

**COMPETENCES REQUIRED FOR APPLICANTS
TO ATTAIN STATE REGISTRATION AS CLINICAL SCIENTISTS**

SPECIALTY :

CLINICAL MOLECULAR GENETICS



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.

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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	<ul style="list-style-type: none"> understanding the science that underpins the specialty (modality) and the broader aspects of medicine and clinical practice 	<ul style="list-style-type: none"> must understand the scientific principles of the techniques and methods employed for establishing genotypes must be able to advise on choice and suitability of samples for particular molecular diagnostic tests must be familiar with sources of up to date information on genetic disorders, DNA markers and mutations must be familiar with the problems associated with the common diagnostic procedures relevant to clinical molecular genetics must have a basic knowledge of related disciplines in order to be able to integrate relevant diagnostic results into an interpretation must understand the effectiveness and limitations of the common diagnostic procedures relevant to clinical molecular genetics must be familiar with information on the developments and needs in clinical molecular genetics
3a.1	<ul style="list-style-type: none"> demonstrating a strong base of knowledge appropriate to the specialty and to the investigations and therapeutic options available 	
2b.1	<ul style="list-style-type: none"> experience of searching for knowledge, critical appraisal of information and integration into the knowledge base 	
2b.4	<ul style="list-style-type: none"> ability to apply knowledge to problems associated with the routine provision, and development, of the service 	
2a.1	<ul style="list-style-type: none"> ability to identify the clinical decision which the test/intervention will inform 	
2a.3, 2c.1	<ul style="list-style-type: none"> ability to make judgements on the effectiveness of procedures 	
2a.2	<ul style="list-style-type: none"> application of the knowledge base to the specialty (modality) and to the range of procedures/investigations available 	
<i>Achievement of:</i>	<ul style="list-style-type: none"> an understanding of the principles of the diagnostic methods employed in the practice of clinical molecular genetics a critical understanding of the application of investigate protocols and diagnostic tests for establishing genotypes a critical understanding of the integration and interpretation of molecular genetic parameters with other diagnostic parameters (cytogenetic, haematological, etc) in the overall clinical assessment of the patient a critical understanding of scientific method and the tools required to successfully evaluate, develop and/or modify both current and emerging technologies as routine diagnostic tools in clinical molecular genetics research skills and expertise sufficient to support supervised and collaborative research initiatives in clinical molecular genetics 	
<i>Achieved through:</i>	<ul style="list-style-type: none"> participation in appropriate training programmes (ie CMGS Grade A, MRCPATH Part 1 in genetics), and in post training as a pre-registrant in clinical molecular genetics participation in local research meetings and evidence of supervised and collaborative research initiatives the presentation of outcomes of method evaluations, protocol development and clinical research initiative of a standard suitable for publication self endeavour (eg literature awareness, participation in CMGS MRCPATH self help course) 	
<i>Assessed by:</i>	<ul style="list-style-type: none"> the locally nominated supervisor (usually a registered Clinical Scientist) and CMGS appointed assessor 	

