

Examinations in intensive care medicine: an international perspective

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The term "examination" is derived from the Latin *examen*¹ (ie, inspecting, weighing and testing; from Latin *examen*, the tongue of a balance). The testing of educational achievement in medicine is frequently accomplished through examinations — at the end of basic training, with success in the examination a requirement for entry into advanced training (eg, the Royal College of Physicians and Royal Australasian College of Physicians), and at the end of advanced training (eg, the Joint Faculty of Intensive Care Medicine [JFICM]).

The examinations are designed as a comprehensive test of medical knowledge and may incorporate assessments of clinical competence. In a number of countries, success in the examination is essential to acquire specialist status, along with other requirements such as apprenticeship time and theses. It is recognised that the methods for assessing competence in intensive care vary widely among different countries.

Educational theory suggests that there is no ideal method for assessing educational outcomes and that multiple formats and exposures may be required.²

The educational committee of the World Federation of Societies of Intensive and Critical Care Medicine recently published the results of a study of education and training in intensive care medicine around the world.³ Forty-five countries were surveyed: 26 in Europe, eight in South America, four in Asia, three in Africa and the Middle East, two in North America and two in Australasia. The cardinal findings of the study were:

- 43 of the 45 countries had formal training programs in intensive care medicine (Table 1). In most countries, intensive care medicine was a superspecialty (ie, the trainee should already have completed a primary specialty). It was a primary specialty in 9%.
- Not all the training programs had a formal curriculum.
- The duration of training varied across the programs, with a mean duration of about 24 months.
- An examination was mandatory in only 25 of the 43 countries.

The authors concluded that there is considerable global variation in access, duration, and content of national training programs in intensive care medicine, and also in methods of assessment and accreditation.³

In this, the first of a series of articles on certification in intensive care medicine, we aim to provide a global per-

spective on methods of assessment and certification in intensive and critical care medicine, and to compare methods used in different countries with the Australasian JFICM assessment scheme. The JFICM scheme includes a comprehensive examination, which has been in place since 1979 and continues to evolve.

Below we describe the procedures of selected countries. These have been chosen as examples from each continent to provide a broad overview of existing international examination processes in intensive care medicine. The formats were current at the time of writing.

Australasia^{4,5}

Diploma of the Joint Faculty of Intensive Care Medicine

Administering body: JFICM of the Australian and New Zealand College of Anaesthetists (ANZCA) and the Royal Australasian College of Physicians (RACP).

Year of commencement: 1979.

Examinations: A primary and a fellowship examination.

Primary examination

The primary examination is sat during the 3 years of basic training, before commencement of advanced training. The examination is held annually and focuses on the basic sciences. At present, candidates must pass or be exempt from this examination before entering advanced training.

Fellowship examination

The fellowship examination is sat after 12 months of core intensive care training (during the 3 years of advanced training).

The format of the examination is:

- A written section comprising two 150-minute papers, each containing 15 short-answer questions. Candidates are required to obtain a mark greater than a predetermined threshold before being invited to attend the clinical and oral sections of the examination.
- A clinical section comprising two 20-minute hot cases (patients in the ICU) and two 10-minute cold cases (non-ICU cases).
- Cross-table viva section comprising six 10-minute tables.

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- Objective structured clinical examination (OSCE) section comprising 10 10-minute stations, including investigations, equipment, monitoring and communication stations (as well as the two clinical cold cases).

Assessment: To pass the fellowship examination, candidates must secure an overall mark of 50% and individually pass three of the four sections (written, clinicals, vivas and OSCEs). Failure in more than one section or a bad performance in the clinical section results in an overall fail, irrespective of the total mark secured.

Pass rate: The average pass rate is of the order of 65%.

A similar process has been developed for paediatric intensive care, with the first examination held in 1997.

Requirements for certification

Award of the Diploma of the JFICM requires:

- 6 years of postgraduate experience after the intern year (postgraduate year [PGY] 1) — 3 years of basic training and 3 years of advanced training. These must include at least 2 years of ICU, 1 year of anaesthesia, and 1 year of medicine.
- Successful completion of a formal project.
- Successful completion of the fellowship examination.
- Attendance at a workshop on communication and organ donation.
- Attainment of sufficient satisfactory in-training assessments.

Europe⁶

European Diploma in Intensive Care (EDIC)

Administering body: European Society of Intensive Care Medicine (ESICM).

Year of commencement: 1991.

Components: The examination comprises two parts.

