Education and Training Committee, 3 March 2016

Complaint from the Institute of Biomedical Science (IBMS)

Executive summary and recommendations

Introduction
This paper relates to a clinical scientist programme proposed by the Institute of Biomedical Science (IBMS), namely the Certificate of Competence by Equivalence (Clinical Scientist) (Flexible). The IBMS has submitted a complaint to the Committee relating to their experience of the post visit stage of the approval process.

Decision
The Committee is asked to consider and respond to the complaint from the IBMS.

Background information
The Health and Social Work Professions Order 2001 does not provide for a right of appeal in Part IV (Education and Training). As a public body, the HCPC is expected to make reasonable attempts to resolve any issues with complainants.

This proposed programme was considered by the Education and Training Panel (ETP) on 24 September 2015[1]. ETP decided that the conditions in the visitors' report must be met before the programme could be approved. The approval process allows education providers up to two attempts to meet conditions. Visitors can ask for further evidence if they are not satisfied that the education provider's initial response demonstrates that our standards have been met. More detailed information about the post visit process can be found in our 'approval process: supplementary information for education providers' publication[2]. A timeline of the approval process, as well as the HCPC documents referred to in the IBMS' complaint, are included as appendices.

Clinical scientist modalities
Although clinical scientists are regulated as a single profession, using one protected title of 'clinical scientist', registrants practice in highly specialised roles across a number of areas. These areas of specialised practice are grouped broadly by modalities which recognise the overarching areas of practice which clinical scientists specialise in[3].Whilst the protected title is set out in legislation, modalities are instead formed by the profession itself, and as such can and do change and develop over time as practice evolves and clinical scientists train and specialise in new areas of practice. In recent years, the profession has increasingly referred to 'sub modalities' within some modalities. The Health and Social Work Professions Order 2001 makes no mention of modalities (or sub modalities). The standards of proficiency (SOPs) for clinical

[1] http://www.hcpc-uk.org/aboutus/committees/educationandtrainingpanel/index.asp?id=719
[2] http://www.hcpc-uk.org/assets/documents/1000299957345_v9ApprovalProcessSupplementaryInformaitionforEducationProviders(Post1July).pdf (Page 13 & 14)
[3] http://www.hcpc-uk.org/aboutregistration/professions/index.asp?id=4#profDetails

scientists[4] reflect these arrangements as they set out the knowledge, skills and experience for all clinical scientists without specifying detailed standards for specific modalities (or sub modalities) of practice. Some requirements in the standards of proficiency are modality specific (e.g. SOP 13.7). The level of detail of modalities (and sub modalities) is usually captured in the curriculum for the profession.

Approval process

There are currently three approved programmes for clinical scientists in the UK[5]. As approved programmes for clinical scientists need to demonstrate that they meet the SOPs within the context of different modalities, we have adapted the approval process for all programmes in this profession. We run a two stage process that allows us firstly to focus on the standards of proficiency and the curriculum at a modality level and secondly on the standards of education and training across the entire programme encompassing all modalities. Stage 1 uses a number of Partners, each with specialised experience and involves a documentary review at the HCPC offices. Stage 2 equates to a standard approval visit and involves three visitors and takes places at the education provider. The outcomes from Stage 1 are carried over to Stage 2, and if required, recommended as conditions.

Resource implications

Resources involved with the approval process to date covered by the annual Education Department work plan and budget.

Financial implications

Costs associated with the approval process to date covered by the annual Education Department budget.

Appendices

Appendix 1	IBMS covering letter
Appendix 2	IBMS complaint, including appendix 1 (Titled: Institute of Biomedical Science Request to the HCPC Education and Training Committee to Review the Findings of the HCPC Visitors Additional Information Request for the Approval Visit 15/16 July 2015. Appendix 1: Comparison of Modalities)
Appendix 3	IBMS complaint appendix 2 (Titled: Association of Clinical Scientists (ACS) Guidelines for application for the ACS certificate of attainment)
Appendix 4	IBMS complaint appendix 3 (Titled: Modernising Scientific Careers – Scientist Training Programme – MSc in Clinical Science Curriculum – Cellular Science 2013/14)
Appendix 5	Approval process timeline
Appendix 6	HCPC visitors' report
Appendix 7	HCPC additional documentation request form

Date of paper

22 February 2016

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[4] http://www.hcpc-uk.org/assets/documents/1000050AStandards_of_Proficiency_Clinical_Scientists.pdf

[5] http://www.hcpc-uk.org/education/programmes/register/index.asp?EducationProviderID=all&StudyLevel=all&ModeOfStudyID=all&IntakeStatus=Open&professionID=4&Submit.x=27&Submit.y=17

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Chief Executive
Jill Rodney

04 February 2016

Chairman, HCPC Education and Training Committee
Health and Care professions Council

Dear Chairman

Re: Institute of Biomedical Science Request to the HCPC Education and Training Committee to Review the Findings of the HCPC Visitors Additional Information Request for the Approval Visit 15/16 July 2015.

I am writing on behalf of the Institute of Biomedical Science (IBMS) in relation to certain conditions that are required to be fulfilled as an outcome of a programme approvals visit from the HCPC that took place on 15/16 July 2015.

I am aware that the correct terminology is that of a 'complaint' but I would prefer this is considered more of an appeal. I wish to stress that the HCPC staff that worked with us on our application for programme approval have been helpful and constructive at all times and this should not be construed in any way as a criticism of their role.

The IBMS requests that the Education and Training Committee give consideration to the issues defined in the accompanying document, which the IBMS believes demonstrate variation in the interpretation and application of HCPC standards in relation to the SETs, and respond accordingly.

For ease of location within the document I have used a highlight to enable easy identification of the specific questions I would like Committee to address.

Yours sincerely

A. C. Wainwright

Alan Wainwright

Executive Head of Education

Institute of Biomedical Science Request to the HCPC Education and Training Committee to Review the Findings of the HCPC Visitors Additional Information Request for the Approval Visit 15/16 July 2015.

Programme seeking HCPC approval: IBMS Certificate of Competence by Equivalence (Clinical Scientist)

The Institute of Biomedical Science (the IBMS) wishes to appeal against the visitor findings in respect of specific Standards of Education and Training on the grounds of what it perceives to be inequality in terms of acceptability and sufficiency of documentation relating to process and course content. Evidence for this appeal is based on a comparison with the documentation for approved routes provided by the Academy for Healthcare Science (AHCS) and the Association for Clinical Scientists (ACS).

The IBMS is aware that there already exists four HCPC approved routes to clinical scientist registration, each offered in a number of modalities (specialisms) or sub-modalities (sub specialisms):

- The Academy for healthcare Science (AHCS) Scientist Training Programme route
- The AHCS Scientist Training programme equivalence route
- The Association for Clinical ACS Route One
- The ACs Route Two

The IBMS applied for HCPC approval of a new equivalence route to clinical scientist in response to a need among some registered biomedical scientists working at a senior level in a role that is better defined by clinical scientist registration.

The IBMS is familiar with the existing clinical scientist registration routes, the course content and the accompanying documentation and referred to this in order to inform the development of our own approach to documentation.

The IBMS understands that the respective programmes differ but believes that the assessment of them against the Standards of Education and Training should be consistent.

Based on this the IBMS has observed that there is:

- Significant variation in the interpretation of 'modalities' and sub-modalities' and how they relate to training curricula for already approved routes
- Significant variation in the scope and detail of documentation available for already approved routes with particular reference to the information required in respect of placement training.

The IBMS wishes to reference specific documentation in support of the matters raised.

1. Understanding of Modalities and Sub-modalities

1.1 In the light of the visitors' reports, and also guidance received from the HCPC staff, it is apparent that the terms 'modality' and 'sub-modality' in the context of the curricula are interpreted very differently by different approved education providers and these differ from the HCPC list of modalities in which the Standards of Proficiency (SoPs) for clinical scientist can be met. The IBMS stated that it was applying for approval of training routes in the modalities of:

- Cellular science – consisting of the separate sub-modalities of histopathology (also referred to as cellular pathology) and cytopathology
- Clinical biochemistry
- Clinical Immunology
- Clinical microbiology and the sub-modality of virology
- Clinical haematology and the sub-modality of transfusion science

1.2 The Institute identified that the modalities in which HCPC approved training is offered differ between the AHCS and the ACS. These in turn do not correspond with the approved clinical scientist modalities listed on the HCPC website.

1.3 The STP is now the primary route to clinical scientist registration. However, the terminology used for the different modalities and sub-modalities is not reflected on the HCPC website. Neither Cellular Science nor Cellular Pathology is listed as clinical scientist modalities but the Cellular Sciences programmes with required specialisation in either cytopathology, histopathology or reproductive science is approved. However, the IBMS proposed programmes in cytopathology and histopathology has not been accepted and the IBMS has been required to have a single modality programme of cellular science with both sub-modalities equally represented. The same is true Clinical Microbiology and Haematology (described as Infection Sciences and Blood Sciences modalities by the AHCS) whereby we are prevented from offering the sub-modalities of virology or transfusion science as distinct and separate programmes. (See Appendix 1: Comparison of Modalities).

1.4 The modalities and sub-modalities in which the Institute has applied for training approval reflect the options available through the AHCS Scientist Training Programme and also the laboratory services that operate as distinct and separate areas of knowledge and expertise.

1.5 The Institute has regarded sub-modalities as subjects having equal status as modalities. The information on the HCPC website does not categorically deny or preclude this interpretation as is evidenced by the acceptance of the modalities and sub-modalities offered by the AHCS and the ACS. This interpretation has also been applied by the ACS, which invites applications within its modalities OR sub-modalities (see Appendix 2. "Guidelines for Application for the ACS Certificate of Attainment" - Recognised Modalities of Practice). This interpretation has also been applied by the AHCS to the HCPC approved Scientist Training Programme (STP). In Year 1 of the STP in Cellular Sciences "trainees begin by following the generic curriculum which spans

all divisions together with some division/theme specific modules. In Year 2, trainees start to specialise (in histopathology **or** cytopathology **or** reproductive science) and by Year 3 ***all of the curriculum is focussed on their chosen specialism"*** (see Appendix 3 STP MSc in Clinical Science Curriculum: Cellular Science page 28). The Institute has taken a similar approach which recognises the consolidation of knowledge and expertise within the respective sub-modalities at a level commensurate with or above that of the final year (Year 3) of the STP.

1.6 Following this model, the IBMS curricula for sub-modalities requires ALL candidates to have a common generic knowledge representative of the modality as a basis for specialisation in a given sub-modality.

1.7 In contrast to the above example in 1.5, the response to the Institute's application for HCPC approval of the sub-modalities of cytopathology and histopathology has been to require a blend of both these sub-modalities in a single cellular science modality curriculum rather than as the separate specialisms that are within the STP and which operate in the laboratory context. A similar expectation is placed upon the sub-modalities of transfusion science and virology whereby the report requires them to be delivered as a part of the 'parent' modalities of haematology and microbiology.

1.8 In respect of clinical scientist training, and indeed diagnostic service provision, sub-modalities covered by the Institute's programme curricula are clear and distinct science services that have their own knowledge and skill requirements and training regimes, their own test repertoire and are managed separately from the 'original' modality discipline.

1.9 The Institute wishes the Education and Training Committee to explain the variation in acceptability in the interpretation of modalities and sub-modalities, which currently is not applied consistently across approved and pending routes to clinical scientist registration.

2. Practice placements requirements – SET 5 general comments

2.1 The IBMS had a number of conditions in the visitors first report that related to HCPC SETs 5.3; 5.4; 5.5; 5.6; 5.7; 5.8; 5.9; 5.10; 5.12; and 5.13.

2.2 The programme developed by the IBMS is an experiential equivalence route to clinical scientist registration whereby it is the ***outcomes of professional development that has already taken place that are being assessed.*** The equivalence route is therefore only for individuals who are already in employment, who have completed their professional training and who are operating at a level commensurate with that of a clinical scientist. Therefore these individuals are not on "placement" as would be the case undertaking a period of laboratory based training in the context of a Master's degree programme. The IBMS is concerned that perhaps the HCPC visitors had misunderstood this important aspect regarding the nature of placements and as a result is being required to implement processes that are not appropriate for

individuals who have already been trained and have achieved a high level of autonomous practice.

2.3 Rather than query this at the time Institute responded positively to the conditions, albeit trying to recognise that the students were not 'on placement' and had already completed their training.

The outcome of the responses was that the visitors:

- accepted that 5.12 and 5.13 had been met;
- that the responses to 5.5; 5.6; 5.7; 5.9; 5.10 were appropriate platforms to ensure the conditions were met but submission of updated documents was required to evidence this;
- SETs 5.3; 5.4; and 5.8 required further amendments to the responses.

2.4 The IBMS is willing and able to make the amendments required for its documentation in order to meet the conditions but would welcome an explanation for the apparent discrepancy between the requirements for the approval of its own equivalence programme for clinical scientists compared with that of the AHCS approved equivalence programme for clinical scientists.

2.5 In preparing our response to the outstanding conditions given in the HCPC visitor's Additional Documentation Request the IBMS sought reference in the documentation of an already approved clinical scientist equivalence route on the AHCS website. The expectation was that a similar level of required detail would exist in order to inform the development of our own revised approach to documentation. The IBMS understands that the respective programmes differ but believes that the assessment of them against the Standards of Education and Training should be consistent.

2.6 The visitors report (May 2012) for the AHCS Clinical Scientist Equivalence Route that is available to view on the HCPC website gave conditions for 13 standards related to SET 5. The IBMS expected that the documentation of this approved programme would reflect how these conditions were met in a similar or comparable way to that required of the IBMS. This does not appear to be the case.

2.7 In the remaining conditions for SET 5.3; 5.4; 5.8 the HCPC visitors have focussed on the need to evidence specific training requirements for clinical scientists. The IBMS has the view that the visitor response is not consistent with the mode of delivery of the programme. As stated above, the programme is based on experiential learning and is therefore designed to require the collation of a portfolio of evidence of training that has already taken place and is now being applied at a high level of practice. We are asking the HCPC Education and Training Committee to consider the evidence provided by the IBMS in respect of the above SETs and to determine whether or not the response of the visitors is appropriate in this instance. We would ask that consideration is made in the light of the approach taken by the AHCS that has an HCPC approved equivalence route and which the IBMS has sought to mirror.

2.8 In seeking views from those who have been awarded a Certificate of Equivalence by the AHCS the IBMS has been informed that candidates are required to evidence equivalence to the AHCS Good Scientific Practice through the production of a portfolio of evidence based on the STP curriculum. The requirement on the Institute to provide evidence of training support did not appear to be mirrored by the experience of candidates who had completed the AHCS equivalence route.

2.9 In reviewing the AHCS documentation available to candidates seeking equivalence to the Scientist Training Programme the IBMS could find no evidence how the AHCS has addressed these standards. A comparison between the conditions for approval of the IBMS equivalence route compared with the information and guidance provided by the AHCS is now made in section 3 below to illustrate this.

3. Practice placements requirements – specific comments: SET 5.3 The practice placement setting must provide a safe and supportive environment.

3.1 The Institute's response to the original condition was to state that "in view of the visitors comments we will amend the feedback form to include confirmation that the laboratory is working to IBMS training approval standards and that any required supplementary or additional training must be provided or arranged by the laboratory".

3.2 It was also stated that "In recognition that this is an experiential equivalence route to registration and therefore much or all of the clinical scientist equivalent training will have already taken place the candidates will be required to complete a self-declaration as part of their submission. The purpose of this will be to confirm that during their training the placement laboratory met the Institute's training standards and they received the necessary resources and support to enable them to achieve the required standards of the clinical scientist standards of proficiency".

3.3 The visitor's Additional Documentation Request form stated that "there is no reference to particular criteria relevant to clinical science. In particular the visitors were unable to locate where it was stated that applicants would require access to multidisciplinary teams or ward rounds to ensure ability to interact with medics at case discussion meetings".

3.4 The IBMS is seeking an explanation from the HCPC Education and Training Committee on the requirement for this level of detail given the following:

- this is an equivalence route
- the candidates will have already completed training and evidence of this experience is a required element of the experiential portfolio
- the assessment relates directly to the curriculum which is based on the requirements for the HCPC SoPs.

3.5 The IBMS requests that the HCPC Education and Training Committee compare the requirements placed on the IBMS with the documents available from the AHCS website and comment on the apparent disparity. Attention is drawn to page 4 of the AHCS *Applicants Guide to the Scientist Training Programme equivalence (Clinical Scientist)* where it is stated:

- The summary must contain the names, qualifications (including professional registration) and contact information of the applicant's supervisors.
- The applicant's summary of professional experience *"should contain sufficient detail to allow the assessors to determine if there has been as adequate period of supervised training in the duties and responsibilities of a clinical scientist".*
- The AHCS does not prescribe a specific length of training to confer equivalence.
- The applicant must satisfy the assessors that "*their training programme and current practice has enabled the applicant to achieve an equivalent level of skill in all domains of GSP"*

However, it is also noted that this document:

- contains no specific detail regarding how or where the training should take place
- contains no reference to laboratory approval, audit of training, assessment of trainers, training of trainers

4. Practice placements requirements – specific comments: SET 5.4 The education provider must maintain a thorough and effective system for approving and monitoring all placements.

4.1 The IBMS response to the original condition was to state that " both the applicant and the mentor (who must be an HCPC registered clinical scientist) are required to complete feedback forms 3 months in to the process and that the following section would be added to the Candidate Guidance document:

2.8 Applicants should be aware that in addition to the self-assessment form they will be expected to confirm by a self-declaration in their portfolio and in the oral assessment that training received, and the environment in which it was delivered, in order to provide evidence for the portfolio has met the Institute's Laboratory Training Standards. In addition, that their mentor will be expected to confirm these training standards are ongoing and if there is any doubt that the standards are being met the Institute may instigate a visit to the laboratory.

Both the applicant and the mentor (who must be an HCPC registered clinical scientist) are required to complete feedback forms 3 months in to the process.

The IBMS also added the following response: "*In view of the visitors comments we will amend the feedback form to include confirmation that the laboratory is working to IBMS standards and that any required supplementary or additional training will be provided or arranged by the laboratory".*

4.2 In its original submission the IBMS also stated that "*In recognition that this is an experiential equivalence route to registration and therefore much or all of the clinical scientist equivalent training will have already taken place the candidates will be required to complete a self-declaration as part of their submission. The purpose of this will be to confirm that during their training the placement laboratory met the Institute's training standards and that they received the necessary resources and support to enable them to achieve the required standards of the clinical scientist standards of proficiency".*

The Additional Documentation Request form from the visitors identified that "*there is no reference to particular criteria relevant to clinical science. In particular the visitors were unable to locate where it was stated that applicants would require access to multidisciplinary teams or ward rounds to ensure ability to interact with medics at case discussion meetings".*

4.3 The Institute is seeking an explanation from the HCPC Education and Training Committee on the requirement for this level of detail given the following:

- this is an equivalence route
- the candidates will have already completed training and evidence of this experience is a required element of the experiential portfolio
- the assessment relates directly to the curriculum which is based on the requirements for the HCPC SoPs.

4.4 The IBMS requests that the HCPC Education and Training Committee compare the requirements placed on the IBMS with the documents available from the AHCS website and comment on the apparent disparity. Attention is drawn to the AHCS *Applicants Guide to the Scientist Training Programme equivalence (Clinical Scientist)* where it is noted that this document does not:

- contain any specific detail regarding how or where the training should take place
- contain any reference to laboratory training approval process or an audit of training

Appendix 1: Comparison of Modalities

1. Institute of Biomedical Science (IBMS)

The IBMS proposed five modalities in life sciences, with four sub-modalities options making a total of 7 different specialist areas.

Modality	Sub-Modality
Cellular Science	Histopathology
	Cytopathology
Clinical Biochemistry	*Full modality*
Clinical Immunology	*Full modality*
Clinical Microbiology	Virology
Haematology	*Full modality*
	Transfusion Science

2. Association of Clinical Scientists (ACS)

Reference documentation **c**reated: 16 August 2002 Modified: January 2015
Reference: DOC-ACS001-Guidelines)

Twelve different modalities of practice have been approved for Clinical Scientist registration purposes and recognised for the ACS Certificate of Attainment. Some disciplines also have sub-modalities. The HCPC and the ACS recognise the same modalities and sub-modalities and the ACS may approve new ones from time to time.
The full list of accepted modalities is as follows, with those relevant to life sciences in bold:

- Audiology
- **Clinical Biochemistry – including the sub-modalities of**
    - **Paediatric Metabolic Biochemistry**
    - **Analytical Toxicology**
- **Clinical Embryology**
- **Clinical Genetics – comprising the sub-modalities**
    - **Cytogenetics**
    - **Molecular Genetics**
- **Clinical Immunology**
- **Clinical Microbiology**
- Clinical Physiology – comprising the sub-modalities
- Respiratory Physiology
- Neurophysiology

- **Cellular Science – comprising the sub-modalities**
  - **Cellular Ultrastructure and Molecular Pathology**
  - **Myology and Immunohistochemistry**
- **Haematology - including the sub-modality of**
  - **Blood Transfusion**
- **Histocompatibility and Immunogenetics**
- Medical Physics and Clinical Engineering
- Radiotherapy
- Nuclear Medicine
- Diagnostic Radiology & Radiation Protection
- Non-ionising Radiation Techniques
- Clinical Engineering, Physiological Measurement & Computing
- **Developing Sciences – a special combination modality covering two or more of the current modalities.**

3. Academy of Healthcare Sciences (AHCS) Modalities for Clinical Scientists (STP)

Division	Specialism (one only completed)
Blood Sciences	Clinical Biochemistry
	Haematology and Transfusion
	Clinical Immunology
	Histocompatibility & Immunogenetics
Cellular Sciences	Histopathology
	Cytopathology
	Reproductive Science
Infection Sciences	Microbiology

4. National School of Healthcare Sciences Themed Pathways with those relevant to life sciences in bold:

Medical physics
Clinical pharmaceutical science
Clinical engineering
Reconstructive science
Blood sciences
Cellular sciences
Infection Sciences
Cardiac, vascular, respiratory and sleep sciences
Neurosensory sciences
Genetics sciences
Clinical bioinformatics

5. **HCPC listed Modalities for Clinical Scientists** with those relevant to life sciences in bold

Audiology
Clinical Biochemistry
Clinical Genetics
Clinical Immunology
Clinical Microbiology
Clinical Physiology
Embryology
Haematology
Histocompatibility & Immunogenetics
Medical Physics & Clinical Engineering

6. **Table to show comparison of modalities/specialisms**

	HCPC	**IBMS**	**AHCS/NSHCS**	**ACS**
Specialism				
Cellular Science		X	X	X
Clinical Biochemistry	X	X	X	X
Clinical Embryology				X
Clinical Genetics/Genetic Sciences	X		X	X
Clinical Immunology	X	X	X	X
Clinical Informatics			X	
Cellular Ultrastructure and Molecular Pathology				X
Cytogenetics				X
Cytopathology		X	X	
Developing Sciences				X
Embryology	X			
Haematology	X	X		X
Haematology and Transfusion			X	
Histocompatibility and Immunogenetics	X		X	X
Histopathology		X	X	
Medical/Clinical Microbiology	X	X	X	X
Molecular Genetics				X
Myology and Immunohistochemistry				X
Paediatric Metabolic Biochemistry				X
Reproductive Science			X	
Transfusion Science/Blood Transfusion		X		X
Toxicology				X
Virology		X		

7. Table to show comparison of modalities/specialisms when grouped by theme

	HCPC	IBMS	AHCS/NSHCS	ACS
Specialism				
Cellular Science		X	X	X
Cellular Ultrastructure and Molecular Pathology				X
Cytopathology		X	X	
Histopathology		X	X	
Myology and Immunohistochemistry				X
Clinical Biochemistry	X	X	X	X
Paediatric Metabolic Biochemistry				X
Toxicology				X
Clinical Immunology	X	X	X	X
Clinical Genetics/Genetic Sciences	X		X	X
Clinical Informatics			X	
Cytogenetics				X
Molecular Genetics				X
Clinical Embryology				X
Embryology	X			
Reproductive Science			X	
Developing Sciences				X
Haematology	X	X		X
Haematology and Transfusion			X	
Histocompatibility and Immunogenetics	X		X	X
Transfusion Science/Blood Transfusion		X		X
Medical/Clinical Microbiology	X	X	X	X
Virology		X		

Association of Clinical Scientists

GUIDELINES FOR APPLICATION FOR THE ACS CERTIFICATE OF ATTAINMENT

Association of Clinical Scientists
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FAX: 020 7403 8006
Email: info@assclinsci.org

Created: 16 August 2002
Modified: 13 January 2015
Reference: DOC-ACS001-Guidelines
Version: Rev 14 – fees

Modified: 03/13 January 2015

1. Introduction

In the UK, registration as a Clinical Scientist is controlled by the Health and Care Professions Council (HCPC). Unlike in other healthcare professions, e.g. chiropody, physiotherapy etc. where suitable approved courses and university degrees are the recognised requirement for acceptance for HCPC registration, the approved route to registration for Clinical Scientists is the Association of Clinical Scientists (ACS) Certificate of Attainment. The only exception is for those scientists practising overseas, and who are already fully trained and qualified, who may apply directly to the HCPC under their **international entry route**. Information on this route must be obtained from the HCPC (***www.hcpc-uk.org***) and is NOT covered in this document.

The HCPC and the ACS are completely separate organisations. The former is the registration body and deals with many forms of healthcare sciences. It has no direct links with the professions although works with them on matters of registration.

The ACS is an umbrella organisation comprising the clinical science professions as its members. Individuals cannot “join” the ACS – they can only apply to it for assessment for the Certificate of Attainment. The ACS Board consists of representatives nominated by the clinical science professions. The ACS assesses applicants against our generic competences which relate to the standards of proficiency set down by the HCPC. The ACS Board awards the Certificate of Attainment for applicants who satisfy the standards of proficiency relevant to the applicant’s modality. The certificate of attainment is a pre-requisite for HCPC registration. The ACS is therefore one of the bodies responsible for monitoring standards of assessment for Clinical Scientists entering the professions. The ACS is intended purely to assess applicants against the set standards of performance. Enquiries on training and qualifications should be addressed to the individual professional bodies who are far better equipped to deal with specific questions. The ACS also has no remit to deal with the registration of Biomedical Scientists or any other Healthcare Scientists.

HCPC requires that evidence of attainment of a number of generic competences in Clinical Science (***Appendix 1***) be provided. For UK applicants this will take the form of the ACS Certificate of Attainment, which will be awarded following a successful assessment of a portfolio of evidence regarding competencies followed by a formal interview.

Effective: 16 of 2014

This document sets out the process for obtaining the ACS Certificate of Attainment and how this relates to the application for registration as a Clinical Scientist with the HCPC.