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GENERIC COMPETENCES		SPECIFIC COMPETENCES
HPC Standards of Proficiency Codes - 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	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> must be able to interpret the results of diagnostic tests for the genetic diseases commonly diagnosed in the trainee's laboratory must understand the clinical problems concerning the genetic diseases commonly diagnosed in the trainee's laboratory must be able to develop/devise an investigation strategy taking into account the complete clinical picture must have an understanding of the clinical relevance of inherited or acquired genetic abnormalities must understand the molecular basis of the commonly diagnosed genetic disorders
2b.3, 3a.1	<ul style="list-style-type: none"> understanding of the wider clinical situation relevant to the patients presenting to his/her specialty 	
2b.3	<ul style="list-style-type: none"> ability to develop/devise an investigation strategy taking into account the complete clinical picture 	
1a.5, 3a.2	<ul style="list-style-type: none"> understanding of the clinical applications of his/her specialty and the consequences of decisions made upon his/her actions/advice 	
3a.2	<ul style="list-style-type: none"> awareness of the evidence base that underpins the use of the procedures employed by the service 	
<i>Achievement of:</i>	<ul style="list-style-type: none"> an understanding of the clinical relevance of the inherited or acquired abnormalities in the structure or expression of genes an understanding of the pathology of genetic disease 	
<i>Achieved through:</i>	<ul style="list-style-type: none"> participation in appropriate training programmes (ie CMGS Grade A, MRCPPath Part 1 in genetics), and in post training as a pre-registrant in clinical molecular genetics participation in local research meetings and evidence of supervised and collaborative research initiatives the presentation of outcomes of method evaluations, protocol development and clinical research initiatives of a standard suitable for publication self endeavour (eg literature awareness, participation in CMGS MRCPPath self help course) 	
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GENERIC COMPETENCES		SPECIFIC COMPETENCES
HPC Standards of Proficiency Codes - 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	<ul style="list-style-type: none"> understanding of the principles associated with a range of techniques employed in the modality 	<ul style="list-style-type: none"> must understand the principles associated with the commonly used techniques and diagnostic procedures in clinical molecular genetics must understand the required standards of practice for these techniques must have experience of performing these techniques must understand the problems associated with these techniques sufficiently to be able to troubleshoot when necessary must understand of the principles of quality control and quality assurance must have experience of the use of quality control and quality assurance techniques including restorative action when performance deteriorates
2b.4	<ul style="list-style-type: none"> knowledge of the standards of practice expected from these techniques 	
2b.4	<ul style="list-style-type: none"> experience of performing these techniques 	
2b.4	<ul style="list-style-type: none"> the ability to solve problems that might arise during the routine application of these techniques (troubleshooting) 	
2c.1, 2c.2	<ul style="list-style-type: none"> understanding of the principles of quality control and quality assurance 	
2c.1, 2c.2	<ul style="list-style-type: none"> experience of the use of quality control and quality assurance techniques including restorative action when performance deteriorates 	
<i>Achievement of:</i>	<ul style="list-style-type: none"> an ability to perform the commonly used techniques employed in the practice of clinical molecular genetics a critical ability to review the results and to understand the required quality control procedures for these techniques a critical understanding of molecular diagnostic techniques to facilitate method troubleshooting an understanding of the hazards and risks associated with these techniques 	
<i>Achieved through:</i>	<ul style="list-style-type: none"> participation in appropriate training programmes (ie CMGS Grade A, MRCPPath Part 1 in genetics), and in post training as a pre-registrant in clinical molecular genetics supervised practical instruction at the laboratory bench self endeavour (eg literature awareness, participation in CMGS MRCPPath self help course) 	
<i>Assessed by:</i>	<ul style="list-style-type: none"> the locally nominated supervisor (usually a registered Clinical Scientist) and CMGS-appointed assessor 	

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GENERIC COMPETENCES		SPECIFIC COMPETENCES
HPC Standards of Proficiency Codes - Clinical Scientist	4-RESEARCH AND DEVELOPMENT	Be able to demonstrate a training in research which should include:
2b.1	<ul style="list-style-type: none"> ability to read and critically appraise the literature 	<ul style="list-style-type: none"> •must be able to read and critically appraise the literature •must be able to develop the aims and objectives of a project •must be able to develop new technique or experimental protocol in clinical molecular genetics •must be able to perform a new technique or experimental protocol and generate results •must be able to critically appraise the results in the light of existing knowledge •must be able to present research findings to an audience of peers – both spoken and written
2b.1	<ul style="list-style-type: none"> ability to develop the aims and objectives associated with a project 	
2b.1	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> ability to perform the required experimental work ability to produce and present the results (including statistical analysis) 	
2b.1	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> ability to present data and provide a critical appraisal to an audience of peers – both spoken and written 	
<i>Achievement of:</i>	<ul style="list-style-type: none"> • an understanding of the current state of research in the specialty of clinical molecular genetics • a basic ability to design and introduce new molecular diagnostic techniques into the laboratory • a basic ability to perform research and development relevant to the work of a clinical molecular geneticist 	
<i>Achieved through:</i>	<ul style="list-style-type: none"> • participation in a supervised research project within appropriate training programmes, ie CMGS Grade A, MRCPPath Part 1 in genetics • participation in local seminars journal club meetings, research meetings, etc • presentation of outcomes at a standard suitable for publication • self endeavour (eg literature awareness, participation in CMGS MRCPPath self help course) 	
<i>Assessed by:</i>	<ul style="list-style-type: none"> • the locally nominated supervisor (usually a registered Clinical Scientist) and CMGS-appointed assessor 	

