COMPETENCES REQUIRED FOR APPLICANTS TO ATTAIN STATE REGISTRATION AS CLINICAL SCIENTISTS

SPECIALTY : RESPIRATORY PHYSIOLOGY

Association of Clinical Scientists

This document comprises a discipline-specific version of the general competence document and provides additional guidance as to how to complete the general document, Appendix 1 of the Guidelines, that you must submit with your application.

Remember that the aim of the process is for the candidate to satisfy the assessor that he or she has the appropriate basic qualifications and length of experience for issue of the Certificate of Attainment, and that the training programme/period of supervised practice has enabled the candidate to achieve the basic level of competence required for registration as a clinical scientist.

Created: 19 August 2002
Modified: 1 July 2009
Reference: DOC-ACS013-Specific Competences-Clinical Physiology-Respiratory Physiology
Version: Rev-04 – Re-mapping to revised HPC Competences and Re-Titled Professional Accountability competence area.

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GENERIC COMPETENCES		SPECIFIC COMPETENCES
HPC Standards of Proficiency Code - Clinical Scientist	**1-SCIENTIFIC**	Be able to demonstrate the rigorous application of scientific methods in his/her experience to date
3a.1	• understanding the science that underpins the specialty (modality) and the broader aspects of medicine and clinical practice	• must understand the principles of the techniques and investigative procedures undertaken within the discipline of respiratory physiology and in respiratory medicine • must be able to advise on the choice of appropriate investigative and therapeutic procedures based on the clinical condition and presenting symptoms of the patient and the results of previous investigations where appropriate • must be familiar with the evidence for and limitations of common investigative and therapeutic procedures relevant to respiratory physiology, used in the diagnosis and management of patients • must have a basic knowledge of related disciplines in order to be able to integrate relevant results into an overall interpretation of the clinical condition
3a.1	• demonstrating a strong base of knowledge appropriate to the specialty and to the investigations and therapeutic options available	
2b.1	• experience of searching for knowledge, critical appraisal of information and integration into the knowledge base	
2b.4	• ability to apply knowledge to problems associated with the routine provision, and development, of the service	
2a.1	• ability to identify the clinical decision which the test/intervention will inform	
2a.3, 2c.1	• ability to make judgements on the effectiveness of procedures	
2a.2	• application of the knowledge base to the specialty (modality) and to the range of procedures/investigations available	

Achievement of:	• an understanding of the principles, applications and limitations of the physiological measurement and diagnostic techniques employed in the practice of respiratory medicine • a detailed understanding of the application of different investigative, diagnostic and therapeutic procedures in the assessment of the respiratory system and the ability to recognise the necessity for performing specific test procedures where clinically appropriate • a critical understanding of the integration and interpretation of the results of specific investigative parameters in respiratory physiology with other diagnostic modalities (eg imaging, haematological, immunological) in the overall assessment of the patient
Achieved through:	• a structured taught element (eg MSc course, lecture programme) and participation in appropriate training and assessment programmes conducted by approved specialist societies (eg ARTP/BTS) • continued self-endeavour (eg literature research and critical appraisal) under supervision of a state registered clinical scientist in respiratory physiology
Assessed by:	• the locally nominated supervisor-usually a state registered clinical scientist in respiratory physiology and as part of the professional body (ARTP/BTS) examination of competences

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GENERIC COMPETENCES		SPECIFIC COMPETENCES
HPC Standards of Proficiency Code - Clinical Scientist	**2-CLINICAL**	Be able to demonstrate the following relevant to the contribution of his/her specialty to patient care:
2a.4, 2b.2, 2c.1	• ability to provide interpretation of data and a diagnostic (therapeutic) opinion, including any further action to be taken by the individual directly responsible for the care of the patient	• must have a detailed understanding of the normal functioning of the respiratory system and of the human body as a whole, in order to provide a foundation for the understanding of different disease processes that may be encountered within the discipline • must understand the underlying mechanisms of the pathophysiology of respiratory disease and the impact that systemic diseases may have on the functioning of the respiratory system • must be able to recognise changes in relevant signs, symptoms and measured parameters (ie test results) and relate them to the underlying pathology of specific diseases and conditions associated with the respiratory system • must be able to recognise significant changes in relevant signs, symptoms and measured parameters and understand the effects of diagnostic or therapeutic procedures in order to interpret any changes in the clinical condition • must be able to contribute to the monitoring and ongoing management of patients with respiratory disease those with respiratory abnormalities • must have adequate clinical knowledge in order to be able to communicate effectively with clinical and other professional colleagues with the working environment
2b.3, 3a.1	• understanding of the wider clinical situation relevant to the patients presenting to his/her specialty	
2b.3	• ability to develop/devise an investigation strategy taking into account the complete clinical picture	
1a.5, 3a.2	• understanding of the clinical applications of his/her specialty and the consequences of decisions made upon his/her actions/advice	
3a.2	• awareness of the evidence base that underpins the use of the procedures employed by the service	