It should be noted that -

- You cannot call yourself "Clinical Scientist" or work unsupervised in the UK unless you are registered. This, and other titles, are protected and reserved under law.
- The application for registration is a two-stage process, with the award of the ACS Certificate of Attainment required before application to the HCPC for registration.
- You do not need to give prior warning to either the HCPC or the ACS of your intention to apply for the Certificate of Attainment and registration.
- You cannot submit a portfolio to the ACS for assessment until you have completed the full time requirements laid down in the documents. It is the application date that must meet these requirements, not the time of interview. Early applications will be returned together with your fees, less an administration charge.
- The ACS Certificate of Attainment is a UK qualification for HCPC registration and all successful applicants should use that HCPC UK route documentation when applying subsequently for registration. *Even if you are an overseas applicant working overseas or in the UK, if you utilise the ACS route then your application to the HCPC must be via their UK route not their International route.* .

2. Recognised Modalities of Practice

Twelve different modalities of practice have been approved for Clinical Scientist registration purposes and recognised for the ACS Certificate of Attainment. These are listed below and in ***Appendix 2***. For the purpose of identifying applicable assessors by the ACS, some disciplines also have sub-modalities and these are also listed in ***Appendix 2***. The HCPC and the ACS recognise the same modalities and sub-modalities and the ACS may approve new ones from time to time. ***Appendix 2*** also contains details of the professional bodies/organisations associated with these modalities and/or sub-modalities, and those listed bodies subsidise the ACS application fees for current members.

The full list of accepted modalities is as follows:

- Audiology
- Clinical Biochemistry – including the sub-modalities of
    - Paediatric Metabolic Biochemistry
    - Analytical Toxicology
- Clinical Embryology
- Clinical Genetics – comprising the sub-modalities
    - Cytogenetics
    - Molecular Genetics
- Clinical Immunology
- Clinical Microbiology
- Clinical Physiology – comprising the sub-modalities
    - Respiratory Physiology
    - Neurophysiology
- Cellular Science – comprising the sub-modalities
    - Cellular Ultrastructure and Molecular Pathology
    - Myology and Immunohistochemistry
- Haematology - including the sub-modality of
    - Blood Transfusion

- Histocompatibility and Immunogenetics
- Medical Physics and Clinical Engineering
    - Radiotherapy
    - Nuclear Medicine
    - Diagnostic Radiology & Radiation Protection
    - Non-ionising Radiation Techniques
    - Clinical Engineering, Physiological Measurement & Computing
- Developing Sciences – a special combination modality covering two or more of the current modalities.

Applications must be made within these modalities or sub-modalities. The HCPC will register successful applicants in this branch of healthcare science as simply "Clinical Scientist". Your name, registered location and date of expiry of your registration are made available in the public domain on the HCPC website, together with the category of registration – Clinical Scientist. Modalities and sub-modalities may be recorded by the HCPC but not made public. Modalities and sub-modalities are simply ways of identifying appropriate assessors for the ACS to properly review and judge the application. The HCPC do not require Clinical Scientists to re-register if they change their role during their career. Registration is a "fitness to practice" assessment ensuring minimum standards necessary to protect members of the public. Clinical Scientists are expected to maintain training and expertise relevant to the current work carried out. To this end registrants must comply with the Continuing Professional Development (CPD) requirements of the HCPC and their profession throughout their professional working life.

3. Training Routes and the ACS Certificate of Attainment

There are two recognised training routes for registration purposes; one takes a minimum of 3 years (**Route One**) and the other a minimum of 6 years (**Route Two**). The minimum educational requirement is a formal BSc with evidence to support the "scientific" competency in the relevant modality either by MSc certificate or by other knowledge based assessment to an equivalent level. The training requirements associated with the two routes are described below. The formal registration definitions, as approved by Privy Council, are given in italics.

Route One

Registration requirement – "The possession of a first or second class Honours degree in a science subject appropriate to a clinical science modality awarded by a Higher Educational Institution in the United Kingdom or other equivalent approved qualification and satisfactory completion of a Clinical Scientists' approved training scheme and relevant supervised pre-registration experience as a scientist working in one of the clinical science modalities, which when added to the training period, amounts to not less than three years, which will be demonstrated by interview and assessment of a portfolio of evidence of training and experience to confirm attainment of the approved Competences".

There are currently approved training schemes for the modalities of Audiology, Clinical Biochemistry (including Analytical Toxicology), Clinical Embryology, Clinical Genetics, Clinical Immunology, Clinical Microbiology, Haematology, Histocompatibility & Immunogenetics and Medical Physics & Clinical Engineering. Training schemes are currently not available for either sub-modality of Clinical Physiology or for Cellular Science and therefore anyone applying for the ACS Certificate of Attainment, and subsequently for registration, in these modalities will need to do so under Route Two. All applicants utilising the special combination modality, "Developing Sciences", also have to submit under Route Two.

The nine approved training schemes provide 2 or 3 years of training, depending on the modality (See ***Table 1***). After finishing the formal training scheme the individual must then complete pre-registration training (minimum 3 years in total) of supervised practice in one of the clinical science modalities listed above while employed as a *pre-registrant*. This training does not have to be continuous. The supervisor of this training must be a senior Clinical Scientist (i.e. Agenda for Change Band 8 or above, with at least 6 years post-registration experience at the time of your submission), or a consultant medical practitioner, in an appropriate specialty.

Individuals will be required to produce a portfolio of evidence of the 3 years of training and pre-registrant experience. Guidance notes on the portfolio are given in ***Appendix 3***. The portfolio will be assessed as part of the requirement for the ACS Certificate of Attainment, which is a pre-requisite for application to the HCPC for registration (as outlined in ***Figure 1***).

Route Two

Registration requirement – "The possession of a first or second class Honours degree in a science subject appropriate to a clinical science modality awarded by a Higher Educational Institution in the United Kingdom or other equivalent approved qualification and a total of six years postgraduate training and experience of which a minimum of three years of supervised pre-registration experience as a scientist working in one of the clinical science modalities. This total experience must be demonstrated by interview and assessment of a portfolio of evidence of training and experience to confirm attainment of the approved Competences".

This route for the ACS Certificate of Attainment, and subsequently for registration, is applicable to any individual who fulfils the requirements shown above. It is the only route available for individuals in Clinical Physiology, Cellular Science and Developing Sciences which do not have approved training schemes. The supervisor of training must be a Clinical Scientist (i.e. Agenda for Change Band 8 or above, with at least 6 years post-registration experience at the time of your submission), or a consultant medical practitioner, in an appropriate specialty. Supervisors who do not meet these criteria may be acceptable but the applicant must provide a full CV of their proposed supervisor giving academic and professional qualifications as well as job history and brief professional experience. This will be reviewed by the ACS Board and, on the advice and recommendation of the Director in whose modality the application falls, decide if the supervisor is applicable to act for the applicant in an ACS application. This must be provided to the ACS Office **in advance** of the submission of the portfolio application to ensure they meet the necessary standards to act in that role. The decision of the Board is final.

Applicants **must** have 3 years of supervised practice (or the part-time equivalent) in a Clinical Science modality listed above while employed as a pre-registrant in their respective Clinical Science modality. The remaining 3 years may consist of **relevant** experience gained while doing an MSc or PhD, or while employed as an MTO or BMS. A fully taught, academic MSc is not acceptable since while it may fulfil the educational part of the competency it would probably not contribute to the clinical scientist experience that needs to be gained – applicants should contact the ACS Office with details of their MSc in advance of submission if unsure. The total of six years postgraduate training does not have to be continuous. During the three years of employment as a pre-registrant, the applicant will undertake training to become proficient in the Clinical Science competences for that modality. The pre-registrant will be required to attain the same level and standard of generic competences as applicants applying under Route One.

The **Developing Sciences** modality is intended for applicants whose training has covered 2 or more modalities and, by the nature of their work, have a more specialised training and experience. Such applicants will have to carefully justify the reason for applying under this modality and indicate exactly under which other modalities they wish to be assessed. More details are given in ***Appendix 3***. Assessment fees are greater for entry under this modality since they will be more complex and require review by three assessors.

All individuals will be required to produce a portfolio of evidence of the 6 years of training and pre-registration experience. This will be assessed as part of the requirement for the ACS Certificate of Attainment, which is a pre-requisite for application to the HCPC for registration (as outlined in ***Figure 1***).

Individual Cases

As already stated, if fully trained, qualified and practising overseas, applicants may use the HCPC international application route and have no need to apply to the ACS. For applicants who have received their clinical scientist experience and training outside of the UK, but are not fully qualified, applications to the ACS for certification will be considered on an individual case basis. Advice should be sought from the relevant professional body (see ***Appendix 2***) and from the HCPC. The HCPC and the ACS will use The National Academic Recognition Information Centre for the United Kingdom (UK NARIC) for testing equivalences of overseas qualifications. Applications should be made to NARIC for a verification document that your qualifications are equivalent to those in the UK and this must be included in the ACS application. For more details on this procedure, please see the NARIC website - www.naric.org.uk. Please note that, having achieved the ACS Certificate of Attainment, such overseas applicants will then apply to the HCPC under the UK application route and not the HCPC International Route.

Table 1: Summary of Training and Assessment Requirements:

Route to registration	Training and experience required for registration		Assessment	Modalities to which this applies
Route One: 3 years to registration	Successful completion of an approved 2 year clinical science training scheme	1 year of experience and further training while practising as a supervised pre-registrant in clinical science	Examination of a portfolio of evidence and interview to demonstrate that the approved competences have been attained	**CLINICAL GENETICS** **CLINICAL EMBRYOLOGY** **MEDICAL PHYSICS & CLINICAL ENGINEERING**
Route One: 3 years to registration	Successful completion of an approved 3 year clinical science training scheme		Examination of a portfolio of evidence and interview to demonstrate that the approved competences have been attained	**AUDIOLOGY** **CLINICAL BIOCHEMISTRY** **CLINICAL MICROBIOLOGY** **HISTOCOMPATIBILITY & IMMUNOGENETICS** **HAEMATOLOGY** **CLINICAL IMMUNOLOGY**
Route Two: 6 years to registration	3 years postgraduate experience relevant to clinical science	3 years of experience and further training while practising as a supervised pre-registrant in clinical science	Examination of a portfolio of evidence and interview to demonstrate that the approved competences have been attained	**ALL MODALITIES INCLUDING :** **CLINICAL PHYSIOLOGY** **CELLULAR SCIENCE** **DEVELOPING SCIENCES COMBINATION MODALITY**

Please note that in the case of Route ONE

- the total period of training and experience from commencement of training must total 3 years prior to submission to the ACS. The requirement should not be interpreted that there needs to be a further period of one year AFTER COMPLETION of the initial approved training scheme.
- Some modalities (e.g. Audiology) commence the formal training with an accredited MSc which is included within that period for these requirements.

4. Schedule for the Assessment for ACS Certificate of Attainment

The two training routes for applicants for the ACS Certificate of Attainment, and subsequently for registration purposes, have been outlined in Section 3.

The ACS Certificate of Attainment includes the requirement for formal interview by two (or for Developing Sciences, three) ACS-appointed HCPC registered Clinical Scientist assessors normally from the relevant modality (or sub-modality) who will usually be nominated by an ACS member professional body.

The formal interview will include an assessment of:

a) The candidate's knowledge of the Generic Competences (see ***Appendix 1***) as applied to the relevant modality or sub-modality
b) The portfolio of evidence submitted in support of gaining the generic modality or sub-modality-specific competences (see ***Appendix 3*** for details of portfolio requirements)

For those candidates applying under Route One, the portfolio of evidence should cover the 3-year training and experience period. For those candidates applying under Route Two, the portfolio of evidence should cover the 6-year training and experience period.

All assessments will be held in a UK assessment centre, approved by the ACS.

Interview Schedules

For most modalities, there is a fixed interview schedule of 3 or 4 periods during the year, with a deadline for receipt of applications around 12 weeks prior to that date. Some of the modalities and sub-modalities receiving few applications will maintain an ad hoc application and acceptance schedule – see below.

Extra assessment interviews may occasionally be arranged according to demand.

Modalities will normally have interviews arranged according to the following timetable.

<table>
<tr><th>Modality</th><th>Sub Modality</th><th>INTERVIEW 1</th><th>INTERVIEW 2</th><th>INTERVIEW 3</th><th>INTERVIEW 4</th></tr>
<tr><td>Medical Physics & Clinical Engineering</td><td>All</td><td>February</td><td>June</td><td>October</td><td></td></tr>
<tr><td colspan="2">Audiology</td><td rowspan="3">January</td><td rowspan="3">April</td><td rowspan="3">July</td><td rowspan="3">October</td></tr>
<tr><td colspan="2">Clinical Embryology</td></tr>
<tr><td>H&I</td><td></td></tr>
<tr><td rowspan="2">Clinical Genetics</td><td>Molec Genetics</td><td rowspan="2">February</td><td rowspan="2">May</td><td rowspan="2">July</td><td rowspan="2">November</td></tr>
<tr><td>Cytogenetics</td></tr>
<tr><td colspan="2">Clinical Biochemistry</td><td rowspan="3">March</td><td rowspan="3">June</td><td rowspan="3">September</td><td rowspan="3">December</td></tr>
<tr><td colspan="2">Clinical Immunology</td></tr>
<tr><td colspan="2">Clinical Microbiology</td></tr>
<tr><td rowspan="2">Clinical Physiology</td><td>Resp Physiology</td><td colspan="4" rowspan="5">Ad Hoc</td></tr>
<tr><td>Neurophysiology</td></tr>
<tr><td colspan="2">Cellular Science</td></tr>
<tr><td colspan="2">Haematology</td></tr>
<tr><td colspan="2">Developing Sciences</td></tr>
</table>

Portfolio submission deadlines to meet these interview dates are posted on the ACS website and will be approximately 3 months prior to the month of interview. Details of the actual dates in any year, as well as the deadlines for submission to be included in that round of interviews, will be fixed by October each year for the following year and will be available on the ACS website and ACS Office.

Applicants should submit as soon as they have completed their portfolio and meet the timing criteria. It should be noted that that applications will not be accepted prior to the completion of 3 years or 6 years of training as appropriate for the application route – the timing criteria relate to the time of application NOT the time of actual interview. Leaving submission until the last day of the deadline will risk missing being included if there is anything missing or needing clarification. Please note that although the ACS will endeavour to be as supportive as possible, applications risk not being included in the next interview round if there are no vacant slots remaining, even if received before the deadline.

The assessment will be scheduled for a maximum of 1 hour for Route One and 2 hours for Route Two applicants. The length of the actual interview will vary and some average statistics are provided in the Reports on the website. The result of the interview cannot be given at its completion as the recommendations of the assessors have to be ratified by the ACS Board. In most cases, the ACS Administrative Office will formally communicate the outcome of the assessment process to the applicant within 2 weeks of the interview. The ACS Certificate of Attainment will be awarded to successful candidates.

Unsuccessful candidates will be notified in writing and the letter will contain details of where to seek advice to help a future application. Such applications will require an application form and portfolio together with the full fee applicable at that time. If you have failed in a single competence area, the assessors may request that you provide evidence or information relevant to that competence.

As well as avoiding a full portfolio production this involves lesser fees though must be completed within a set period from the original interview for the other competences and data in the portfolio to be still considered relevant.

Appeal

Candidates can appeal in writing. Appeals should be sent to the ACS Administrative Office (address at the end of this document) within 4 weeks of receiving notification of the outcome of the interview. The letter should indicate clearly that it is an appeal rather than comments of dissatisfaction and the grounds of the appeal. Please note that appeals can only be made on the process of the assessment and not on the judgement of the assessors.

Full details are provided elsewhere In DOC-ACS0035 - Summary Appeals Procedure which is available on the website.

5. ACS Certificate of Attainment Assessment Process

1. As outlined above, assessments for the ACS Certificate of Attainment will normally take place at set times during the year. It is the responsibility of the candidate to ensure that they apply and submit the relevant material as early as possible within the specified deadlines. You are strongly advised not to wait but to submit as soon as the portfolio is completed, once the time requirements have been met, since delays due to any emerging problems could mean you miss the interview session.
2. We will do our best to expedite the processing of your application. You should anticipate that the formal review of your portfolio and pre-interview processing will take around 12 weeks although no firm guarantee can be given. Therefore, at least 12 weeks before the start of the preferred assessment month, the completed application form and assessment fee, together with 2 correctly bound copies of the portfolio of evidence plus one complete but unbound copy, should be submitted to the ACS Administrative Office. For your security we recommend you use Next Day Special Delivery to allow tracking. The two copies of the portfolio should be firmly bound with spiral or comb binding. Do not present an insecure portfolio, such as in a ring binder or lever arch, as these can come apart during review and transporting. Any portfolios bound in this way will be rejected and the applicant required to re-submit a correctly bound application, thus delaying the assessment (see Appendix 3). The third unbound copy will be scanned for archive or emergency purposes.
3. Every page must be sequentially numbered. Target sizes for portfolios are 60 pages for Route ONE and 120 pages for Route TWO. This includes the Appendix 1 document and all the contents bound into the portfolio. A successful portfolio can be constructed within the guideline sizes (40-80 pages for Route ONE and 80 to 160 pages for Route TWO). Portfolios outside these dimensions will not be accepted by the ACS Office. Duplexing reduces bulk but has no effect on these page limitations.
4. Portfolios cannot be returned to you once accepted for processing, so you are advised to retain an extra copy for yourself. Full fees are also not refundable once submitted. If the application cannot be accepted there will be a minimum £25 administration charge. Submissions earlier than the completion of the set training period, and any missing or incomplete documentation or incorrectly bound portfolios, will prevent the candidate entering the formal assessment process. If the application criteria are not met this will be communicated in writing to the candidate together with the reasons for the decision.
5. ACS assessors from the relevant modality or sub-modality will be assigned. The portfolio of evidence will normally be reviewed by these assessors within 6 weeks from receipt to ensure that it meets the relevant standard. If successful, the candidate will be notified and provided with the interview date, time and centre. Failure to follow the portfolio guidelines could result in rejection of the portfolio or a delay of the interview.
6. Your portfolio MUST contain sufficient evidence to satisfy the assessors of all aspects of your competences described in Appendix 1. If there is not sufficient evidence you will not proceed to interview, so be sure that the portfolio is comprehensive. Candidates who submit a sub-standard portfolio of evidence will be provided with guidance on remedial action required for resubmission for a later round of assessments. You will not be allowed to progress to interview unless the assessors are reasonably satisfied from the portfolio that the evidence you provide meets the basic criteria. If the concerns are felt to be straightforward and potentially easily rectified, then you will be given a short period of grace to provide any missing data or clarify any serious points of issue without loss of fee. Failure to satisfactorily provide

Effective: 1 April 2015

the required data within that time (usually a month) will lead to rejection of the application, less an administrative fee, for re-submission with payment of the full current fee.

7. If you are unavailable, either to respond to requests for more information or to attend an interview within the period after portfolio submission you should inform the ACS Office when you submit your application, or as soon as possible thereafter. Avoid submitting if you are not going to be available for any prolonged period during the coming 3 months. Candidates unable to attend for interview may suffer financial penalties or be required to re-submit an updated portfolio – see Appendix 4. Applicants who have been away from work for some period e.g. on maternity leave or on an extended gap period immediately prior to interview, have been noted as having difficulties at ACS interview and are advised to consider delaying submission until they have returned to work and are up to speed again.
8. At the formal assessment interview the assessors will ask questions to ascertain whether the relevant generic competences have been achieved. These questions may also be related to the submitted portfolio of evidence. The aim of the interview is to confirm that you meet the standards required and that you carried out the work in your portfolio. This is a competence based assessment that is designed to establish that you are safe to practice as a Clinical Scientist. The assessors will make a recommendation on the outcome to the ACS Board for ratification and subsequent notification to the applicant. Applicants cannot be told of the result at the time of the interview.
9. The ACS Administrative Office will usually formally communicate the outcome of the assessment process to the applicant within 2 weeks. Unsuccessful candidates will be advised of remedial work, and the likely time needed to do this.
10. The ACS Certificate of Attainment will be issued to successful candidates at that time and this is recognised by HCPC as affirming you meet the standard for registration. This is the accepted UK route to HCPC registration as a Clinical Scientist.

6. Completing The Application Form For The ACS Certificate Of Attainment

- The form must be completed in English, in black ink and using block capitals or typescript/word processor. Faxed forms will not be accepted as original signatures are required.
- A passport-sized photograph should be appended to the final page of the application form in the space provided.
- It is essential that all accompanying documents are provided in English versions or authorised translations.
- For reasons of maintaining confidentiality, the ACS Administrative Office can only deal with applicants themselves and cannot deal with third parties.
- Receipt of the full fee is a requirement before entering the assessment process.
- All documentation should be sent to the ACS Administrative Office, 130-132 Tooley Street, London SE1 2TU. We will acknowledge safe receipt of your application by return.

Further information on constructing the portfolio and assessment procedures is provided in the accompanying ACS documentation and FAQs available from the website – or by application to the ACS Office.

Applicant Fees

	from 12 January 2015
Current Members of ACS Member Professional Bodies:	
Route ONE (3-year route)	£180.00
Route TWO (6-year route)	£220.00
Developing Sciences	£280.00
Applicants who are NOT current Members of ACS Member Professional Bodies:	
Route ONE (3-year route)	£305.00
Route TWO (6-year route)	£305.00
Developing Sciences	£355.00
Any applicant for a single competency re-sit	£105.00

Please note :

- There is no requirement to "pre-register" in advance your intention of submitting to either the ACS or the HCPC. You should simply make your full application at the appropriate time.
- It is the responsibility of the applicant to ensure portfolio submissions arrive in good time and NO variation on these timings can be accepted due to postal delays – proof of posting will not be accepted as proof of delivery.
- The list of constituent ACS Member Professional Bodies is given in Appendix 2 and on the application form and you must provide a current membership number for one of these bodies to qualify for the subsidised fees.
- Cheques or money orders in sterling are to be payable to "Association of Clinical Scientists" or "ACS". BACs transfer into our bank account is possible. Please contact the Office. Other forms of payment are not acceptable.
- The fees cover the ACS assessment process and the issue of the Certificate of Attainment to successful candidates. They do not include the travel costs of the individual being assessed.
- Cheques are non-refundable.
- Applications rejected due to some irregularity on receipt will have fees returned less a minimum £25 administration charge.
- Applications requiring to produce further data or clarification requested by assessors prior to interview will have a set period of up to 30 days to provide the data and, if satisfactory, will proceed to interview without penalty. If the satisfactory data cannot be provided within this period, the fees will be returned less a £25 administration charge. Applicants will then have to submit a cheque for the full current fees on re-submission.
- Applicants who are unsuccessful at interview will have no refund. They will have to submit a cheque for the full fees on re-submission.

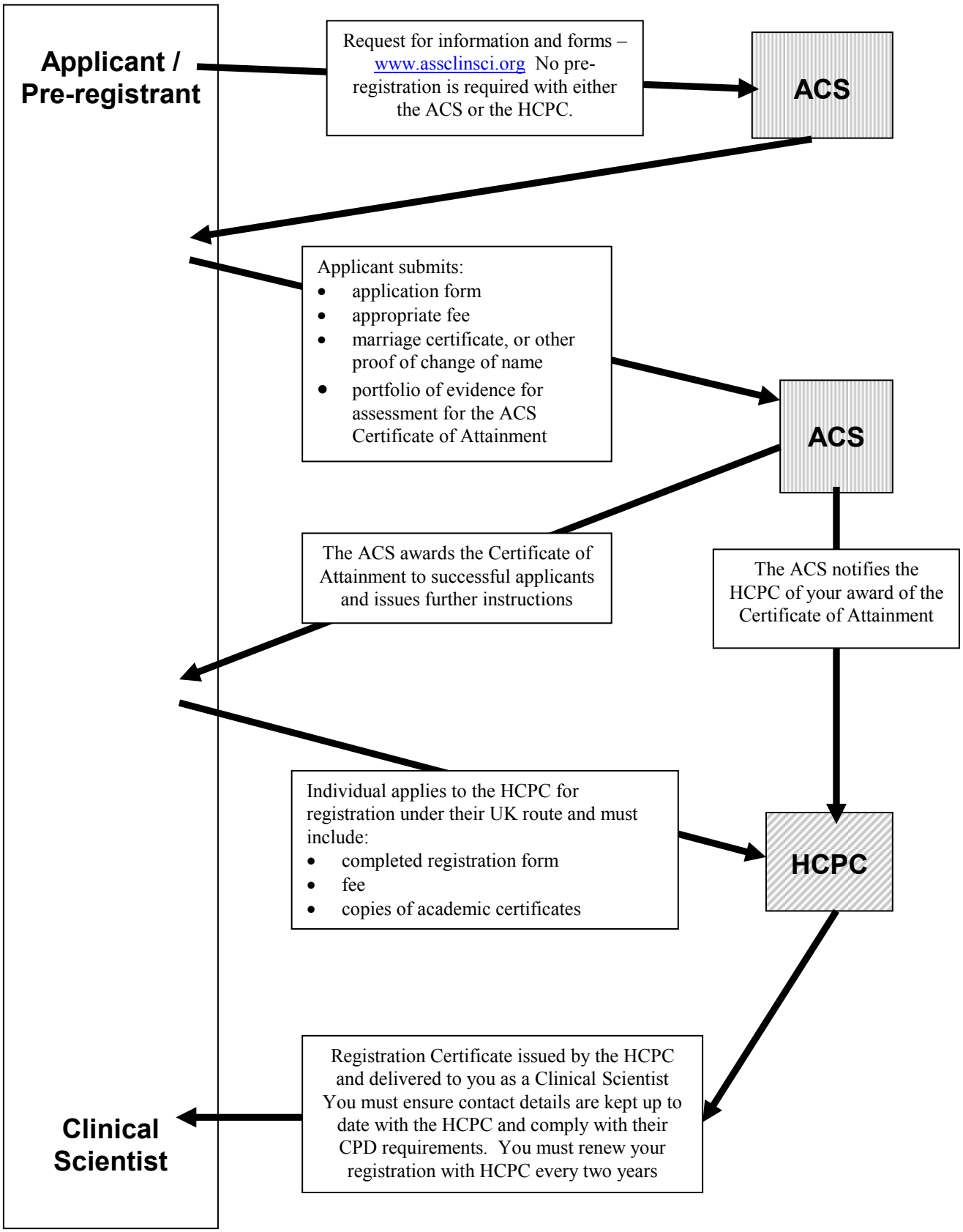
Contact Addresses

ACS Administrative Office,
130-132 Tooley Street, London SE1 2TU
Tel : 020 7940 8960
Fax : 020 7403 8006
Email : info@assclinsci.org
Website : www.assclinsci.org

Health and Care Professions Council,
Park House, 184 Kennington Park Road,
London SE11 4BU
Tel : 020 7582 0866
Fax : 020 7820 9684
Email : info@hcpc-uk.org
Website : www.hcpc-uk.org

Figure 1: Summary of Process for ACS Certificate of Attainment and for Registration with the HCPC as a Clinical Scientist

NB This is the UK route for applicants and for those overseas applicants NOT fully qualified. Fully trained, qualified and experienced OVERSEAS applicants may apply directly to the HCPC under the INTERNATIONAL route to registration. They should not apply through the ACS.



