consensus reached for many proposed changes, we do not believe that respondents' answers in these survey rounds were biased.

### **Conclusion**

EACTAIC continues to develop its Fellowship programs with the goal of ensuring high-quality, standardized education in Europe and worldwide so as to train highly skilled and competent perioperative physicians capable of caring for patients undergoing cardiac, thoracic, and vascular anesthesia and critical care. To achieve this, a consensus was required among centers offering Fellowship programs on the knowledge, skills, and competencies required for mastery of cardiac, thoracic, and vascular anesthesia and critical care. Resulting from this consensus, the second edition of the EACTAIC Fellowship Curriculum was developed that encompasses basic and advanced training and certification requirements as well as the required educational objectives, relevant competencies, and learning and teaching methods to achieve high-quality, standardized training. Subsequently, the revised curriculum has been endorsed by the European Society of Anaesthesia and Intensive Care. Future evaluations of both graduating Fellows and the CTVAIC Fellowship Program will be critical to demonstrate the validity and effectiveness of the revised curriculum.



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**Tables**

**Table 1a. Traffic light responses to first questionnaire.**

Voting in the first questionnaire on the importance of the proposed changes are based on a traffic light scale where *green* means the changes should be included, *yellow* means they would be useful to be included, and *red* means they are not important enough to be included.

	<b>Suggested Changes</b>	<b>Green</b>	<b>Yellow</b>	<b>Red</b>
1.	Before being accepted as a Fellow, candidates must have a valid license to practice medicine in the host country and a valid specialist degree examination in anesthesiology which is recognized in the host country.	24/31 (77%)	5/31 (16%)	2/31 (7%)
2.	EACTAIC allows flexibility in the rotation of the Fellow between the various training rotations so as not to burden the host center's schedule. However, the Fellow should complete the total number of days at the end of the training year to meet the minimum required duration of the basic and advanced training rotations.	29/31 (94%)	2/31 (6%)	0/31 (0%)
3.	Alternatively, host centers may be accredited to offer training only in cardiac, cardiothoracic, cardiovascular, or thoracic and vascular anesthesia. In these cases, the 12 months of basic training should be devoted to the specialties offered.	25/31 (81%)	6/31 (19%)	0/31 (0%)
4.	Working time directives should always be observed in accordance with applicable national law. Overtime must be compensated.	26/31 (84%)	5/31 (16%)	0/31 (0%)
5.	The CTVAIC Fellowship program should be completed within a 24-month training period and should not be interrupted by frequent and/or extended absences due to illness or personal circumstances. No significant extension of training period is required to compensate for annual and sick leave as outlined in the signed employment agreements, unless the Fellow does not meet the training objectives and the minimum number of cases and rotations required.	31/31 (100%)	0/31 (0%)	0/31 (0%)
6.	Extended absence from training due to sick leave or personal circumstances will require a reasonable extension of the training period to meet the required minimum training rotations, caseload, and competency levels. EACTAIC education Chair could allow freezing the training programme for a maximum of 6 months in case of legitimate reasons for medical or family leave of absence.*	29/31 (94%)	2/31 (6%)	0/31 (0%)
7.	EACTAIC recognizes completion of this training period as basic EACTAIC Fellowship. Completion of the EACTAIC basic Fellowship training is a prerequisite for participation in the	25/31 (81%)	4/31 (13%)	2/31 (6%)



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	EACTAIC advanced Fellowship training program. EACTAIC will issue the basic training certificate as soon as possible after completion of the basic training period and passing the exit interview.			
8.	The Fellow should receive clear learning objectives from the program director prior to the start of each basic and advanced training rotation.	19/31 (61%)	11/31(36%)	1/31 (3%)
9.	The number of thoracic cases required should be increased from 25 to 30 in the dedicated 1.5-month rotation and/or centers should be encouraged to establish contractual arrangements with nearby centers with a high volume of thoracic cases to offer exchange Fellowship rotations in thoracic anesthesia.	17/31 (55%)	9/31 (29%)	5/31 (16%)
10.	The number of minimum vascular cases required should be increased from 25 to 30 within the dedicated 1-month rotation and/or encourage centers to have contractual agreements with close centers with a high volume of vascular cases to offer exchange Fellowship training rotations in vascular anaesthesia.	18/31 (58%)	8/31 (26%)	5/31 (16%)
11.	A one-month rotation in the PACU at institutions with a fast-track program may substitute for an ICU rotation.	14/31 (45%)	10/31 (32%)	7/31 (23%)
12.	The training rotation in the ICU or PACU should be well structured to acquire the required knowledge, skills and competencies.	28/31 (90%)	2/31 (7%)	1/31 (3%)
13.	Fellows who have prior experience in a dedicated ICU for the care of patients in cardiac, thoracic, and vascular anesthesia (e.g., through residency or a specific period of formal training) may be exempt from the one-month ICU rotation.	13/31 (42%)	11/31 (35%)	7/31 (23%)
14.	Specification of techniques: e.g., techniques of extracorporeal circulation including ECMO, mechanical circulatory support, and ventricular assist devices.	20/31 (65%)	9/31 (29%)	2/31 (6%)
15.	Specification of training in echocardiography: training in TTE and TEE in accordance with EACVI through training courses, classical teaching and simulation-based training whenever possible.	23/31 (74%)	8/31 (26%)	0/31 (0%)
16.	Exchange programs: Fellows may participate in exchange programs with other institutions to gain specific clinical experience in certain subspecialties that are underrepresented in their host centers, such as anesthesia for heart and lung transplantation.	17/31 (55%)	11/31 (35%)	3/31 (10%)
17.	There is a greater need for more training in research during the training year. **	7/31 (22%)	12/31 (39%)	12/31 (39%)
18.	There is a need for increased exposure to complex cases during the advanced training year.**	14/31 (45%)	12/31 (39%)	5/31 (16%)
19.	It is necessary to use the University Hospital of Southampton competency checklist instead of the CanMEDS levels for	8/31 (26%)	17/31 (55%)	6/31 (19%)



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	assessing skills and knowledge in the curriculum, overlooking case numbers and focusing on competency levels.			
20.	At four-month intervals and at the end of each training rotation, the faculty members responsible for training the Fellows submit a critical evaluation of each Fellow's acquired competencies to the CTVAIC program director using a standardized form.	18/31 (58%)	6/31 (19%)	7/31 (23%)
21.	A request to participate in the exit interview may be made to the board of directors, which will consider such requests on a case-by-case basis. The following conditions must be met before a request can be made: 1. a statement signed by all parties that they have no objection to the request; 2. statement by the applicant that his/her presence is solely for the purpose of facilitating the interview, including a detailed explanation of how this will be accomplished; 3. statement by the applicant that all parties have the right to interrupt the conversation and remove the applicant if necessary for the proper conduct of the conversation. In such a case, the reason for the decision should be recorded.	19/31 (61%)	11/31 (36%)	1/31 (3%)

\*Despite this consensus, 73% of respondents voted for interrupting the Fellowship training for acceptable medical and family reasons for up to 6 months period. \*\* The need for more research training in the curriculum was excluded because only 61% of respondents chose green or yellow traffic lights to rate its importance of including.

Where EACTAIC, European Association of Cardiothoracic Anesthesiology and Intensive Care; CTVAIC, Cardiothoracic and Vascular Anesthesia and Intensive Care; PACU, postanesthesia care unit; ICU, intensive care unit; ECMO, extracorporeal membrane oxygenation; EACVI, European Association of Cardiovascular Imaging; TTE, transthoracic echocardiography; TEE, transesophageal echocardiography; CanMEDS, please refer to [2,3,12]



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**Table 1b. Scaled responses to first questionnaire.**

Consensus analysis to incorporate the changes identified in the first questionnaire based on a five-point ordinal Likert scale. Consensus was defined as 70% or more agreement.

	<b>Variable</b>	<b>Strongly agree</b>	<b>Agree</b>	<b>Neither agree, nor disagree</b>	<b>Disagree</b>	<b>Strongly disagree</b>
1.	Before being accepted as a Fellow, candidates must have a valid license to practice medicine in the host country and a valid specialist degree examination in anesthesiology which is recognized in the host country.	22/31 (71%)	5/31 (16%)	2/31 (7%)	1/31(3%)	1/31(3%)
2.	EACTAIC allows flexibility in the rotation of the Fellow between the various training rotations so as not to burden the host center's schedule. However, the Fellow should complete the total number of days at the end of the training year to meet the minimum required duration of the basic and advanced training rotations.	19/31 (61%)	12/31 (39%)	0/31 (0%)	0/31 (0%)	0/31 (0%)
3.	Alternatively, host centers may be accredited to offer training only in cardiac, cardiothoracic, cardiovascular, or thoracic and vascular anesthesia. In these cases, the 12 months of basic training should be devoted to the specialties offered.	17/31 (55%)	9/31 (29%)	5/31 (16%)	0/31 (0%)	0/31 (0%)
4.	Working time directives should always be observed in accordance with applicable national law. Overtime must be compensated.	19/31 (61%)	8/31 (26%)	3/31 (10%)	1/31 (3%)	0/31 (0%)
5.	The CTVAIC Fellowship program should be completed within a 24-month training period and should not be interrupted by frequent and/or extended absences due to illness or personal circumstances. No significant extension of training period is required to compensate for annual and sick leave as outlined in the signed employment agreements, unless the Fellow does not meet the training objectives and the minimum number of cases and rotations required.	19/31 (61%)	10/31 (32%)	2/31 (7%)	0/31 (0%)	0/31 (0%)
6.	Extended absence from training due to sick leave or personal circumstances will require a reasonable extension of the training period to meet the required minimum training rotations, caseload, and competency levels. The EACTAIC Education	18/31 (58%)	9/31 (28%)	2/31 (7%)	2/31 (7%)	0/31 (0%)



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	Chair could allow legitimate reasons for family or medical leave to freeze the 12 months of training for no more than 6 months.*					
7.	EACTAIC recognizes completion of this training period as basic EACTAIC Fellowship. Completion of the EACTAIC Basic Fellowship training is a prerequisite for participation in the EACTAIC advanced Fellowship training program. EACTAIC will issue the basic training certificate as soon as possible after completion of the basic training period and passing the exit interview.	18/31 (58%)	9/31 (28%)	2/31 (7%)	2/31 (7%)	0/31 (0%)
8.	The Fellow should receive clear learning objectives before the start of each basic and advanced training rotation.	14/31 (45%)	7/31 (23%)	8/31 (25%)	2/31 (7%)	0/31 (0%)
9.	The number of thoracic cases required should be increased from 25 to 30 in the dedicated 1.5-month rotation and/or centers should be encouraged to establish contractual arrangements with nearby centers with a high volume of thoracic cases to offer exchange Fellowship rotations in thoracic anesthesia.	11/31 (36%)	9/31 (29%)	5/31 (16%)	5/31 (16%)	1/31 (3%)
10	The number of minimum vascular cases required should be increased from 25 to 30 within the dedicated 1-month rotation and/or encourage centers to have contractual agreements with close centers with a high volume of vascular cases to offer exchange Fellowship training rotations in vascular anaesthesia.	9/31 (29%)	10/31 (32%)	7/31 (23%)	4/31 (13%)	1/31 (3%)
11	A one-month rotation in the PACU at institutions with a fast-track program may substitute for an ICU rotation.	10/31 (32%)	8/31 (26%)	7/31 (23%)	2/31 (6%)	4/31 (13%)
12	The training rotation in the ICU or PACU should be well structured to acquire the required knowledge, skills and competencies.	10/31 (32%)	8/31 (26%)	7/31 (23%)	2/31 (6%)	4/31 (13%)
13	Fellows who have prior experience in a dedicated ICU for the care of patients in cardiac, thoracic, and vascular anesthesia (e.g., through residency or a specific period of formal training) may be exempt from the one-month ICU rotation.	9/31 (29%)	9/31 (29%)	7/31 (23%)	2/31 (6%)	4/31 (13%)
14	Specification of techniques: e.g., techniques of extracorporeal circulation including ECMO, mechanical circulatory support, and ventricular assist devices.	13/31 (42%)	12/31 (39%)	4/31 (13%)	1/31 (3%)	1/31 (3%)