Achievement of:	• an understanding of the normal anatomy and physiology of the respiratory system and the effects of different disease processes on the functioning of the respiratory system as a whole • an understanding of the mode of action and efficacy of different therapies (both pharmacological and non-pharmacological) and the mechanisms by which they may modulate disease processes in clinical respiratory medicine • an understanding of the methods by which different investigative procedures may be utilised in order to achieve an appropriate clinical interpretation and assessment of the clinical condition
Achieved through:	• a structured taught element (eg MSc course, lecture programme) and participation in appropriate training and assessment programmes conducted by approved specialist societies (eg ARTP/BTS) • participation in departmental seminars and clinical meetings, audit and clinical report evaluation • continued professional development and self-endeavour (eg literature awareness) under supervision of a registered clinical scientist in respiratory physiology
Assessed by:	• the locally nominated supervisor-usually a state registered clinical scientist in respiratory physiology and as part of the professional body (ARTP/BTS) examination of competences

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GENERIC COMPETENCES		**SPECIFIC COMPETENCES**
HPC Standards of Proficiency Code - Clinical Scientist	**3-TECHNICAL**	Be able to demonstrate the following, relevant to the modality or area of specialisation in which he/she wishes to be recognised
3a.2	• understanding of the principles associated with a range of techniques employed in the modality	• must have a detailed understanding of investigative techniques and therapeutic procedures (eg dynamic lung volumes, static lung volumes, gas transfer, body plethysmography, field exercise testing, challenge testing) with a knowledge of test protocols and recognised national/international standards of practice • must be competent to perform investigative and therapeutic investigations in respiratory physiology (eg dynamic lung volumes, static lung volumes, gas transfer, body plethysmography, field exercise testing, challenge testing) using a variety of techniques in a range of patients across the spectrum of disease severity • must have detailed understanding of physiological measurement techniques together with knowledge regarding the pathophysiology of lung disease in order to investigate and resolve problems associated with both measurement and calibration errors and those related to respiratory disease • must be able to interpret quality control and quality assurance data and take appropriate corrective action where necessary • must understand principles and practice with respect to health and safety aspects of work eg sterilisation and disinffection techniques, gas cylinders etc and take appropriate corrective action where necessary
2b.4	• knowledge of the standards of practice expected from these techniques	
2b.4	• experience of performing these techniques	
2b.4	• the ability to solve problems that might arise during the routine application of these techniques (troubleshooting)	
2c.1, 2c.2	• understanding of the principles of quality control and quality assurance	
2c.1, 2c.2	• experience of the use of quality control and quality assurance techniques including restorative action when performance deteriorates	
Achievement of:	• an ability to perform a range of investigative techniques and therapeutic procedures in respiratory medicine to the required standards of an operational protocol as defined for the purposes for laboratory accreditation or under the guidance of the recognised professional body (ARTP/BTS) • a critical ability to review results and relate the findings to both disease pathophysiology and to quality control and assessment information used for measurement procedures within the respiratory function laboratory • a detailed understanding of the measurement principles involved in the respiratory function laboratory (operation of analysers, flow/volume measuring devices etc) in order to facilitate troubleshooting and to develop adequate procedures of preventative maintenance • an understanding of the hazards (environmental, biological, chemical, physical) associate with the operating of the respiratory function laboratory and knowledge of the appropriate controlling legislation and procedures for risk assessment	

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Achieved through:	• a structured taught element (eg MSc course, lecture programme) and participation in appropriate training and assessment programmes held by the approved specialist societies (ARTP/BTS) • practical instruction and experience (with completion of a log-book) and participation in local courses eg manual handing, fire and electrical safety, basic and hospital life support, VDU awareness • continued professional development and self-endeavour (eg literature awareness) under the supervision of a state registered clinical scientist in respiratory physiology
Assessed by:	• the locally nominated supervisor-usually a state registered clinical scientist in respiratory physiology and as part of the professional body (ARTP/BTS) examination of competences