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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	<ul style="list-style-type: none"> ability to assess a situation and act accordingly when representing the specialty 	<ul style="list-style-type: none"> must have an ability to assess a situation and act accordingly when representing the specialty of clinical molecular genetics must be able to respond to enquiries regarding the service and to communicate effectively with colleagues within the profession must be able to communicate with patients, carers and relatives, the public and other healthcare professionals as appropriate must be able to educate colleagues in the outcome of problem solving and research and development activities must have evidence of presentation of scientific material at meetings and in the literature
1a.6	<ul style="list-style-type: none"> ability to respond to enquiries regarding the service provided when dealing with clinical colleagues 	
1a.2, 1b.1, 1b.3	<ul style="list-style-type: none"> ability to communicate with patients, carers and relatives, the public and other healthcare professionals as appropriate 	
1b.3, 1b.4	<ul style="list-style-type: none"> ability to communicate the outcome of problem solving and research and development activities 	
2b.1	<ul style="list-style-type: none"> evidence of presentation of scientific material at meetings and in the literature 	
<i>Achievement of:</i>	<ul style="list-style-type: none"> an ability to communicate clearly and with confidence to clinical and other professional colleagues both within and outside the profession of clinical molecular genetics an ability to educate and train others both within and outside the profession of clinical molecular genetics an understanding of all aspects of information technology pertinent to the service provision 	
<i>Achieved through:</i>	<ul style="list-style-type: none"> participation in appropriate training programmes, (ie CMGS Grade A, MRCPPath Part 1 in genetics), and in post training as a pre-registrant in clinical molecular genetics participation in local seminars journal club meetings, clinical meetings, etc presentations in oral and written form through the medium of seminars, tutorials, case presentations, posters and peer-reviewed publications self endeavour (eg literature awareness, participation in CMGS MRCPPath self help course) 	
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HPC Standards of Proficiency Code - Clinical Scientist	6-PROBLEM SOLVING	Be able to deal with the unexpected and thus be able:	
2a.2	<ul style="list-style-type: none"> to assess a situation 	<ul style="list-style-type: none"> must be able to interpret quality control and quality assurance data must be able to recognise diagnostic problems must have an understanding of the underlying causes of diagnostic problems must have experience in the resolution of diagnostic problems must be able to demonstrate personal initiative in problem solving 	
1a.6, 2b.1	<ul style="list-style-type: none"> determine the nature and severity of the problem 		
1a.6, 2b.1	<ul style="list-style-type: none"> call upon the required knowledge and experience to deal with the problem 		
1a.6, 2b.1	<ul style="list-style-type: none"> initiate resolution of the problem 		
1a.6	<ul style="list-style-type: none"> demonstrate personal initiative 		
<i>Achievement of:</i>	<ul style="list-style-type: none"> a critical understanding of the types of problems associated with molecular diagnostic procedures in clinical molecular genetics a critical ability to review diagnostic results and determine the significance of quality control information an ability to recognise diagnostic problems and institute corrective procedures 		
<i>Achieved through:</i>	<ul style="list-style-type: none"> participation in appropriate training programmes (ie CMGS Grade A, MRCPPath Part 1 in genetics), and in post training as a pre-registrant in clinical molecular genetics participation in local seminars, journal club meetings, research meetings, etc self endeavour (eg literature awareness, participation in CMGS MRCPPath self help course) 		
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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	<ul style="list-style-type: none"> Understanding of the legal and ethical boundaries of the modality, and the ethical aspects of scientific research. 	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Ability to recognise the limits of personal practice and when to seek advice. 	
1a.7	<ul style="list-style-type: none"> Ability to manage personal workload and prioritize tasks appropriately. 	
1a.3, 1a.4, 2b.5, 2c.2	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Ability to contribute effectively to work undertaken as part of a multi-disciplinary team 	
1b.4	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Understanding of the need for, and ability to establish and maintain, a safe practice environment. 	
	<ul style="list-style-type: none"> 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. 	
<i>Achievement of:</i>	<ul style="list-style-type: none"> 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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<i>Assessed by:</i>	<ul style="list-style-type: none">• the nominated local supervisor and appropriate professional body external advisor/tutors