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15	Specification of training in echocardiography: training in TTE and TEE in accordance with EACVI through training courses, classical teaching and simulation-based training whenever possible.	14/31 (45%)	13/31 (42%)	4/31 (13%)	0/31 (0%)	0/31 (0%)
16	Exchange programs: Fellows may participate in exchange programs with other institutions to gain specific clinical experience in certain sub-specialties that are underrepresented in their host centers, such as anesthesia for heart and lung transplantation.	8/31 (26%)	16/31 (52%)	5/31 (16%)	1/31 (3%)	1/31 (3%)
17	There is a greater need for more training in research during the training year.	5/31 (16%)	6/31 (19%)	9/31 (29%)	9/31 (29%)	2/31 (7%)
18	There is a need for increased exposure to complex cases during the advanced training year.	7/31 (22%)	9/31 (29%)	11/31 (35%)	2/31 (7%)	2/31 (7%)
19	It is necessary to use the University Hospital of Southampton competency checklist instead of the CanMEDS levels for assessing skills and knowledge in the curriculum, overlooking case numbers and focusing on competency levels.	3/31 (10%)	8/31 (25%)	15/31 (48%)	3/31 (10%)	2/31 (7%)
20	At four-month intervals and at the end of each training rotation, the faculty members responsible for training the Fellows submit a critical evaluation of each Fellow's acquired competencies to the CTVAIC Program Director using a standardized form.	10/31 (32%)	11/31 (35%)	5/31 (16%)	3/31 (10%)	2/31 (7%)
21	A request to participate in the exit interview may be made to the Board of Directors, which will consider such requests on a case-by-case basis. The following conditions must be met before a request can be made: 1. a statement signed by all parties that they have no objection to the request; 2. statement by the applicant that his/her presence is solely for the purpose of facilitating the interview, including a detailed explanation of how this will be accomplished; 3. statement by the applicant that all parties have the right to interrupt the conversation and remove the applicant if necessary for the proper conduct of the conversation. In such a case, the reason for the decision should be recorded.	4/31 (13%)	19/31 (61%)	7/31 (23%)	0/31 (0%)	1/31 (3%)

\* Despite this consensus, 73% of respondents voted for interrupting the Fellowship training for acceptable medical and family reasons for up to 6 months period.

Agreements with a rate >70% are marked in grey.



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Where EACTAIC, European Association of Cardiothoracic Anesthesiology and Intensive Care; CTVAIC, Cardiothoracic and Vascular Anesthesia and Intensive Care; PACU, postanesthesia care unit; ICU, intensive care unit; ECMO, extracorporeal membrane oxygenation; EACVI, European Association of Cardiovascular Imaging; TTE, transthoracic echocardiography; TEE, transesophageal echocardiography; CanMEDS, please refer to [2,3,12]





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**Table 2a. Traffic light responses to second questionnaire.**

Votes on the second questionnaire on the importance of the proposed changes are based on a traffic light scale where *green* means the changes should be included, *yellow* means they would be useful to be included, and *red* means they are not important enough to be included.

	<b>Suggested Changes</b>	<b>Green</b>	<b>Yellow</b>	<b>Red</b>
1.	A checklist should be included to quantitatively assess the standard steps for each of the seven clinical skills (already included in the first version of the curriculum) to ensure transparency and equity in the assessment of clinical skills among the different Fellows at the different host institutions and to provide an objective assessment tool.	27/31 (87%)	3/31 (10%)	1/31 (3%)
2.	Recommendations were developed for the structure of the exit interview at the end of each year of the EACTAIC CTVAIC Fellowship Program to ensure transparency and equity in the assessment of Fellows by different examiners and to eliminate potential bias or conflicts of interest.	24/31 (77%)	7/31 (23%)	0/31 (0%)
3.	Fellows may be considered for continuation of the training at the end of the basic training period, even if they have not passed the theoretical part of the EACVI/EACTAIC TEE exam, provided they meet all other requirements, including case numbers, basic rotations, scientific presentations, research activities, etc. In this case, EACTAIC will not issue the certificate of completion of the Basic Fellowship program until the Fellow passes the theoretical part of the TEE exam.	19/31 (61%)	11/31 (36%)	1/31 (3%)
4.	A two-week ICU rotation as part of the four-week basic ICU rotation or a three- to six-month advanced ICU rotation is recommended when possible.	15/31 (48%)	8/31 (26%)	8/31 (26%)
5.	Consider deferring the mandatory passing of the EACVI-EACTAIC TEE theoretical examination to the second, advanced year of training when two years of training are planned and the Fellow needs a long time to achieve the competencies, knowledge, and skills required in the first basic year of training.	15/31 (49%)	12/31 (39%)	4/31 (12%)
6.	In special situations where the Advanced Fellowship position at an EACTAIC-accredited training center cannot be filled by a suitable candidate who has completed the Basic Fellowship training, the title of Advanced EACTAIC Fellowship could be awarded as an honor and prestige to exceptionally qualified candidates through an open selection process, even if they have not completed a formal EACTAIC Basic Fellowship.	11/31 (35%)	4/31 (13%)	16/31 (52%)

Where EACTAIC, European Association of Cardiothoracic Anesthesiology and Intensive Care; CTVAIC, Cardiothoracic and Vascular Anesthesia and Intensive Care; ICU, intensive care unit; EACVI, European Association of Cardiovascular Imaging; TEE, transesophageal echocardiography



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**Table 2b. Scaled responses to second questionnaire.**

Consensus questionnaire on including the changes identified during the second round of surveys based on five-point, ordinal Likert's scale. The sums of percentages may less than 100% due to rounding.

	Variable	Strongly agree	Agree	Neither agree, nor disagree	Disagree	Strongly disagree
1.	A checklist should be included to quantitatively assess the standard steps for each of the seven clinical skills (already included in the first version of the curriculum) to ensure transparency and equity in the assessment of clinical skills among the different Fellows at the different host institutions and to provide an objective assessment tool.	14/31 (46%)	13/31 (42%)	2/31 (6%)	2/31 (6%)	0/31(0%)
2.	EACTAIC host centers should be encouraged to use the DOPS checklists developed by OLV Clinic Aalst as a free smartphone application to assess the clinical skills of Fellows.	9/31 (29%)	12/31 (39%)	7/31 (22%)	2/31 (7%)	1/31 (3%)
3.	Recommendations were developed for the structure of the exit interview at the end of each year of the EACTAIC CTVAIC Fellowship Program to ensure transparency and equity in the assessment of Fellows by different examiners and to eliminate potential bias or conflicts of interest.	13/31 (42%)	15/31 (49%)	3/31 (9%)	0/31 (0%)	0/31 (0%)
4.	Fellows may be considered for continuation of the training at the end of the basic training period, even if they have not passed the theoretical part of the EACVI/EACTAIC TEE exam, provided they meet all other requirements, including case numbers, basic rotations, scientific presentations, research activities, etc. In this case, EACTAIC will not issue the certificate of completion of the Basic Fellowship program until	11/31 (35%)	13/31 (42%)	3/31 (10%)	4/31 (13%)	0/31 (0%)



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	the Fellow passes the theoretical part of the TEE exam.					
5.	The Fellow should receive clear learning objectives before the start of each basic and advanced training rotation.	17/31 (55%)	12/31 (39%)	2/31 (6%)	0/31 (0%)	0/31 (0%)
6.	A one-month training rotation in the PACU to treat patients undergoing cardiac, thoracic, and vascular surgery may be substituted for an ICU rotation.	14/31 (45%)	13/31 (42%)	4/31 (13%)	0/31 (0%)	0/31 (0%)
7.	A two-week ICU rotation as part of the four-week basic ICU rotation or a three- to six-month advanced ICU rotation is recommended when possible.	6/31 (19%)	12/31 (39%)	3/31 (10%)	7/31 (22%)	3/31 (10%)
8.	Consider deferring the mandatory passing of the EACVI-EACTAIC TEE theoretical examination to the second, advanced year of training when two years of training are planned and the Fellow needs a long time to achieve the competencies, knowledge, and skills required in the first basic year of training.	7/31 (23%)	10/31 (32%)	9/31 (29%)	4/31 (13%)	1/31 (3%)
9.	In special situations where the Advanced Fellowship position at an EACTAIC-accredited training center cannot be filled by a suitable candidate who has completed the basic Fellowship training, the title of advanced EACTAIC Fellowship could be awarded as an honor and prestige to exceptionally qualified candidates through an open selection process, even if they have not completed a formal EACTAIC basic Fellowship.	4/31 (13%)	9/31 (29%)	2/31 (6%)	9/31 (29%)	7/31 (23%)

Agreements with a rate >70% are marked in grey.

Where EACTAIC, European Association of Cardiothoracic Anesthesiology and Intensive Care; DOPS, direct observation of procedural skills; OLV, one lung ventilation; CTVAIC, Cardiothoracic and Vascular Anesthesia and Intensive Care; PACU, postanesthesia care unit; ICU, intensive care unit; EACVI, European Association of Cardiovascular Imaging; TTE, transthoracic echocardiography; TEE, transesophageal echocardiography



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**Table 3: Basic CTVAIC Fellowship Rotation Schedule**

<b>BASIC PROGRAM</b>	<b>12 months</b>
<i>Modules*</i>	<i>Minimum requirements*</i>
<p><b>Cardiac anesthesia</b></p> <p><b>Transesophageal echocardiography (TEE)</b> Basic and advanced theory of perioperative cardiac echocardiography according to EACVI.</p> <p>Intraoperative training in TEE according to EACVI standards and performance of a comprehensive examination.</p>	<p><b>7 months</b></p> <p>A minimum of 100 cases with CPB (30% other than CABG surgery).</p> <p>Candidates must pass the theoretical part of the EACVI TEE Certification Exam. *</p> <p>* Fellows may be considered for continuation of the training at the end of the basic training period, even if they have not passed the theoretical part of the EACVI/EACTAIC TEE exam, provided they meet all other requirements, including case numbers, basic rotations, scientific presentations, research activities, etc. In this case, EACTAIC will not issue the certificate of completion of the basic Fellowship program until the Fellow passes the theoretical part of the TEE exam.</p>
<b>Thoracic anesthesia</b>	<p><b>1.5 months</b></p> <p>Minimum of 25 thoracic cases</p>
<b>Vascular anesthesia</b>	<p><b>1 month</b></p> <p>Minimum of 25 major vascular cases</p>
<p><b>Postanesthesia care unit (PACU)</b></p> <p><b>Intensive care unit (ICU)</b></p>	<p><b>1 month</b></p> <p>Focus on postoperative care of patients who undergone cardiovascular or thoracic surgery</p>
<p><b>Transthoracic echocardiography (TTE)</b> (only for cardiac anesthesia)</p> <p>Training in TTE and TEE according to EACVI through training courses, didactic teaching, and simulation-based training whenever possible.</p>	<p><b>0.5 month</b></p> <p>Training provided by cardiologists or echocardiography technicians.</p>
<p><b>Interventional cardiology</b> (only for cardiac anesthesia)</p>	<p><b>0.5 month</b></p> <p>In hybrid operating room or cardiology laboratory</p>
<p><b>Extracorporeal perfusion techniques</b> (only for cardiac anesthesia)</p>	<p><b>0.5 month</b></p> <p>Training provided by perfusionists</p>

CTVAIC means cardiothoracic and vascular anesthesia and intensive care, CPB, cardiopulmonary bypass; CABG, coronary artery bypass grafting; EACVI, European Association of Cardiovascular Imaging.

\*Fellows trained for basic Fellowship in Cardiothoracic and Vascular Anesthesia must complete all modules - according to the time specified. Fellows trained in for basic Fellowship without cardiac anesthesia i.e thoracic and vascular anesthesia, must complete other modules correspondingly longer.



