

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

SPECIALTY :

CLINICAL BIOCHEMISTRY

SUB-SPECIALTY :

ANALYTICAL TOXICOLOGY



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.

For the purposes of this document, an accredited specialist in analytical toxicology is defined as a clinical scientist (AfC Grade 8b or above) with

- specialist training (minimum possession of an MSc in analytical toxicology or a related discipline), and*
- at least three years experience in analytical toxicology in a clinical laboratory.*

The accredited specialist must be registered with the Regional ACB Tutor.

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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 principles of the techniques and methods employed in the discipline must be able to advise on choice of samples and aspects of other investigations relevant to the discipline must be familiar with the evidence for, and limitations of, the common procedures relevant to the discipline used in the diagnosis and management of poisoning must have a basic knowledge of related disciplines in order to be able to integrate relevant toxicological findings to give a coherent assessment of a given clinical or forensic situation must be familiar with information on developments and needs in the discipline
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 physical and chemical methods employed in the practice of analytical toxicology a critical understanding of the application of investigative protocols and diagnostic tests in the investigation of poisoning and in other situations where toxicological testing is performed (therapeutic drug monitoring, drugs of abuse testing, heavy metals/trace element assay, etc.) a critical understanding of the integration and interpretation of the results of toxicological tests with other diagnostic parameters (biochemical, haematological, imaging, 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 analytical toxicology 	
<i>Achieved through:</i>	<ul style="list-style-type: none"> a structured taught element (eg approved MSc course, lecture programme) and participation in appropriate training programmes participation in local research meeting and local, Regional and National scientific meetings the presentation of outcomes of method evaluations, protocol development and audit initiatives of a standard suitable for publication 	
<i>Assessed by:</i>	<ul style="list-style-type: none"> the nominated local supervisor (usually a registered Accredited Specialist) and national ACB Tutor network structure 	

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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	<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 recognise the significance of changes in signs, symptoms and analytical results and their relation to specific clinical situations must have a detailed understanding of the normal functioning of the human body, with particular emphasis on the discipline, to provide a foundation for the understanding of toxicological processes must fully understand the effects of pre- and post-analytical variables on the interpretation of results must be able to develop/devise investigation protocols to diagnose poisoning and to monitor individual patients must appreciate the consequences of clinical decisions made on his/her actions and advice must have a detailed knowledge of the appropriateness of investigations and advice given on the results of the investigations, based on evidence-based practice
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 general clinical medicine and its application to the treatment of poisoning an understanding of the physiology of man and the effects of poisons on metabolic processes an understanding of the effects of drug therapy on metabolic and toxicological processes and the mechanisms by which drugs modulate disease processes and understanding of the effects of pre- and post-analytical variables required for the appropriate interpretation and assessment of diagnostic procedures in analytical toxicology 	
<i>Achieved through:</i>	<ul style="list-style-type: none"> a structured taught element (eg approved MSc course or approved lecture programme) and participation in training programmes to include appropriate clinical laboratory secondment continuing experience in an analytical toxicology laboratory approved for training purposes, under the supervision of an Accredited Specialist in the discipline participation in local seminars, clinical meetings, attendance at grand rounds and ward rounds, clinical audit and clinical report evaluation and authorisation self-endeavour (eg private study and literature evaluation) under the tutelage of an appropriate Accredited Specialist in analytical toxicology 	

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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	<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 have practical experience of analytical techniques and procedures commonly used in the discipline and special techniques relevant to the area of practice must have achieved practical competence of the necessary standard to consistently produce valid results must have sufficient knowledge of the fundamentals of procedures and techniques to be able to solve problems and troubleshoot must have a detailed understanding of the principles of internal quality control and external quality assessment and to use this practically to take action to improve performance when that deteriorates must understand the components of quality assurance in relation to the practice of analytical toxicology
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"> the ability to perform common technical procedures detailed in the ACB Pre-registration Training Log Book in analytical toxicology to the required standards of an operational protocol as defined for the purposes of laboratory accreditation under CPA (UK) or its equivalent the ability to critically review the results and determine the significance of quality control and assessment information for methods used in analytical toxicology a detailed understanding of the principles behind the techniques used in analytical toxicology, to facilitate method troubleshooting and the development of appropriate procedures for preventive maintenance an understanding of potential hazards (environmental, biological, chemical, and radiation) associated with the practice of analytical toxicology and the appropriate controlling legislation (eg COSHH) and appropriate procedures for risk assessment a thorough appreciation of the importance of quality assurance to the provision of an analytical toxicology service 	
<i>Achieved through:</i>	<ul style="list-style-type: none"> a structured taught element (eg approved MSc course or approved lecture programme) and participation in appropriate training programmes appropriate practical instruction, at bench level, in the techniques and procedures used in the discipline participation in locally organised health & safety courses and experience of the health & safety committee structure in the employing institution 	