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GENERIC COMPETENCES		**SPECIFIC COMPETENCES**
HPC Standards of Proficiency Code - Clinical Scientist	**4-RESEARCH AND DEVELOPMENT**	Be able to demonstrate a training in research which should include:
2b.1	• ability to read and critically appraise the literature	•must have developed basic research skills and be capable of problem solving, troubleshooting and to undertake investigations of unanswered questions •must have basic research skills including the ability to identify potential problems, formulate specific hypotheses and to develop and implement an experimental plan to investigate and resolve the problem •must have developed the skills to search appropriate databases for information including use of specific application eg Medline, Embase, BIDS •must have an understanding of the ethics of human (medical) research including data protection, ethical approval and responsibility for anonymous data
2b.1	• ability to develop the aims and objectives associated with a project	
2b.1	• ability to develop an experimental protocol to meet the aims and objectives in a way that provides reliable and robust data (i.e. free of bias)	
2b.1	• ability to perform the required experimental work ability to produce and present the results (including statistical analysis)	
2b.1	• ability to critically appraise results in the light of existing knowledge and the hypothesis developed and to formulate further research questions	
1b.4, 2b.1	• ability to present data and provide a critical appraisal to an audience of peers – both spoken and written	

Achievement of:	• a critical understanding of scientific and research methodology in order to successfully evaluate, develop and/or modify both current and emerging technologies as routine diagnostic tools in routine respiratory physiological measurement • the development of research skills and expertise sufficient to support supervised and collaborative research projects in respiratory physiology and for other related disciplines • the development of skills to perform an effective literature survey and to consolidate and evaluate the information obtained from all available sources
Achieved through:	• participation in departmental seminars and clinical research meetings and evidence of supervised and collaborative research initiatives, potentially leading to a higher degree (MSc/MPhil/PhD) • the presentation of outcomes of method evaluations or clinical investigations, protocol development and research projects of a standard suitable for publication • continued self-endeavour (eg literature research and critical appraisal) under the supervision of an appropriate accredited specialist in respiratory physiology
Assessed by:	• the locally nominated supervisor-usually a state registered clinical scientist in respiratory physiology and as part of the professional body (ARTP/BTS) examination of competences

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GENERIC COMPETENCES		**SPECIFIC COMPETENCES**
HPC Standards of Proficiency Code - Clinical Scientist	**5-COMMUNICATION**	Be able to communicate in both the written and spoken media to colleagues, peers and patients:
1a.6	• ability to assess a situation and act accordingly when representing the specialty	• must be able to communicate effectively with colleagues within the discipline and in the wider clinical community (including patients, carers and relatives) • must be able to present findings of clinical research projects in both written and oral communication through reports, scientific papers, posters, seminars and lectures • must be able to educate and train colleagues and be able to undertake the responsibility of supervising junior colleagues • must be capable of utilising modern communication media eg Powerpoint
1a.6	• ability to respond to enquiries regarding the service provided when dealing with clinical colleagues	
1a.2, 1b.1, 1b.3	• ability to communicate with patients, carers and relatives, the public and other healthcare professionals as appropriate	
1b.3, 1b.4	• ability to communicate the outcome of problem solving and research and development activities	
2b.1	• evidence of presentation of scientific material at meetings and in the literature	
Achievement of:	• an ability to communicate clearly and with confidence to clinical and other professional colleagues both within and outside the profession of respiratory medicine in both a formal and informal setting • an ability to educate and train others both within and outside the respiratory department and to supervise the work of trainees and other staff • an understanding of all aspects of information technology pertinent to service provision and support of a respiratory function laboratory and the research function	
Achieved through:	• a structured taught element (eg MSc course, lecture programme) and participation in appropriate training and assessment programmes conducted by the approved specialist societies (eg ARTP/BTS) • presentations in both oral and written format within and outside the department through seminars, tutorials, posters and appropriate peer-reviewed publications • participation in local seminars and meetings, clinical audit and clinical report evaluation • self endeavour (eg competence in word processing and other PC based applications)	
Assessed by:	• the locally nominated supervisor-usually a state registered clinical scientist in respiratory physiology and as part of the professional body (ARTP/BTS) examination of competences	