**Table 4: Advanced CTVAIC Fellowship Rotation Schedule**

<b>ADVANCED PROGRAM</b>	<b>3-to-6 months optional modules</b>
<p><b>Advanced Cardiac Anesthesia Fellowship</b></p> <ul style="list-style-type: none"> <li>• Advanced hemodynamic monitoring.</li> <li>• Management of patients with cardiomyopathy, left heart failure, valve diseases, pericardial diseases.</li> <li>• Heart transplantation.</li> <li>• Mechanical circulatory support, e.g., IABP, LVAD, RVAD, Impella, ECMO.</li> <li>• Pulmonary hypertension, RV failure</li> <li>• Fast-track heart surgery.</li> </ul>	<p>3–6 months.</p> <p>Cardiac anesthesia forms the main topic in the advanced training program in cardiac anesthesia.</p> <p>Candidates must succeed in passing the practical part (e-logbook) of the EACVI TEE Certification.</p> <p>Passing both theoretical and practical parts and completion of the certification process by the end of the advanced program is obligatory for Advanced CTVA Fellowship certification.</p>
<p><b>Transesophageal echocardiography</b></p> <ul style="list-style-type: none"> <li>• The accomplishment of the recommended number of TEE studies as defined by EACVI.</li> <li>• Assessments of cardiac pathologies related to main topics in the box above.</li> </ul>	<p>3–6 months.</p> <p>Advanced level of knowledge in perioperative cardiac echocardiography according to the EACVI/ EACTA process of certification guidelines.</p>
<p><b>Advanced Thoracic Anesthesia Fellowship</b></p> <ul style="list-style-type: none"> <li>• Protective one-lung ventilation.</li> <li>• Selective lobar collapse using bronchial blockers.</li> <li>• Lung isolation and one-lung ventilation management including double-lumen endobronchial tubes and bronchial blockers and fiberoptic bronchoscopy.</li> <li>• Regional analgesia techniques for thoracic surgery, including paravertebral, epidural and fascial plane blocks</li> <li>• Ultrasound-imaged regional blocks.</li> </ul>	<p>3–6 months.</p> <p>Thoracic anesthesia forms the main topic in the advanced training program in thoracic anesthesia.</p>
<p><b>Advanced Vascular Anesthesia Fellowship</b></p> <ul style="list-style-type: none"> <li>• Preoperative assessment, risk stratification and medical management of vascular patients.</li> <li>• Elective and emergency open aortic surgery.</li> <li>• Endovascular interventional procedures (EVAR, TEVAR, angioplasty).</li> <li>• Carotid artery interventions.</li> <li>• Pain management in vascular patients, with particular reference to critical limb ischemia.</li> </ul>	<p>3–6 months.</p> <p>Vascular anesthesia forms the main topic in the advanced training program.</p>
<p><b>Advanced Intensive and/or intermediate care of adult cardiothoracic and vascular patients</b></p> <ul style="list-style-type: none"> <li>• Circulatory failure (heart failure, shock, cardiorespiratory arrest, cardiac arrhythmias, ischemic heart disease, pulmonary embolism, major hemorrhage, vasoplegia).</li> <li>• Respiratory failure (ARDS), pulmonary edema, pneumothorax, pneumonia).</li> <li>• Gastrointestinal failure (peritonitis, pancreatitis, liver failure, nonocclusive</li> </ul>	<p>3 – 6 months.</p>



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<p>mesenteric ischemia..</p> <ul style="list-style-type: none"> <li>• Neurological failure (delirium and coma, cerebral ischemia and bleeding).</li> <li>• Airway and chest injuries.</li> <li>• Aortic injuries.</li> <li>• Infectious diseases (SIRS) and sepsis including a sepsis bundle strategy.</li> <li>• Coagulopathies including DIC, heparin resistance, heparin-induced thrombocytopenia, major hemorrhage, transfusion reactions.</li> <li>• Equipment and apparatus (design, physics, standards, limitations, e.g., non-invasive and invasive postoperative ventilation, continuous renal replacement therapy devices, non-invasive and invasive hemodynamic monitoring).</li> <li>• Indication, contraindication, drug selection, complications for sedation, anesthesia, analgesia, neuromuscular blockade, nutrition in the ICU.</li> <li>• Criteria for weaning IPPV and tracheal extubation</li> <li>• Transfer and discharge criteria.</li> <li>• Extracorporeal circulation for cardiac and/or respiratory support (e.g., ECMO).</li> <li>• Respiratory support including endotracheal suction, fiberoptic bronchoscopy including alveolar lavage and sampling, percutaneous tracheotomy, invasive and non-invasive ventilation techniques, use of prone position and weaning IPPV.</li> <li>• Hemodynamic management and stabilization, including advanced cardiovascular monitoring, positive inotropic and vasoactive therapy, basic and advanced life support, defibrillation, cardioversion, pacing.</li> <li>• Fluid therapy, intra-vascular volume management.</li> <li>• Correction of coagulopathy, patient blood management, blood product transfusion.</li> <li>• Acute kidney injury and renal replacement therapy.</li> </ul>	
<p><b>Heart and/or single-and-double-lung transplantation module</b></p> <ul style="list-style-type: none"> <li>• Clinical management of the end-stage heart and lung disease and surgical options for their treatment.</li> <li>• Clinical management of patients waiting heart transplantation.</li> <li>• Current limitations of organ transplantation and efforts to increase the available donor pool.</li> <li>• Multidisciplinary nature of patient evaluation and listing for transplantation.</li> <li>• Donor optimization, management and allograft retrieval.</li> <li>• Ex-vivo heart and lung perfusion.</li> <li>• Physiology of the denervated organ.</li> <li>• Surgical technique of heart transplantation and knowledge of intra-operative and immediate postoperative care, including stability of induction of anaesthesia,</li> </ul>	<p>3 – 6 months.</p>



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<p>ventilation, oxygenation, hemodynamic support, and allograft and noncardiac organ protection.</p> <ul style="list-style-type: none"> <li>• Primary graft dysfunction and indications for mechanical circulatory support.</li> <li>• Surgical options for lung transplantation, including minimally invasive lung transplantation and various intraoperative extracorporeal support mechanisms.</li> <li>• Intra-operative and immediate postoperative care, including protective ventilation, oxygen delivery, hemodynamic support, indications for inhaled nitric oxide and other pulmonary vasodilators, allograft and non-pulmonary organ protection.</li> <li>• Conservative and extracorporeal treatment options for primary lung dysfunction, including ECMO indications for and techniques.</li> <li>• Immunosuppressive regimens.</li> <li>• Postoperative infections and sepsis.</li> </ul> <p>Skills</p> <ul style="list-style-type: none"> <li>• Insertion and interpretation of measurements from invasive arterial and central venous lines and pulmonary artery balloon catheter.</li> <li>• TEE for monitoring left and right ventricular function and diagnosis of primary graft dysfunction/failure.</li> <li>• Regional analgesia for thoracic surgery.</li> </ul>	
<p><b>Organizational or research module</b></p> <ul style="list-style-type: none"> <li>• Communicating effectively with surgical colleagues and other members of the team.</li> <li>• Summarizing a case for transfer to critical care staff.</li> <li>• Understanding how to communicate with patients in ICU who have tracheal intubation.</li> <li>• Recognizing the need for senior help when and where appropriate.</li> <li>• Documenting accurate clinical records.</li> <li>• Presentation to departmental meetings and participating in clinical audits.</li> </ul> <p>Skills</p> <ul style="list-style-type: none"> <li>• Full participation in multidisciplinary clinical audits.</li> <li>• Commitment to continued professional development.</li> </ul>	<p>3–6 months.</p>

Acronyms used: IABP, intra-aortic balloon pump; LVAD, left ventricular assist device; RVAD, right ventricular assist device; ECMO, extracorporeal membrane oxygenation; RV, right ventricle; TEE, transesophageal echocardiography; (T) EVAR, (thoracic) endovascular aortic/aneurysm repair; EACVI, European Association of Cardiovascular Imaging; ARDS, adult respiratory distress syndrome; NOMI, nonocclusive mesenteric ischemia; SIRS, systemic inflammatory response syndrome; DIC, disseminated intravascular coagulopathy; ICU, intensive care unit



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**Table 5: Commonalities and differences between the Basic and Advanced CTVAIC**

**Fellowships**

	<b>Basic Training</b>	<b>Advanced Training</b>
Requirement	Obligatory	Optional
Duration	12 months	12 months
Rotations / Modules	Fixed rotations in different areas	Modular rotations
Prerequisites for entry	Appropriate language skills (B2 and as per the national regulations) License to practice medicine and a specialist degree examination in anesthesiology at national level	Completion of basic EACTAIC training in addition to appropriate language skills (B2 and as per the national regulations) License to practice medicine and a specialist degree examination in anesthesiology at national level if Fellow changes institutions or countries
EACVI TEE Certification (only required for cardiac anesthesia Fellows)	Theoretical part assessed by examination	Practical part assessed by eLogbook
Number of procedures, 360-degree multi-source feedback evaluation and clinical skills evaluation	Reviewed by the end of training	Reviewed by the end of training
Exit exam	No	No
Exit interview to review training	Required at the end of basic training	Required at the end of advanced training

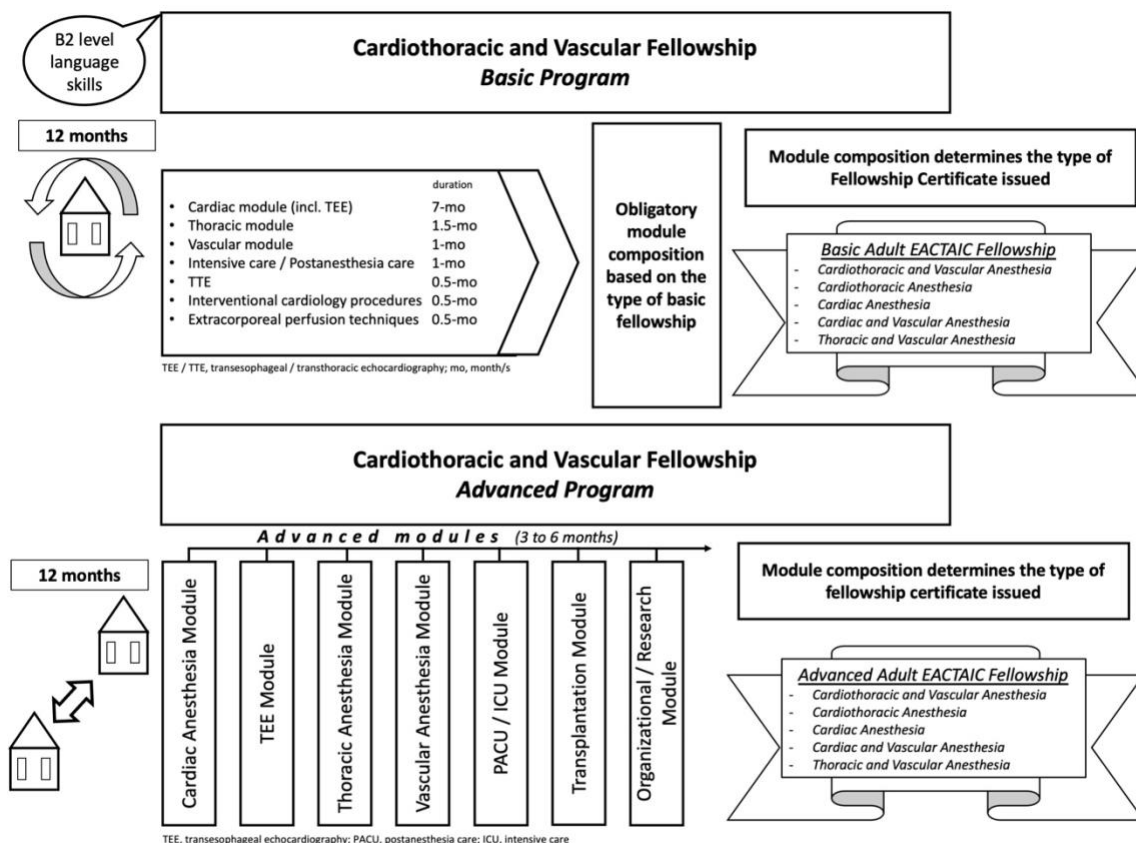
CTVAIC means cardiothoracic and vascular anesthesia and intensive care; EACTAIC, European Association of Cardiothoracic Anaesthesia and Intensive Care; EACVI, European Association of Cardiovascular Imaging; TEE, transesophageal echocardiography.