Created: 16 August 2002
Modified: 13 January 2015
Reference: DOC-ACS001-Guidelines
Version: Rev 14 – fees

Competences required for applicants to attain HCPC registration as a Clinical Scientist via ACS					
MODALITY:		**SUBMODALITY: (if applicable)**		**APPLICANT'S NAME:**	

APPENDIX 1

This set of documents must be completed and returned in your portfolio.
Please complete the three header sections above on each page.
These are the generic competencies that must be met by all Clinical Scientists.
Refer to the Specific Competences document for guidance in completing this document.
Use typescript or black ink and block capitals for all sections.

EXPERIENCE: The candidate should be able to demonstrate that he/she has worked in an environment that has enabled the individual to receive training and gain experience relevant to the competences set out below.

1 - SCIENTIFIC

	Area of Competence	Indicate section(s) in portfolio where competence is demonstrated
Sci1	understanding the science that underpins the specialty (modality) and the broader aspects of medicine and clinical practice	
Sci2	demonstrating a strong base of knowledge appropriate to the specialty and to the investigations and therapeutic options available	
Sci3	experience of searching for knowledge, critical appraisal of information and integration into the knowledge base	
Sci4	ability to apply knowledge to problems associated with the routine provision, and development, of the service	
Sci5	ability to identify the clinical decision which the test/intervention will inform	
Sci6	ability to make judgements on the effectiveness of procedures	
Sci7	application of the knowledge base to the specialty (modality) and to the range of procedures/investigations available	

Created: 14 August 2002
Modified: 20 December 2012
Reference: DOC-ACS002-Generic Competences
Version: Rev-08 – change HPC to HCPC

COMPETENCES REQUIRED FOR APPLICANTS TO ATTAIN HCPC REGISTRATION AS CLINICAL SCIENTISTS VIA ACS					
MODALITY:		**SUBMODALITY: (if applicable)**		**APPLICANT'S NAME:**	

2 - CLINICAL

	Area of Competence	Indicate section(s) in portfolio where competence is demonstrated
Clin1	to understand the requirements of accuracy and precision of a procedure in the context of diagnosis, prognosis, monitoring and treatment and to use that information appropriately	
Clin2	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	
Clin3	understanding of the wider clinical situation relevant to the patients presenting to his/her specialty	
Clin4	ability to develop/devise an investigation strategy taking into account the complete clinical picture	
Clin5	understanding of the clinical applications of his/her specialty and the consequences of decisions made upon his/her actions/advice	
Clin6	awareness of the evidence base that underpins the use of the procedures employed by the service	

COMPETENCES REQUIRED FOR APPLICANTS TO ATTAIN HCPC REGISTRATION AS CLINICAL SCIENTISTS VIA ACS					
MODALITY:		**SUBMODALITY: (if applicable)**		**APPLICANT'S NAME:**	

3 - TECHNICAL

	Area of Competence	Indicate section(s) in portfolio where competence is demonstrated
Tech1	understanding of the principles associated with a range of techniques employed in the modality including the appropriate use of Information Technology	
Tech2	knowledge of the standards of practice expected from these techniques including positioning of patients for safe interventions	
Tech3	experience of performing these techniques	
Tech4	the ability to solve problems that might arise during the routine application of these techniques (troubleshooting)	
Tech5	understanding of the principles of quality control and quality assurance	
Tech6	experience of the use of quality control and quality assurance techniques including restorative action when performance deteriorates	

Created: 14 August 2002
Modified: 20 December 2012
Reference: DOC-ACS002-Generic Competences
Version: Rev-08 – change HPC to HCPC

COMPETENCES REQUIRED FOR APPLICANTS TO ATTAIN HCPC REGISTRATION AS CLINICAL SCIENTISTS VIA ACS					
MODALITY:		**SUBMODALITY: (if applicable)**		**APPLICANT'S NAME:**	

4 - RESEARCH AND DEVELOPMENT

	Area of Competence	Indicate section(s) in portfolio where competence is demonstrated
R&D1	ability to read and critically appraise the literature	
R&D2	ability to develop the aims and objectives associated with a project	
R&D3	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)	
R&D4	ability to perform the required experimental work ability to produce and present the results (including statistical analysis)	
R&D5	recognise the value of research and has the ability to critically appraise results in the light of existing knowledge and the hypothesis developed and to formulate further research questions	
R&D6	ability to present data and provide a critical appraisal to an audience of peers – both spoken and written	

COMPETENCES REQUIRED FOR APPLICANTS TO ATTAIN HCPC REGISTRATION AS CLINICAL SCIENTISTS VIA ACS					
MODALITY:		**SUBMODALITY: (if applicable)**		**APPLICANT'S NAME:**	

5 - COMMUNICATION

	Area of Competence	Indicate section(s) in portfolio where competence is demonstrated
Com1	ability to assess a situation and act accordingly when representing the specialty	
Com2	ability to respond to enquiries regarding the service provided when dealing with clinical colleagues	
Com3	ability to communicate with patients, carers and relatives, the public and other healthcare professionals as appropriate	
Com4	ability to communicate the outcome of problem solving and research and development activities	
Com5	evidence of presentation of scientific material to peers, colleagues or other healthcare professionals	

Created: 14 August 2002
Modified: 20 December 2012
Reference: DOC-ACS002-Generic Competences
Version: Rev-08 – change HPC to HCPC

COMPETENCES REQUIRED FOR APPLICANTS TO ATTAIN HCPC REGISTRATION AS CLINICAL SCIENTISTS VIA ACS					
MODALITY:		**SUBMODALITY: (if applicable)**		**APPLICANT'S NAME:**	

6 - PROBLEM SOLVING

	Area of Competence	Indicate section(s) in portfolio where competence is demonstrated
PS1	to assess a situation	
PS2	determine the nature and severity of the problem	
PS3	call upon the required knowledge and experience to deal with the problem	
PS4	initiate resolution of the problem	
PS5	demonstrate personal initiative	

COMPETENCES REQUIRED FOR APPLICANTS TO ATTAIN HCPC REGISTRATION AS CLINICAL SCIENTISTS VIA ACS					
MODALITY:		**SUBMODALITY: (if applicable)**		**APPLICANT'S NAME:**	

7 - PROFESSIONAL ACCOUNTABILITY

	Area of Competence	Indicate section(s) in portfolio where competence is demonstrated
Prof1	Has read, understands and follows the Standards of Proficiency for Clinical Scientists as published by the Health & Care Professions Council	
Prof2	To be personally responsible for and must be able to justify their decisions	
Prof3	Understanding of the legal and ethical requirements of the modality, and the ethical aspects of scientific research.	
Prof4	Understands the need to practice safely and effectively within their abilities and can recognise the limits of personal practice and identify when to seek advice.	
Prof5	Ability to manage personal workload and prioritize tasks appropriately.	
Prof6	Can demonstrate competence in the principles of clinical governance including clinical audit, accreditation requirements relevant to the modality. This will include the importance of equality and diversity, confidentiality, informed consent and data security	
Prof7	Ability to contribute effectively to work undertaken as part of a multi-disciplinary team	
Prof8	Ability to supervise others as appropriate to area of practice. Understanding of the role of appraisal in staff management and development.	
Prof9	Understanding of the need and obligation for career-long self-directed learning and the importance of continuing professional development.	
Prof10	Understanding of the need for, and ability to establish and maintain, a safe practice environment. Understanding of the requirements and obligations of Health and Safety including infection control	
Prof11	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.	

APPENDIX 2

SUB-MODALITIES RECOGNISED FOR THE ACS CERTIFICATE OF ATTAINMENT

MODALITY	SUB-MODALITY OPTIONS	Apply under	
		Route One	Route Two
Audiology	• *Full modality*	✓	✓
Clinical Biochemistry	• *Full modality*	✓	✓
	• Analytical Toxicology	✓	✓
	• Paediatric Metabolic Biochemistry	✗	✓
Clinical Genetics	• Cytogenetics	✓	✓
	• Molecular Genetics	✓	✓
Clinical Immunology	• *Full modality*	✓	✓
Clinical Microbiology	• *Full modality*	✓	✓
Clinical Physiology	• Respiratory Physiology	✗	✓
	• Neurophysiology	✗	✓
Cellular Science	• Cellular Ultrastructure and Molecular Pathology	✗	✓
	• Myology and Immunohistochemistry	✗	✓
Clinical Embryology	• *Full modality*	✓	✓
Haematology	• *Full modality*	✓	✓
	• Blood Transfusion	✓	✓
Histocompatibility & Immunogenetics	• *Full modality*	✓	✓
Medical Physics & Clinical Engineering	• Radiotherapy	✓	✓
	• Nuclear Medicine	✓	✓
	• Diagnostic Radiology & Radiation Protection	✓	✓
	• Non-ionising Radiation Techniques	✓	✓
	• Clinical Engineering, Physiological Measurement & Computing	✓	✓
Developing Sciences	• A combination modality - to allow applicants who do not exactly fit into the current group of modalities above but whose training and experience covers two or more of the current modalities	✗	✓

Created: 16 August 2002
Modified: 13 November 2014
Reference: DOC-ACS003-Appendix 2-Sub-modalities and Professional Bodies
Version: 012

List of Professional Bodies which constitute the Association of Clinical Scientists

The following organisations can provide assistance on careers and training queries, guidance on portfolio construction and assistance for any rejected at portfolio or failed at interview applications.

You will be eligible for subsidised ACS application fees if you are paid up members of one of the professional bodies below that are full member bodies of the ACS.
Bodies not affiliated to the ACS are indicated otherwise but are provided for your convenience and completeness and do not afford subsidised ACS application fees.

ACB (Association for Clinical Biochemistry and Laboratory Medicine)

Administrative Office
Association for Clinical Biochemistry
and Laboratory Medicine
130-132 Tooley Street
London
SE1 2TU
Tel: 020 7403 8001
Fax: 020 7403 8006
Email: enquiries@acb.org.uk
Website: www.acb.org.uk

This is the professional body relating to Clinical Biochemistry, Clinical Microbiology and Clinical Immunology.

ACGS (Association for Clinical Genetic Science)

Simon McCullough
ACC Secretary
Medical Genetics
Belfast City Hospital Trust
Lisburn Road
Belfast
BT9 7AB
Tel: 028 9504 0883
Email: simon.mccullough@belfasttrust.hcsni.net
Website: www.acgs.uk.com

This is the professional body relating to Clinical Cytogenetics and Clinical Molecular Genetics

ACE (Association of Clinical Embryologists)

ACE Secretariat
Portland Customer Services
Commerce Way
Colchester
CO2 8HP
Tel: 01206 796 351
Email: linda.allardyce@portlandpress.com
Website: www.embryologists.org.uk

ACEM (Association of Clinical Electron Microscopists)

Dr J Moss
Electron Microscopy Unit
Department of Histopathology
Charing Cross Hospital
Fulham Palace Rd
London
W6 8RF
Tel: 020 8846 7147
Fax: 020 8383 0551
Email: j.moss@ic.ac.uk
Website: www.acem.org.uk
NOT ACS MEMBER - OBSERVER STATUS ONLY

ARTP (Association for Respiratory Technology and Physiology)

ARTP Administrator
The Association for Respiratory Technology
and Physiology
c/o Executive Business Support Ltd
City Wharf, Davidson Road
Lichfield, Staffs
WS14 9DZ
Tel: 0845 226 3062
Fax: 0121 355 2420
Email: admin@artp.org.uk
Website: www.artp.org.uk

BAA (British Academy of Audiology)

BAA Admin
Blackburn House
Redhouse Road
Seafield
West Lothian
EH47 7AQ
Tel: 01625 290 046
Fax: 01506 811 477
E-mail: admin@baaudiology.org
Website: www.baaudiology.org

BBTS (British Blood Transfusion Society)

David Noble
Executive Manager
British Blood Transfusion Society
Enterprise House
Manchester Science Park
Lloyd Street North
Manchester
M15 6SE
Tel: 0161 232 7999
E-mail: bbts@bbts.org.uk
Website: www.bbts.org.uk

BSH (The British Society for Haematology)

Dr Sheila JM O'Connor
BSH
Haematology Malignancy Diagnostic Service
Level 3 Bexley Wing
St James's Institute of Oncology
Beckett Street
Leeds
LS9 7TF
Tel: 0113 206 8136
Fax: 0113 206 7883
Email: sheila.oconnor@nhs.net
Website: www.b-s-h.org.uk

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Reference: DOC-ACS003-Appendix 2-Sub-modalities and Professional Bodies
Version: 012

BriSCEV (British Society for Clinical Electrophysiology of Vision) Ruth Hamilton Professional Liaison Officer British Society for Clinical Electrophysiology of Vision Clinical Physics Department Royal Hospital for Sick Children Dalnair Street Glasgow G3 8SJ Tel: 0141 201 1855 Fax: 0141 201 0098 E-mail: ruth.hamilton@glasgow.ac.uk Website: www.briscev.org	**BSCN (British Society for Clinical Neurophysiology)** Dr Robin Kennett BSCN Secretary Department of Clinical Neurophysiology The Radcliffe Infirmary Woodstock Road Oxford OX2 6HE Email: secretariat@bscn.org.uk Website: www.bscn.org.uk
BSHI (British Society for Histocompatibility and Immunogenetics) Dr Sue Davey BSHI Dept of H&I, NHSBT Charcot Road Colindale London NW9 5BG Tel: 020 8957 2997 Fax: 020 8957 2717 Email: sue.davey@nhsbt.nhs.uk Website: www.bshi.org.uk	**IPEM (Institute of Physics and Engineering in Medicine)** IPEM Fairmount House 230 Tadcaster Road York Y024 1ES Tel: 01904 610 821 Fax: 01904 612 279 Email: office@ipem.org.uk Website: www.ipem.ac.uk

APPENDIX 3

GUIDANCE NOTES FOR CANDIDATES ON PORTFOLIO CONTENT

YOU ARE URGED TO **READ THIS CAREFULLY** – WHILE IT IS THE INTERVIEW THAT IS THE ASSESSMENT, CORRECT PREPARATION AND PRESENTATION OF THE PORTFOLIO IS PART OF ESTABLISHING YOUR COMPETENCES. PROBLEMS WITH YOUR APPLICATION FORM OR PORTFOLIO COULD MEAN YOU MISSING THE NEXT INTERVIEW ROUND. SUBMITTING AN INADEQUATE PORTFOLIO MAY LEAD TO DELAYS OR EVEN FAILURE TO PROCEED TO AN INTERVIEW.

1. INTRODUCTION

The assessment for the ACS Certificate of Attainment consists of a review of the portfolio of evidence plus an interview once the portfolio is satisfactory and acceptable to two assessors.

The requirement is for the candidate to satisfy the assessors that he/she has the appropriate basic qualifications and length of experience, and that the training programme/period of supervised practice has enabled the candidate to achieve a basic level of skill in *all* of the competences required for registration as a Clinical Scientist. The generic competency set to be attained by all Clinical Scientists is included in these Guidelines (Appendix 1) and this document, completed to indicate how competences have been acquired, should form part of your portfolio. Appendix 1 contains references to the HCPC Standards of Proficiency document which are the requirements for registration and how these relate to the ACS competences. A discipline-specific version of the general competence document may be obtained from the website or the ACS Administrative Office and contains additional guidance as to how to complete the generic document by suggesting the type of evidence to use, and where that evidence may be sourced for your profession.

All documentation relating to the ACS can be downloaded from the website, including a series of useful frequently asked questions (FAQs) and sample portfolios from many of the modalities. We are very grateful to those candidates who have agreed to the use of their work as examples. We encourage applicants to read through these sample portfolios, even for other modalities, since they will give examples of how others have achieved their certification. The samples contain the completed Appendix 1 plus the supporting script but in most cases *exclude* the individual copies of the supporting evidence.

Created: 16 August 2002
Modified: 20 December 2012
Reference: DOC-ACS004-Notes for Candidates
Version: Rev 09 – Periodic review

2. PORTFOLIO CONSTRUCTION

The portfolio is your opportunity to describe what you have done, and the competences you have achieved. In the case of a Route ONE application, then it should especially highlight experience obtained following completion of the formal pre-registration training i.e. in the last year or two, depending on the modality. It should not be a textbook, but the layout should be clear and the content should be well chosen, explicit and concise – quality rather than quantity. If it isn't acceptable and complete then your assessors will not allow you to progress to interview – causing delays while you provide the missing information. The competences covered within the various sections should be clearly stated, or cross-referenced to the competency document (Appendix 1). Once completed with your particular details, Appendix 1 must be bound into each copy of your portfolio.

Coverage

You must demonstrate that all the major elements of the competences have been covered and that there are no significant gaps. The portfolio must show that you have personally carried out work in key areas of practice, and not just observed it being done. The portfolio should be a combination of the facts, the evidence and the benefits. Statements of attendance or participation are on their own insufficient and must be amplified by brief comments on exactly WHAT your role in it was and HOW it helped you to achieve a particular competence. Evidence of 'hands on' experience is important, as is also a clear demonstration that the work has been done under the overall supervision of a registered practitioner, who should have confirmed their supervision as part of the portfolio record. You must demonstrate a good basic understanding of the subject matter, compatible with the length of the training period. Supporting evidence must be included to establish that you did the work – a mere statement to that effect is not sufficient.

Critical analysis

The portfolio should include sections that demonstrate the ability to critically assess data and hypotheses. This may be through project work, literature analysis or in other ways relating to individual competences.

Above all, it should substantiate that you meet all the required competences. You must describe your involvement and how that meets particular competences, and then you must provide the evidence to support it. The exact portfolio layout is left to you, but the key factor is ensuring that your evidence is present to back up your statements since, without the evidence, your comments are worthless and this will result in wasted time as the assessors request further material from you. And your commentary and evidence must relate to each and all of the competence areas.

Finally, carefully select your evidence, since a few well chosen examples will be more valuable than a host of ill-thought-out examples which will not impress an assessor. It must always add value to your case and you have page constraints within the portfolio which must be adhered to.

Portfolio content

The following table describes typical material that you should use in the construction of your portfolio

3-Year Route	*6-Year Route*
The portfolio must begin with a covering report, usually not exceeding 5000 words, containing a summary of your training over the whole pre-registration period. The report must indicate how competences have been developed, and both the report and any supporting material must be clearly cross-referenced to the competency document (Appendix 1). For example, a PhD in a relevant subject could be referenced as evidence of attainment of R&D competences 1-5. Published papers and presentations at meetings would be referenced as evidence of attainment of R&D competence 6 and communication competences 5 and 6. Case presentations or case studies could be referenced in support of the clinical competences. The report should be supported by appropriate material such as: ▪ copies of the competency document (Appendix 1) completed to indicate attainment of competency in each area by reference to specific documents and qualifications, for example extracts from your training log book or portfolio from the approved Clinical Scientist training scheme ▪ your Certificate of Completion of training ▪ copies of certificates of any relevant postgraduate qualifications (MSc, PhD etc) ▪ internal reports in which you have been involved ▪ reports on major placements or secondments during the training period, if not already detailed in the your training logbook or portfolio ▪ project work, published papers etc. In each example you must indicate **your role** and **what you gained** from it – not just that it occurred. You should **NOT** include : ▪ a detailed, day-to-day training diary, ▪ full training logbook or portfolio, ▪ full text of any published papers, the abstract page is sufficient ▪ full text of case studies or essays – prolonged introductions and pre-amble are unnecessary as evidence and only pertinent pages need be included. ▪ the full text of an MSc/PhD project; but a 1-2 page summary may be appropriate to demonstrate your point.	As for the 3-year route but, in the absence of a formal pre-registration (formerly called Grade A) log book or portfolio, more detailed information will be required in support of the competencies. You will have to satisfy the assessors in exactly the same way, so there is NO real difference in the two application routes other than the size of the 6-year application due to the extra data and variety of sources of that data that need to be included.

Portfolio Size

As a guide, the portfolio will typically contain a contents list, a brief covering report, a training report explaining the achievement of the competences (some prefer to combine

the covering report with the training report), the competency table (Appendix 1) with related explanatory details, plus the supporting material comprising the evidence to which you are referring. ***Every page in the portfolio must be numbered***. Use these page numbers, or appendix or section numbers to reference your evidence in the portfolio script. In practice it has been found that portfolios tend to be around 60 pages for Route One applications (ranging from 40-80) and 120 pages for Route Two (ranging from 100-160). The completed bound portfolio of material should be around these target sizes and should definitely not exceed these ranges. Slim Route ONE portfolios of less than 40 pages cannot provide sufficient evidence, since the opening sections and overview must account for at least half of that – the Appendix 1 being seven pages in itself. Similarly, the creation of a portfolio with more than 80 pages indicates poor management, R&D and communications skills if the applicant cannot produce the evidence more concisely. Similar comments would apply to the quoted ranges of Route TWO applications. ***The ACS Office has been directed NOT to accept portfolios outside these limits – 40 to 80 pages for Route ONE and 80 to 160 pages for Route TWO***. Rejection will entail loss of administration fee and requirement to resubmit a correctly constructed portfolio with the full current fee at that time. The assessors are looking for well selected, quality evidence and will not look favourably on a large quantity of unselected evidence. Do not include full copies of papers or essays nor include certificates of attendance of every meeting attended –only include abstracts or relevant pages of papers and select a few good examples of meetings to prove the point. Never use page separators to split sections – they count as a page in your portfolio. Unacceptable applications will be rejected for resubmission and incur administration fees. You may use duplexed printing to reduce bulk in binding and hence cost of postage, but each page must still be numbered and meet the criteria. Do not photo-reduce 2 pages onto one to try to meet the criteria as the text becomes illegible and will again be rejected. Create the portfolio by good management and selective choice of evidence, rather than by trying to squeeze in poorly selected material.

Selection and Inclusion of Evidence

Font size for text should not be smaller than 12 point. Where substantial documents, portfolios, papers or reports have been produced in training, you should submit the full document **only** where it is <u>all</u> specifically relevant to the area in which registration is sought. Other material should be extracted or abstracted as appropriate – e.g. the title page and abstract of published papers, an abstract of presentations at meetings, or the meeting programme, etc. Elsewhere in your script you will comment on why this is relevant to your competences and what benefit you gained. Certificates and other evidence must not be photo-reduced to get more information on a page – e.g. copying two A4 sheets to a single A4 side is not allowed as it cannot be clearly read by assessors.

Where reports are submitted, they should address one or more competences and should combine critical scientific analysis with evidence of background reading, appropriately referenced. The style and structure of reporting should be similar to that used for scientific papers (introduction, methods, results, discussion, and conclusion). Evidence demonstrating the core competences associated with communication and presentation skills is required, as well as those relating to problem-solving and scientific analysis.

Reference: ACS-PAS004-Notes for Candidates

Well-written, relevant summaries are better than a mass of poorly structured material. All data included should add value and be commented on appropriately. Large amounts of data accompanied by minimal comment will be ignored by the assessors, and will reflect poorly on your ability to organise and present material. Understanding and following the instructions for preparation and presentation of the portfolio is part of establishing your competences.

All applicants are advised to review the sample portfolios from successful applicants which are posted on our website. They are not to be taken as templates for your application, nor as the only format for presentation, but simply an example of a successful application. These are added to periodically, but even if one is not representative of your modality, you will find examples of acceptable styles and formats, which will assist in the preparation of any portfolio.

Presentation

Your portfolio is the only thing your assessors have on which to decide whether you meet the standard necessary to proceed to interview. If anything is omitted from your portfolio, or the presentation is poor, the assessors will not allow you to proceed. You may be asked for missing material or resolution of unclear data which must be provided within the stipulated timeframe without loss of fees. If the omissions are more serious or you cannot provide the material in time, you will have to re-submit a full application and then you will lose an administration charge from your fees, as well your assessment being delayed. .

One copy of your portfolio should be provided unbound in a separate envelope. The Office will use this to scan for archive purposes and in case of an emergency. You must also provide two correctly bound copies for the assessors. The material MUST be securely bound in the portfolio.

- Ring binders and lever arch files are **not** acceptable since they are insecure, as well as bulky, and will be rejected on receipt with loss of administration fee.
- Comb or spiral edge binding is preferred.
- Every page must be numbered sequentially throughout the portfolio.
- You may use duplex printing to reduce bulk but each side still counts as a page of your portfolio to be within the set number of allowed pages.
- Do not use any transparent plastic envelopes to hold data as these are insecure and make reading your work tedious and slow.
- Do not use page/section separators which simply add bulk and make documents less accessible.
- A list of contents, indicating all documents submitted, should be provided at the beginning of the portfolio, followed by the completed Appendix 1 table and other documentation and data.
- Only the application form and the cheque (plus, if relevant, a certificate proving your change of name, such as a marriage certificate) should be presented separately and not bound into the portfolio.

Portfolios **cannot** be returned once submitted for assessment by the ACS. You may be asked to provide a supplement to the portfolio if a small section of data is found inadequate or incomplete. The application will be rejected outright if the required data is

substantial or you do not meet the timing requirements for application. You cannot apply for ACS certification until you complete the timing requirements, irrespective of whether you would have completed them by the time of the interview.

You are advised to make a fourth copy of your portfolio for your own use. Not only will this be useful to familiarise yourself with the layout and data content before the interview, but also if questions arise or additions are requested which require reference to the original portfolio.

A typical portfolio should contain the following sections securely bound *(page numbers are for guidance only and for a Route ONE portfolio – pages in the report section and the evidence will be around double this for Route TWO applications):*

- Title/Cover page followed by Contents page *and* introductory covering report, usually not exceeding 5000 words, containing a summary of your training over the whole pre-registration period, to give the assessors a brief background of your particular work in Clinical Science *(2-5 pages – 5% of portfolio - some applicants prefer to include this overview in the main report area);*
- the Competency Document (Appendix 1) completed to give either page or paragraph references to the succeeding body of your portfolio. This will be a key section for scrutiny in the preliminary review of the portfolio by the assessors to determine suitability to proceed to interview; *(7 pages – 10%)*
- the body of your portfolio, containing the detailed review of your training and experience clearly cross-referenced to the samples of supporting evidence and indicating your part in each item, as well as what you gained from it *(10-15 pages – 25%)*
- the supporting evidence *(30-50 pages – 60%) -*
    - copies of relevant pages or sections of extracts from your training log book or portfolio
    - for Route One, a copy of your Certificate of Completion of training
    - copies of certificates of any relevant postgraduate qualifications (MSc, PhD etc);
    - for applicants whose academic qualifications were obtained outside the UK, a copy of a NARIC certificate indicating equivalence to UK standards
    - internal reports or audits in which you have been involved
    - reports on major placements or secondments during the training period if not already detailed in the training logbook or portfolio
    - project work, published papers etc.
    - copies of signed affidavits from trainers or supervisors for some stages of your work
    - for Route Two you might include, for example, copies of sections of a PhD in a relevant subject which could be referenced as evidence of attainment of R&D competences 1-5. Abstracts of published papers and presentations at meetings would be referenced as evidence of attainment of R&D competence 6 and communication competences 5 and 6. Case presentations or case studies could be referenced in support of the clinical competences.