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GENERIC COMPETENCES		**SPECIFIC COMPETENCES**
HPC Standards of Proficiency Code - Clinical Scientist	**6-PROBLEM SOLVING**	Be able to deal with the unexpected and thus be able:
2a.2	• to assess a situation	• must have the ability to assess a situation and determine the nature and severity of problems relating to both equipment used in respiratory physiology measurement and those encountered during the testing procedure • must have the knowledge and experience to act accordingly in response to a problem encountered with the discipline or within the health care sector in general • must have the ability to demonstrate personal initiative to resolve problems associated with respiratory physiology laboratory procedures or in the wider health care context
1a.6, 2b.1	• determine the nature and severity of the problem	
1a.6, 2b.1	• call upon the required knowledge and experience to deal with the problem	
1a.6, 2b.1	• initiate resolution of the problem	
1a.6	• demonstrate personal initiative	
Achievement of:	• an ability to critically appraise a situation and implement the required action to resolve problems encountered both in the routine investigative and therapeutic procedures performed in respiratory physiology and in the wider health care context • an ability to critically appraise information supplied and implement the required action to resolve problems in the clinical aspects of a respiratory physiology service	
Achieved through:	• participation in appropriate training programmes and attendance at relevant scientific meetings • supervised experience of problem solving in the laboratory • supervised experience of problem solving in relevant aspects of clinical liaison (oral and written) • continued self-endeavour (eg literature research and critical appraisal) under the supervision of a state registered clinical scientist in respiratory physiology	
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GENERIC COMPETENCES		SPECIFIC COMPETENCES
HPC Standards of Proficiency Code – Clinical Scientist	**7-PROFESSIONAL ACCOUNTABILITY**	Be able to demonstrate an understanding of management principles and techniques, including the following:
1a.1	• Understanding of the legal and ethical boundaries of the modality, and the ethical aspects of scientific research.	• must be able to recognise legal and ethical boundaries of the modality and practice and conduct research within these boundaries • must be able to recognise the limits of his/her knowledge and skills • must understand the principles of clinical governance and be able to audit, reflect on and review practice • must understand the need for and basic requirements of accreditation schemes appropriate to the modality • must understand the importance of effective communication with colleagues and be able to function as an effective member of a multidisciplinary team • must understand the principles of appraisal and be able to supervise staff in his/her area of responsibility • must participate in an appropriate CPD scheme (after completion of training) • must have acquired a basic knowledge of health and safety requirements appropriate to the discipline • must have acquired a basic understanding of the structure and organization of the department, and relevant financial aspects.
1a.6	• Ability to recognise the limits of personal practice and when to seek advice.	
1a.7	• Ability to manage personal workload and prioritize tasks appropriately.	
1a.3, 1a.4, 2b.5, 2c.2	• Understanding of the principles of clinical governance including clinical audit, accreditation requirements relevant to the modality. The importance of confidentiality, informed consent and data security	
1b.2	• Ability to contribute effectively to work undertaken as part of a multi-disciplinary team	
1b.4	• Ability to supervise others as appropriate to area of practice. Understanding of the role of appraisal in staff management and development.	
1a.8, 2c.2	• Understanding of the need for career-long self-directed learning and the importance of continuing professional development.	
1a.5, 1a.8, 2b.4, 3a.3	• Understanding of the need for, and ability to establish and maintain, a safe practice environment.	
	• Understanding of the structure and organization of the department and how it fits into the local clinical setting, General understanding of the way the modality is structured and practised in other locations within the UK. Basic understanding of the importance of financial accountability, budgetary control and resource management.	

Achievement of:	• an understanding of the management principles and tools used in the service • the ability to act as a professional and work effectively as part of a team • understanding of the importance and principles of accreditation, audit, confidentiality, data security and safe working practice

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Achieved through:	• a structured taught element (eg approved MSc course or approved lecture programme), participation in appropriate training programmes and local courses on general, personnel and financial management, health and safety, audit, etc • participation in local seminars and meetings, attendance at clinical audit meetings and clinical governance committees. • attendance at departmental management meetings • involvement, under supervision, in management within the laboratory • mentoring by an experienced practitioner
Assessed by:	• the nominated local supervisor and appropriate professional body external advisor/tutors

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