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Figure 1. Flow chart illustrating the different Fellowship pathways and associated certifications.





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## Appendices

### Appendix A

#### **EACTAIC Regulations for Interrupted Fellowship Training during the Pandemic**

The members of the board of directors and education committee of the European Association of Cardiothoracic Anaesthesiology and Intensive Care (EACTAIC) approved the following suggested solutions for mitigation of the interruption in fellowship training by the task force published in the Journal of Cardiothoracic and Vascular Anesthesia. [1]

- The EACTAIC host centres should ensure ongoing communication with and provide their fellows with accurate local measures to contain COVID-19 infection and protect employees.
- Fellows should be encouraged to participate in online learning activities (e.g., webcasts, webinars, and forums) to improve their cardiothoracic and vascular medicine knowledge and related topics.
- An individual agreement between the host centres and fellows should govern the time frame for medical care of COVID-19 patients and associated ICU/IMC shifts.
- The host centres that cannot afford to pay a monthly salary should offer some privileges/benefits to fellows in charge of caring for COVID-19 patients, such as days off, free meals during shifts, medical benefits if they do not have health insurance, or, if possible, free access to (national and international) training courses (webinars).
- EACTAIC might waive defined lengths of training periods and rotations, or the number of cases required for training periods to move towards a competency-based rather than time-based curriculum.
- The host centres should provide psychological and mental support as necessary.
- EACTAIC will waive the requirement to take the EACVI/EACTAIC certification exam for trans-esophageal echocardiography in 2020/2021, with the exam will be made up and completed at the earliest possible time date.
- Time spent in the ICU during the COVID-19 outbreak should be considered fulfilling the ICU rotation requirements during the mandatory education and training period.
- Extension of the training periods might be required to allow the fellow to fulfil the required number of cases and competency levels.
- Encourage mutual exchange among the mentors for education and lectures.



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- International trainees should be allowed an extended period of time to organize logistics to participate in the fellowship program, which international travel restrictions may hamper.
- The EACTAIC host centres for the EACTAIC fellowship program should pay for the fellows caring for COVID-19 patients.
- EACTAIC offers alternatives for fellows to protect their training time, such as temporary work at other hospitals.
- Working in COVID-19 ICU can be considered as only partial fulfilment for the ICU training rotation.

These regulations are effective on **October 15, 2021**, and applied to the fellows during the pandemic and any unforeseen circumstances.

Prepared by the Task Force on behalf of the members of the Education Committee and Board of Directors: **Mohamed R. El Tahan, MD; Jan-Uwe Schreiber, MD, Ph.D.; Kirstin Wilkinson, MBBS FRCA; Jonathan Huber, BM FRCA, Anna-Flo Forner, MD; Paul Diprose, PhD, FRCA; Fabio Guarracino, MD, Ph.D.; Gabor Erdoes, MD, PhD.**

#### **Reference**

1. Mohamed R El Tahan, Kirstin Wilkinson, Jonathan Huber, Jan-Uwe Schreiber, Anna-Flo Forner, Paul Diprose, Fabio Guarracino, Gabor Erdoes. Challenges in the Cardiothoracic and Vascular Anesthesia Fellowship Program Since the Coronavirus Disease 2019 (COVID-19) Pandemic: An Electronic Survey on Potential Solutions. J Cardiothorac Vasc Anesth. 2022; 36:76-83

## Appendix B

### The recommended structure for Fellowship exit interview.

#### EACTAIC Exit interview

##### The sequence of procedures for exit interviews

1. The Education Chair will assign two members of the Education Committee as interviewers for the exit interview, depending on their availability and interest. The Fellowship host center's submitted material will be made available in advance to the interviewers to allow an initial assessment.
2. A standard letter is sent to the Fellow, the Program Director on site, and the two interviewers with the request to arrange a suitable date and time for all parties within a specified time frame.
3. The interviewers will sign a conflict-of-interest declaration form and a declaration of agreement to share the exit interview recordings with Education Committee panel members in case of an appeal process.
4. The interviewers will review the performance of the Fellow mentioned in the European Association of Cardiothoracic Anesthesiology and Intensive Care (EACTAIC) Fellowship curriculum in a non-standard interview fashion by asking questions, for example, about previous experience, the most challenging case performed, availability of support and mentoring, the Fellow's opinion of the Fellowship program, points for improvement, the intention to receive future Fellowship training, etc. The interviewers can also ask questions about the procedures included in the logbook. Likewise, the Program Director can be asked about training and internal procedures at the center.
5. All exit interviews are planned by the EACTAIC secretariat and made available through a secured Internet access media platform.
6. The Education Chair does not participate in any of the exit interviews to ensure transparency in case of an appeal.
7. All exit interviews will be recorded after obtaining written consents from all participants in compliance with the data protection regulations of the general data protection regulations (GDPR). The recordings are confidential and archived for internal use to communicate the points for improvement to the centers, to handle future complaints and to maintain quality.
8. After the interview, the Education Chair reviews the recording and sends feedback to the local Fellowship Program Director.



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9. The interviewers send the completed and signed standard evaluation form within 24 hours of the exit interview to the Education Chair to issue the fellowship with the Fellowship program's final certificate.
10. After obtaining the interviewers` evaluation forms, the Education Chair reviews all the materials, including recordings, and will communicate feedback to the Fellowship Program Director.
11. Appeals against the Education Chair's decision or the professional conduct of the interviewers will be handled according to the appeal procedure.

## Appendix C

### EACTAIC appeal process

The process for appealing the decisions of an examiner or their professional conduct during an exit interview from an EACTAIC Fellowship

The process for appealing the decisions of an examiner or their professional conduct during an exit interview from an EACTAIC Fellowship

1. Should an European Association of Cardiothoracic Anesthesiology and Intensive Care (EACTAIC) Fellow or their Program Director wish to appeal against the decision made in the exit interview conducted for the EACTAIC Fellowship Program or make a grievance against the professional conduct of an interviewer present at the interview then the Fellow or the Program Director (hereinafter referred to as the appellant) must inform the Chair of the EACTAIC Education within seven calendar days of the interview with a written statement providing the reasons for the appeal. The appeal request must be written in English and sent by registered mail or an email to the Educational Chair.
2. Before the appeal process starts, the interviewer will be informed directly by the Education Chair of the allegations made against him or her and provided with the relevant evidence. If the appeal comes from the Fellow alone, the Education Chair will inform the Fellowship Director of the appeal. At this point, the Education Chair will try to mediate between the affected party so that the initiation of an official appeal may be reconsidered.
3. The appeal process will start if reconciliation proves impossible or if the interviewer's behavior has been unprofessional. The process will only begin after receipt of all the required documents no later than midnight of the seventh calendar day after the exit interview based on the appellant's time zone as identifiable by the date of the registered mail's postmark sending of the email.
4. The EACTAIC Education Chair will formally interview the interviewer to explain their conduct and be questioned on it.
5. After that, the Education Chair calls to action the appeal panel and conducts the appeal in whole or in part as oral interviewing of the panel members and the interviewer. The appeal panel will consist of a minimum of two members of the EACTAIC Education Committee (hereinafter referred to as panel members) or unavailability or conflict of interest, inviting a third-panel member to review the appeal and the exit interview. The selection of the panel members will be the responsibility of the EACTAIC Education Chair. In writing, panel members must confirm that they have no conflicts of interest with either the appellant (Fellow and Program Director) or the examiner. Likewise, the appellant and



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interviewer must provide consent for panel members reviewing the appeal to access the recorded interview.

6. The EACTAIC Education Chair will provide each panel member and the interviewer with all relevant materials and documents concerning the appeal.

7. Response to the appeals will be in the form of written statements by the panel members.

8. Within 20 calendar days of the panel members' appointment and following formal virtual interview with the EACTAIC Education Chair, they independently and confidentially give an account of the situation according to/her assessment and submit their decision and recommendations in writing to the EACTAIC Education Chair.

9. It is the EACTAIC Education Chair and appeal panel's responsibility to recommend an initial decision on the appeal.

10. The EACTAIC Board of Directors has to approve the EACTAIC Education Chair and appeal the panel's decision. The EACTAIC Secretariat will then inform all parties involved: the appellant, the examiner, and the panel members. This ends the appeal procedure finally, and no further appeal will be considered regardless of whether the appellant later cites additional evidence.

11. If the final decision supports the interviewer's professional misconduct, the interviewer should be removed from the EACTAIC Education Committee for their remaining term of office.

12. If the final decision is that the evidence does not support grounds for professional misconduct, the Board of Directors may remove the accusing Program Director from the EACTAIC Education Committee for their remaining term of office.

13. The conduct of every appeal investigation will be reported to the Education Committee once the Board of Directors has approved a decision.

## Appendix D

### Staged approach policy in escalating issues

A staged approach policy in escalating issues with non-compliant host centers for EACTAIC Fellowship Programs

A staged approach policy in escalating issues with non-compliant host centers for EACTAIC Fellowship Programs

1. All centers participating in the EACTAIC Fellowship Program are treated equally and are subject to the same reporting criteria. Where centers do not provide regular reports or become unresponsive, the process described below will be followed by the Chair of the Education Committee or his/her delegate.
2. If hosting centers do not respond or supply regular reports, the local leaders will be emailed with a reminder that this is a requirement of hosting the EACTAIC Fellowship and asked for a response within 15 working days. Where possible, it would be helpful to follow this email up with a phone call.
3. If there is no response within 15 working days, a further email will be sent to both the local program lead and the Head of Department indicating that EACTAIC is concerned about the lack of contact and that regular reporting to EACTAIC is a formal requirement for hosting an EACTAIC Fellowship program. Further, EACTAIC is keen to support all centers and requests an online meeting with the Program Lead and Head of Department to discuss any local problems with the Fellowship program. It will be requested that this meeting takes place within 28 days of the email.
4. If the center engages and local problems are identified, these can be addressed on a case-by-case basis. If there is no response, the Chair of the Education Committee (or delegate) will send an email and a follow-up letter by post to the Program Director with a copy to the Head of Department. This will state that EACTAIC is keen to retain the connection and Fellowship Program at the center, but that engagement with the EACTAIC Education Committee is essential to sustain this. It will be stated that EACTAIC will have to consider withdrawing approval for the Fellowship program unless the center's Fellowship Program Lead meets with EACTAIC representatives online as soon as possible. Further, it will be indicated that EACTAIC will be contacting local EACTAIC Fellows directly for their feedback.
5. If there is still no response after one month, EACTAIC will send an official email and letter indicating that the Fellowship Program's approval at the center will be withdrawn at the end of the tenure of the current Fellows.





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## Supplements

### Supplement A

#### Basic and advanced training topics

#### Basic training (in accordance with [1]) [1-5]

##### 1.1. General patient assessment and risk estimation

Relevant knowledge (generally Level A)

- Physiology of the heart, the circulatory system and the respiratory system. Basic knowledge of embryological development of cardiac, thoracic and vascular structures.
- Pre-operative invasive and non-invasive assessment of cardiac diseases and interpretation of results including electrocardiogram (ECG), chest X-ray, echocardiography, cardiac stress testing, coronary angiography, cardiac magnetic resonance imaging (cMRI), and computer tomography (CT).
- Pre-operative pulmonary evaluation and interpretation of the results, including arterial blood gas and acid-base analysis, pulmonary function tests, oximetry and thoracic imaging.
- Age-related alterations and frailty assessment for risk stratification.
- Patient information and informed consent including medico-legal aspects, appraisal of discernment and consent capacity.
- Principles of risk and outcome assessment and relevant scoring systems (e.g., EuroSCORE).