- **You should NOT include:**
    - a detailed, day-to-day training diary
    - your full training logbook or portfolio

- the full copies of papers and publications or essays – a copy of the abstract or relevant pages is sufficient
- the full copies of case studies – a copy of only the relevant pages is sufficient
- the full text of an MSc/PhD project – a 1-2 page summary may be appropriate
- superfluous separator pages to sections or plastic envelopes

3. THE ASSESSMENT PROCESS AND INTERVIEW

If any major omission, or failure to meet the set criteria, is noted on submission, you will be notified directly by the ACS Office and required to rectify this before the application can be processed. Otherwise you will receive immediate acknowledgement of safe receipt and notification that the initial review of your portfolio by the assessors has commenced. You will be informed, normally within 6-8 weeks of this date of receipt, that either your portfolio has been found satisfactory to proceed to interview or what steps must be taken to allow a re-submission in the future. If there is any delay, the ACS Office will endeavour to notify you of progress at this time. It is also usual to provide a time and venue for the interview at this time but this may not always be possible and may be conveyed to you later. We endeavour to give you a minimum of 3-4 weeks notice of the interview date to allow you to make suitable arrangements. If you cannot attend at the set time for whatever reason, then your submission will be held over to the next interview session when a new date and time will be offered. If you decline a series of offered interview dates then parts of your portfolio may become outdated and specific rules have been set to cover this (Appendix 4). It is crucial that you ensure you are available for clarification of any points during the month following submission of the portfolio and that you include a covering letter indicating your non-availability during the subsequent 12 week period if you plan any holiday or other travel away from your workplace. This could delay the processing of your application.

While the ACS will endeavour to process your application swiftly, circumstances sometimes cause delays and the periods stipulated in these documents are guideline targets rather than guaranteed deadlines. Although you CANNOT submit until you have met the requirements for the time spent in supervised training, you are encouraged to have your portfolio in preparation in order to submit as soon as possible after this.

Once the assessors are satisfied that your portfolio contains sufficient evidence that you meet the required standards and no major omissions identified, then you will be offered an interview. It is this interview that is the examination to assess if you meet the standards required for certification and hence registration. You will not be informed which assessors have been allocated to you until the actual day to avoid any potential compromising contacts. A review of the first 800 applications made to the ACS (2003-2007) indicates that approximately 4% are rejected at the portfolio stage but that the rest are offered interview, although some will be required to provide additional data first and so be delayed – which could have been avoided had they been more careful with the initial presentation. At interview a further 4% fail to convince the assessors that they can comply with what they have presented in the portfolio – they may have witnessed or experienced, but not adequately been personally involved in, or benefited from, the work cited. Further statistics are available on the ACS website.

The interviews will normally take no longer than 60 minutes for Route One applicants and 2 hours for Route Two applicants depending on the complexity of the application. While regional interviews are arranged in some cases, this may not always be possible

and central locations allowing a number of interviews to be carried out on the same day more efficiently utilise the time of the assessors. You will need to provide your own funding for transport to the interview. You should arrange to arrive at least 30 minutes prior to the interview time as late arrival could necessitate re-arrangement of the timetable or cancellation of your interview. Have a mobile phone with you to allow contact with the Office in case of delays. There is no need for you to remain at the venue after your interview.

The interview, normally with two assessors (three for Developing Science applications), is an oral examination and formal assessment of your competences. The assessors may use your portfolio as a basis for questions but they may also deal with the competences as scenarios that you will be experiencing in your day-to-day working life. It will seek to establish that your training has been comprehensive and verify that you carried out what you claim in the portfolio. You will not be re-assessed on the academic components of training (approved training course, MSc course, etc.) **except** in so far as it may support the background to competences. You will be required to demonstrate a good general level of scientific ability and an understanding of the basic principles related to the competences, including a full appreciation of practical aspects (i.e. not just what was done, but why it was carried out that way and the significance of the results obtained).

It is the intention to establish breadth of knowledge and competence rather than find fault. The interview will not dwell on small areas of competences but encompass the whole breadth of the requirements. Therefore, you will be asked questions covering ALL the competences to establish that in each and every one you have achieved a basic level of competence. Note that it is NOT the purpose of the interview to assess whether you meet the requirements of your present job. Certification is to facilitate registration with HCPC which is a standard of “fitness to work” not “fitness for the job you hold”, which is a matter for your employer.

The assessment is a simple pass or fail in each competence area, and a failure in any one of the competence areas means that the certificate cannot be awarded on this occasion. Having said that, there may be weaknesses in some minor sub-sections of a competence which are not sufficient to fail you. The assessors will make an objective decision on this.

You may be able to gauge from the interview how successful you have been. However, assessors are *not allowed* to pronounce success or failure so you should not ask them. Formal notification of the result will be sent to you by post normally within 2 weeks, after ratification by the ACS Board. In the case of a successful assessment, this will be accompanied by the Certificate of Attainment, or otherwise you will be informed of the steps required before you re-submit. The HCPC are then notified by the ACS in anticipation of your subsequent application. Again, please do not make enquiries of the ACS Office as they will notify you of your result by email and letter as soon as they possibly can.

4. Summary

To be eligible for **Route One** application you must have –

- a 1st or 2nd class honours degree or equivalent in an appropriate subject;
- completed training and hold documentation, such as a Certificate of Completion, demonstrating that you have done so;
- completed a further period gaining experience in the modality under supervision, such that the total time together with that for training is not less than 3 years; (NB Experience prior to commencing formal Pre-Registration (formerly Grade A) training may not be included in the time allowance for Route One applications with the single exception of an approved MSc course which is the normal starting point for some modalities), and
- your supervisor of training must be a clinical scientist (i.e. Agenda for Change Band 8 or above with at least 6 years post-registration experience), or a consultant medical practitioner, in an appropriate specialty.

To be eligible for **Route Two** application you must have –

- a 1st or 2nd class honours degree or equivalent in an appropriate subject;
- completed at least 3 years postgraduate experience relevant to the clinical science e.g. as MTO, BMS or PhD;
- completed at least 3 years of experience and further training while practising as a supervised pre-registrant in the clinical science modality so that the total time is not less than 6 years (NB A PhD could be before or soon after fulfilling the clinical scientist requirement); and
- your supervisor of training must be a clinical scientist (i.e. Agenda for Change Band 8 or above, with at least 6 years post-registration experience), or a similarly qualified consultant medical practitioner in an appropriate specialty. NB It is expected that you will have devised a training plan with your supervisor to ensure that during the three year clinical scientist period you cover all the competence areas required.

Supervisors who do not meet these criteria may be acceptable but the applicant must then provide, in advance of application, a full CV of their proposed supervisor giving academic and professional qualifications as well as job history and brief professional experience substantiating their suitability to act as a supervisor of a clinical scientist. This will be reviewed by the ACS Board and, on the advice and recommendation of the Director in whose modality the application falls, decide if the supervisor is applicable to act for the applicant in an ACS application. This must be provided to the ACS Office **in advance** of the submission of the portfolio application to ensure they meet the necessary standards to act in that role. The decision of the Board is final. A copy of the ACS letter of acceptance of that supervisor must be included with your application form (not bound in the portfolio).

For clarification

Please note that the dates quoted in your application form MUST clearly indicate that a full THREE or SIX qualifying years as appropriate have been met – please check them carefully or the application will be rejected.

If you have had more than one supervisor during the period of training then each must sign the appropriate area of the application form – copying sheets of the application form as necessary.

You need to download from the website the full regulations and application pack

- ACS Guidelines pack;
- ACS Application form;
- Specific Competences Guide for your modality;
- Sample successful portfolio(s) as indication of presentation – not necessarily for your modality.

You must submit

- two (three for Developing Science applications) securely bound copies (see above) of your portfolio compiled as stipulated;
- one complete but unbound copy of the portfolio held in a suitable envelope;
- a completed application form duly signed by your supervisor(s);
- if you have changed your name by marriage or other reason, you must provide evidence of your identity, e.g. copy of marriage certificate, etc as appropriate, attached to your application form (not bound in the portfolio);
- a cheque or a banker's draft in UK Sterling made payable to the Association of Clinical Scientists, or ACS, for the appropriate fee. We do NOT provide invoices or proforma invoices nor accept foreign currency, credit cards or any other form of payment. You may transfer money through internet banking into our account but contact the office for our bank details first and be aware it is your responsibility to ensure the payment is made before you submit your portfolio and that it can be identified to you to allow processing your application without delays.

You must bring to the interview

- your own copy of the portfolio to refer to in the interview,
- your passport, driving licence or other identity card providing a means of photographic ratified identification. If your name thereon is different to that on your application form, then it must relate to your marriage certificate or other proof of name-change provided with your application form. Employee ID badges and similar unratified evidence is not acceptable. If you cannot provide a suitable photographic proof as listed above you should obtain a ratified photograph from a Solicitors or Commissioner for Oaths.

We advise registered delivery of your application to

ACS Administrative Office,
130-132 Tooley Street, LONDON SE1 2TU

NB Applications will NOT be accepted prior to the day of completion of the full 3-year or 6-year period as appropriate. It is emphasised that this deadline is based on the date of your portfolio submission and NOT based on the subsequent, possible interview date. Rejection of your application for whatever reason will incur a £25 administration fee

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Version: Rev 09 – Periodic review

Association of Clinical Scientists

ACS INTERVIEW OFFER PROCEDURE

Candidates are encouraged to apply for the ACS Certificate of Attainment as soon as they meet the necessary criteria. However, following submission of the portfolio, they must be available –

- during the week after submission to respond to any queries from the ACS Office concerning the application.
- During the following 3-4 weeks to respond to requests for additional information by the assessors. If this is not provided within the stipulated deadline contained within the request letter, you may not be able to be included in the next interview round. If this is not provided within 8 weeks of the date of the letter your application will be rejected.
- At the designated period for interview. You cannot select a specific day if the published interview round extends over more than one day. You are required to be available depending on according to assessor availability. Interviews may take place at any time, you are therefore encouraged to notify this office of any dates you feel unable to attend an assessment as soon as they are known.

Advisory deadlines, for submitting an application to ensure inclusion in the next round of these interviews, are also given on the website. However, inclusion will always depend upon available assessor slots for that round of interviews and cannot be guaranteed. You are always advised to submit AS SOON AS you meet the time criteria and not wait for deadlines.

It is appreciated that, for various reasons, applicants may find that they are unavailable for interview following portfolio submission to the ACS. As it is essential that the evidence in the portfolio is still accurate and current at the time of interview, the following procedure has been agreed by the ACS Board.

FIRST INTERVIEW OFFER

1. Once a candidate's portfolio is accepted for interview, the ACS will normally offer an interview date within the processing guidelines, which should normally be within 12 weeks of application. *There is no refund of fees once this offer is made*.

SECOND INTERVIEW OFFER

2. If, for whatever reason, the applicant cannot meet that interview date and notifies the ACS Office as soon as they are aware of this, then the ACS will offer an alternative SECOND interview date during the next session. *No extra documentation and no extra charges will be involved*.

FINAL INTERVIEW OFFER

3. If, for whatever reason, the candidate declines or cannot meet the second offered interview date, and notifies the ACS Office as soon as they are aware of this, the ACS will offer a third and final alternative date in the following session. *In these circumstances, the candidate must provide, prior to the interview, a letter from their supervisor, to be affixed to the portfolio, affirming that the candidate has continued in practice and maintained the necessary training for certification. This will also require an additional £25 administration charge.*

Created: 16 February 2006
Modified: 04 July 2011
Reference: DOC-ACS004a-Procedure Following Declined Interview Dates
Version: Revision 3

RESUBMISSION

4. If, for whatever reason, they decline or cannot meet the THIRD interview date, the ACS will **not** offer further dates. The portfolio of evidence will now be considered out of date. *The applicant must now re-submit their portfolio - updating all the relevant areas. They must also provide information on the work carried out in the period since the original application, confirmed by a signature(s) from their current supervisor(s). A new fee must accompany re-submission of the portfolio to allow it to re-enter the assessment process.*

EXCEPTIONS

If there are exceptional circumstances causing the applicant to be repeatedly unavailable for interview, then the additional costs may be waived but the candidate must submit an explanatory letter and appropriate supporting evidence, e.g. medical certificate. However, even in this case the portfolio must be updated and confirmation received from the supervisor that the candidate has maintained training and experience in the modality in the intervening period.

APPLICATION FOR ACS CERTIFICATE OF ATTAINMENT

Please read the Guidelines for Applicants before completing this form using BLACK ink OR Font and BLOCK CAPITALS

Select Modality and Sub-Modality

(You must select one of these choices - Medical Physics applicants may select from two sub-modalities if their training overlaps these options and they wish this to be considered by the assessors)

SELECT IN WHICH CATEGORY YOU WISH TO BE ASSESSED -	INDICATE CLEARLY HERE
Audiology	
Clinical Biochemistry	
Clinical Biochemistry – Analytical Toxicology	
Clinical Biochemistry – Paediatric Metabolic Biochemistry	
Clinical Embryology	
Clinical Genetics – Cytogenetics	
Clinical Genetics – Molecular Genetics	
Clinical Immunology	
Clinical Microbiology	
Clinical Physiology – Neurophysiology	
Clinical Physiology – Respiratory Physiology	
Cellular Science – Ultrastructure & Molecular Pathology	
Cellular Science – Myology & Immunohistochemistry	
Haematology	
Haematology - Blood Transfusion	
Histocompatibility & Immunogenetics	
Medical Physics & Clinical Engineering (MP&CE) – Radiotherapy	
MP&CE - Nuclear Medicine	
MP&CE - Diagnostic Radiology & Radiation Protection	
MP&CE - Non-ionising Radiation Techniques – **specify** e.g. MRI etc	
MP&CE - Clinical Engineering, Physiological Measurement & Computing - **specify**	
Developing Science – tick here and indicate above the combination of modalities to assess	

ROUTE ONE – I have completed and provide evidence of a formal pre-registration (formerly Grade A) course which plus clinical scientist experience totals 3 years — **For Route ONE tick here**

ROUTE TWO – for all other applications – I provide evidence of a minimum of 3 years supervised clinical scientist training + another 3 years of relevant experience totalling 6 years — **For Route TWO tick here**

CONTACT DETAILS

First Name(s):		**Surname**	
Title	Mr ☐ Mrs ☐ Miss ☐ Ms ☐ Dr ☐	**Maiden/previous Name**	(attach marriage certificate or other proof of name change)
PLEASE ENSURE YOU NOTIFY THE ACS OFFICE OF ANY CHANGE OF ADDRESS PRIOR TO CERTIFICATION		**Date of Birth**:	D D M M Y Y Y Y

Home Address		**Work Address**	
		Dept.	
		Hospital	
		Address	
City		**City**	
Country (for non-UK)		**Country** (for non-UK)	
Postcode:		**Postcode:**	
Tel :		**Tel :**	
Mobile :		**Fax :**	
E-mail :		**E-mail :**	
Preferred Correspondence Address (delete one - if no selection is made the WORK address will be used)		**HOME ADDRESS / WORK ADDRESS**	

Created: 16 August 2002
Modified: January 2015
Reference: DOC-ACS005-Application Form
Version: Rev12 - fees

QUALIFICATIONS – you must provide evidence of a minimum first or second class honours degree. (NARIC certification of overseas academic qualifications is required unless superseded by a UK academic qualification)			
Include copies all certificates in portfolio	**First Academic Qualification**	**Second Academic Qualification**	**Third Academic Qualification**
Institution			
Qualification			
Subject(s)			
Classification			
Year awarded			

PRESENT APPOINTMENT										
Job Title										
Employer:										
Date Appointed:	D	D	M	M	Y	Y	Y	Y	**Grade of Appointment or AfC Banding**	

TO QUALIFY FOR SUBSIDISED FEES YOU MUST BE A CURRENT FULL MEMBER OF ONE OF THESE ACS CONSTITUENT MEMBER PROFESSIONAL BODIES			
Professional Body		**Membership Grade**	**Membership no**
Association for Clinical Biochemistry and Laboratory Medicine	ACB		
Association for Respiratory Technology and Physiology	ARTP		
Association for Clinical Genetic Science (formally ACC or CMGS)	ACGS		
Association of Clinical Embryologists	ACE		
British Academy of Audiology	BAA		
British Blood Transfusion Service	BBTS		
British Society for Clinical Neurophysiologists	BSCN		
British Society of Haematology	BSH		
British Society for Histocompatibility and Immunogenetics	BSHI		
Institute for Physics and Engineering in Medicine	IPEM		

EQUAL OPPORTUNITIES SURVEY

(This section is not compulsory and the data is entirely confidential being used for statistical purposes and not related to any individuals. We encourage you to complete it for us to carry out more accurate analysis of applicants to ensure our processes are fair, and identify where any changes may be required. HCPC have a similar policy and survey to cover registrants in all professions.)

Do you consider yourself to have a Disability ? If YES, please indicate what form this disability takes	**YES / NO**	.....

Please indicate which of the following ethnic groups describes you (UK government categories)			
001 White – British		009 Black or Black British – Caribbean	
002 White – Irish		010 Black or Black British – Asian	
003 White – Other		011 Asian or Asian British – Indian	
004 Mixed – White & Black Caribbean		012 Asian or Asian British – Pakistani	
005 Mixed – White & Black African		013 Asian or Asian British – Bangladeshi	
006 Mixed – White & Asian		014 Asian or Asian British – Other	
007 Mixed – Other		015 Chinese	
008 Black or Black British - African		016 Other Ethnic Group	
		017 Prefer not to state	

Created: 16 August 2002
Modified: January 2015
Reference: DOC-ACS005-Application Form
Version: Rev12 - fees

For applicants applying by the 3-year route (Route 1)

(The total period covered by the dates on this page MUST comprise 3 full years.
If your formal training included and started with an approved MSc then include this in the dates shown here.
You cannot apply to the ACS under Route 1 prior to the completion of the full 3 years indicated below.)

Your Formal Pre-registration (formerly Grade A) Training Record

Professional Organisation providing Department of Health approved (formerly Grade A) Training Scheme e.g. ACB, BAA, IPEM etc	
Training Centre	

	D	D	M	M	Y	Y	Y	Y
Date Formal Training Started								
And Completed								

Your subsequent experience (copy this page if more than one centre)

Centre at which experience obtained	
Organisation providing further Pre-Registration experience (if any)	

	D	D	M	M	Y	Y	Y	Y
Date your subsequent period of experience started								
And date completed (indicate CURRENT if still ongoing here – do not leave blank)								

Your Supervisor	Name	
	HCPC or GMC Registration No.	

For applicants applying by the 6 year route (Route 2)

**(The total period covered by the dates on this page MUST comprise 6 full years.
Of this, a minimum of 3 full years must be in the role of a supervised training clinical scientist.
You cannot apply to the ACS under Route 2 prior to the completion of the full 6 years indicated below.)**

Postgraduate Experience and Training prior to working as a pre-registrant Trainee

(Copy this page if more than 3 centres)

Institution 1	Name								
	Position								
		D	D	M	M	Y	Y	Y	Y
	Start date								
	Finish date								
Institution 2	Name								
	Position								
		D	D	M	M	Y	Y	Y	Y
	Start date								
	Finish date								
Institution 3	Name								
	Position								
		D	D	M	M	Y	Y	Y	Y
	Start date								
	Finish date								

3 years required experience as a supervised pre-registrant Clinical Scientist

(copy this page if more than one centre)

Centre at which your experience was gained									
Post you held									
Dates of your period of experience		D	D	M	M	Y	Y	Y	Y
	Start								
	Finished (indicate CURRENT if still ongoing here – do not leave blank)								
Your Supervisor	Name								
	Registered Profession								
	HCPC/GMC Registration No.								

Created: 16 August 2002
Modified: January 2015
Reference: DOC-ACS005-Application Form
Version: Rev12 - fees

AN INAPPROPRIATE APPLICATION SIGNED OR SUBMITTED PRIOR TO THE COMPLETION OF THE **FULL** SET PERIOD OF 3 OR 6 YEARS WILL BE REJECTED AND DISPOSED OF, WITH RESULTANT LOSS OF ADMINISTRATION FEES.

PROVISION OF FALSE INFORMATION COULD BE CONSIDERED AS FRAUD BY THE HCPC, BREACHING THE CODE OF CONDUCT, AND MAY RESULT IN A REGISTRANT SUPERVISOR AND THE APPLICANT BEING STRUCK OFF THE REGISTER.
(Copy this page if more than one supervisor involved as indicated on previous pages.)

PASTE PASSPORT-SIZED COLOUR PHOTOGRAPH HERE
Please do not use staples.

I wish to apply for a Certificate of Attainment and declare that the information I have given in this application is, to the best of my knowledge, accurate and true.

Date:

D	D	M	M	Y	Y	Y	Y

……...…….
(Signature of Applicant)

I certify that the candidate has completed the necessary period of training and experience for the selected application route and that the information provided herein by the applicant is, to the best of my knowledge, accurate and true.

Date:

D	D	M	M	Y	Y	Y	Y

……...…….
(Signature of Supervisor)

CHECK LIST - You must submit –

- **This application form plus**
- **ONE unbound copy of your portfolio, plus**
- **TWO correctly bound copies of your portfolio** in which you must include, suitably cross referenced -:
  - The completed Generic Competences document (Appendix 1)
  - A copy of all degree certificates
  - NARIC certification of any overseas qualifications (*non-UK academic qualifications only*)
  - A copy of certificate of completion of formal Pre-registration (formerly Grade A) approved training (*3-year route only*)
  - The supporting evidence
- **If you have changed your name by marriage or for other reason, you MUST also separately staple a copy of the certificate to the application form (not bound in the portfolio please).**
- **a cheque** (payable to the "ACS") for the appropriate registration fee

	From 12 January 2015
Current Members of ACS Member Professional Bodies:	
Route ONE (3-year route)	£180.00
Route TWO (6-year route)	£220.00
Developing Sciences	£280.00
Applicants who are NOT full current Members of ACS Member Professional Bodies:	
Route ONE (3-year route)	£305.00
Route TWO (6-year route)	£305.00
Developing Sciences	£355.00
Single Competence re-sit	£105.00

You MUST bring a passport, driving licence or other ratified photographic proof of identity to interview.
CAREFULLY CHECK THE APPLICATION FORM AND PORTFOLIO BEFORE SUBMISSION TO AVOID DELAYS IN PROCESSING DUE TO ERRORS OR OMISSIONS WHICH COULD RESULT IN MISSING AN INTERVIEW ROUND.

- **PORTFOLIOS AND FEES WILL NOT BE RETURNED ONCE RECEIVED FOR PROCESSING.**
- **REJECTED PORTFOLIOS WILL RESULT IN LOSS OF £25 ADMINISTRATION CHARGES.**
- **ALL FEES ARE NON-REFUNDABLE ONCE ACCEPTED FOR INTERVIEW.**

Please send your completed form and portfolios together with the registration fee to:

ACS Registrar,
130-132 Tooley Street, London, SE1 2TU

FOR OFFICE USE ONLY			
Date received			
Date Acknowledged			
Reference Number			
Assessors			

MODERNISING SCIENTIFIC CAREERS

Scientist Training Programme

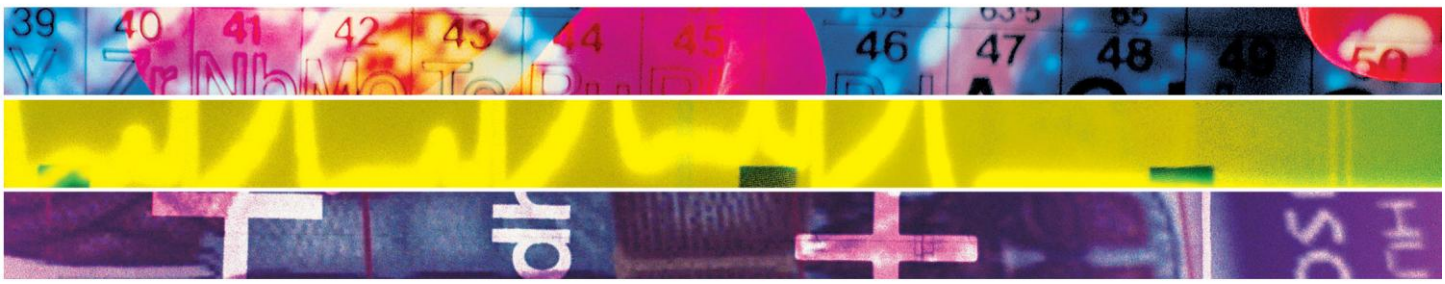
MSc in CLINICAL SCIENCE

Curriculum

CELLULAR SCIENCE

2013/14

Modernising Scientific Careers



Science in healthcare DRIVING A MODERN NHS

CONTENTS

READERSHIP

This Scientist Training Programme (STP) MSc Clinical Science curriculum describes the MSc Clinical Science programmes that, together with the work based learning guide, provide the details of each themed STP in the UK for:

- academic and administrative staff, including external examiners within Higher Education Institutions (HEIs);
- trainees, host departments and managers of services that employ healthcare science staff;
- work based trainers, including all those involved in supervising, mentoring, coordinating, assessing and delivering STP education and training;
- Local Education and Training Boards (LETBs) and all healthcare science education and training commissioning organisations in the UK;
- patients and the public;
- Modernising Scientific Careers (MSC) accreditation panels.

A glossary of terms used is provided in the Appendices.

Section 1: Introduction to Modernising Scientific Careers (MSC) and the Scientist Training Programme (STP)

1.1 Introduction to Modernising Scientific Careers (MSC)

1. The healthcare science (HCS) workforce plays a central role in safe and effective patient care across all pathways of care from health and wellbeing to end of life. There are approximately 55,000 employees in the healthcare science workforce in the NHS in the UK, and approximately 80% of all diagnoses can be attributed to their work.

2. Healthcare science involves the application of science, technology and engineering to health. *Good Scientific Practice* (GSP) [Appendix 3] sets out the principles and values on which good practice within healthcare science is founded. It makes explicit the professional standards of behaviour and practice that must be achieved and maintained by all those who work in healthcare science. *GSP* and the Education and Training Standards of the Health and Care Professions Council (HCPC) together form the basis for all MSC training curricula which contextualise the Standards of Proficiency set down by the HCPC in a way that is accessible to the profession and the public.

3. The healthcare science workforce and services have traditionally been grouped into three broad areas called divisions, namely: Life Sciences/Clinical Laboratory Sciences, Physical Sciences/Medical Physics and Biomedical Engineering, and Physiological Sciences/Clinical Physiology Sciences. Within each division there are a number of healthcare science specialisms. With advances in scientific technology, changes to the delivery of healthcare scientific services and the development of MSC, the boundaries between these divisions have been shifting. MSC recognises this important change and to date has identified twelve STP themes within healthcare science, which enables training across a total of 28 healthcare science specialisms, with curricula for additional specialisms still under development.

1.2 Introduction to the Scientist Training Programme (STP)

4. The STP is designed to provide healthcare scientist trainees with strong science-based, patient-centred clinical training in a specialist area of healthcare science. Initial rotational training provides a broad base of knowledge, skills and experience across a group of related cognate specialisms reflective of the evolving clinical and scientific changes and requirements followed by specialisation in a single HCS specialism. STP is a three-year pre-registration postgraduate academic (MSc Clinical Science) and work based programme.