Part I examination

This is a multiple-choice examination with both single and multiple response types (100 questions in 3 hours). It is usually held during the ESICM Annual Congress in September/October and during the Dutch Annual Meeting on Intensive Care Medicine in January/February. Ongoing discussions with the Swiss authorities may result in a common Part I examination. A maximum of three attempts is allowed.

Part II examination

The Part II examination has a clinical component (60–90 minutes) and an oral component (30–40 minutes). The clinical component comprises one long case (30 minutes) plus two short cases (15 minutes each).

Table 1. Countries with formal training programs in intensive care medicine

Australasia

Australia, New Zealand

North America

United States of America, Canada

South America

Argentina, Brazil, Colombia, Chile, Ecuador, Peru, Uruguay, Venezuela

Europe

Austria, Belgium, Bulgaria, Croatia, Czech Republic, Estonia, Finland, France, Germany (examination optional), Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Netherlands, Poland, Portugal, Scandinavia, Slovakia, Spain, Switzerland, Turkey, United Kingdom

Asia

Hong Kong, India, Indonesia, Malaysia

Africa and the Middle East

Egypt, Israel, South Africa

The examination is usually held using a structured, centralised format once or twice annually in each European country if enough eligible candidates have applied. The recommended time to hold the examination is April–June and/or October–November each year. A maximum of four attempts is allowed.

Assessment: A fail in either component is a fail for the examination as a whole. A bare fail in one component may, at the discretion of the examiners, be compensated for by an “excellent” or perhaps by a pass in the other component.

Pass rate: 70%.

United States⁷⁻¹⁰

Administering body: In North America, certification in critical care medicine is offered as a subspecialty by the American Board of Internal Medicine, American Board of Anesthesiology and American Board of Surgery. The information from the American Board of Surgery below is representative of the certification process.

American Board of Surgery Certification in Critical Care

Examination components

The examination is held annually and is entirely written, usually with about 225 questions covering both basic science and clinical subjects. The examination consists of single best-answer questions only. This type of question comprises a brief statement, case history, graph or picture, followed by a question and list of possible options. It is given in computerised testing centres run by a vendor who

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maintains about 225 centres in the country, so candidates generally do not have to travel far to take the examination. *Assessment and pass rate:* The examination is scored using equating methodology, to ensure that passing standards are similar from year to year (Frank Lewis, American Board of Surgery, personal communication). There are no fixed quotas for passing or failing, but generally the pass rate is around 80%. The examination is entirely written multiple choice, and there are no oral examinations or practical examinations involving patients.

Requirements for certification

At least 3 years of clinical training in an accredited surgical residency program are required, plus the attestation of the program director regarding the clinical skills of the candidates. Residents may therefore take a Surgery Critical Care (SCC) fellowship after 3 clinical years, and are allowed to take the examination immediately afterward. If they pass, their certification in SCC is withheld until they complete residency and become certified in surgery, but they do not have to take the examination again.

Canada¹¹

Fellowship (FRCPC or FRCSC)

Administering body: Royal College of Physicians and Surgeons of Canada.

Components

The examination has a written component only. There are separate examinations for candidates in adult and paediatric training programs. The examination comprises two 3-hour papers of short-answer questions. Each paper deals with the principles and practice of critical care medicine and contains questions on the basic and clinical science aspects of critical care, as well as diagnosis and patient management.

Assessment: To pass the examination, candidates must secure an overall mark of 70%.

Pass rate: The average pass rate is of the order of over 90% for candidates with MDs from Canada or the US (Gary Cole, Royal College of Physicians and Surgeons of Canada, personal communication).

Requirements for certification

- Royal College certification in anaesthesia, cardiac surgery, emergency medicine, general surgery or internal medicine (see requirements for these disciplines). Three years of the base specialty must be completed before entry into the critical care medicine program.
- 2 years of adult or paediatric critical care medicine residency, 1 year of which may be undertaken in one of the specialties listed above, with the joint approval of the

program director in the base specialty and the program director of the critical care medicine program. This period must include:

- 1 year of adult or paediatric critical care medicine residency, including direct patient care, consultation, and administration at an appropriate level of seniority.
 - 1 year which must include one or both of:
 - an additional clinical residency relevant to critical care medicine; and
 - pre-approved research relevant to the educational objectives in critical care medicine and acceptable to the residency program director.
- Success in the critical care examination.