##### Skills

- Assessment of patients based on physical examination and history with use of appropriate laboratory tests and examinations. [1] **Level C**
- Scores evaluation, e.g., physical status in accordance with American Society of Anesthesiologists (ASA). [1] **Level D**
- Airway evaluation. **Level C**
- Interpretation and limitations of peri-operative monitoring, including invasive and non-invasive cardiac function tests, pulmonary function tests, blood gas analysis, common radiological imaging, coagulation tests, liver and renal function tests, endocrine function tests, and drug monitoring. **Level C**
- Selection and planning of the individual anesthesia technique. **Level C**
- Postponement or cancellation of surgery decision making. [1] **Level C**
- Participation in multi-disciplinary (morbidity) conferences. **Level C**



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- Pre-operative fasting, pre-medication and adaptation of pre-operative drug therapy. **Level C**



## 1.2. Anesthesia management – cardiac surgery

### Relevant knowledge (generally **Level A**)

- Knowledge of anesthetic agents and their effects on cardiac function and in patients with cardiac diseases.
- Principles of intraoperative pharmacology and relevant medication, including positive inotropes, chronotropes, vasoconstrictors, vasodilators, and anti-arrhythmic agents.
- Principles of patient blood management, including specific diagnostic tools, application of relevant medication and blood products.
- Principles of basic hemodynamic monitoring and relevant techniques, such as arterial pressure measurement, central venous pressure.
- Principles of relevant neuromonitoring techniques (e.g., processed electro-encephalography (pEEG), near-infrared sonography (NIRS), somatosensible evoked potentials (SSEP), motor evoked potentials (MEP).
- Principles of conventional cardiopulmonary bypass techniques. Principles of myocardial preservation. Effects of cardiopulmonary bypass on human physiology, organ function, and pharmacology.
- Basic principles of common procedures in cardiac surgery, such as coronary artery bypass grafting (CABG).

### Skills

- Workplace preparation following environmental safety measures and checklists. [1] **Level C**
- Use of technical and medical equipment, inclusive advanced hemodynamic monitoring, neuromonitoring, coagulation monitoring and basic peri-operative TEE. **Level C**
- Provision of safe induction, maintenance, and emergence from anesthesia. **Level C**
- Defibrillation, cardioversion. **Level D**
- Transvenous pacemaker insertion and modes of action; use of a temporary pacemaker. **Level C**
- Central and peripheral venous (ultrasound-guided) access and peripheral arterial catheterization, pulmonary artery catheterization, arterial blood gas collection, and gastric tube insertion. [1] **Level D**
- Blood salvage and transfusion. **Level D**
- Organ systems and hemostasis homeostasis maintenance throughout cardiac surgery procedures. **Level C**
- Interpretation of point-of-care coagulation monitoring such as rotational thromboelastometry (ROTEM) and thromboelastography (TEG). **Level C**
- Management of patients on cardiopulmonary bypass. **Level C**



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- Diagnosis and management of intraoperative critical incidents including. **Level C**
  - allergic reactions, anaphylaxis,
  - gas embolism, aspiration pneumonia and pneumothorax,
  - hypoxia, hypercarbia, hypoventilation, hyperventilation, high ventilator peak inspiratory pressures,
  - hypertension (systemic / pulmonary), hypotension, arrhythmias, myocardial ischemia, cardiac failure, cardiopulmonary resuscitation,
  - oliguria, anuria,
  - intra-operative blood gas and electrolyte disturbances,
  - intra-operative awareness,
  - adverse blood products transfusion reaction,
  - coagulopathy and excessive bleeding,
  - systemic inflammatory response syndrome (SIRS) / postoperative vasoplegic syndrome (PVS).
- Management of patient transport to and from the intensive care unit (ICU). **Level C**
- Consideration of ethical and medico-legal aspects. **Level C**

### 1.3. Anesthesia management – thoracic surgery

#### Relevant knowledge (generally **Level A**)

- Principles of pulmonary evaluation as described previously, and basic knowledge in the interpretation of results from pulmonary function tests, lung perfusion testing and CT.
- Knowledge of the bronchial anatomy.
- Knowledge about relevant anesthetic agents and their effects in patients with lung diseases.
- Principles of intraoperative pharmacology and relevant medication, including bronchodilators and steroids.
- Basic principles of common procedures in thoracic surgery (mediastinoscopy, video-assisted thoracoscopic surgery (VATS), open lung resection, pneumonectomy).
- Basic principles of endoscopic pulmonary procedures, such as bronchial stenting and endoscopic lung volume reduction (ELVR).

#### Skills

- Bronchoscopic examination to verify the position of a lung-separation device and to confirm the correctness of the bronchus to be stapled and the patency of the other bronchi. **Level C**
- Provision of safe induction, maintenance, and emergence from anesthesia in patients undergoing thoracic surgery of varying complexity, including airway management, the decision



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of which drug to use, one-lung ventilation technique, and management of intraoperative adverse events. **Level C**

Management of most common peri-operative critical incidents and complications including:

**Level C**

- bronchospasm,
  - hypoxemia, hypercapnia,
  - pneumothorax,
  - pulmonary hypertension.
- One-lung ventilation with a double-lumen tube. **Level C**
  - One-lung ventilation with other techniques (e.g., Arndt blocker, EZ blocker). **Level B**
  - Postoperative pain management, including epidural and paravertebral analgesia. **Level C**
  - Additional techniques in pain management (e.g., epidural analgesia, truncal blocks, multimodal analgesic techniques). **Level B**

#### 1.4. Anesthesia management – major vascular surgery

Relevant knowledge (generally **Level A**)

- Knowledge of peri-operative management for vascular patients undergoing vascular interventions, including anesthetic choices, perioperative monitoring, and risk identification.
- Basic principles of the peri-operative management of lumbar drainage for aortic interventional procedures.
- Basic principles of spinal cord protection during surgical and interventional aortic procedures.
- Basic principles of neuromonitoring.

Skills

- Pre-operative assessment, risk stratification and medical management of vascular patients. **Level D**
- Provision of safe induction, maintenance, and emergence from anesthesia in patients undergoing vascular surgery of varying complexity, including airway management, the decision of which drug to use, hemodynamic management, and management of intraoperative adverse events. **Level C**
- Management of the most common perioperative critical incidents and complications including **Level C**
  - acute kidney injury,
  - neurological insults,
  - paraplegia,
  - post-reperfusion syndrome.



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- Management of elective and emergency open abdominal aortic aneurysms (AAA) and AAA repair. **Level D**
- Management of carotid endarterectomy, angioplasty, or stenting. **Level D**

## 1.5. Post-operative Critical care

### Relevant knowledge (generally **Level A**)

- Scoring systems in the ICU (e.g., the Sequential Organ Failure Assessment (SOFA), the Simplified Acute Physiology Score (SAPS), the Confusion Assessment Method (CAM)-ICU).
- Etiology, pathophysiology, diagnosis and treatment plans / bundles according to international standards for specific critical conditions in cardiothoracic and vascular surgery patients. [1]
- Circulatory failure (heart failure, shock, cardiorespiratory arrest, cardiac arrhythmias, ischemic heart disease, pulmonary embolism, bleeding complications, vasoplegia).
- Anaphylaxis.
- Respiratory failure, including adult respiratory distress syndrome (ARDS), pulmonary edema, pneumothorax, pneumonia.
- Acute kidney injury and failure.
- Gastrointestinal failure, peritonitis, pancreatitis, liver failure, non-occlusive mesenteric ischemia (NOMI).
- Neurological failure (delirium and coma, cerebral ischemia and bleeding).
- Airway and chest injuries.
- Aortic injuries.
- Infectious diseases (systemic inflammatory response syndrome (SIRS) and sepsis, including sepsis bundle strategy).
- Coagulation disorders (disseminated intravascular coagulopathy (DIC), heparin resistance, heparin-induced thrombocytopenia, severe bleeding, transfusion reaction).
- Equipment and apparatus (equipment design, physics, standards, limitations; e.g. non-invasive and invasive postoperative ventilation, continuous renal replacement therapy devices, non-invasive and invasive hemodynamic monitoring). [1]
- Indication, contraindication, drug selection, complications: sedation, anesthesia, analgesia, neuromuscular relaxation, nutrition. [1]
- Multimodal and pre-emptive analgesia concepts. [1]
- Weaning and extubation criteria. [1]
- Transfer and discharge criteria. [1]
- Indications for and application of extracorporeal circulation in intensive care patients for cardiac and / or respiratory support (e.g., ECMO).



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Skills

- Physical examinations and patient assessment (e.g., respiratory and peristaltic sounds, temperature gradient capillary refill). **Level D**
- Applying sedation, general anesthesia, multimodal analgesia. **Level D**
- Management of the airways, inclusive of emergency intubation. **Level D**
- Central venous, peripheral venous, arterial catheters, and pleural drains insertion using aseptic techniques. **Level D**
- Gastrointestinal tube insertion. [1] **Level D**
- Airway maneuvers inclusive of suction of endotracheal secretions, tracheotomy (percutaneous), bronchoalveolar lavage and sampling. **Level B**
- Invasive ventilation including prone position ventilation and weaning strategies. **Level B**
- Delivery of continuous positive pressure ventilation and non-invasive ventilation. **Level B**
- Hemodynamic stabilization and management, inclusive of pacing, cardioversion, defibrillation, advanced and basic life support, vasoactive and inotropic therapy, advanced cardio-vascular monitoring. **Level B**
- Voluemia management and fluids administration. **Level D**
- Management of blood product transfusion and coagulopathies correction. **Level D**
- Renal replacement therapy and acute renal failure. **Level B**
- Identification of relevant pre-existing co-morbidities. **Level D**
- Responding to trends in physiological variables. **Level D**
- Patient transportation inter- and intra-hospital. **Level B**
- Arterial and central venous line cannulation (ultrasound-guided). **Level D**
- Myocardial infarction, pulmonary embolism, tamponade, hypovolemia. **Level D**
- Assessment of intravascular volume status. **Level C**
- Recognition of substantial pericardial or pleural effusion. **Level B**

## 1.6. Basic peri-operative echocardiography

Relevant knowledge (generally **Level A**)

- Principles of basic theory of peri-operative cardiac echocardiography according to the European Association of Cardiovascular Imaging (EACVI) / EACTAIC process of certification for TEE. [5]

Skills

- Basic levels of peri-operative TEE and lung and vessel ultrasonography as performed in the operating room. **Level C**



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- Performance of the recommended number of peri-operative echocardiography exam according to EACVI / EACTAIC certification guidelines. [5] **Level D**

### 1.7. Anesthesia management – interventional procedures in cardiology

#### Relevant knowledge (generally **Level A**)

- Basic principles of common procedures in interventional cardiology, such as coronary angiography, closures of left atrial appendage and patent foramen ovale, electrophysiology studies including ablation of atrial fibrillation and ventricular tachycardia, transcatheter aortic valve replacement (TAVR), and mitral / tricuspid clipping with relevant complications.
- Procedural sedation guidelines from the European Board of Anaesthesiology (EBA)/ European Society of Anaesthesiology and Intensive Care (ESAIC).[1]
- Monitoring and capnography use according to the safety recommendations from EBA. [1]

#### Skills

- Safe induction of, maintenance of, and emergence from anesthesia in patients undergoing interventional cardiac procedures, including the decision of which drug to use, ventilation techniques, management of airways and management of intraoperative adverse events. **Level C**
- Sedation for invasive procedures in cardiology. **Level D**
- Sedation and anesthesia outside the operating theatre, also considering the local organization and the specific patients and procedures. **Level D**

### 1.8. Extracorporeal perfusion management

#### Relevant knowledge (generally **Level A**)

- Basic principles of extracorporeal perfusion.
- Types of extracorporeal circuits, e.g., cardiopulmonary bypass (CPB), extracorporeal membrane oxygenation (ECMO).
- Types, composition and mechanisms of cardioplegic solutions.
- Cardioprotective measures.
- Safety recommendations for extracorporeal circulation from the European Board of Cardiovascular Perfusion (EBCP).
- Providing the theoretical background of extracorporeal circulation and associated subject areas, including:
  - Anticoagulation monitoring and management. **Level A**
  - Cardioprotective measures including cardioplegia and hypothermia. **Level A**
  - Acid-base management (alpha- vs. pH-stat). **Level A**





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- Management of adverse events including air embolism and mechanical failure of CPB.  
*Level A*



## Advanced training [1-5]

In cooperation with the local Program Director, after the completion of the basic training, the fellow can design the advanced training to include any or a combination of the following options.