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- participation in departmental quality forums, such as quality assurance meetings
- self-endeavour (eg private study and literature awareness) under the tutelage of an appropriate Accredited Specialist in analytical toxicology

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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	<ul style="list-style-type: none"> • must have developed basic research skills and be capable of investigating unexpected problems and unanswered questions • must have basic research skills to be able to identify problems, formulate hypotheses and develop an experimental plan to resolve a problem • must have acquired critical appraisal skills with respect to assessing the importance and relevance of published research and to appraise results from research undertaken, in the light of existing knowledge • must have acquired the appropriate scientific and technical skills to perform the experimental work required and supervise others in its performance and to subject the results obtained to appropriate statistical analysis • must have acquired presentational skills to permit communication, both spoken and written, of research findings for critical appraisal by peers
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 and 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 knowledge of study design to enable a hypothesis to be tested
 - scientific and technical skills to ensure the achievement of accurate results from which valid conclusions can be drawn
 - sufficient understanding of the principles and practice of statistical analysis to allow meaningful presentation of the results from research
 - practical experience and an understanding of critical appraisal skills
 - evidence of participation in basic scientific research and collaborative research in the clinical environment
 - evidence of continuing oral and written presentation of research findings

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<i>Achieved through:</i>	<ul style="list-style-type: none"> • a structured taught element (eg approved MSc course or approved lecture programme) and participation in training programmes • participation in local research meetings and evidence of supervised and collaborative research initiatives, potentially leading to a PhD • participation in research and development projects throughout training • presentation, both locally and to the wider analytical toxicology community, of the results of research findings • self-endeavour (eg critical appraisal and literature search) under the tutelage of an appropriate Accredited Specialist in analytical toxicology
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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 be able to communicate effectively with colleagues within the discipline and in the wider clinical, analytical, and forensic community must be able to present findings in both written and spoken media through reports, scientific papers, posters, seminars and lectures must be able to educate and train colleagues and be able to undertake the responsibility of junior colleagues must be able to communicate sensitively and appropriately with patients, carers, customers, legal representatives, and the wider public
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 professional colleagues both within and outside the discipline of analytical toxicology in both formal and informal settings an ability to educate and train others within and outside the analytical toxicology department and to supervise the work of trainee clinical scientists in analytical toxicology and other staff as appropriate to the task evidence of continuing experience in the formal presentation of findings and data by verbal and written communication an understanding of all aspects of information technology pertinent to the service provision and support of an analytical toxicology department and competence in its use to the level required to effectively practice analytical toxicology an understanding of the ethical aspects of communication with patients, legal representatives, and the public 	
<i>Achieved through:</i>	<ul style="list-style-type: none"> a structured taught element (eg approved MSc course or approved lecture programme) and participation in training programmes presentations in oral and written form within and outside the department, through seminars, tutorials, case presentations, posters and appropriate peer-reviewed publications participation in local seminars, clinical meetings, attendance at grand rounds and ward rounds, clinical audit and clinical governance and clinical report authorisation self-endeavour (eg competence in the use of word processing, other pc based programmes and the Internet) under the tutelage of an appropriate Accredited Specialist in analytical toxicology 	
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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	<ul style="list-style-type: none"> to assess a situation 	<ul style="list-style-type: none"> must be capable of seeking and establishing (where relevant) relationships between independent pieces of information must be able to recognise the unusual and act appropriately must be able to communicate with others effectively to ensure resolution of a problem in a timely way must be capable of utilising the knowledge base pertinent to the discipline must be aware of the overall operation of the service and its detail to allow problems affecting the service to be recognised quickly and resolved
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 detailed knowledge of the operation of the service a detailed knowledge of the pre-analytical, analytical and post-analytical factors which may affect the overall quality of the service comprehensive communication skills to permit collaboration and direction of laboratory colleagues a detailed knowledge of analytical toxicology and competence to retrieve pertinent information from the literature and appropriate databases 	
<i>Achieved through:</i>	<ul style="list-style-type: none"> a structured taught element (eg approved MSc course or approved lecture programme), participation in appropriate training programmes and local courses on the effective use of information retrieval services and other aspects of information technology participation in local seminars and clinical meetings, attendance at grand rounds and ward rounds, clinical audit, clinical governance and clinical report authorisation attendance at departmental management meetings involvement, under supervision, in problem solving within the laboratory self-endeavour, under the tutelage of an appropriate Accredited Specialist in analytical toxicology 	
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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. 	

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<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
<i>Achieved through:</i>	<ul style="list-style-type: none"> • 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
<i>Assessed by:</i>	<ul style="list-style-type: none"> • the nominated local supervisor and appropriate professional body external advisor/tutors