5. Recruitment to the programme is competitive, and in England a national recruitment process is led by the National School of Healthcare Science (NSHCS). Following induction, workplace training commences with a rotational training programme in a themed group of up to four healthcare science specialisms, followed by training in a specific specialism.

6. The STP is an integrated training programme combining academic study leading to the award of a specifically commissioned MSc in Clinical Science and a work based training programme. Completion of both will lead to the award of a Certificate of Completion of the Scientist Training Programme (CCSTP) by the NSHCS. Graduates are eligible to apply to the Academy for Healthcare Science for a Certificate of Attainment and will then be eligible to apply to HCPC for registration as a Clinical Scientist.

1.3 Scientist Training Programme Outcomes: 2013/14

Graduates of the STP will possess the essential knowledge, skills, experience and attributes required of a newly qualified Clinical Scientist. STP graduates will have clinical and specialist expertise in a specific healthcare science specialism, underpinned by broader knowledge and experience within a healthcare science division or theme. They will be competent to undertake complex scientific and clinical roles, defining and choosing investigative and clinical options, and making key judgements about complex facts and clinical situations within a quality assurance framework. Many will work directly with patients and all will have an impact on patient care and outcomes. They will be involved, often in lead roles, in innovation and improvement, research and development, and/or education and training.

On completion of the STP all graduates should be able to demonstrate the following.

Professional Practice

1. Professional practice that meets the professional standards of conduct, performance and ethics defined by *Good Scientific Practice* and the regulator (HCPC), and is safe, lawful and effective, and within the scope of practice for the role undertaken, while maintaining fitness to practise.
2. Personal qualities that encompass communication skills, self-management, self-awareness, acting with integrity and the ability to take responsibility for self-directed learning, maintaining their own health and wellbeing, critical reflection and action planning to maintain and improve performance.
3. The ability to be an independent self-directed learner acting autonomously in a non-discriminatory manner when planning and implementing tasks at a professional level, contributing to the education and training of colleagues and providing mentoring, supervision and support as appropriate.
4. The ability to work, where appropriate, in partnership with other professionals, often as part of a multidisciplinary team, supporting staff, service users and their relatives and carers while maintaining confidentiality.
5. The ability to work with public, service users, patients and their carers as partners in their care, embracing and valuing diversity.

Scientific and Clinical Practice

6. A systematic understanding of relevant knowledge, and a critical awareness of current problems, future developments and innovation in health and healthcare science practice, much of which is at, or informed by, the forefront of their professional practice in a healthcare environment.

7. High-quality clinical and scientific practice that applies basic, core scientific knowledge, skills and experience in a healthcare setting, places the patient and the public at the centre of care, prioritising patient safety and dignity and reflecting NHS/health service values and the NHS Constitution.
8. The ability to perform quality assured appropriate diagnostic or monitoring procedures, treatment, therapy or other actions safely and skilfully, adhering to applicable legislation and in compliance with local, national and international guidelines.
9. The ability to deal with complex scientific and clinical issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences, including patients and the public.
10. The ability to define and choose investigative and scientific and/or clinical options, and make key judgements about complex facts in a range of situations.
11. Originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in healthcare and healthcare science and their specialism.

Research, Development and Innovation

12. A comprehensive understanding of the strengths, weaknesses and opportunities for further development of healthcare and healthcare science as applicable to their own clinical practice, research, audit, innovation and service development, which either directly or indirectly leads to improvements in patient experience, clinical outcomes and scientific practice.
13. Conceptual understanding and advanced scholarship in their specialism, enabling them to critically evaluate and critique current research and innovation methodologies and, where appropriate, propose new research questions and hypotheses.

Clinical Leadership

14. Scientific and clinical leadership based on the continual advancement of their knowledge, skills and understanding through the independent learning required for continuing professional development.
15. The ability to critique, analyse and solve problems, define and choose investigative and scientific and/or clinical options, and make key judgements about complex facts in a range of situations.

1.4 Overview of the MSc Clinical Science Programme

7. This document sets out the proposed structure, high-level learning outcomes and indicative content for the proposed three-year, part-time Masters in Clinical Sciences that forms part of the Scientist Training Programme (STP). The programme combines and integrates the generic professional practice learning, themed learning in a group of specialisms and individual specialist programmes.

8. Figure 1 depicts the overall structure and timing of each STP programme while Figure 2 depicts the broad framework around which all MSc Clinical Science programmes must be structured. However, each division within the Modernising Scientific Careers Programme (MSC) has interpreted and adapted this framework.

Figure 1: Modernising Scientific Careers: Scientist Training Programme (STP): Diagrammatic representation of employment-based, pre-registration, three-year NHS-commissioned education and training programme

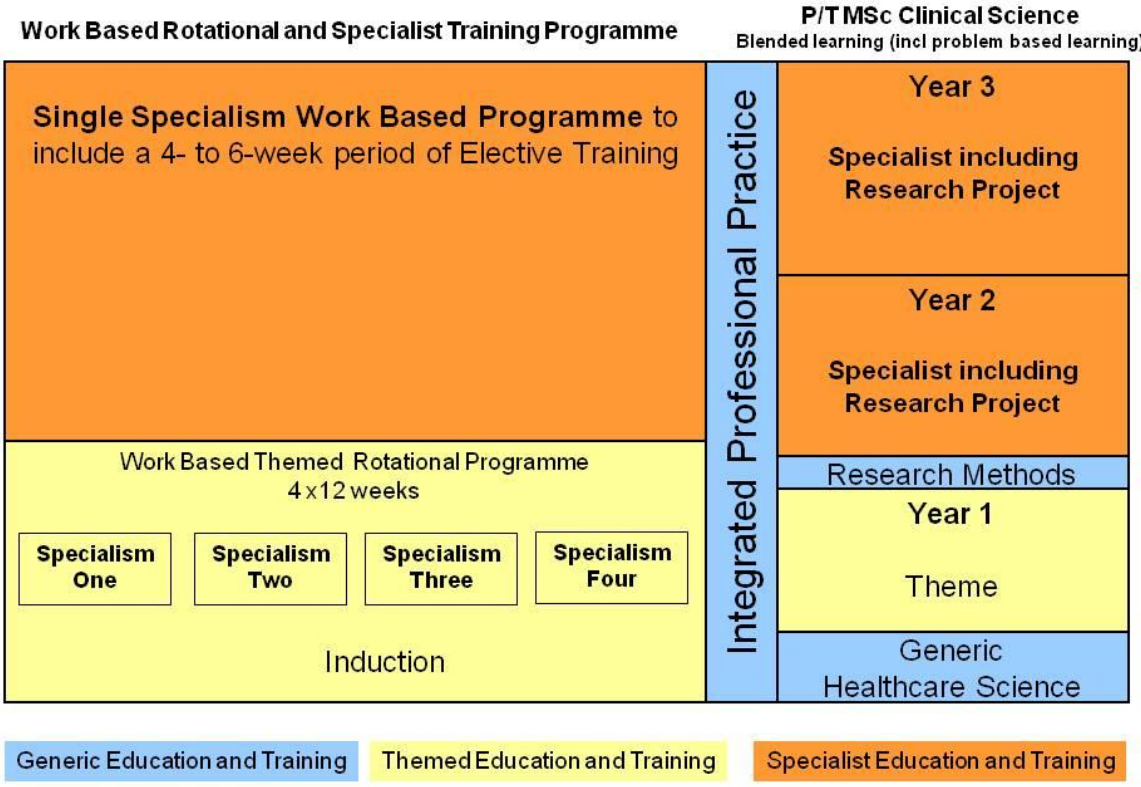
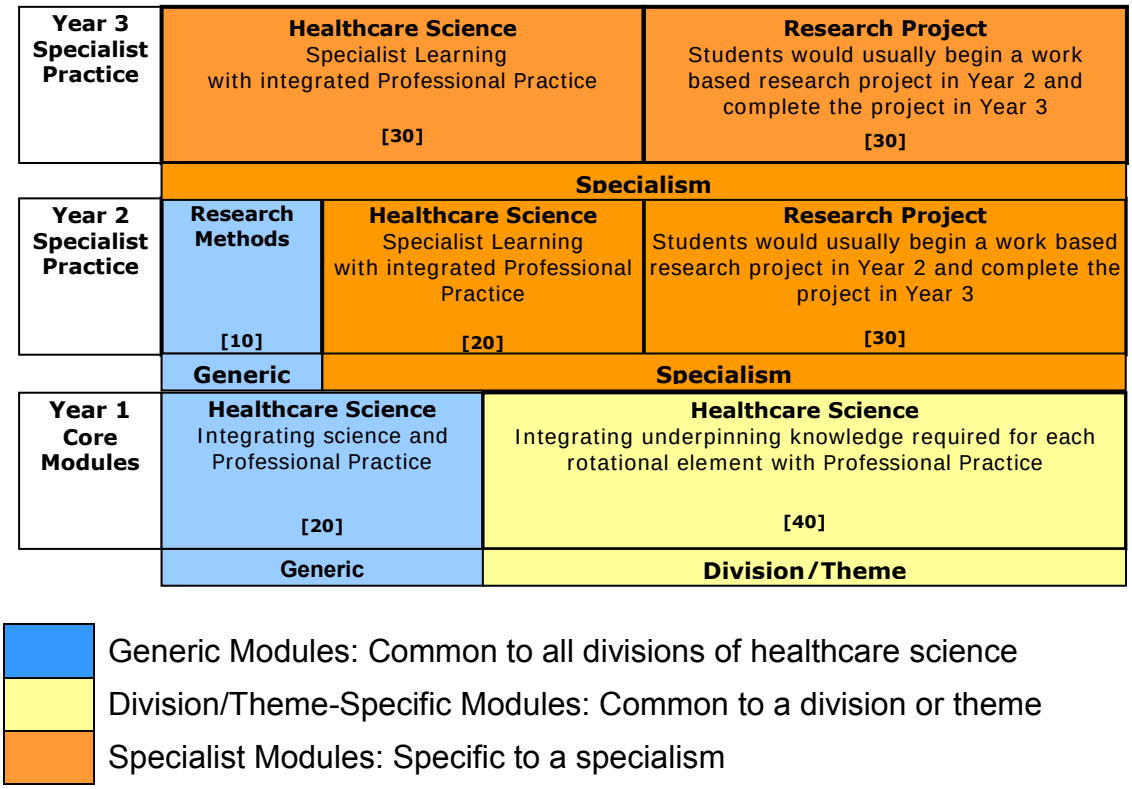


Figure 2: High-Level Framework for MSc Clinical Science



Section 2: Entry Routes, Award Title, Delivery, Accreditation of Prior Learning

2.1 Entry Routes

9. In England there are two routes of entry into STP. Through the **direct entry route**, the trainee will be competitively appointed. Alternatively, some STP trainees may enter into training with support of their employers through an **in-service training** route, as long as employers can demonstrate the ability to support STP training by meeting work based accreditation standards. In both cases potential STP applicants **must** participate in the national recruitment/assessment process and meet the minimum entry requirements for the academic and work based programme. For direct entry applicants, this will be a competitive process, whereas in-service trainees will be required to go through the national recruitment process to ensure that they meet the standards for entry into STP.

2.2 Progression

10. No condonement/compensation of modules and no aggregation of marks are permitted. Students must pass all modules to be eligible for the final award.

2.3 Award Titles

11. The title of the degree programme should be consistent with current MSC terminology. The award titles are:

Life Sciences
MSc Clinical Science (Blood Sciences)
MSc Clinical Science (Cellular Sciences)
MSc Clinical Science (Genetics)
MSc Clinical Science (Infection Sciences)

Physical Sciences and Biomedical Engineering
MSc Clinical Science (Medical Physics)
MSc Clinical Science (Clinical Engineering)
MSc Clinical Science (Reconstructive Science)
MSc Clinical Science (Clinical Pharmaceutical Science)

Physiological Sciences
MSc Clinical Science (Cardiac, Critical Care, Vascular, Respiratory and Sleep Sciences)
MSc Clinical Science (Gastrointestinal Physiology and Urodynamic Science)
MSc Clinical Science (Neurosensory Sciences)

Across all Divisions
MSc Clinical Science (Clinical Bioinformatics)

In accordance with their own discretion and regulations, HEIs may be able to seek a variation in the award title to enable the specialism to be identified. This

should be raised as part of MSC Accreditation and discussed with the commissioner.

2.4 Mode of Delivery: Part-time

2.5 Relevant Quality Assurance Agency (QAA) Code(s) of Practice

12. HEIs should adhere to the current QAA Code of Practice for the Assurance of Academic Quality and Standards in Higher Education. At the time of preparing this document the QAA is in the final stages of a major review of the Code of Practice and is expected to publish 'The UK Quality Code for Higher Education'. Further details can be found on the QAA website: http://www.qaa.ac.uk/Pages/default.aspx

2.6 Awarding Body

13. While the full programme could be delivered and awarded by a single university provider, equally a collaborative partnership between a number of universities may be preferable. It would be expected that where collaborative provision is proposed a memorandum of agreement or understanding is in place. The delivery arrangements must be clearly defined, including the academic and logistical responsibilities of each partner and the financial arrangements between the university and its partner. The awarding university must satisfy itself that the partner is able to discharge its responsibilities satisfactorily and will be responsible for the quality assurance of the programme.

2.7 Accreditation of Prior Learning

14. A process for Accreditation of Prior Learning (APL) that conforms to the guidelines below must be defined by each HEI provider. This must clearly define the minimum and maximum level of APL that will be awarded, the timing, costs and process, and align to statutory requirements for healthcare science. Good practice supports the view that such prior learning should only be used once, double counting is not recommended.

QAA 'Higher education credit framework for England: guidance on academic credit arrangements in higher education in England', August 2008
http://www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Higher-education-credit-framework-for-England-guidance-on-academic-credit-arrangements-in-higher-education-in-England-Augu.aspx

QAA 'Guidelines on the accreditation of prior learning', September 2004
http://www.qaa.ac.uk/Publications/InformationAndGuidance/Pages/Guidelines-on-the-accreditation-of-prior-learning-September-2004.aspx

HCPC 'Standards of education and training', September 2009
http://www.hpc-uk.org/aboutregistration/standards/sets/

2.8 Programme Delivery and Monitoring

15. The tender and subsequent MSC accreditation process will require an HEI to provide a detailed description of the content of each module and the teaching and learning and assessment strategy to demonstrate how the programme and module aims/learning outcomes will be met.

Section 3: The MSc Clinical Science Curriculum

3.1 Purpose

16. The purpose of the STP MSc curriculum is to clearly set out the expectations of graduates from the programme, including the academic skills, knowledge and understanding that each trainee will be expected to gain, develop and apply during work based training. Set within an integrated academic and work based programme the expectations of all MSc programmes should be read alongside the work based learning guides.

Additionally, the purpose is to signal the importance of providers being aware of the current structure, strategic direction and priorities of healthcare delivery in the UK, for example the NHS Constitution. The requirement to prioritise patients and their care and ensure that the patient and service provided by healthcare science is at the centre of all learning, assessment and work based practice is equally important.

3.2 Curriculum Development and Maintenance

17. Curriculum development began in 2010 and has been led by the Modernising Scientific Careers (MSC) team working with NHS and higher education colleagues and patients. Since 2012 the NSHCS has also contributed to curriculum development and maintenance via the professional leads and each of the NSHCS themed boards. Professional bodies have been represented in some curriculum working groups and have also been invited to provide feedback as the work developed, either directly or via the NSHCS themed boards.

All programmes have also been reviewed and approved by Health Education England via the Healthcare Science Professional Board Education and Training Working Group. External feedback from a review undertaken in 2012 by the Institute of Education has been incorporated into all programmes from 2013 onwards. All of the latest versions of the MSc Clinical Science programmes and work based learning guides can be found on the NHS Networks website by following the link: http://www.networks.nhs.uk/nhs-networks/msc-framework-curricula

All MSC curricula will be subject to regular review, with all stakeholders given the opportunity to contribute to each review. This process is currently being set out in an MSC long-term curriculum maintenance plan.

18. STP MSc Clinical Science programmes leading to an academic award must be aligned to current NHS policy and strategy, and at the time of writing this guide should consider the recommendations of:

- *The Future of the Healthcare Science Workforce (2008)*
- *Modernising Scientific Careers: The Next Steps, a consultation* (2008)
- *Modernising Scientific Careers: The UK Way Forward (2010)*
- *Strategy for UK Life Sciences (December 2011)*

- *Strategy for UK Life Sciences One Year On* (2012)
- *Innovation Health and Wealth, Accelerating Adoption and Diffusion in the NHS (December 2011)*
- *NHS Education and Training Outcomes Framework: http://www.dh.gov.uk/health/2012/01/forum-response/*
- *NHS Constitution http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_132958.pdf*
- *NHS Constitution handbook http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/@dh/@en/documents/digitalasset/dh_132959.pdf*
- *NHS Commissioning Board planning guidance http://www.commissioningboard.nhs.uk/files/2012/12/everyonecounts-planning.pdf*
- *NHS Mandate https://www.wp.dh.gov.uk/publications/files/2012/11/mandate.pdf*
- *HEE Design to Delivery that will give you the statutory basis and duties of HEE http://www.dh.gov.uk/prod_consum_dh/groups/dh_digitalassets/documents/digitalasset/dh_132087.pdf*

HEIs should ensure they keep abreast of future strategic direction and policy.

3.3 Tender Process and Monitoring

19. Local Education and Training Boards are responsible for the commissioning of MSc Clinical Science programmes and the quality of each programme. The lead commissioner function for MSC programmes sits within the West Midlands.

3.4 MSC Accreditation

20. All MSc Clinical Science programmes must hold MSC Accreditation to confirm that commissioned MSc in Clinical Science programmes delivered by an HEI meet the requirements of the MSC Scientist Training Programme outlined in *Modernising Scientific Careers: The UK Way Forward* (DH, 2010). This accreditation process is currently the responsibility of the MSC Accreditation team, with advice given by the Health Education England Healthcare Science Professional Board (HEE HCSPB) and its Education and Training Working Group (HEE HCSPB ETWG).

3.5 Programme Delivery

21. HEIs are expected to ensure that all teaching, learning and assessment is up to date and informed by research to ensure that at graduation, Clinical Scientists meet the Framework for Higher Education Qualifications (FHEQ) descriptor at level 7 (http://www.qaa.ac.uk/). By undertaking a substantive research project bearing 60 credits, students should become aware of the major contribution the healthcare science workforce makes to research and innovation to benefit patients and the delivery of healthcare.

22. The key principles include:

- programmes must deliver the MSC learning outcomes and indicative content, which the HEE HCSPB Education and Training Working Group has advised meets the requirements of *Modernising Scientific Careers: The UK Way Forward;*
- wherever possible, delivery of the principles and knowledge underpinning practice should occur before the work based learning;
- programmes must meet current NHS education quality metrics and current Health and Care Professions Council (HCPC) Standards of Education and Training;
- the NSHCS, host departments, patients and the public should be involved in the design, implementation, delivery and review;
- assessment programmes must be fair, valid and reliable, and clearly articulated for all modules, and the timing and content should consider and complement the work based assessment programme;
- a robust student support and mentoring system must be in place and arrangements to support students in difficulty agreed with the NSHCS;
- a high-quality teaching and learning environment with appropriate resources and facilities to support teaching and research;
- teaching staff who are research active with a track record of undertaking high-quality research of national and international standing that is relevant to the practice of healthcare science and the NHS;
- evidence that each MSc programme meets the equivalent of the relevant HCPC Standards of Education and Training.

23. The Professional Practice and Good Scientific Practice underpin the MSc and work based programme. Key professional practice learning outcomes are included in the MSc programme and it is important that the MSc programme embeds the standards of professionalism set out in Good Scientific Practice in all aspects of the delivery and assessment of the programme. Trainees should be encouraged to develop a range of skills to support their professional life, and continuing professional development spanning communication, leadership, personal reflection, duty of care, duty of candour, critical reflection, giving and receiving feedback, career planning, commitment to lifelong learning.

HEIs should ensure that all staff involved in each MSc programme have read and are aware of the requirements of *Good Scientific Practice*, a copy of which can be found in the Appendices.

3.6 Academic Induction

24. It is expected that there will be a period of academic induction at the start of each MSc programme.

3.7 Teaching and Learning

25. It is expected that a blended learning approach will be adopted, based on a model of student-centred adult learning that balances and integrates face-to-face teaching, e-learning, etc., and considers the broader requirements of each STP. It is expected that a broad range of teaching and learning activities will be utilised, appropriate to the learning outcomes. Trainees should be enabled to gain the skills necessary to manage their own learning, and to exercise initiative and personal and professional responsibility. The learning strategy matrix and proformas outlined in 'Liberating Learning'[1] describe a range of activities that may be appropriate to this MSc programme; they are likely to include:

- Advanced library study
- Case study/discussions
- Debate
- Discussion forum
- Expert briefings
- Individual tutoring
- Interactive lectures
- Personal critical reflection and action planning
- Problem-based learning
- Role play
- Student-led and tutor-led seminars
- Skills teaching
- Simulation
- Self-assessment
- Self-directed learning activities
- Team projects
- Tutor-led small group learning

26. It is also expected that e-learning and m-learning[2] opportunities will be available to enable students to be active participants in a range of learning activities. Work based learning will also contribute to the academic educational experience of the trainees, for example seminars, journal clubs, local, national and international scientific and education meetings.

All contributors to the MSc should have up-to-date knowledge of the requirements of the programme, current healthcare science and education practice.

[1] Liberating Learning, The Report of the Conference of Postgraduate Medical Deans' ad hoc Working Group on the Educational Implications of the European Union Working Time Directive and the subsequent European Working Time Regulations: November 2002 (revised 2009).
[2] JISC TechDis: see http://www.jisctechdis.ac.uk/technologymatters/mobilelearning for further information with respect to mobile (m) learning.

3.8 Interprofessional Learning

27. Opportunities to enable interprofessional and interdisciplinary learning, within and outside healthcare science, should be a fundamental part of each programme.

3.9 Patient and Public Involvement

28. The HEI programme team should have mechanisms in place to ensure that there is meaningful patient and public involvement in the design, delivery, development and quality assurance of each programme. It is expected that patients will be represented on course committees at all levels and contribute to teaching, learning and assessment.

Descriptions of MSc programmes need to make clear and explicit links to new models of service delivery, care and patient pathways. The delivery of high-quality, compassionate, patient-centred care should be an integral part of each degree programme, with the emphasis on the contribution of the healthcare science workforce to ensure trainees are aware that their actions have an impact on the patient and the patient's family. The responsibility of all staff in the NHS to maximise quality and productivity and efficiency and to continually strive to improve services should be stressed. Equally important is the ability of graduates from the STP to communicate with the general public with respect to healthcare science, leading to a better educated public that is encouraged to take responsibility for its own health and wellbeing and has a greater understanding of the role that science plays in society.

Section 4: Assessment[3]

4.1 Purpose of Assessment

29. The purpose of assessment is to enable the trainee to demonstrate that they have the requisite knowledge, skills, attitudes and beliefs to work as a Clinical Scientist and, together with the successful graduation from the work based element of the STP, that they meet the HCPC standards of education and training, professional skills, conduct performance and ethics to provide reassurance to the public.

30. The MSc Clinical Science assessment programme should support assessment for learning, and in particular:[4]

- help clarify what good performance is (goals, criteria, standards);
- encourage 'time and effort' on challenging learning tasks;
- deliver high-quality feedback information that helps learners to self-correct;
- encourage positive motivational beliefs and self-esteem;
- encourage interaction and dialogue around learning (peer and teacher–student);
- facilitate the development of self-assessment and reflection in learning;
- involve students in decision making about assessment policy and practice;
- support the development of learning communities;
- integrate and complement the work based assessment programme:
- help teachers adapt teaching to student needs.

31. The HEI must have in place a clear, overarching strategic and systematic approach to assessment that fits with the curriculum and delivers assessment methods that are valid, reliable/generalisable, feasible, fair, acceptable and defensible, and is led by assessment experts. The approach to the assessment of the MSc Clinical Science should also be cognisant of and complement the work based assessment programme.

32. The assessment programme should be designed to enable the trainee to obtain regular constructive feedback on progress and achievement. It should encourage critical reflection and action planning, identifying both strengths and areas for development and improvement.

33. The approach to assessment should include and be overseen by a central coordinating leadership group or assessment-focused group who oversee, advise and scrutinise assessment across modules and years in order to build a consistent approach to assessment across the whole programme, involving module/programme leaders as appropriate. The overall assessment strategy

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[3] Quality Assurance Agency *Code of Practice*.

[4] Nicol DJ (2007) Principles of good assessment and feedback. REAP International Online Conference. www.reap.ac.uk/public/Papers/Principles_of_good_assessment_and_feedback.pdf (accessed 2.12.09).

should be documented in a clear and accessible manner with accountabilities clearly allocated. The strategy should also demonstrate how the approach is based on a sound understanding of the evidence base, academic literature and good practice in assessment.

4.2 Key areas that must be covered by the Assessment Strategy include:

- A clear statement of accountabilities, including the governance structure for assessment.
- The balance between formative and summative assessment.
- The assessment of each module, including the contribution of individual assessments and examinations within the module.
- Progression criteria.
- The range of valid, reliable and appropriate assessment techniques that will be utilised across the programme and for each module.
- The process for providing clear and timely information for students.
- How all examiners will be trained (including refresher training) and the guidelines that will be given.
- The mechanisms in place to ensure comparability of standards and to share good practice, including external examiners.
- How standard setting is undertaken.
- How student feedback will be given, including time lines.
- The arrangements for assessment of students with a disability.
- An assessment blueprint demonstrating the relationship between each assessment and the learning outcomes of the programme.
- Exemplar criteria and marking scheme, including critical reflective writing.
- The process of appointing external examiners.
- A defined role for external examiners that includes contributing to the review and development of assessment strategies and providing advice from an overarching perspective.

Section 5: Trainee Supervision, Support and Mentoring

34. The trainee supervision, support and mentoring systems will span the academic and work based elements of STP, and the relationship between the two systems must be clear to trainees, work based staff and HEI staff. The trainee supervision, support and mentoring system must be designed to encourage safe and effective practice, independent adult learning, appropriate professional conduct of the trainee and the safety of the patient. Those undertaking the role of supervisor or mentor must have relevant qualifications and experience and have undertaken appropriate and up-to-date training. The HEI will be expected to have an academic supervisory, support and mentoring scheme in place and to provide access to student support services.

Academic supervisor(s): Responsible, usually as part of a supervisory team, for guiding and assisting students during their period of academic study, including the research module.

Work based education supervisor: Responsible for monitoring, supporting and assessing the trainee on a day-to-day basis in their scientific, clinical and professional work and may take on the role of co-supervisor of the research project as part of the academic supervisory team.

5.1 Fitness to Practise

35. The HEI must have a clear policy with respect to Fitness to Practise, which must clearly articulate how staff and students are made aware of the policy and how the policy is implemented. Alongside this must be a clear policy on how student whistleblowers are supported. Breaches of professional practice and behaviour identified by the HEI or during HEI activities must be reported and investigated in accordance with this Fitness to Practise policy and accurate records maintained within the HEI. The NSCHCS should be informed of any issues with respect to fitness to practise and professional suitability.