### 2.1. Anesthesia management – cardiac surgery

Relevant knowledge (generally **Level A**) as described previously, as well as the followings:

- Principles of advanced hemodynamic monitoring and relevant techniques, such as use of the pulmonary artery catheter, continuous cardiac output monitoring and measurement.
- Principles of modified cardiopulmonary bypass (minimized CPB, left-heart CPB) and the off-pump revascularization technique.
- Principles of advanced procedures in cardiac surgery and clinical management of affected patients (valve surgery and thoracic aortic surgery, including ascending, transverse, and descending aortic surgery with circulatory arrest).
- Principles and state of the art of mechanical support including intra-aortic balloon pumps, and extracorporeal membrane oxygenation.
- Current state of temporary and long-term mechanical circulatory support (ventricular assist devices, total artificial hearts).
- Principles of use of inhaled pulmonary vasodilators (nitric oxide (NO), prostaglandins).
- Principles of fast-track surgery.

Skills as described previously, as well as the followings:

- Clinical management of patients with pericardial diseases. **Level D**
- Management of cardiomyopathy patients and of those with congenital and acquired valvular heart disease, electrophysiological disturbances, congenital heart disease, heart failure, infectious and neoplastic cardiac diseases. **Level D**

### 2.2 Anesthesia management – thoracic surgery

Relevant knowledge (generally **Level A**) as described previously, as well as the followings:

- Principles of common procedures in thoracic surgery (open and thoracoscopic lung resections, robotic lung resection, lung volume reduction surgery, mediastinoscopy, pneumonectomy).
- Principles of diagnostic and interventional bronchoscopic surgery including lung volume reduction, bronchopulmonary lavage; endoscopic, rigid, fiberoptic and laser resection, cryotherapy, bronchial stenting and sealing.



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- Principles of peri-operative management of esophageal surgery for varices, neoplastic, colon interposition, foreign body, stricture, and tracheoesophageal fistula.

Skills as described previously, as well as the followings:

- Alternative ventilation techniques in thoracic surgery (e.g., jet ventilation). **Level D**
- Principles of postoperative chronic pain management. **Level D**

### 2.3. Anesthesia management – major vascular surgery

Relevant knowledge (generally **Level A**), as described previously as well as the followings:

- Knowledge of perioperative management of TEVAR and EVAR.
- Knowledge of the principles of perioperative management of lumbar drainage for aortic interventional procedures.
- Excellent knowledge of the principles of spinal cord protection during surgical and interventional aortic procedures.
- Excellent knowledge of the principles of cerebral function monitoring.

Skills as described previously, as well as the followings:

- The use of rapid ventricular pacing (RVP) during deployment of the stent for TEVAR. **Level B**
- Pain management for patients undergoing vascular procedures. **Level D**
- Anesthesia for peripheral vascular procedures. **Level C**
- Care of patients undergoing limb amputation. **Level D**
- Ultrasound guided peripheral nerve blocks for vascular procedures. **Level C**
- Pain management, with particular reference to critical limb ischemia. **Level B**

### 2.4. Post-operative management/ Critical care

Relevant knowledge (generally **Level A**), as described previously as well as the followings:

- Knowledge of cardiac and thoracic physiology.
- Postoperative cardiac critical care, including analgesia, sedation and ventilation.
- Postoperative care and analgesia after thoracic surgery.
- An understanding of the management of cardiac pacing modes.
- An understanding of extracorporeal membrane oxygenation and other devices used for mechanical circulatory support.

Skills as described previously, as well as the followings:



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- Interpretation of invasive and non-invasive cardiovascular monitoring. **Level D**
- Use of inotropes and vasodilators. **Level D**
- Management of intra-aortic balloon counter pulsation and other mechanical circulatory support devices. **Level C**
- Detection of problems occurring with extracorporeal circulation management. **Level C**
- Anesthesia for procedures in intensive care, including emergency resternotomy, re-intubation, tracheostomy or cardioversion. **Level D**
- Principles and management of chest drains. **Level D**

## 2.5. Advanced perioperative echocardiography

Relevant knowledge (generally **Level A**), as described previously the followings:

- Advanced level of knowledge in peri-operative cardiac echocardiography according to the EACVI/EACTAIC process of certification guidelines. [5]

## 2.6. Heart and/or lung transplantation

Relevant knowledge (generally **Level A**)

- Understanding of the physiology and clinical presentations of end-stage heart and lung disease and surgical options for their management.
- Understanding of the principles of heart transplantation and clinical management of affected patients.
- Knowledge of current limitations of organ transplantation and efforts to increase the suitable donor pool.
- Understanding of the multidisciplinary nature of patient evaluation and listing for transplantation.
- Knowledge of the principles of donor optimization, management and allograft retrieval.
- Knowledge of the principles of ex-vivo heart and lung perfusion.
- Understanding of the physiology of the denervated organ.
- Understanding of the surgical conduct of heart transplantation and knowledge of intra-operative and immediate postoperative care, including stability of induction, ventilation, oxygenation, hemodynamic support, and allograft and noncardiac organ protection.
- Understanding of primary graft dysfunction and indications for mechanical circulatory support.
- Understanding of the surgical options for lung transplantation, including minimally invasive lung transplantation and various intraoperative extracorporeal support mechanisms.



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- Knowledge of intra-operative and immediate postoperative care, including protective ventilation, oxygen delivery, hemodynamic support, indications for inhaled NO and other pulmonary vasodilators, allograft and non-pulmonary organ protection.
- Knowledge of the principles of primary lung dysfunction and conservative and extracorporeal treatment options, including indications for and techniques of ECMO
- Understanding of immunosuppressive regimens and the role of postoperative infections and sepsis.

Skills

- Central venous pressure invasive arterial monitoring, pulmonary artery catheter insertion and interpretation. **Level D**
- TEE for monitoring of left and right ventricular function and diagnosis of primary graft dysfunction / failure. **Level C**
- Insertion and management of thoracic epidurals **Level D**

## 2.7. Organizational module

Skills

- Communicating effectively with patients and their families. [2] **Level D**
- Communicating effectively with surgical colleagues. [2] **Level D**
- Communicating with the intubated patient. **Level D**
- Recognizing the need for senior help. **Level D**
- Maintaining accurate clinical records. **Level D**
- Presentations at departmental meetings. **Level D**
- Participation in multi-disciplinary clinical audits. **Level C**
- Commitment to continued professional development. **Level D**

## 2.8. Research module

Relevant knowledge (generally **Level A**)

- Principles of clinical trials, including design, end points, inclusion / exclusion criteria and reporting requirements.
- Understanding of Good Clinical Practice (GCP) requirements for clinical research involving patients.
- Basic knowledge of ethics in clinical and experimental research
- Principles of sample size and study power determinations and basic statistical evaluation.



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- Principles of patient and data confidentiality agreements.
- Understanding tools for data collection, analysis and reporting.
- Principal international basic science priorities in the field of cardiac anaesthesia.
- Ethics and practicalities of biological sample collection, storage and biobanking
- Principles and ethics of scientific publishing.

Skills

- Ability to help design a clinical or basic science research project or part of it as a member of the investigative team. **Level D**
- Ability to help complete an ethics application. **Level C**
- Ability to discuss basic statistical approaches. **Level C**
- Ability to consent, recruit, and follow up research participants according to regulatory frameworks. **Level C**
- Ability to help analyze data. **Level C**
- Ability to contribute to disseminating study results in abstracts, presentations and publications. **Level C**



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## Supplement B

### EACTAIC Checklist for Direct Observation of Practical Skills (DOPS).

#### Direct Observation of Procedural Skills [DOPS] Assessment Form

Please complete the question using a cross (x). Please use black ink and CAPITAL LETTERS

Trainee's surname \_\_\_\_\_

Trainee's forename(s) \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Observation Preoperative evaluation of patients \_\_\_\_\_

National Code \_\_\_\_\_

Observed By \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Date (DD/MM/YYYY) □□/□□/□□□□

Signature of supervising doctor \_\_\_\_\_

What level of supervision does the trainee Supervisor in theatre require for this procedure?	<ul style="list-style-type: none"><li>• Supervisor in theatre</li><li>• Supervisor in theatre suite</li><li>• Distant supervision</li></ul>
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What went well? *	
What could have gone better? *	
Plan for learning and development**	

<b>Possible areas for feedback:</b>
* <i>Planning, preparation, grasp of theoretical background, understood procedure and alternatives, plans and risks explained to patient, handling of patient, team communication, ability to cope with problems, mindful of cross-infection, ability to evaluate own performance, maintenance of records, post-procedure instructions, professional standards</i>
** <i>e-Learning, simulation, courses, targeted clinical experience, journal</i>



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Step	Pass*	Fail*
Knowledge and understanding of the planned surgical procedure		
Preoperative evaluation and understanding of patient's cardiac morbidity and its interaction with the anesthetic procedure		
Preoperative evaluation and understanding of patient's co-morbidities and their interaction with the anesthetic procedure		
Knowledge of the principal risk scores in cardiac surgery (EUROSCORE, STS score) and understanding of the principles of a perioperative risk evaluation		
Structured interview for taking a comprehensive medical history of the patient (according to local standard practice)		
Structured physical examination of the patient (according to local standard practice)		
Evaluation and understanding of required laboratory test results (full blood count and biochemical tests) with particular attention to haemoglobin concentration, coagulation, renal and liver functions, and management of blood product requirements in accordance with local standard practice		
Evaluation and understanding of the patient's electrocardiogram		
Evaluation and understanding of the results of additional pre-operative investigations, including <ul style="list-style-type: none"> <li>• Preoperative echocardiography</li> <li>• Preoperative treadmill testing</li> <li>• Preoperative coronary angiogram</li> <li>• Preoperative pulmonary function tests</li> <li>• Preoperative chest X-ray, CT and MRI scans</li> </ul>		
Knowledge of the correct duration of suspension or management of antiplatelet medication and/or anticoagulants before surgery		
Evaluation of the feasibility of procedure-related regional blocks (neuraxial or peripheral nerve blocks) for thoracic and vascular surgery or postoperative pain management		
Effective communication with the patient during the interview		
Sufficient information provided to the patient regarding <ul style="list-style-type: none"> <li>• The anesthetic procedure including relevant procedure-related risks and adverse events.</li> <li>• Procedure-related options and variations (e.g., regional analgesia for postoperative pain management)</li> <li>• Pre-operative preparation including smoking cessation, durations of fasting and fluid restrictions, peri-operative and premedication</li> <li>• Postoperative critical care in intensive or post-anaesthesia care units</li> </ul>		
Effective and open communication with other involved health professionals in the multidisciplinary team including surgeons, cardiologists, therapists and nurses		
Obtaining informed consent		
Documentation of the patient interview and examination results according to local standard practice		
Effective time management		

\* Please check the relevant box.