South Africa¹²

Certificate in Critical Care (CMSA)

Administering body: Colleges of Medicine of South Africa (CMSA). (CMSA is the parent body which houses all the colleges of the base disciplines, such as the College of Anaesthetists and the College of Surgeons.) The Certificate in Critical Care is offered as a subspecialty by the base discipline college — eg, Certificate in Critical Care (Anaesthetics). Examinations are held twice a year, in March–May and September–October.

Year of commencement: 2002.

Components

The examination comprises:

- A written paper of 3 hours, which comprises four general questions pertaining to the practice of critical care. At least one of the four questions is in the form of multiple-part, short-notes type questions.
- A written paper of 2 hours on data interpretation. This comprises a minimum of 10 short questions on data interpretation pertinent to the practice of critical care in general. A special paediatric Paper 2, focusing on paediatric data interpretation, is set in the event of there being candidates with a fellowship in paediatrics (FCPaed). These candidates answer this paper instead of the general Paper 2.
- An oral examination comprising four parts. Each part is of 15 minutes' duration and is held with an examiner who is a registered critical care specialist.

Assessment:

- Weighting of the examination is: Paper 1, 25%; Paper 2 (data interpretation), 25%; and Oral, 50%.
- Criteria for entry to the oral examinations are:
 - candidates must pass the majority of questions in Papers 1 and 2;
 - candidates must obtain a mark of at least 45% for each written paper; and

Table 2. Countries where success in an intensive care examination is mandatory for certification¹⁴

Argentina	France	Lithuania
Australia	Greece	Netherlands
Belgium	Hong Kong	New Zealand
Brazil	Hungary	Scandinavia
Bulgaria	India	South Africa
Canada	Indonesia	Switzerland
Czech Republic	Ireland	United States
Egypt	Israel	
Estonia	Latvia	

- candidates must obtain a minimum of a 50% average for both written papers.
- Criteria for failing the examination are:
 - failure in two of the four oral examination components;
 - a subminimum of <45% in any one component of the examination (written or oral);
 - a mark >45% but <50% in one component of the examination (written or oral) that is not compensated by the other component; or
 - an average of two components (written and orals) of <50%.

Pass rate: Since inception, the pass rate has been 74% (Dr S Bhagwanjee and Dr PD Gopalan, CMSA, personal communication).

Requirements for certification

- The candidate must have been registered for training in the subspecialty and completed at least 18 months of full-time post-specialisation training in the subspecialty.
- The College Senate, through its Examinations and Credentials Committee, reviews every application for admission to the examination, and may also review and take into account the professional and ethical standing of the candidate. For this purpose the candidate's application to take the examination has to be supported by a written report from the head of his or her critical care training unit or division.
- The candidate must be registered to practise internal medicine, paediatrics, surgery, anaesthetics, obstetrics and gynaecology, neurosurgery or cardiothoracic surgery as a specialist.
- The candidate must be successful in the exit examination.

India¹³

Administering body: Critical care certification in India is offered by two bodies, the National Board of Examinations and the Critical Care Education Foundation.

National Board of Examinations

The National Board of Examinations was established in 1975 and provides fellowship training in a number of superspecialties. Recently, it has started to provide a fellowship in critical care. There are two examinations, an entrance examination (to gain entry to the fellowship) and an exit examination.

Final assessment

Before being deemed eligible to be assessed for the award of fellowship, the candidate must furnish:

- The prescribed application form signed by the head of the department and institution;
- A log book and competency grid; and
- A competence certificate to appear for the final examination on completion of the prescribed course of training from the head of the department.

Assessment comprises a theory examination, viva voce and a clinical component. The pass mark is 60%.

Requirements for certification

- Registration with the National Board.
- Log book and competency grid.
- Competence certificate to appear for the final examination on completion of the prescribed course of training from the head of the department.
- Success in the exit examination.

Critical Care Education Foundation (CCEF)

The Critical Care Education Foundation has run an independent training scheme and an examination in critical care medicine since 2004. There are two examinations: a primary and a final certificate examination. The final examination consists of a written multiple-choice question paper, OSCEs, vivas, and a clinical section comprising both ICU cases and ward patients.

Further information

A list of other countries¹⁴ where success in the intensive care examination is mandatory for certification is shown in Table 2.

Contacts for further information about the highlighted examinations are shown in the Appendix.

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Appendix. Contacts for further information about the examinations

Australasia

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North America

<http://www.abim.org>
<http://www.theaba.org>
<http://www.absurgery.org>

Canada

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South Africa

Mrs Ann Vorster, Colleges of Medicine of South Africa
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