Section 6: Progression, Annual Monitoring of Progress, Equality and Diversity, Curriculum Review and Updating

6.1 Progression

36. All trainees will usually be expected to complete the requirements for the MSc Clinical Science award within three years after initial registration (periods of suspension will not lead to an automatic extension of this period). This aligns with the duration of the STP and it is expected that successful STP graduates will be required to attain both an MSc in Clinical Science and certification of completion of STP work based training.

6.2 Annual Monitoring of Progress

37. The programme governance must include annual monitoring of progress that considers the outcome of the review of each module (including student and lay evaluation) and the handling and consideration of the external examiner's report. This process should enable the programme leaders to identify and propose changes to the programme in response to feedback.

6.3 Equality and Diversity

38. All programmes should reference and be able to demonstrate evidence of adherence to the Disability Discrimination Act 1995 (DDA) which was extended to education in September 2002, following amendments introduced by the Special Educational Needs and Disability Act (SENDA) 2001. Additionally evidence should be demonstrated to show adherence to the Disability Discrimination Act (2005) which includes the Disability Equality Duty and the QAA Code of Practice on Students with Disabilities should be available. All degree programmes should also include evidence of adherence to the 2010 Equality Act and any superseding legislation with respect to equality.

As part of this commitment to equality staff should be committed to inspiring and supporting all those who work, train and provide training in healthcare science to operate in a fair, open and honest manner. The approach taken is a comprehensive one and reflects all areas of diversity, recognising the value of each individual. This means that no one is treated less favourably than anybody else on the grounds of ethnic origin, nationality, age, disability, gender, sexual orientation, race or religion. This reflects not only the letter but also the spirit of equality legislation, taking into account current equality legislation and good practice.

Key legislation includes:

- Race Relations Act 1976 and the Race Relations Amendment Act (RRAA) 2000
- Disability Discrimination Act 1995 and subsequent amendments
- Sex Discrimination Act 1975 and 1986, and the 1983 and 1986 Regulations

- Equal Pay Act 1970 and the Equal Pay (Amendment) Regulations 1983 and 1986
- Human Rights Act 1998
- Employment and Equality (Sexual Orientation) Regulations 2003
- Employment and Equality (Religion or Belief) Regulations 2003
- Gender Recognition Act 2004
- Employment Equality (Age) Regulations 2011.

6.4 Curriculum Review and Updating

39. The review and updating of the doctoral level academic award curriculum will be part of the long-term MSC curriculum maintenance programme currently being developed.

If you have any feedback with respect to this programme please contact: msc.hee@nhs.net

Section 7: Relationships and Partnerships

7.1 National School of Healthcare Science

40. The NSHCS provides a national coordinating and oversight function to support trainees and host departments in the delivery of STP training. It is responsible for:

- national recruitment into STP, enabling a transparent and robust selection of the very best science graduates;
- providing national oversight of STP trainees throughout their training by managing and monitoring their progress through the Online Learning and Assessment Tool (OLAT), supporting trainees in difficulty as well as coordinating national structured assessments both during and at the end of STP training;
- evaluation of ongoing work based assessment outcomes through the OLAT, enabling the School to benchmark training programme delivery for early identification of programme issues that may need to be addressed and resolved, and reporting these as part of agreed MSC governance arrangements;
- liaising with each HEI's MSc Clinical Science programme director to ensure the integration and coordination needed to deliver the academic and work based programmes that form the STP; liaising with MSC Strategic Health Authority (SHA) leads (and education and quality leads in the future arrangements) on local issues and problems and their resolution;
- working closely with workplace training departments and providing support as appropriate;
- organising national 'Train the Trainer' programmes to ensure common standards of delivery and content, and recommending ongoing training activities to support the continuing professional development of work based trainers.

41. Professional Leads in each of the scientific divisions within the NSHCS will provide help and support with respect to organising rotations and/or specialist training that might require national coordination. In order to optimise the educational benefit and value of OLAT and the e-learning Portfolio, Professional Leads will also work with and support training departments in its use.

The School can be contacted on the following email: nshcs@Westmidlands.nhs.uk and at www.nshcs.org.uk.

7.2 The Academy for Healthcare Science

41. The Academy for Healthcare Science (AHCS provides the professional voice for the healthcare science workforce. Its functions are to:

- act as a strong and coherent professional voice;

- be able to influence and inform a range of stakeholders on all matters relating to healthcare science and scientific services;
- act as the overarching body for professional issues related to education, training and development in the UK health system including the provisions of UK wide quality assurance across education and training arrangements;
- provide the infrastructure to support the professional regulation/registration of the healthcare science workforce including:

    - establishing a system of professional accreditation of education and training programmes for the regulation/registration of the healthcare science workforce;
    - setting the professional standards for the delivery of accredited registers as required by CHRE (to be renamed the Professional Standards Authority for Health and Social Care) to ensure consistency and coherence across all MSC programmes;
    - taking the central role in the sponsorship of the voluntary registers to achieve 'accredited' status as set out by CHRE (to be renamed the Professional Standards Authority for Health and Social Care);
    - becoming an HPC education provider for the statutory regulation of clinical scientists;
    - establishing a system for equivalence across the whole of the healthcare science workforce.

http://www.academyforhealthcarescience.co.uk/

The following sections of this MSc Curriculum provide an overview of the STP for the specialisms within this theme. This is followed by the Generic, Division and Themed Learning Outcomes and Indicative Content, together with the high-level work based learning outcomes.

Section 8: Professional Practice

Professional practice spans the whole of the three-year training programme, underpinning both work based training and the MSc in Clinical Science and is described in the document Good Scientific Practice. This document sets out the principles and values on which good practice undertaken by the Healthcare Science workforce is founded. Wherever possible teaching should be contextualised to patients and patient care recognising that the work of all members of the healthcare science workforce have an impact on patients and their care.

Good Scientific Practice sets out for the profession and the public the standards of behaviour and practice that must be achieved and maintained in the delivery of work activities, the provision of care and personal conduct.

Good Scientific Practice uses as a benchmark the Health Professions Council (HPC) Standards of Proficiency and Standards of Conduct, Performance and Ethics, but expresses these within the context of the specialities within Healthcare Science, recognising that three groups of the workforce, Biomedical Scientists, Clinical Scientists and Hearing Aid Dispensers are regulated by the HPC. The aim is that the standards are accessible to the profession and understandable by the public.

Good Scientific Practice represents standards and values that apply throughout an individual's career in healthcare science at any level of practice. The standards will be contextualised by the role within Healthcare Science that an individual undertakes. This means that the standards must be interpreted based on the role that an individual performs. For example, in supervised roles where individuals work within defined procedures, rather than autonomously, some standards will need to be interpreted appropriately for the context of the specific role. There will, however, always be a requirement for an individual to work within the limits of their scope of practice and competence.

Students and trainees will be expected to be working towards meeting the expectations set out in this document. However, if an individual is undertaking further training and development following qualification from a professional training programme, he or she will be expected to be able to meet the standards in this document within their scope of practice.

The standards have been used to support curriculum development and will be used to underpin the process of judging individual equivalence, particularly for emerging specialisms.

The standards have been divided into five domains. The domains of *Good Scientific Practice* detailed in section 2 are:

1. Professional Practice
2. Scientific Practice
3. Clinical Practice
4. Research and development
5. Clinical Leadership

Further details including the content of each domain can be found in Appendix 3.

Within the MSc Clinical Sciences (Genetic Science) key outcomes for trainees are for all modules are shown below.

Learning Outcomes: Associated Personal Qualities and Behaviours (Professionalism)

On successful completion of this module the trainee will, in the context of clinical biochemistry:

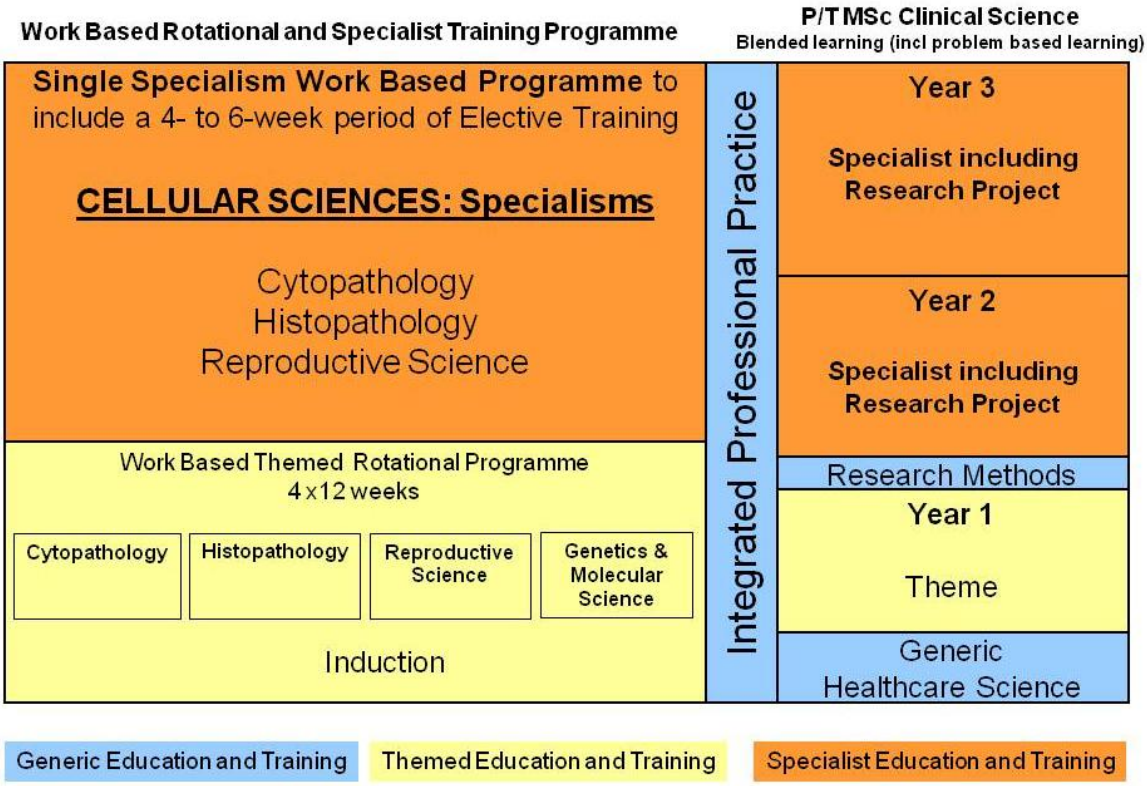
1. Present complex ideas in simple terms in both oral and written formats.
2. Consistently operate within sphere of personal competence and level of authority.
3. Manage personal workload and objectives to achieve quality of care.
4. Actively seek accurate and validated information from all available sources.
5. Select and apply appropriate analysis or assessment techniques and tools.
6. Evaluate a wide range of data to assist with judgements and decision making.
7. Conduct a suitable range of diagnostic, investigative or monitoring procedures with due care for the safety of self and others.
8. Report problems and may take part in restorative action within quality control/assurance requirements to address threats of performance deterioration.
9. Work in partnership with colleagues, other professionals, patients and their carers to maximise patient care.

Section 9: MSc Clinical Science (Cellular Sciences)

9.1 Overview of STP in Genetic Science

The diagram below provides an overview of the STP each trainee in Genetic Science will follow.

Figure 1: Modernising Scientific Careers: Scientist Training Programme (STP): Diagrammatic representation of employment-based, pre-registration, three-year NHS-commissioned education and training programme



9.2 Cellular Sciences Route Map

The route map overleaf shows how the high-level framework has been interpreted for the MSc in Clinical Science (Cellular Sciences) for three specialisms, namely:

i. Histopathology
ii. Cytopathology
iii. Reproductive Sciences

MSc Clinical Sciences: Cellular Sciences Route Map

Year 1	Year 2	Year 3
Introduction to Healthcare Science, Professional Practice and Clinical Leadership [20]	Research Methods [10]	
Introduction to Cellular Sciences – underpinning knowledge for rotational work based training [40]		
	EITHER: *Histopathology*	
	Pathological Basis of Disease [10]	Major Organ Histopathology excluding Cancer [10]
	Systematic Investigation of Pathological Specimens [10]	Cancer [10]
	Research Project [30]	Specialised Histopathology [10]
	OR	Research Project [30]
	Cytopathology	
	Pathological Basis of Disease [10]	Major Organ Cellular Pathology including Cancer [10]
	Systematic Investigation of Pathological Specimens [10]	Gynaecological Cytopathology [10]
	Research Project [30]	Non-Gynaecological Cytopathology 10]
	OR	Research Project [30]
	Reproductive Science	
	Infertility, Treatment and the Role of Regulation [10]	Culture of Gametes and Embryos [10]
	Gametes and Fertilisation [10]	Micromanipulation and Cryopreservation [10]
	Research Project [30]	Embryology [10]]
		Research Project [30]

Route map of STP in Cellular Sciences with specialism in Histopathology, Cytopathology or Reproductive Science. In Year 1, trainees begin by following the generic curriculum which spans all divisions (blue) together with some division/theme-specific modules (yellow). In Year 2, trainees start to specialise (orange) and by Year 3 all of the curriculum is focused on their chosen specialism

Credits			
Generic	**20**	**10**	**0**
Division/Theme	**40**	**0**	**0**
Specialism		**50**	**60**
Total	**60**	**60**	**60**

Section 10: Generic Modules

Generic Curriculum

The generic STP MSc Clinical Science curriculum followed by all trainees comprises three modules:

- Introduction to Healthcare Science, Professional Practice and Clinical Leadership: Year 1
- Research Methods: Year 2
- Research Project: Years 2 and 3

The generic STP work based programme generic curriculum modules are:

- Professional Practice: Years 1, 2 and 3
- Elective: following completion of the rotational training programme

These modules align to Good Scientific Practice (see Appendix).

Year 1: Generic Module
Introduction to Healthcare Science, Professional Practice and Clinical Leadership
[20 credits]

The overall aim of this introductory module is to provide all trainees with a broad knowledge and understanding of science and scientific knowledge, contextualised to the practice of healthcare science and the services provided by their healthcare science division/specialism. Central to this is the contribution of healthcare science to patient care, patient safety, service delivery, research and innovation, often at the cutting edge of science, for example genomics and bioinformatics. All members of the healthcare science workforce must understand the impact of their work on patients and patient care and remember that their work has a direct or indirect impact on patient care.

It is recognised that some of the learning within this module will not be at master's level, as allowed for in university regulations, but achievement of each learning outcome provides the building blocks for the division- and specialism-specific learning to follow, ensuring a common starting point for all trainees. While some of the learning may be at a lower level, the application of that knowledge in the divisional and specialist modules will be at master's level.

As an introductory module it is expected to provide an overview and reinforcement of key concepts with respect to the organisation, structure and function of the body, and important areas such as the psychosocial aspects of health and disease, clinical pharmacology and therapeutics, genomics and bioinformatics.

A major focus of this module is professional practice. This module will introduce and critically review the frameworks and academic literature underpinning professional practice and enable trainees to gain the knowledge, skills, experience and tools to develop, improve and maintain high standards of professional practice at all times.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

Scientific Basis of Healthcare Science

1. Describe the cellular, tissue and systems responses to disease and discuss those body systems and processes relative to your division/specialism.
2. Explain the main principles and core concepts of clinical genetics and genomics and discuss in the context of patients referred to services provided by your division/specialism.
3. Explain the main principles and core concepts of the sociology of health and illness and discuss those relevant to patients and the role of your division/specialism.
4. Explain the basis of epidemiology, public health and health protection and discuss in relation to patients and the safety of patients referred to services provided by your division/specialism.
5. Explain the basic principles of clinical pharmacology and therapeutics and discuss in relation to patients and the safety of patients referred to services provided by your division/specialism.
6. Explain the basic principles of physics that underpin healthcare science and discuss in relation to patients and the safety of patients referred to services provided by your division/specialism.
7. Discuss and justify how bioinformatics, including large biological datasets, contributes to patient safety, patient care and the practice of healthcare science and defend the governance and ethical frameworks within which bioinformatics can be used.

Professional Practice

8. Discuss and appraise the ethical foundations of professionalism, including critical reflection, and how these relate to the clinical scientist, the patient, the practice of healthcare science and the wider healthcare environment.
9. Explain and critically evaluate the structures, processes and methodologies that underpin the quality of the service provided by the NHS and quality improvement initiatives to promote high-quality patient care and enhance patient safety, and discuss the quality mechanisms relevant to your division/specialism.
10. Explain the principles of effective written and verbal communication and feedback, considering the needs and dignity of patients, the public, health professionals and scientists.
11. Describe and evaluate the basic principles and structures underpinning history taking, clinical examination and clinical decision making and discuss their role in your division.

Clinical Leadership

12. Discuss, compare and contrast a range of leadership models, including those that underpin current NHS Leadership and Competency Frameworks, and identify and critically evaluate how your personal values, principles and assumptions affect your personal leadership style.
13. Explain the current structure and management of health and social care systems and services at a national (UK-wide) and local level and the way in which the voice of patients and the public is embedded in all aspects of healthcare and healthcare education.

Learning Outcomes: Practical Skills

On successful completion of this module the trainee will:

1. Practise the skill of history taking.
2. Practise the skill of giving and receiving meaningful feedback.

Indicative Content

Review of the organisation, structure and function of the body

- Chemical, cellular and tissue level of organisation of the body
- Metabolism
- Function of blood as a tissue, blood cells (types and life times)
- Anatomy and physiology:
  - skin
  - skeletal system
  - respiratory system
    - ventilation
    - gas exchange
    - blood gas transport
  - heart, blood vessels and lymphatic system
- Central, peripheral and autonomic nervous system
- Vision, hearing and equilibrium
- GI tract, including digestion and absorption of food, the liver and liver function tests
- Renal system
- Endocrine system
- Electrolyte and acid-base balance
- Hormonal mechanisms and control
- Abdomen, pelvis and perineum, including male and female reproductive tract

Review of pathophysiology: cellular, tissue and systems responses to disease

- Review of the pathological processes underpinning common diseases:
  - cell death
  - inflammation
  - neoplasia
  - hypertrophy
  - hyperplasia

- tissue response to injury and repair

Introduction to the main principles and core concepts of clinical genetics and genomics

- Meiosis and Mendelian inheritance
- Nucleic acid structure and function
- Chromosome structure and function
- Nomenclature used to describe the human genome
- Common genetic disorders
- Impact of genetic disorders on the patient and their families
- Genomic technology and role of the genome in the development and treatment of disease

Introduction to sociology of health and illness

- Factors affecting health and their contribution to inequalities in health between populations
- Basis of health protection, including principles of surveillance
- Patients' responses to illness and treatment, including the impact of psychological and social factors including culture, on health and health-related behaviour
- Health belief models
- Diversity of the patient experience
- Disability, including learning disabilities
- Potential health inequalities
- Self-care
- Impact of life-threatening and critical conditions
- Patient involvement in decisions regarding their healthcare

Introduction to epidemiology, public health and health protection

- Health and disease in population terms
- The importance of population factors in individual health/disease processes
- Data interpretation, including the variability of biological data and application of statistics
- Investigating disease, epidemiology and natural history, including mathematical modelling
- Role of local, national and international bodies associated with health protection
- Principles of surveillance, the characteristics of different surveillance systems and key current policies and programmes used to protect health
- Screening programmes, including design, strengths and weaknesses

Introduction to clinical pharmacology and therapeutics

- Overview of the basic principles of pharmacokinetics
- Overview of the basics of drug metabolism and excretion
- Basic mechanisms and clinical importance of drug interactions

Basic principles of physics underpinning common measurement techniques used in healthcare science

- Structure of matter (atomic and nuclear models)

- Radiation: nature and its measurement and radiation safety
- Physics and mathematics of image formation
- Basic electricity and magnetism as it relates to the measurement of physiological signals
- Viscous and inertial flow of simple liquids

Ethical foundations of professionalism and the patient at the centre of care

- Defining professionalism within health and healthcare science
- Characteristics (personal traits) that impact on professionalism and professional practice in the workplace
- Ethical, legal and governance requirements arising from working at the level of the Clinical Scientist
- Critical Reflective Practice
    - Evidence base
    - Reflection as a structure for learning
    - Frameworks that support critical reflective practice
    - Reflection to improve professional practice
    - Reflection as a model for developing deep learning
    - Reflection as a means of improving patient care, service delivery and scientific investigation

Introduction to quality, quality improvement

- Patient safety
- Definition of terms
- Quality management
- Quality control
- Quality assurance
- Quality improvement
- Quality methodologies
- Quality processes and procedures
- Clinical governance
- Current NHS quality management and improvement systems
- Quality assurance to protect patients and assure high-quality healthcare science services, and deliver safe and effective services

Introduction to history taking, clinical examination

- Importance of patient-centred care, treating patients with respect, honesty and compassion, maintaining patient dignity and confidentiality and putting the patient first
- Duty of candour and the importance of this in healthcare
- Informed consent
    - Principles, guidance and law with respect to informed consent
    - Introduction to the patient, including role of the Clinical Scientist
    - Explanation to the patient
- Structured models for presenting a patient history
- Process of patient-centred interviewing and the features of a good consultation
    - Initiating the session
    - Gathering information

    - Building the relationship
    - Explaining and planning
    - Closing the session
- Link between the patient history and examination and development of clinical investigation and management plans
- Shared clinical decision making
- How information from a history and examination is used to develop clinical management plans

Introduction to communication skills

- Principles of effective communication, including:
    - written and electronic
    - verbal
    - non-verbal
- Importance of:
    - signposting
    - listening
    - paraphrasing
    - language
    - commonly used questioning techniques
    - non-verbal behaviour
    - ideas
    - beliefs
    - concerns
    - expectations
    - summarising
    - communication
- Range of question types that can be used in a communication
- Key features of effective patient interviews and information giving
- Adapting communication methods for people/groups/culture
- Feedback
    - The role of feedback in clinical education and continuing professional development
    - Feedback models
    - Characteristics of effective feedback

Introduction to leadership within the NHS

- Theories and models of leadership
- Concept of shared leadership
- Associated personal qualities and behaviours that promote shared leadership
- Overview of the NHS Leadership Framework and Clinical Leadership Competency

Introduction to the structure of the NHS

- Structure of the NHS across the four UK countries
    - Structure
    - Accountabilities
    - Funding arrangements
    - Working relationships

- NHS Constitution
  - The seven key principles that guide the NHS in all it does
  - NHS Values
    - Respect and dignity
    - Commitment to quality of care
    - Compassion
    - Improving lives
    - Working together for patients
    - Everyone counts
- Quality improvement structures and processes within the NHS
- Patient safety and the requirement to protect patients from avoidable harm
- Patient focus
  - Shared decision making with patients
  - Access to information
  - Choice
  - Personalised care
  - Safeguarding patients

Year 2: Generic Module
Research Methods
[10 credits]

The overall aim of this module is to ensure that the trainee has the knowledge, skills and experience of the role of research, development and innovation in the NHS in improving patient care, including prevention, diagnostics, treatment and service delivery. On completion of this module and the research project, trainees should be able to generate ideas; assess, plan, conduct, evaluate, interpret and report research and innovation projects, which includes original research; and disseminate the findings and, where appropriate, the adoption of the findings. Trainees should also be able to use research to improve practice.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Discuss and critically evaluate the context within which research, development, innovation and audit are undertaken to improve patient care, promote innovation and improve service delivery.
2. Describe, compare and contrast a range of research methods/approaches, including cohort studies, qualitative, quantitative, systematic review, sampling techniques and clinical trials.
3. Explain and justify current UK ethical and governance frameworks and processes spanning the conduct of human and animal research, innovation and audit.
4. Critically evaluate the literature/evidence base to identify a research question and create a new approach or technique to improve patient care or service delivery.
5. Discuss and justify the research, audit and innovation process from idea generation to dissemination/implementation, including patient/user

involvement and intellectual property.
6. Describe and evaluate a range of data analysis techniques to ensure the validity, reliability and appropriateness to the research aim, design and conclusion.
7. Describe how clinical guidelines are produced and the concept of evidence-based practice, including the role of current statutory and advisory regulatory bodies.
8. Identify potential sources of research and innovation funding for healthcare science/Clinical Scientists.

Learning Outcomes: Practical Skills

On successful completion of this module the trainee will:

1. Undertake an evidence-based literature review, critically appraise the output, draw appropriate conclusions and report the findings, and where appropriate, use the findings to inform a research project.
2. Identify, discuss and critically evaluate a research, innovation or audit project that has resulted in an improvement in patient care, diagnostics or service delivery.

Indicative Content

Research methods/approaches
- Differentiation between audit and research
- Cohort studies
- Qualitative
- Quantitative
- Systematic review
- Meta-analysis
- Sampling techniques
- Clinical trials (pre-clinical to translational)
- Epidemiological studies
- Study design
- Hypothesis generation and testing

Ethical and governance research frameworks
- Good Clinical Practice (GCP)
- Human research
- Animal research
- Innovation
- Audit

Research, audit and innovation process
- Literature searching and referencing
- Innovation pathway (Invention, Evaluation, Adoption and Diffusion)
- Idea generation
- Patient/user involvement
- Peer/expert review

- Practical and financial criteria and constraints affecting research
- Dissemination/implementation
- Intellectual property
- Quality assurance
- Monitoring and reporting
- Archiving
- Roles and responsibilities of the research/innovation team

Data analysis techniques
- Data validity, reliability and appropriateness
- Application and interpretation of statistical techniques
- Power calculations
- Intention-to-treat analyses

Clinical guidelines
- Evidence-based practice
- Statutory and advisory regulatory bodies

Research and innovation funding
- Sources of funding including research councils and charities
- Grant applications

Section 11: Division/Theme-Specific Modules

Introduction to Cellular Sciences

This section covers the division/theme-specific module that will be studied by all trainees undertaking the Cellular Sciences STP programme.

Division: **Life Sciences**
Theme: **Cellular Sciences**
Years 1 and 2: **Introduction to Cellular Sciences [40 credits]**

The overall aim of this module is to provide the trainee with the knowledge that underpins the rotations in the first 12 months of the Cellular Sciences STP and the common learning required within the division. The 40-credit module may conveniently be considered as three cellular specialisms-focused rotational modules plus Genetics and Molecular Science from the Genetics STP programme, each of 10 credits, although it is recognised that they may not be delivered in discrete modules.

A high-level description of the work based learning is included to provide MSc Clinical Science providers with information on how the academic and MSc elements of each STP integrate. The full work based Learning Guide can be found at:

http://www.networks.nhs.uk/nhs-networks/msc-framework-curricula/stp

Division: **Life Sciences**
Theme: **Cellular Sciences**
Year 1 and 2: **Introduction to Cellular Sciences [40 Credits in total]:**

- **Histopathology Rotation: HP-1: Introduction to the Principles and Practice of Histology [10 credits]**
- **Cytopathology Rotation: CP-1: Principles and Practice of Cervical Cytology and Diagnostic Cytopathology [10 credits]**
- **Reproductive Science Rotation: RS-1: Principles and Practice of Reproductive Science and Diagnostic Semen Analysis [10 credits]**
- **Genetics Rotation: CG-1: Genetics and Molecular Science [10 credits]**

Training capacity may be an issue in Reproductive Science and Genetics. Therefore, the rotational modules in these specialisms have been designed so that trainees can complete them without having to spend a full three months in a specialist laboratory. Work based experience in areas of Histopathology and Cytopathology are relevant.