Overall rating of the trainee's performance according to UEMS grading <ul style="list-style-type: none"> <li>• A = Only theoretical knowledge, requires demonstration by instructor</li> <li>• B = Still requires direct supervision</li> <li>• C = Prepared to perform under indirect supervision</li> <li>• D = Prepared to perform independently</li> </ul>	
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Repeat of DOPS recommended for progress check (Y /N)?	
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**Direct Observation of Procedural Skills [DOPS] Assessment Form**

**Please complete the question using a cross (x). Please use black ink and CAPITAL LETTERS**

Trainee's surname \_\_\_\_\_

Trainee's forename(s) \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Observation Arterial line insertion \_\_\_\_\_

National Code \_\_\_\_\_

Observed By \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Date (DD/MM/YYYY) □□/□□/□□□□

Signature of supervising doctor \_\_\_\_\_

What level of supervision does the trainee Supervisor in theatre require for this procedure?	<ul style="list-style-type: none"> <li>Supervisor in theatre</li> <li>Supervisor in theatre suite</li> <li>Distant supervision</li> </ul>
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What went well? *	
What could have gone better? *	
Plan for learning and development**	

<b><i>Possible areas for feedback:</i></b>
* <i>Planning, preparation, grasp of theoretical background, understood procedure and alternatives, plans and risks explained to patient, handling of patient, team communication, ability to cope with problems, mindful of cross-infection, ability to evaluate own performance, maintenance of records, post-procedure instructions, professional standards</i>
** <i>e-Learning, simulation, courses, targeted clinical experience, journal</i>



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Step	Pass*	Fail*
Knowledge of anatomy at placement sites including radial, femoral and brachial arteries		
Understanding the indications for placement in a cardiac, thoracic or vascular anaesthesia		
Knowledge of possible adverse events related to the procedure		
Pre-procedure assessment of the patient <ul style="list-style-type: none"> <li>• Patient aware of the procedure, informed consent given</li> <li>• Anatomical situation of the placement site</li> <li>• Additional psychological or pharmacological support including sedation and local analgesia if required</li> </ul>		
Equipment preparation including ultrasound imaging machine if to be used		
Effective positioning of the placement site and use of local analgesia		
Creating and maintaining a septic field.		
Arterial line placement without using ultrasound imaging <ul style="list-style-type: none"> <li>• Identification by palpation</li> </ul>		
Arterial line placement using ultrasound imaging. <ul style="list-style-type: none"> <li>• Effective use of ultrasound imaging technique in- or out-of-plane)</li> </ul>		
Effective use of the chosen of catheter set including catheter over needle or wire)		
Confirmation of correct catheter positioning		
Connecting the cannula to the bedside transducer confirming adequate backflow of arterial blood.		
Fixation of the arterial cannula while maintaining asepsis.		
Confirmation of adequate distal perfusion after cannulation including skin color and capillary refill		
Appropriate documentation of the procedure in patient's clinical records		

\* Please check the relevant box.

Overall rating of the trainee's performance according to UEMS grading <ul style="list-style-type: none"> <li>• A = Only theoretical knowledge, requires demonstration by instructor</li> <li>• B = Still requires direct supervision</li> <li>• C = Prepared to perform under indirect supervision</li> <li>• D = Prepared to perform independently</li> </ul>	
Repeat of DOPS recommended for progress check (Y /N)?	



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**Direct Observation of Procedural Skills [DOPS] Assessment Form**

**Please complete the question using a cross (x). Please use black ink and CAPITAL LETTERS**

Trainee's surname \_\_\_\_\_

Trainee's forename(s) \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Observation Central Venous Catheter insertion \_\_\_\_\_

National Code \_\_\_\_\_

Observed By \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Date (DD/MM/YYYY) □□/□□/□□□□

Signature of supervising doctor \_\_\_\_\_

What level of supervision does the trainee Supervisor in theatre require for this procedure?	<ul style="list-style-type: none"><li>• Supervisor in theatre</li><li>• Supervisor in theatre suite</li><li>• Distant supervision</li></ul>
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What went well? *	
What could have gone better? *	
Plan for learning and development**	



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and Intensive Care**

<b><i>Possible areas for feedback:</i></b>
<i>* Planning, preparation, grasp of theoretical background, understood procedure and alternatives, plans and risks explained to patient, handling of patient, team communication, ability to cope with problems, mindful of cross-infection, ability to evaluate own performance, maintenance of records, post-procedure instructions, professional standards</i>
<i>** e-Learning, simulation, courses, targeted clinical experience, journal</i>

Step	Pass*	Fail*
Knowledge of anatomy at placement sites including jugular, subclavian and femoral veins		
Understanding the indications for placement in a cardiac, thoracic and vascular anaesthesia		
Knowledge of the possible adverse events related to the procedure		
Pre-procedure patient assessment <ul style="list-style-type: none"> <li>• Patient aware of the procedure and informed consent provided.</li> <li>• Anatomy of the placement site.</li> <li>• Additional psychological or pharmacological support including sedation and local analgesia if required.</li> </ul>		
Equipment preparation including ultrasound imaging if to be used.		
Effective positioning of the site of placement and local analgesia.		
Creating and maintaining an aseptic field.		
Central venous cannulation without using ultrasound imaging <ul style="list-style-type: none"> <li>• Identification of insertion point by palpation and anatomical landmarks</li> </ul>		
Central venous cannulation using ultrasound imaging. <ul style="list-style-type: none"> <li>• Effective use of ultrasound imaging in-or out-of-plane)</li> </ul>		
Effective use of the chosen type of catheter set		
Confirmation of correct catheter positioning including inspection of pressure tracing.		
Fixation of the catheter while maintaining aseptic field.		
Connection of the central venous cannula to the transducer with confirmation of adequate backflow of blood.		
Post-procedure exclusion of adverse events including haemo- and pneumo-thorax)		
Appropriate documentation of the procedure in the patient's case record		

\*Please check the relevant box.

Overall rating of the trainee's performance according to UEMS grading <ul style="list-style-type: none"> <li>• A = Only theoretical knowledge, requires demonstration by instructor</li> <li>• B = Still requires direct supervision</li> <li>• C = Prepared to perform under indirect supervision</li> <li>• D = Prepared to perform independently</li> </ul>	
Repeat of DOPS recommended for progress check (Y /N)?	



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and Intensive Care

**Direct Observation of Procedural Skills [DOPS] Assessment Form**

**Please complete the question using a cross (x). Please use black ink and CAPITAL LETTERS**

Trainee's surname \_\_\_\_\_

Trainee's forename(s) \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Observation Pulmonary Arterial Balloon Catheter positioning \_\_\_\_\_

National Code \_\_\_\_\_

Observed By \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Date (DD/MM/YYYY) □□/□□/□□□□

Signature of supervising doctor \_\_\_\_\_

What level of supervision does the trainee Supervisor in theatre require for this procedure?	<ul style="list-style-type: none"> <li>• Supervisor in theatre</li> <li>• Supervisor in theatre suite</li> <li>• Distant supervision</li> </ul>
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What went well? *	
What could have gone better? *	
Plan for learning and development**	

<p><b><i>Possible areas for feedback:</i></b></p> <p><i>* Planning, preparation, grasp of theoretical background, understood procedure and alternatives, plans and risks explained to patient, handling of patient, team communication, ability to cope with problems, mindful of cross-infection, ability to evaluate own performance, maintenance of records, post-procedure instructions, professional standards</i></p> <p><i>** e-Learning, simulation, courses, targeted clinical experience, journal</i></p>
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Step	Pass*	Fail*
Knowledge of the anatomy at the site of placement including jugular, subclavian and femoral veins		
Understanding the indications for placement in a cardiac, vascular or thoracic anaesthesia		



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and types of introducers used.		
Knowledge of possible adverse events related to the procedure		
Pre-assessment of the patient <ul style="list-style-type: none"> <li>• Patient aware of the procedure and informed consent provided</li> <li>• Anatomy of the site of placement</li> <li>• Additional psychological or pharmacological support including sedation and local analgesia)</li> </ul>		
Proper preparation of monitoring and equipment including ultrasound machine if used		
Effective positioning of the site of placement.		
Establishing and maintenance of an aseptic field.		
Placement without using ultrasound imaging <ul style="list-style-type: none"> <li>• Identification of insertion point by palpation and anatomical landmarks</li> </ul>		
Placement using ultrasound imaging. <ul style="list-style-type: none"> <li>• Effective use of ultrasound imaging in- or out-of-plane)</li> </ul>		
Adequate preparation of the Pulmonary Arterial Balloon Catheter and verification of its functionality		
Effective communication with assisting team members		
Knowledge of catheter positioning in the pulmonary artery with prompt recognition of all pressure curves that will be encountered including right atrial, right ventricular, pulmonary arterial and wedge pressure curves and testing of the catheter.		
Effective site dressing while maintaining asepsis		
After procedure checks for possible adverse events		
Appropriate documentation of the procedure as well as measured and calculated parameters		
Interpretation of Pulmonary Arterial Balloon Catheter measurements and derived calculations including cardiac output, pulmonary artery and wedge pressures and systemic vascular resistance.		

\* Please check the relevant box

Overall rating of the trainee's performance according to UEMS grading <ul style="list-style-type: none"> <li>• A = Only theoretical knowledge, requires demonstration by instructor</li> <li>• B = Still requires direct supervision</li> <li>• C = Prepared to perform under indirect supervision</li> <li>• D = Prepared to perform independently</li> </ul>	
Repeat of DOPS recommended for progress check (Y /N)?	



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**Direct Observation of Procedural Skills [DOPS] Assessment Form**

**Please complete the question using a cross (x). Please use black ink and CAPITAL LETTERS**

Trainee's surname \_\_\_\_\_

Trainee's forename(s) \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Observation Induction of general anesthesia for cardiac surgery \_\_\_\_\_

National Code \_\_\_\_\_

Observed By \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Date (DD/MM/YYYY) □□/□□/□□□□

Signature of supervising doctor \_\_\_\_\_

What level of supervision does the trainee Supervisor in theatre require for this procedure?	<ul style="list-style-type: none"> <li>• Supervisor in theatre</li> <li>• Supervisor in theatre suite</li> <li>• Distant supervision</li> </ul>
--	---

What went well? *	
What could have gone better? *	
Plan for learning and development**	

<p><b><i>Possible areas for feedback:</i></b></p> <p><i>* Planning, preparation, grasp of theoretical background, understood procedure and alternatives, plans and risks explained to patient, handling of patient, team communication, ability to cope with problems, mindful of cross-infection, ability to evaluate own performance, maintenance of records, post-procedure instructions, professional standards</i></p> <p><i>** e-Learning, simulation, courses, targeted clinical experience, journal</i></p>
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Step	Pass*	Fail*
Knowledge of the patient's medical history, medications and relevant co-morbidities		
Knowledge and preparation of the planned surgical procedure		
Understanding the pharmacodynamics and pharmacokinetics of the main drugs used for		



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intravenous induction of general anaesthesia and their effects on cardiovascular function in relation to the planned surgical procedure		
Knowledge and understanding of the possible adverse during intravenous induction in relation to the cardiovascular pathology		
Pre-operative assessment of the patient <ul style="list-style-type: none"> <li>• Patient aware of the procedure, informed consent provided</li> <li>• Surgical safety check</li> <li>• Additional psychological or medical support to patient as required</li> </ul>		
Appropriate preparation of monitoring, equipment, and anesthetic and resuscitative medications		
Correct positioning of the patient prior to induction		
Effective communication with other team members including anaesthetic assistants, nurses, perfusionists, surgeons		
Safe and effective dosing of intravenous inductions agents.		
Effective and correctly timed, administration of adjuvant medication including antibiotics and antifibrinolytics.		
Effective maintenance of hemodynamic stability		
Effective management of intravenous fluids during induction of anaesthesia.		
Effective and safe airway management including mask ventilation, tracheal intubation, mechanical ventilation parameters and post-intubation checks.		
Confirmation after induction of anaesthesia functioning monitoring and mechanical ventilation and stable hemodynamics prior to surgical preparation of the patient		
Appropriate documentation of induction of anaesthesia on the patient records		
Planning of appropriate intraoperative maintenance of anaesthesia and postoperative analgesia		

\*Please check the relevant box

Overall rating of the trainee's performance according to UEMS grading <ul style="list-style-type: none"> <li>• A = Only theoretical knowledge, requires demonstration by instructor</li> <li>• B = Still requires direct supervision</li> <li>• C = Prepared to perform under indirect supervision</li> <li>• D = Prepared to perform independently</li> </ul>	
Repeat of DOPS recommended for progress check (Y /N)?	