Histopathology Rotation
HP-1: Introduction to the Principles and Practice of Histology
[10 credits]

This module will provide the trainee with knowledge and understanding of the principles and practice of histology as applied to clinical medicine. They will be expected to apply this knowledge and understanding in the workplace as they

use a range of histological techniques and gain experience of interpreting results from patient investigations.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Describe and recognise normal the cellular morphology of specified tissues and organs and relate these to the pathobiological processes associated with them.
2. Describe the receipt, preparation and processing of specimens for histopathological diagnosis.
3. Describe the appropriate demonstration technique as part of the diagnostic process.
4. Explain and evaluate microscopical examination techniques.
5. Describe and evaluate the application of quality assurance methodologies to histopathology.
6. Discuss the purpose and process of preparation and interpretation of clinical diagnostic reports.
7. Discuss the partnership of histopathology with other clinical specialisms in histological investigation and contribution to patient care.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Receive, prepare and process specimens for histopathological investigation. To include dissection, tissue selection cutting, fixation and staining, as appropriate.
2. Select the appropriate demonstration technique in the investigation of representative histopathology specimens.
3. Use microscopic examination techniques to investigate histopathological specimens.
4. Recognise normal cellular morphology of representative tissues and organs and common pathobiological processes associated with them.
5. Comply with quality assurance processes associated with histopathological investigations.

Indicative Content

- Normal cellular morphology and ultrastructure of specified tissues and organ systems, including skin, building on basic anatomy and physiology
- Introduction to tissue preparation techniques
- Specimen acquisition, viability, collection and delivery
- Principles and practice of fixation
    - Principles of specimen dissection and block selection

    - Tissue processing and embedding techniques
    - Pre-treatment, e.g. decalcification
    - Macrophotography
- Introduction to demonstration techniques and their rationale and hazards
    - Haematoxylin and eosin
    - Special stains to identify individual tissue/cellular components, e.g. connective tissues, nucleic acids, mucins, lipids, pigments
    - Histochemical techniques
    - Immunocytochemistry
    - Molecular diagnostics
    - Electron microscopy
- Microscopy principles and practice
    - Microtomy, cryotomy, ultramicrotomy
- Quality assurance
    - Artefacts
- Basic principles of pathobiology, to include inflammation, fibrosis, necrosis, hypertrophy, hyperplasia, atrophy, metaplasia and apoptosis

Cytopathology Rotation
CP-1: Principles and Practice of Cervical Cytology and Diagnostic Cytopathology
[10 credits]

This module will provide the trainee with knowledge and understanding of cervical cytology and an overview of the role and limitations of diagnostic cytopathology. They will apply and relate this knowledge as they learn to recognise normal cells in cervical cytology preparations. They will also gain and apply knowledge of the cervical screening programme, the role of fine needle aspiration cytology and non-gynaecological cytology preparation techniques.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Explain the physiology and pathophysiology of the female reproductive tract.
2. Describe the appearance of normal and relate this to abnormal cellular patterns in cervical cytology.
3. Discuss and evaluate the organisation and delivery of current cervical screening programmes.
4. Describe relevant techniques for non-gynaecological cytology samples.
5. Describe and evaluate the application of quality assurance methodologies to cytopathology.
6. Discuss the purpose and process of preparation and interpretation of clinical diagnostic reports.
7. Describe the partnership of cytopathology to other clinical specialisms in cytological investigation and contribution to patient care.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Receive, prepare and process specimens for cytopathological investigation.
2. Select appropriate methods for preparation, fixation and staining.
3. Use microscopic examination techniques on a selection of cytopathology samples.
4. Recognise the appearance of normal and abnormal cellular patterns in Cervical Cytology.

Indicative Content

- Overview of the cervical screening programme, including aetiology, principles of screening, coverage, and call and recall and failsafe
- Understanding of the role and impact of Human Papilloma virus (HPV) vaccination and testing on the cervical screening programme
- Principles of quality assurance, including internal quality control (IQC), external quality assessment (EQA) and audit
- The anatomy and physiology of the female reproductive tract
- Cell patterns of normal and abnormal cervical cytology samples
- Basic understanding of the use of information technology (IT) systems in cytology laboratories and the interface with laboratory computer systems
- Treatment options for cervical intra-epithelial neoplasia (CIN) and cervical cancer
- Principles of liquid-based cytology and imaging technologies
- The roles of staff in a cytology department: pathologists, biomedical scientists, consultant biomedical scientists (advanced practitioners), 'checkers', medical laboratory assistants and cytology screeners
- Principles of non-gynaecological cytology preparation techniques
- The advantages and limitations of fine needle aspiration (FNA) cytology in the diagnosis of benign conditions and malignant disease
- The role of immunocytochemistry and molecular techniques in gynaecological and non-gynaecological cytology

Reproductive Science Rotation
RS-1: Principles and Practice of Reproductive Science and Diagnostic Semen Analysis
[10 credits]

This module will provide the trainee with knowledge and understanding of the normal physiology of the male and female reproductive tracts. They will apply this knowledge as they learn to perform a range of techniques and interpret results from diagnostic semen analysis. They will also gain knowledge of current legislation and regulations.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Describe male and female reproductive anatomy.
2. Describe male and female reproductive physiology.
3. Explain and evaluate current legislation and regulation as it relates to reproductive science.
4. Describe relevant techniques for semen analysis and preparation.
5. Describe and evaluate the application of quality assurance methodologies to reproductive science.
6. Discuss the purpose and process of preparation and interpretation of clinical diagnostic reports.
7. Describe the partnership of reproductive science with other clinical specialisms and contribution to patient care.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Apply and interpret quality assurance methodologies in reproductive science.
2. Apply health and safety methodologies and practices appropriate to the reproductive science laboratory.
3. Perform to accepted standard relevant techniques for semen analysis and preparation.
4. Prepare, interpret and report on diagnostic semen analysis (under supervision).
5. Work in partnership with the reproductive science laboratory and other clinical specialisms in the investigation of infertility.

Indicative Content

- Overview of sexual differentiation, including differentiation of the fetal testes and ovary, and the endocrinology and embryology of sexual differentiation
- The anatomy and physiology of the male reproductive tract
- The anatomy and physiology of the female reproductive tract
- Hormonal control of female reproduction, including the menstrual cycle, follicle growth, autocrine and paracrine factors regulating follicle growth, follicular fluid, ovulation, corpus luteum
- Hormonal control of male reproduction
- Basic understanding of the regulatory mechanisms associated with human assisted reproductive therapy (ART)

- The roles of ART centre staff: clinicians, scientists, clinical embryologists, nurses, counsellors
- Principles of and standards for diagnostic semen analysis
- Characteristics of normal and abnormal semen samples
- Semen preparation, including different methodologies, diagnostic tests and functional tests

Genetics Rotation
CG-1: Genetics and Molecular Science
[10 credits]

This module will provide the trainee with an introduction to human genetics and molecular science. They will understand the organisation and delivery of a genetics laboratory service. They will perform some common methods used in genetics and gain an understanding of the interpretation of patient results in a variety of clinical settings.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Explain nucleic acid structure and function and chromosome structure and function.
2. Explain and apply the nomenclature used to describe the human genome.
3. Discuss patterns of inheritance.
4. Describe and evaluate the design, operation and performance of methods used in the investigation of chromosomal abnormality.
5. Describe and evaluate the design, operation and performance of methods used to investigate the molecular basis of disease.
6. Describe the partnership of genetics to other clinical specialisms in the investigation and management of genetic disorders and the contribution to patient care.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will

1. Assist with the investigation of chromosomal abnormality, the correct sampling technique and the use of the International System for Chromosome Nomenclature (ISCN).
2. Play a supporting role in cell culture, slide making and G-band staining techniques used in the investigation of chromosome anomalies.
3. Assist with the investigation of the molecular basis of disease, the correct sampling technique and relevant quality parameters.

4. Perform DNA extraction technique, polymerase chain reactions (PCRs) and observe sequencing reactions used in the investigation of the molecular basis of disease.
5. Apply the principles of internal quality control and external quality assessment and draw conclusions about assay performance.
6. Assist with the interpretation and reporting of laboratory results in the context of named genetic disorders.
7. Participate in activities that involve working in partnership with other clinical specialisms in the investigation of genetic disorders.

Indicative Content

- Cell biology, meiosis and mitosis, chromosome segregation
- Chromosome structure and function
- Mechanisms of origin of numerical and structural abnormalities, and behaviour of structural chromosome anomalies at meiosis
- Nucleic acid structure and function, chemical structure of DNA and replication, transcription and translation
- Patterns of inheritance – autosomal dominant and recessive, X-linked
- Introduction to the human genome
- Understanding of current Human Genome Variation Society (HGVS) and International System for Human Cytogenetic Nomenclature (ISCN) nomenclature
- Introduction to the molecular basis of disease
- Molecular science methodology
- Laboratory techniques and application of new cytogenetic tests, e.g. fluorescence in-situ hybridisation(FISH), comparative genomic hybridisation (CGH)
- DNA extraction, polymerase chain reaction (PCR), DNA sequencing, Southern blotting
- RNA extraction, reverse transcription PCR (RT-PCR)
- Application of DNA-based testing for gene mapping, linkage and mutation detection
- Sensitivity and specificity of molecular scientific tests
- Potential application of new DNA tests
- Plasma DNA and RNA

Section 12: MSc Clinical Science Specialist Modules for Cytopathology

<table>
<tr><th></th><th colspan="4">Module Titles</th></tr>
<tr><td>Year 3
Specialist
Modules</td><td>Major Organ Cellular Pathology including Cancer
[10]</td><td>Gynaecological Cytopathology
[10]</td><td>Non-Gynaecological Cytopathology
[10]</td><td>Research Project in Cytopathology
[30]</td></tr>
<tr><td>Year 2
Specialist
Modules</td><td>Research Methods
[10]</td><td>Pathological Basis of Disease
[10]</td><td>Systematic Investigation of Pathological Specimen
[10]</td><td>Research Project in Cytopathology
[30]</td></tr>
<tr><td>Year 1
Core
Modules</td><td colspan="2">Introduction to Healthcare Science, Professional Practice and Clinical Leadership
[20]</td><td colspan="2">Introduction to Cellular Sciences
Underpinning knowledge for rotational elements and integrated professional practice
[40]</td></tr>
</table>

Generic Modules: Common to all divisions of healthcare science

Division/Theme-Specific Modules: Common to a division or theme

Specialist Modules: Specific to a specialism

Division: **Life Sciences**
Theme: **Cellular Sciences**
Specialism: **Cytopathology**
Year 2: **CP-2**
Pathological Basis of Disease
[10 credits]

This module will provide the trainee with knowledge and understanding of the pathological basis of disease and the use of histopathology and cytopathology to detect and diagnose disease. They will apply a range of techniques to case studies in clinical practice and gain experience of interpreting results from patient investigations.

This module is also part of histopathology specialist training. The module may be delivered as a combined module or as separate modules with appropriate clinical context.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Describe the mechanisms and microscopic appearances of inflammatory disease.
2. Describe the mechanisms and microscopic appearances of cell proliferation, growth and death.
3. Describe the mechanisms and microscopic appearances of infectious disease.
4. Describe the mechanisms and microscopic appearances of the immune response and immunological disease.
5. Describe the mechanisms and microscopic appearances of tissue and cell injury, wound healing and repair.
6. Describe the mechanisms and microscopic appearances of local and metastatic tumour spread.
7. Discuss the partnership between histopathology and cytopathology laboratories and other clinical specialisms as part of the diagnosis and review of individual cases and patient care.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Recognise and interpret the microscopical appearance of the tissue or cell and relate to the pathobiological process.
2. Determine adequacy of samples taken by clinicians.

3. Determine adequacy of margins of exision or clearance where applicable.
4. Advise on or request appropriate additional tests to aid in the diagnosis of disease.
5. Recognise carcinoma and local and metastatic tumour spread in microscopic specimens.
6. Under supervision, prepare preliminary reports based on using interpretive and diagnostic skills.
7. Work in partnership with other clinical specialisms as part of the diagnosis and review of individual cases.

Indicative Content

- General principles of different pathological processes at the macroscopic, microscopic and molecular level
- Normal appearance of a variety of tissues, including endocrine, renal, gastrointestinal, respiratory, cardiovascular, male and female genital tract, central and peripheral nervous systems, and the urinary and lymphatic systems
- An understanding of pathological processes such as oncogenesis, carcinogenesis, inflammation, embolism, infarction, ischaemia, congestion, oedema and hypertension
- Epidemiology of common named pathologies associated with the tissues studied
- Principles of infectious diseases and the immune response to infection
- An appreciation of the relationship between cytopathological diagnosis, histopathological diagnosis and clinical outcomes

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Cytopathology
Year 2: CP-3
Systematic Investigation of Pathological Specimens
[10 credits]

This module will provide the trainee with knowledge and understanding of the systematic investigation of pathological specimens as part of the clinical investigation of patients. They will understand and apply a range of techniques to several clinical disorders and gain experience of interpreting results from patient investigations.

This module is also part of histopathology specialist training. The module may be delivered as a combined module or as separate modules with appropriate clinical context.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Describe a wide range of invasive and non-invasive surgical procedures, and their relationship to the collection of histopathology and cytopathology specimens.
2. Describe appropriate investigations for named clinical conditions.
3. Describe and develop investigations that contribute to the treatment and monitoring of disease.
4. Describe the limitations of a variety of investigative techniques in the diagnostic process.
5. Describe the sensitivity and specificity of a variety of investigative techniques in named clinical conditions.
6. Discuss and interpret the outcomes of a variety of investigative techniques in named clinical conditions.
7. Discuss and justify the importance of laboratory and clinical evaluation of new equipment and methods for histopathology and cytopathology.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Participate in the collection of a range of histopathology and cytopathology clinical specimens.
2. Perform investigations for the diagnosis, treatment and monitoring of named clinical conditions.
3. Evaluate and communicate the limitations of a range of investigative techniques in named clinical conditions.
4. Determine and give clinical advice on the sensitivity and specificity of investigative techniques in named clinical conditions.
5. Under supervision, prepare and interpret reports that involve a range of histological and cytological techniques as part of the systematic investigation of named clinical conditions.
6. Work in partnership with other clinical specialisms as part of the diagnosis and review of individual cases.

Indicative Content

- Application of a wide range of invasive and non-invasive surgical procedures, and their relationship to histopathology and cytopathology specimens, e.g. smears, aspirates, biopsies, excisions, resections
- Awareness of the relationship between imaging and the histological or cytological sample, e.g. ultrasound to identify the specific sample site
- Use of standard operating procedures (SOPs) applied to the systematic investigation of a disease process in a specific tissue type
- Application of a range of sampling and staining techniques and using them in a systematic way, according to protocols designed for that tissue type and ensuring quality control procedures are in place

- An appreciation of how accurate and timely histopathological and cytopathological diagnosis and reporting is essential in shaping the treatment and management of the patient. To include supplementary reporting when results of immunocytochemistry or molecular techniques become available
- Current legislation relating to the retention of tissues and organs
- Evaluation of new methods and techniques for processing tissue and for the investigation of tissue and cell preparations
- Cells in each sample type e.g. cervical samples, urine cytology and serous effusions
- Human Tissue Authority Regulations relating to the retention of tissues and organs
- Quality management of laboratory operations
- Evaluation of new methods and techniques for processing tissue and for the investigation of tissue and cell preparations

Division: **Life Sciences**
Theme: **Cellular Sciences**
Specialism: **Cytopathology**
Years 2 and 3: **CP-Res**
Research Project in Cytopathology
[60 credits]

The overall aim of this module, building on the Research Methods module, is for the trainee to undertake a research project that shows originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in a specialism of healthcare science. The research project may span scientific or clinical research, translational research, operational and policy research, clinical education research, innovation, service development, service improvement or supporting professional service users to meet the expected learning outcomes. Research projects should be designed to take into account the research training required by individual trainees and the needs of the department in which the research is to be conducted.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Discuss the stages of the research and innovation process from conceptualisation to dissemination and, if appropriate, translation into practice.
2. Describe the purpose and importance of different kinds of research, including scientific or clinical research, translational research, operational and policy research, clinical education research, innovation, service development, service improvement and supporting professional service users, and relate these to the roles undertaken by Clinical Scientists in the trainee's specialism.
3. Discuss and evaluate the use of reference manager systems.

4. Justify the rationale for research governance and ethical frameworks when undertaking research or innovation in the NHS.
5. Describe the process and requirements for publication in a peer-reviewed journal and the current system of grading research publications.

Learning Outcomes: Practical Skills

On successful completion of this module the trainee will:

1. Design, plan and undertake a research project to test a hypothesis from conception to completion/archiving in accordance with ethical and research governance regulations, drawing on expert advice where necessary and involving patients and service users.
2. Analyse the data using appropriate methods and statistical techniques, and interpret, critically discuss and draw conclusions from the data.
3. Prepare a written project that describes and critically evaluates the research project, clearly identifying the strengths and weaknesses.
4. Present a summary of the research project and outcome that conforms to the format of a typical scientific presentation at a national or international scientific meeting, responding to questions appropriately.
5. Prepare a summary of the research project suitable for non-specialist and lay audiences.

Indicative Content

- Critical evaluation of the literature/evidence base
- Reference management
- Identification of a research question
- Research ethics and regulatory requirements, including issues related to access and use of information
- Data protection and confidentiality guidelines
- Patient safety
- Patient consent
- Sources of funding/grants
- Peer review/expert advice
- Possible risks and balancing risk vs benefit
- Project management techniques and tools
- Roles and responsibilities of those involved in the research
- Monitoring and reporting
- Data analysis
- Data interpretation
- Criteria/metric for assessing and grading research data and publications in the scientific, NHS and HE sectors
- Range of formats and modes of presentation of data
- Requirements for publications submitted to scientific, education and similar journals
- Current conventions with respect to bibliography and referencing of information

Division: Life Sciences
Theme: Cellular Sciences

Specialism: Cytopathology
Year 3: CP-4
Major Organ Cellular Pathology including Cancer
[10 credits]

This module will provide the trainee with knowledge and understanding of the cellular structure and function of the major organs and the cellular pathological findings in a range of clinical disorders, including cancer. They will understand and apply a range of techniques to these clinical disorders and gain experience of interpreting results from patient investigations.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Describe the structure and function of the major organ groups in the human body and their interaction with each other.
2. Discuss the pathophysiology and clinical presentation of common disorders of major organs and common cancers.
3. Explain the processes of tumour growth, angiogenesis, apoptosis and metastasis.
4. Describe and evaluate the application of established cellular pathology techniques to a range of named disorders of the major organs and cancers.
5. Discuss and justify the ethical and legislative processes associated with the investigation of major organ disease and cancer.
6. Discuss the role of the cellular pathology report as part of the decision-making process in guiding diagnosis, management and clinical outcomes in major organ disease and cancer.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Identify and confirm the clinical presentation of a range of major organ diseases and commonly occurring forms of cancer.
2. Perform to quality standards a range of established cellular pathology techniques to named disorders of the major organs and commonly occurring forms of cancer.
3. Identify and evaluate new equipment, methods, or procedures to enhance the contribution of the cellular pathology laboratory to the diagnosis and management of major organ disease and commonly occurring forms of cancer.

4. Under supervision, prepare and interpret reports that involve cellular pathology findings as part of the investigation of major organ disease.
5. Work in partnership with other clinical specialisms as part of the diagnosis and review of named clinical diseases of major organs and commonly occurring forms of cancer.

Indicative Content

- Aetiology, pathogenesis and main clinical features of common non-malignant and malignant diseases encountered in cellular pathology and their impact on patient management, including:
  - dermatopathology, e.g. non-malignant and malignant skin lesions
  - breast pathology, e.g. adenomas, fibrocystic change, cancer
  - hepatobilary pathology, e.g. cirrhosis, cholecystitis, cancer
  - gastrointestinal pathology, e.g. diverticulitis, polyposis, inflammatory bowel disease, cancer
  - genitourinary pathology, e.g. prostatic hyperplasia, cancer
  - cardiac and vascular pathology, e.g. ischaemic heart disease
  - respiratory pathology, e.g. chronic obstructive pulmonary disease (COPD), fibrosis, cancer
- Principles of the initiation and mechanisms of malignant growth and metastasis, including:
  - genetic deregulation and the role of proto-oncogenes and oncogenic viruses
  - the role of telomerase activation in tumourgenesis
  - cell proliferation
  - signalling pathways
  - apoptosis
  - the role of hormones
  - angiogensis
- Application of a wide range of histological, immunocytochemical and molecular techniques to the demonstration of the disease processes
- The role of prognostic and predictive markers (e.g. oestrogen receptor, human epidermal growth factor receptor 2 [HER-2]) in the grading of tumours and monitoring the spread of disease
- Ethical and regulatory issues
- New developments in equipment, methods and procedures used in the laboratory investigation of major organ disease and cancer
- The importance of the histopathology report in assisting diagnosis, management and clinical outcomes
- Multidisciplinary team meetings

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Cytopathology
Year 3: CP- 5
Gynaecological Cytopathology
[10 credits]

This module will provide the trainee with knowledge and understanding of the aetiology, pathogenesis and main clinical features of cervical and other gynaecological cancers. They will understand and gain experience of the role of the cervical cytology laboratory in the diagnosis of gynaecological malignancy.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Explain the aetiology, pathogenesis and main clinical features of cervical cancer.
2. Discuss and evaluate the role of the cervical cytology laboratory in the prevention of cervical cancer.
3. Describe the national screening programme for cervical cancer.
4. Explain the aetiology, pathogenesis and main clinical features of endometrial cancer.
5. Discuss and evaluate the role of the cytology laboratory in the diagnosis of non-cervical malignancies.
6. Explain and critically evaluate the importance of new technologies, automation and ancillary techniques in cervical cancer screening and the investigation of other gynaecological cancers.
7. Discuss the role of the cytopathological report and the multidisciplinary team in the management of gynaecological cancer and patient care.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Recognise and interpret the microscopical appearance of cells and relate to the pathobiological process.
2. Recognise the clinical presentation of a range of gynaecological malignancies.
3. Screen and interpret cervical cytology samples to quality standards.
4. Advise on or request appropriate additional tests to aid in the diagnosis of disease.
5. Identify and evaluate new equipment, methods, or procedures to enhance the contribution of the cytopathology laboratory to the prevention, diagnosis and management of gynaecological malignancies.
6. Analyse national and international data on the incidence, screening, diagnosis, management and survival of gynaecological malignancies.
7. Draft interpretative reports that involve cytopathological findings as part of the investigation of gynaecological malignancies.

8. Work in partnership with other clinical specialisms as part of the diagnosis and review of gynaecological malignancies.

Indicative Content

- Aetiology, pathogenesis and main clinical features of cervical cancer
  - The role of HPV in cervical carcinogenesis
  - The role of HPV vaccination
  - The role of HPV testing in the UK screening programmes
  - The role of colposcopy in the diagnosis of CIN, cervical glandular intra-epithelial neoplasia (CGIN) and cervical cancer
- The role of the cervical cytology laboratory in the prevention of cervical cancer
  - Primary screening
  - Internal quality control
  - Patient management
  - Performance monitoring of individuals, laboratories and screening programmes
  - Quality assurance
  - Invasive cancer audit
  - Cytology: biopsy correlation
  - Role of the hospital-based programme coordinator
  - Management of the cervical cytology laboratory
- The role of the cytology laboratory in the reporting of microorganisms
- Treatment of CIN, CGIN and cervical cancer
- Aetiology, pathogenesis and main clinical features of endometrial cancer
- The role of the cervical cytology laboratory in the diagnosis of non-cervical malignancies
  - Endometrial carcinoma
  - Ovarian carcinoma
  - Extra-uterine malignancies
- New technologies, automation and ancillary techniques in cervical screening

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Cytopathology
Year 3: CP-6
Non-Gynaecological Cytopathology
[10 credits]

This module will provide the trainee with knowledge and understanding of the aetiology, pathogenesis and main clinical features of relevant non-gynaecological cancers. They will understand and gain experience of the role of the cytology laboratory in the diagnosis of non- gynaecological malignancy.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Explain the aetiology, pathogenesis and main clinical features of cancer of the respiratory tract, urinary tract, serous cavities, thyroid gland, salivary glands and lymph nodes.
2. Discuss and justify the applications of non-gynaecological cytology sampling techniques.
3. Discuss the application of specialised techniques to cytology samples.
4. Critically evaluate specialised techniques currently under development that may play a future role in cellular pathology.
5. Discuss and gain experience of the cytopathological report and the multidisciplinary team in the management of non-gynaecological cancer and patient care.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Recognise and interpret the microscopical appearance of cells and relate to the pathobiological process.
2. Recognise the clinical presentation of cancers detected by non-gynaecological cytopathology.
3. Perform to internal quality standards a range of established cytopathological techniques used in non-gynaecological cytopathology. Advise on or request appropriate additional tests to aid in the diagnosis of disease.
4. Identify and evaluate new equipment, methods, or procedures to enhance the contribution of the cytopathology laboratory to the diagnosis and management of non-gynaecological malignancies.
5. Draft interpretative reports that involve cytopathological findings as part of the investigation of non-gynaecological malignancies.
6. Work in partnership with other clinical specialisms as part of the diagnosis and review of non-gynaecological malignancies.
7. Analyse national and international data on the incidence, diagnosis, management and survival of malignancies detected by non-gynaecological cytopathology.

Indicative Content

- Aetiology, pathogenesis and main clinical features of cancer in the following areas:
  - respiratory tract
  - urinary tract
  - serous cavities
  - thyroid gland
  - salivary glands

- lymph nodes
- Applications of non-gynaecological cytology sampling techniques, including:
  - exfoliative techniques
  - aspiration techniques
  - application of specialised techniques to a variety of cytology samples
  - immunocytochemistry
  - Immunofluorescence
  - fluorescence in-situ hybridisation
  - molecular techniques, e.g. PCR
  - electron microscopy
  - image analysis
  - quantitation
  - molecular databases
  - flow cytometry
- Critical evaluation of specialised techniques currently under development that may play a future role in cellular pathology

Section 13: MSc Clinical Science Specialist Modules for Histopathology

<table>
<tr><th></th><th colspan="4">Module Titles</th></tr>
<tr><td>Year 3
Specialist
Modules</td><td>Major Organ Histopathology excluding Cancer
[10]</td><td>Cancer
[10]</td><td>Specialised Histopathology
[10]</td><td>Research Project in Histopathology
[30]</td></tr>
<tr><td>Year 2
Specialist
Modules</td><td>Research Methods
[10]</td><td>Pathological Basis of Disease
[10]</td><td>Systematic Investigation of Pathological Specimens
[10]</td><td>Research Project in Histopathology
[30]</td></tr>
<tr><td>Year 1
Core
Modules</td><td colspan="2">Introduction to Healthcare Science, Professional Practice and Clinical Leadership
[20]</td><td colspan="2">Introduction to Cellular Sciences
Underpinning knowledge for rotational elements and integrated professional practice
[40]</td></tr>
</table>

Generic Modules: Common to all divisions of healthcare science

Division/Theme-Specific Modules: Common to a division or theme

Specialist Modules: Specific to a specialism

This module provides the trainee with the knowledge that underpins the specialist module in histopathology. They will be expected to apply this knowledge and understanding during workplace learning.