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**Direct Observation of Procedural Skills [DOPS] Assessment Form**

**Please complete the question using a cross (x). Please use black ink and CAPITAL LETTERS**

Trainee's surname \_\_\_\_\_

Trainee's forename(s) \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Observation Weaning off cardiopulmonary bypass \_\_\_\_\_

National Code \_\_\_\_\_

Observed By \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Date (DD/MM/YYYY) □□/□□/□□□□

Signature of supervising doctor \_\_\_\_\_

What level of supervision does the trainee Supervisor in theatre require for this procedure?	<ul style="list-style-type: none"> <li>• Supervisor in theatre</li> <li>• Supervisor in theatre suite</li> <li>• Distant supervision</li> </ul>
--	---

What went well? *	
What could have gone better? *	
Plan for learning and development**	

<p><b><i>Possible areas for feedback:</i></b></p> <p><i>* Planning, preparation, grasp of theoretical background, understood procedure and alternatives, plans and risks explained to patient, handling of patient, team communication, ability to cope with problems, mindful of cross-infection, ability to evaluate own performance, maintenance of records, post-procedure instructions, professional standards</i></p> <p><i>** e-Learning, simulation, courses, targeted clinical experience, journal</i></p>
---

Step	Pass*	Fail*
Understanding of the techniques and requirements to achieve safe and effective weaning including heart rhythm, mechanical ventilation, hemodynamics, and transoesophageal echocardiographic examination		



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Knowledge of the available positive inotropes, vasopressors, and adjuvant agents including nitric oxide and methylene blue.		
Preparation for weaning using a systematic approach using an institutional checklist when available		
Pre-weaning communication with the team and anticipation of potential difficult weaning including prolonged durations of aortic clamping and CPB, as well as signs of vasoplegia.		
Recognition of the correct timing to start the weaning off CPB		
Re-starting mechanical ventilation with adequate setting of ventilation parameters		
Effective use of positive inotropic support and proper hemodynamic management at the start of weaning		
The use and operation of temporary pacemaker.		
The use and operation of mechanical circulatory support including the IABP (optional)		
Effective closed communication with the multiple disciplinary teams including anaesthetic assistant, surgeon, perfusionist and nurses during the procedure		
Adequate management of intravascular fluid transfusion, blood products, and positive inotropic support based on echocardiographic imaging and/or hemodynamic monitoring including ABP, PAP, LAP, PAOP and CVP.		
Anticipation of hemodynamic event including heart rhythm, intravascular volume replacement and positive inotropic support.		
Effective pharmacological management of coagulopathies including the use of point-of-care diagnostics.		
Effective ongoing management of hemodynamics until arrival to the intensive care unit		

\* Please check the relevant box.

Overall rating of the trainee's performance according to UEMS grading <ul style="list-style-type: none"> <li>• A = Only theoretical knowledge, requires demonstration by instructor</li> <li>• B = Still requires direct supervision</li> <li>• C = Prepared to perform under indirect supervision</li> <li>• D = Prepared to perform independently</li> </ul>	
Repeat of DOPS recommended for progress check (Y /N)?	



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**Direct Observation of Procedural Skills [DOPS] Assessment Form**

**Please complete the question using a cross (x). Please use black ink and CAPITAL LETTERS**

Trainee's surname \_\_\_\_\_

Trainee's forename(s) \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Observation One-Lung Mechanical Ventilation \_\_\_\_\_

National Code \_\_\_\_\_

Observed By \_\_\_\_\_

National license number (The NUMBER MUST BE COMPLETED) \_\_\_\_\_

Date (DD/MM/YYYY) □□/□□/□□□□

Signature of supervising doctor \_\_\_\_\_

What level of supervision does the trainee Supervisor in theatre require for this procedure?	<ul style="list-style-type: none"> <li>• Supervisor in theatre</li> <li>• Supervisor in theatre suite</li> <li>• Distant supervision</li> </ul>
--	---

What went well? *	
What could have gone better? *	
Plan for learning and development**	

<p><b><i>Possible areas for feedback:</i></b></p> <p><i>* Planning, preparation, grasp of theoretical background, understood procedure and alternatives, plans and risks explained to patient, handling of patient, team communication, ability to cope with problems, mindful of cross-infection, ability to evaluate own performance, maintenance of records, post-procedure instructions, professional standards</i></p> <p><i>** e-Learning, simulation, courses, targeted clinical experience, journal</i></p>
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Step	Pass*	Fail*
Understanding of the techniques and knowledge of the ways to achieve lung isolation appropriate to the surgical procedure and anatomy of the airway for example, double-lumen endobronchial tube or endobronchial blocker.		



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Appropriate pre-procedural planning of chosen technique including an alternative technique in case of an unexpected difficulties ('Plan B')		
Knowledge of the possible adverse events and their cardiopulmonary consequences as well as their management related to the procedure and to one-lung ventilation		
Pre-operative assessment of the patient <ul style="list-style-type: none"> <li>• Patient aware of the procedure and informed consent provided</li> <li>• Assessment of a difficult airway and tracheobronchial anatomy using CXR, CT and bronchoscopy</li> <li>• Additional psychological or medical support including sedation and analgesia if required</li> </ul>		
Appropriate preparation of monitoring and equipment including bronchoscope.		
Appropriate positioning of patient		
Effective placement of a double-lumen endobronchial tube using a conventional or video laryngoscope or a tube with an embedded camera.		
Ability to perform time effective, flexible fiberoptic bronchoscopy to verify the correct positioning of the DLT including identification of the relevant anatomical landmarks.		
Optional: effective placement of an endobronchial blocker via a single-lumen tracheal tube including effective use of bronchoscopy for the placement in a reasonable time		
Safe and effective use of 'protective' ventilation parameters for one-lung mechanical ventilation		
Effective lung collapse of the lung in the surgical field		
Intraoperative management of one-lung ventilation, including re-expansion of the excluded lung at the end of the surgery.		
Identification and management of inadequate lung collapse		
Identification and management of mispositioning of the DLT or bronchial blocker		
Identification and management of intraoperative shunting, hypoxemia, and post-surgical air leak.		
Appropriate documentation of the procedure		

\* Please check the relevant box.

Overall rating of the trainee's performance according to UEMS grading <ul style="list-style-type: none"> <li>• A = Only theoretical knowledge, requires demonstration by instructor</li> <li>• B = Still requires direct supervision</li> <li>• C = Prepared to perform under indirect supervision</li> <li>• D = Prepared to perform independently</li> </ul>	
Repeat of DOPS recommended for progress check (Y /N)?	

**Prepared by the Task Force from Education Committee**

Maria Benedetto, Bologna, Italy  
Stefaan Bouchez, Aalst, Belgium  
Jan Schreiber, The Netherlands  
R Peter Alston, UK  
Mohamed R. El Tahan, Egypt

## **Supplement C**

### **Recommendations for a structure of the exit interview to be performed at the end of each year of the EACTAIC CTVA Fellowship Programme**

#### **Background**

The EACTAIC Cardiac, Thoracic and Vascular Anaesthesiology (CTVA) Fellowship programme provides a curriculum and clinical structure to train anaesthesiologist to provide safe and effective perioperative care of patients undergoing cardiac, thoracic or vascular surgery over a period of one or two years.

#### **Objectives**

The purpose of the exit interview is to ensure that the Fellows are well-trained, and accredited practitioners who can safely deliver perioperative care to patients undergoing anaesthesia for cardiac, thoracic, and vascular surgery and postoperative critical care. [1, 2] To ensure that assessment of Fellows will be transparent, unbiased and objective, a standardized structure should be used for exit interviews at the end of their Fellowship years'. The structure does not aim to be prescriptive as candidates will have different parts of their development and training that merit greater or lesser engagement.

#### **Source of Information**

The recommendations are based on two years' experience of the EACTAIC Education Committee organizing and analyzing the 19 exit interviews performed at the 8 host centres accredited EACTAIC.

#### **Structure**

- Generally, the exit interviews will be undertaken virtually as face-to-face meetings.
- The interviews should be allocated a minimum duration of 30 minutes. [1, 2]
- Examiners should have equal durations of time to interview the candidate. The two examiners should agree in advance how the timing of the interview should be divided between themselves and which areas each will address. [1]
- Two examiners should agree in advance who is going to chair the interviews.
- The EACTAIC examiners assess the competences of applicants using the standardised structure. [1]
- The EACTAIC Education Chair transcribes and analyses the recordings qualitatively using frame-based headlines for consistency in case of appeals raised.

#### **Opening and Setting the Scene**



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- First, the examiners, applicants and supervisors should introduce each other.
- The examiner who is chairing should explain to the fellow that the exit interview is not an exam to assess the applicant's knowledge or skills but only a friendly exit interview to exchange experiences among centres, learn from each other, and receive the fellows' feedback so as to improve the curriculum and EACTAIC programmes.

The purpose of the questions should be to check competencies. General but also, specific areas for example, about the clinical management of a vitium or a problem, may be asked. **The main questions** that should be addressed are as follows.

1. Logbook and portfolio.
2. Completing the training rotations
3. Clinical Management (Knowledge and Technical skills) [1]
4. Non-technical skills, including:
  - Practice-based learning.
  - Communication with surgeons, nurses, perfusionists, and other peers including preoperative assessment, closed-communication in the operating room and postoperative management.
  - Communication skills to transfer information, explain the risks, or deliver adverse information to the patients and their families.
  - Professionalism.
5. Academic achievements including the following.
  - Audit.
  - Research opportunities.
  - Teaching opportunities.
  - Presentations.
  - Scientific writing.
6. Any interruptions in their fellowship training, if any occurred.
7. Any opportunities for Exchange training.
8. The Fellow's insight for self-assessment
  - Areas of practice that they have mastered during their fellowship.
  - Any deficiencies in their knowledge, skills or clinical experience and how they will address them.
  - How they have and will address adverse clinical outcomes
9. Future professional development
  - Future career.
  - Future training.



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10. Feedback from the Fellow on

- Training procedures.
- EACTAIC fellowship
- The obstacles faced during the fellowship
- What might they personally do differently if they were to do it again?
- TOE training and examination.

**References**

1. Sholinghur HK. Preparing for the MMC interviews: a practical guide for trainees. Psychiatric Bulletin (2008), 32,113^115. doi:10.1192/pb.bp.107.015016
2. Greatorex J, Shannon M. How can NVQ assessors' judgements be standardized? University of Cambridge Local Examinations Syndicate. <https://www.cambridgeassessment.org.uk/Images/109712-how-can-nvq-assessors-judgements-be-standardised-.pdf> Accessed February 22,, 2022.

**Prepared by the Task Force**

Peter R Alston, Scotland

Jan Schreiber, The Netherlands,

Gabor Erodes, Switzerland.

Mohamed R. El Tahan, Egypt.



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## Supplement D

### Fellowship Exit Interview - Evaluation and Scoring Sheet

#### EACTA Evaluation and Scoring Sheet

Fellow's Name:

The final evaluation consists of four assessment tools that are graded by the Advisory Committee: (1) number of cardiac, thoracic, and vascular procedures and TEE/TTE performed, (2) number of internships outside the operating room (OR), (3) results of 360-degree evaluation, and (4) results of clinical skills evaluation (CSE). These documents will be submitted to the Advisory Committee at least two weeks before the interview to give adequate time to review. These evaluation tools are scored by each member of the Advisory Committee, with an average score of 70% or above required to pass. The literature review is scored pass/fail, and a passing grade is required by at least 2 members of the Committee. The Committee should provide feedback to the Fellow, describing both the strengths and weaknesses of each document.

	PROPOSAL	REVIEW
SCORES: 1	<u>Number of procedures</u>	PASS / FAIL
2	<u>Number of internships outside the OR</u>	PASS / FAIL
3	<u>Results of 360-degree evaluation</u>	PASS / FAIL
4	<u>Results of clinical skills evaluations</u>	PASS / FAIL

AVERAGE





European Association of  
Cardiothoracic Anaesthesiology  
and Intensive Care

_____	_____
<i>Committee Member (1)</i>	<i>Date</i>
_____	_____
<i>Committee Member (2)</i>	<i>Date</i>
_____	_____
<i>Program Director</i>	<i>Date</i>

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