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Histopathology
Year 2: HP-2
Pathological Basis of Disease
[10 credits]

This module will provide the trainee with knowledge and understanding of the pathological basis of disease and the use of histopathology and cytopathology to detect and diagnose disease. They will apply a range of techniques to case studies in clinical practice and gain experience of interpreting results from patient investigations.

This module is also part of cytopathology specialist training. The module may be delivered as a combined module or as separate modules with appropriate clinical context.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Describe the mechanisms and microscopic appearances of inflammatory disease.
2. Describe the mechanisms and microscopic appearances of cell proliferation, growth and death.
3. Describe the mechanisms and microscopic appearances of infectious disease.
4. Describe the mechanisms and microscopic appearances of the immune response and immunological disease.
5. Describe the mechanisms and microscopic appearances of tissue and cell injury, wound healing and repair.
6. Describe the mechanisms and microscopic appearances of local and metastatic tumour spread.
7. Discuss the partnership between histopathology and cytopathology laboratories and other clinical specialisms as part of the diagnosis and review of individual cases and the contribution to patient care.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Recognise and interpret the microscopical appearance of the tissue or cell and relate to the pathobiological process.
2. Determine adequacy of samples taken by clinicians.
3. Determine adequacy of margins of excision or clearance, where applicable.
4. Advise on or request appropriate additional tests to aid in the diagnosis of disease.
5. Recognise carcinoma and local and metastatic tumour spread in microscopic specimens.
6. Under supervision, prepare preliminary reports based on using interpretive and diagnostic skills.
7. Work in partnership with other clinical specialisms as part of the diagnosis and review of individual cases.

Indicative Content

- General principles of different pathological processes at the macroscopic, microscopic and molecular level
- Normal appearance of a variety of tissues, including endocrine, renal, gastrointestinal, respiratory, cardiovascular, male and female genital tract, central and peripheral nervous systems, and the urinary and lymphatic systems
- An understanding of pathological processes such as oncogenesis, carcinogenesis, inflammation, embolism, infarction, ischaemia, congestion, oedema and hypertension
- Epidemiology of common named pathologies associated with the tissues studied
- Principles of infectious diseases and the immune response to infection
- An appreciation of the relationship between cytopathological diagnosis, histopathological diagnosis and clinical outcomes

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Histopathology
Year 2: HP-3
Systematic Investigation of Pathological Specimens
[10 credits]

This module will provide the trainee with knowledge and understanding of the systematic investigation of pathological specimens as part of the clinical investigation of patients. They will understand and apply a range of techniques to several clinical disorders and gain experience of interpreting results from patient investigations.

This module is also part of cytopathology specialist training. The module may be delivered as a combined module or as separate modules with appropriate clinical context.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Describe a wide range of invasive and non-invasive surgical procedures, and their relationship to the collection of histopathology and cytopathology specimens.
2. Discuss and justify the choice of appropriate investigations for named clinical conditions.
3. Describe and develop investigations that contribute to the treatment and monitoring of disease.
4. Describe and evaluate the limitations of a variety of investigative techniques in the diagnostic process.
5. Discuss the sensitivity and specificity of a variety of investigative techniques in named clinical conditions.
6. Discuss and interpret the outcomes of a variety of investigative techniques in named clinical conditions.
7. Discuss the importance of laboratory and clinical evaluation of new equipment and methods for histopathology and cytopathology.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Participate in the collection of a range of histopathology and cytopathology clinical specimens.
2. Perform investigations for the diagnosis, treatment and monitoring of named clinical conditions.
3. Evaluate and communicate the limitations of a range of investigative techniques in named clinical conditions.
4. Determine and give clinical advice on the sensitivity and specificity of investigative techniques in named clinical conditions.
5. Under supervision prepare and interpret reports that involve a range of histological and cytological techniques as part of the systematic investigation of named clinical conditions.
6. Work in partnership with other clinical specialisms as part of the diagnosis and review of individual cases.

Indicative Content

- Application of a wide range of invasive and non-invasive surgical procedures, and their relationship to histopathology and cytopathology specimens, e.g. smears, aspirates, biopsies, excisions, resections
- Awareness of the relationship between imaging and the histological or cytological sample, e.g. ultrasound to identify the specific sample site
- Use of standard operating procedures (SOPs) applied to the systematic investigation of a disease process in a specific tissue type

- Application of a range of sampling and staining techniques and using them in a systematic way, according to protocols designed for that tissue type, and ensuring quality control procedures are in place
- An appreciation of how an accurate and timely histopathological and cytopathological diagnosis and reporting is essential in shaping the treatment and management of the patient. To include supplementary reporting when results of immunocytochemistry or molecular techniques become available
- Current legislation relating to the retention of tissues and organs
- Evaluation of new methods and techniques for processing tissue and for the investigation of tissue and cell preparations

Division: **Life Sciences**
Theme: **Cellular Sciences**
Specialism: **Histopathology**
Years 2 and 3: **HP-Res**
Research Project in Histopathology
[60 credits]

The overall aim of this module, building on the Research Methods module, is for the trainee to undertake a research project that shows originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in a specialism of healthcare science. The research project may span scientific or clinical research, translational research, operational and policy research, clinical education research, innovation, service development, service improvement, or supporting professional service users to meet the expected learning outcomes. Research projects should be designed to take into account the research training required by individual trainees and the needs of the department in which the research is to be conducted.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Discuss the stages of the research and innovation process from conceptualisation to dissemination and, if appropriate, translation into practice.
2. Describe the purpose and importance of different kinds of research, including scientific or clinical research, translational research, operational and policy research, clinical education research, innovation, service development, service improvement and supporting professional service users, and relate these to the roles undertaken by Clinical Scientists in the trainee's specialism.
3. Discuss and evaluate the use of reference manager systems.
4. Justify the rationale for research governance and ethical frameworks when undertaking research or innovation in the NHS.
5. Describe the process and requirements for publication in a peer-reviewed

journal and the current system of grading research publications.

Learning Outcomes: Practical Skills

On successful completion of this module the trainee will:

1. Design, plan and undertake a research project to test a hypothesis from conception to completion/archiving in accordance with ethical and research governance regulations, drawing on expert advice where necessary and involving patients and service users.
2. Analyse the data using appropriate methods and statistical techniques, and interpret, critically discuss and draw conclusions from the data.
3. Prepare a written project that describes and critically evaluates the research project, clearly identifying the strengths and weaknesses.
4. Present a summary of the research project and outcome that conforms to the format of a typical scientific presentation at a national or international scientific meeting, responding to questions appropriately.
5. Prepare a summary of the research project suitable for non-specialist and lay audiences.

Indicative Content

- Critical evaluation of the literature/evidence base
- Reference management
- Identification of a research question
- Research ethics and regulatory requirements, including issues related to access and use of information
- Data protection and confidentiality guidelines
- Patient safety
- Patient consent
- Sources of funding/grants
- Peer review/expert advice
- Possible risks and balancing risk vs benefit
- Project management techniques and tools
- Roles and responsibilities of those involved in the research
- Monitoring and reporting
- Data analysis
- Data interpretation
- Criteria/metric for assessing and grading research data and publications in the scientific, NHS and HE sectors
- Range of formats and modes of presentation of data
- Requirements for publications submitted to scientific, education and similar journals
- Current conventions with respect to bibliography and referencing of information

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Histopathology
Year 3: HP-4

Major Organ Histopathology excluding Cancer [10 credits]

This module will provide the trainee with knowledge and understanding of the cellular structure and function of the major organs and the cellular pathological findings in a range of clinical disorders other than cancer. They will understand and apply a range of techniques to these clinical disorders and gain experience of interpreting results from patient investigations.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Describe the structure and function of the major organ groups in the human body and their interactions with each other.
2. Explain the pathophysiology and clinical presentation of common disorders of major organs.
3. Describe systemic and local disease within major organ systems.
4. Describe the application of established histopathological techniques to a range of named disorders of the major organs.
5. Discuss the principles and practice of major organ transplantation, including immunosuppression.
6. Discuss and critically evaluate the ethical and legislative processes associated with the investigation of major organ disease.
7. Discuss the role of the histopathology report as part of the decision-making process in guiding diagnosis, management and clinical outcomes in major organ disease.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Identify and confirm clinical presentation of a range of major organ diseases.
2. Perform to quality standards a range of established histopathological techniques to named disorders of the major organs.
3. Identify and evaluate new equipment, methods, or procedures to enhance the contribution of the histopathology laboratory to the diagnosis and management of major organ disease.
4. Under supervision, prepare and interpret reports that involve histopathological findings as part of the investigation of major organ disease.
5. Work in partnership with other clinical specialisms as part of the diagnosis and review of named clinical diseases of major organs.

Indicative Content

- Aetiology, pathogenesis and main clinical features of common diseases encountered in cellular pathology and their impact on patient management, including:
  - dermatopathology, e.g. non malignant skin lesions
  - breast pathology, e.g. adenomas, fibrocystic change
  - hepatobilary pathology, e.g. cirrhosis, cholecystitis
  - gastrointestinal pathology, e.g. diverticulitis, polyposis, inflammatory bowel disease
  - genitourinary pathology, e.g. prostatic hyperplasia, pyelonephritis, urothelial papillary lesions
  - cardiac and vascular pathology, e.g. ischaemic heart disease
  - respiratory pathology, e.g. chronic obstructive pulmonary disease (COPD), fibrosis
  - gynaecological pathology, e.g. endometriosis, fibrous diseases
  - male reproductive pathology, e.g. epididymal cysts
  - endocrine pathology, e.g. goitre
  - ear, nose and throat (ENT) pathology, e.g. nasal polyps, tonsillitis, cystic lesions
  - osteoarticular pathology, e.g. osteoarthritis and rheumatoid arthritis
- Application of a wide range of histological techniques to the demonstration of the disease processes, e.g. diagnostic algorithms
- Awareness of the multi-organ impact of disease and treatment
- Organ transplantation and the morphological presentation of rejection
- Multi-organ transplant
- Ethical and regulatory issues
- New developments in equipment, methods or procedures used in the laboratory investigation of major organ disease
- The importance of the histopathology report in assisting diagnosis, management and clinical outcomes

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Histopathology
Year 3: HP- 5
Cancer
[10 credits]

This module will provide the trainee with knowledge and understanding of the principles of carcinogenesis, malignancy and metastasis. They will understand and apply cellular pathology to the diagnosis and management of a range of common cancers. They will apply cellular pathology techniques in cancer and gain experience of interpreting results from patient investigations.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Describe the biology of normal and abnormal growth.
2. Describe the processes of tumour growth, angiogenesis, apoptosis and

metastasis.
3. Explain the role of oncogenes in cancer development and the molecular basis of oncogenesis.
4. Describe and justify the use of diagnostic algorithms to aid the diagnosis of malignant disease.
5. Describe the use of prognostic indicators to provide advice on clinical and surgical treatment in a multidisciplinary setting.
6. Discuss and critically evaluate the application of clinical and surgical treatment modalities for cancer, including the underpinning evidence base.
7. Discuss and justify the relevance of national and international targets and achievements in the diagnosis, management and survival of cancer patients.
8. Discuss the partnership of histopathology to other clinical specialisms in the investigation and management of cancer and patient care.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Identify and confirm the clinical presentation of a range of common cancers.
2. Perform to quality standards a range of established histopathological techniques to named cancers.
3. Identify and evaluate new equipment, methods, or procedures to enhance the contribution of the histopathology laboratory to the diagnosis and management of cancer.
4. Apply diagnostic algorithms and prognostic indicators to the investigation and management of cancer patients.
5. Draft preparation and interpretation of reports that involve histopathological findings as part of the investigation of cancer.
6. Work in partnership with other clinical specialisms as part of the diagnosis and review of a range of common cancers.

Indicative Content

- Principles of the initiation and mechanisms of malignant growth and metastasis, including:
  - genetic deregulation and the role of proto-oncogenes and oncogenic viruses
  - the role of telomerase activation in tumourgenesis
  - cell proliferation
  - signalling pathways
  - apoptosis
  - the role of hormones

- angiogenesis
- The principles and significance of clonality
- The principles of radioactive and chemical carcinogenesis
- Karyotyping and familial predisposition to certain types of cancer
- Tumour–host interactions
- Aetiology, homeostasis, pathogenesis and the main clinical features, including age-related factors, of malignant diseases encountered in organ group-specific malignant disease, including:
  - skin malignancy
  - breast malignancy
  - hepatobilary malignancy
  - gastrointestinal malignancy
  - genitourinary malignancy
  - vascular malignancy
  - respiratory malignancy
  - gynaecological malignancy
  - male reproductive malignancy
  - endocrine malignancy
  - haemopoietic malignancy
  - neuromuscular malignancy
  - ENT malignancy
  - ophthalmic malignancy
  - osteoarticular malignancy
- Application of a wide range of histological techniques to the diagnosis of cancer
- The processes of grading and staging of cancer
- Role of diagnostic prognostic and predictive markers in the clinical management of patients
- National screening programmes for cancer
- The role of clinical and surgical treatment options in the management of disease
- The impact of diagnostic histopathology on clinical outcomes
- Multidisciplinary team meetings
- Cancer targets – fast-track from GP to treatment (to include initial diagnosis of organ-specific tumour site, e.g. breast, prostate)

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Histopathology
Year 3: HP- 6
Specialised Histopathology
[10 credits]

This module will provide the trainee with knowledge and understanding of application of histopathology to specialised clinical situations, including autopsy. They will apply this knowledge as they use cellular pathology techniques in specialised situations and gain experience of interpreting results from patient investigations.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Describe the structure and function of specialised organ groups in the human body and their interactions with each other.
2. Discuss and evaluate the application of histopathology in clinical sub-specialist areas, including paediatrics.
3. Discuss and evaluate the application of specialised histopathology equipment and techniques in a variety of clinical settings.
4. Discuss the contribution of the histopathology report to the diagnosis and further management of specialised organ groups and clinical sub-specialist areas.
5. Explain and evaluate the organisation and delivery of specialised histopathology services and the procedures required for use of those services.
6. Discuss the autopsy process and the associated regulatory framework.
7. Discuss the partnership of histopathology to other clinical specialisms in the investigation and management of cancer and patient care.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Identify the clinical presentation of a range of relevant disorders of specialised organ groups and clinical subspecialist areas.
2. Perform to quality standards a range of specialised histopathology techniques.
3. Identify and evaluate new equipment, methods, or procedures to enhance the contribution of the histopathology laboratory to the diagnosis and management of specialised organ groups and clinical subspecialist areas.
4. Support the organisation and use of specialised histopathology laboratory services in the UK.
5. Under supervision, prepare and interpret histopathology reports that involve specialised organ groups and clinical subspecialist areas.
6. Support mortuary operation, the autopsy process and the associated regulatory framework. Where appropriate, observe autopsy in action.
7. Work in partnership with other clinical specialisms as part of the diagnosis and review of patients with disorders of specialised organ groups and from clinical subspecialist areas.

Indicative Content

- Aetiology, pathogenesis and main clinical features of common diseases encountered in cellular pathology and their impact on patient management, including:

    - haemopoietic pathology, e.g. hyperplasia, lymphadenitis
    - neuromuscular pathology, e.g. neuroma, schwannoma, myology
    - central nervous system (CNS) pathology
    - ophthalmic pathology, e.g. trachoma
    - eye
    - brain
    - muscle
    - nerve
    - paediatric pathology
    - haematopathology
- Application of specialised techniques to a variety of tissues:
    - specialised immunocytochemistry
    - immunofluorescence
    - fluorescence in-situ hybridisation
    - molecular techniques, e.g. PCR
    - electron microscopy
    - image capture
    - quantitation
    - molecular databases
- Specialised techniques currently under development that may play a future role in cellular pathology
- Knowledge of autopsies and the underlying principle of consent:
    - perinatal and paediatric post mortems
    - coroner's post mortems
    - forensic post mortems
- Human Tissue Authority (HTA) regulations relating to the retention of tissues and organs
- Tissue banking

Section 14: MSc Clinical Science Specialist Modules for Reproductive Science

	Module Titles			
Year 3 Specialist Modules	Culture of Gametes and Embryos [10]	Micromanipulation and Cryopreservation [10]	Embryology [10]	Research Project in Reproductive Science [30]
Year 2 Specialist Modules	Research Methods [10]	Infertility, Treatment and the Role of Regulation [10]	Gametes and Fertilisation [10]	Research Project in Reproductive Science [30]
Year 1 Core Modules	Introduction to Healthcare Science, Professional Practice and Clinical Leadership [20]		Introduction to Cellular Sciences Underpinning knowledge for rotational elements and integrated professional practice [40]	

Generic Modules: Common to all divisions of healthcare science

Division/Theme-Specific Modules: Common to a division or theme

Specialist Modules: Specific to a specialism

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Reproductive Science
Year 2: RS-2

Infertility, Treatment and Role of Regulation [10 credits]

This module will provide the trainee with knowledge and understanding of the causes and treatment options for male and female infertility and the approach to managing the infertile couple. They will understand the role of regulation in treating infertility and become familiar with legislatory quality management aspects of licensed treatments.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Discuss the causes and diagnosis of male and female infertility.
2. Discuss and justify the treatment options for male and female infertility.
3. Describe different ovarian stimulation regimens, including the endocrine and physiological responses.
4. Explain and critically evaluate the statutory and regulatory requirements of fertility treatments and professional codes of practice.
5. Explain and evaluate the principles and practice of quality management and validation.
6. Discuss the linkages between the reproductive science laboratory and other clinical specialisms in the investigation of male and female infertility and patient care.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Suggest a patient's pathway, including treatment options and stimulation regimens based on clinical presentation.
2. Perform procedures within the statutory and regulatory framework.
3. Perform quality management tasks.

Indicative Content

- Investigation of the infertile male, including specialist andrology testing
- Causes of male infertility, including endocrine deficiencies, obstructions, genetic and chromosomal disorders, autoimmunity, varicocele
- Treatment options for male infertility
- Investigation of the infertile female

- Causes of female infertility, including endocrine disorders, genetic and chromosomal disorders, tubal disorders, endometriosis
- Treatment options for female infertility
- In-vivo oocyte development and ovarian stimulation regimens, including mechanism of actions of antagonists and agonists
- Endocrine and physiological response to ovarian stimulation
- Luteal endocrinology
- Outcomes of ART treatment
- The Human Fertilisation and Embryology Act and Code of Practice
- Legislation and regulatory mechanisms in the UK compared with those both within and outside the EU
- Governing bodies and accrediting organisations
- Licensing for both treatment and research in the UK
- Social and ethical responsibilities of a clinical embryologist
- Quality control tests routinely employed in the ART lab – mouse embryo bioassay and sperm survival tests
- Quality management system within an (in-vitro fertilisation) IVF centre
- Validation of equipment and processes

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Reproductive Science
Year 2: RS-3
Gametes and Fertilisation
[10 credits]

This module will provide the trainee with knowledge and understanding of the development of male and female gametes and the process of fertilisation. They will understand and gain experience of insemination methodologies and of reporting outcomes from insemination/fertilisation.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Explain spermatogenesis and spermiogenesis.
2. Explain oogenesis and oocyte maturation.
3. Discuss the cellular and molecular basis of fertilisation.
4. Describe relevant techniques for gamete preparation and handling.
5. Describe methods of insemination and be able to identify normal and abnormally fertilised oocytes.
6. Discuss the linkages between the reproductive science laboratory and other clinical specialisms in the selection and management of patients who will undergo insemination/fertilisation.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found

in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Handle gametes correctly to maintain viability.
2. Undertake an egg recovery procedure and identify oocytes.
3. Perform the different methods of sperm preparation techniques.
4. Identify patients who, based on clinical parameters, require either in vitro fertilisation (IVF) or intracytoplasmic sperm injection (ICSI).
5. Advise patients on their treatment pathway through discussion of the different insemination methods. Perform the different methods of routine (not ICSI) insemination.
6. Identify stages of oocyte maturity and normally and abnormally fertilised oocytes.
7. Record and report accurately patients' fertilisation results.

Indicative Content

- Developmental and genetic control of spermatogenesis and spermiogenesis, including cytology of spermatogenesis, spermatocytes and spermatids
- Physiology of mature sperm
- Acrosome reaction
- Sperm capacitation and zona pellucida binding
- Follicle growth in the human ovary
- Oocyte growth and maturation, including genetic and cellular regulation of meiosis and mitosis
- Structure and properties of the zona pellucida
- Cellular and molecular basis of fertilisation
- The pronuclear oocyte, including completion of the second meiotic division and pronuclear formation
- Syngamy
- Basic laboratory skills and aseptic technique for semen preparation and oocyte collection and handling
- Normal and abnormally fertilisation (polyspermy and parthenogenesis), including failed to fertilise oocytes, theories of origin and implications for patient treatment
- Insemination methodologies
- Risks of loss of viability associated with the handling of gametes and relevant control measures
- Reporting outcomes from insemination/fertilisation

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Reproductive Science
Year 2 and 3: RS-Res
Research Project in Reproductive Science
[60 credits]

The overall aim of this module, building on the Research Methods module, is for the trainee to undertake a research project that shows originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in a specialism of healthcare science. The research project may span scientific or clinical research, translational research, operational and policy research, clinical education research, innovation, service development, service improvement, or supporting professional service users to meet the expected learning outcomes. Research projects should be designed to take into account the research training required by individual trainees and the needs of the department in which the research is to be conducted.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Discuss the stages of the research and innovation process from conceptualisation to dissemination and, if appropriate, translation into practice.
2. Describe the purpose and importance of different kinds of research, including scientific or clinical research, translational research, operational and policy research, clinical education research, innovation, service development, service improvement and supporting professional service users, and relate these to the roles undertaken by Clinical Scientists in the trainee's specialism.
3. Discuss and evaluate the use of reference manager systems.
4. Justify the rationale for research governance and ethical frameworks when undertaking research or innovation in the NHS.
5. Describe the process and requirements for publication in a peer-reviewed journal and the current system of grading research publications.

Learning Outcomes: Practical Skills

On successful completion of this module the trainee will:

1. Design, plan and undertake a research project to test a hypothesis from conception to completion/archiving in accordance with ethical and research governance regulations, drawing on expert advice where necessary and involving patients and service users.
2. Analyse the data using appropriate methods and statistical techniques, and interpret, critically discuss and draw conclusions from the data.
3. Prepare a written project that describes and critically evaluates the research project, clearly identifying the strengths and weaknesses.
4. Present a summary of the research project and outcome that conforms to the format of a typical scientific presentation at a national or international scientific meeting, responding to questions appropriately.
5. Prepare a summary of the research project suitable for non-specialist and lay audiences.

Indicative Content

- Critical evaluation of the literature/evidence base
- Reference management
- Identification of a research question
- Research ethics and regulatory requirements, including issues related to access and use of information
- Data protection and confidentiality guidelines
- Patient safety
- Patient consent
- Sources of funding/grants
- Peer review/expert advice
- Possible risks and balancing risk vs benefit
- Project management techniques and tools
- Roles and responsibilities of those involved in the research
- Monitoring and reporting
- Data analysis
- Data interpretation
- Criteria/metric for assessing and grading research data and publications in the scientific, NHS and HE sectors
- Range of formats and modes of presentation of data
- Requirements for publications submitted to scientific, education and similar journals
- Current conventions with respect to bibliography and referencing of information

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Reproductive Science
Year 3: RS-4
Culture of Gametes and Embyros
[10 credits]

This module will provide the trainee with knowledge and understanding of the principles and practice of culture systems used in an IVF laboratory. They will gain experience of the culture of gametes and embryos in a clinical setting.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Explain and justify the design requirements of a laboratory used to support reproductive science.
2. Describe culture systems used in reproductive science.
3. Describe the importance of the culture environment and the implications for gamete and embryo viability.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Use sterile technique to prepare culture dishes appropriate for gametes and embryos.
2. Culture embryos to maintain viability.
3. Perform quality control checks within the laboratory.
4. Analyse key performance indicators with respect to defined outcomes.
5. Identify, troubleshoot and solve problems.

Indicative Content

- Laboratory design and regulatory requirements
- Preimplantation embryo metabolism, including the energy and nutritional requirements of gametes and embryos
- Principles of culture systems used in the IVF laboratory, including types of culture systems (e.g. microdrops) and different incubator environments (e.g. low oxygen)
- Types of media and their applications
- Control of the culture environment for gametes/embryos in the ART laboratory, the role of buffers and the implications of pH and temperature on cellular processes
- Regulatory issues
- Laboratory quality indicators

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Reproductive Science
Year 3: RS-5
Micromanipulation and Cryopreservation
[10 credits]

This module will provide the trainee with the knowledge and understanding of the principles and practice of micromanipulation and cryopreservation and associated regulatory requirements. They will gain experience of the micromanipulation and cryopreservation of gametes and embryos in a clinical setting.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Describe the principles and practices of micromanipulation.
2. Explain cryobiology and describe the practices of cryopreservation and thawing.
3. Discuss and justify the statutory and regulatory requirements of

micromanipulation and cryopreservation and professional codes of practice.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Perform micromanipulation techniques.
2. Perform cryopreservation and thawing/warming of gametes and embryos.

Indicative Content

- Micromanipulation equipment and methodology
- Principles and practices of intra-cytoplasmic sperm injection (ICSI)
- Risks and regulation associated with ICSI
- Cryobiology, including the physical and chemical processes occurring during cryopreservation and thawing
- Properties of cryoprotectants
- Handling of liquid nitrogen and the appropriate health and safety regulations
- Thermodynamics of slow freezing and vitrification
- Physiological changes that occur in gametes and embryos during cryopreservation
- Regulatory issues with regard to cryostorage

Division: Life Sciences
Theme: Cellular Sciences
Specialism: Reproductive Science
Year 3: RS-6
Embryology
[10 credits]

This module will provide the trainee with the knowledge and understanding of the development and assessment of human pre-implantation embryos. They will gain experience of grading and assessing embryos and of interpreting the outcomes of assisted reproductive technology.

Learning Outcomes: Knowledge and Understanding

On successful completion of this module the trainee will:

1. Explain the cellular and molecular development of the human pre-implantation embryo.
2. Describe relevant techniques for oocyte and embryo morphological assessments.

3. Describe and evaluate the relevant technique for the process of embryo transfer.
4. Discuss implantation and endometrial function.

Learning Outcomes: Associated Work Based Learning

High-level description of the work based learning that accompanies this academic module. Further details of the work based programme can be found in the Work Based Learning Guide, including the Clinical Experiential Learning, Competences and Applied Knowledge and Understanding.

On successful completion of this module the trainee will:

1. Perform oocyte and embryo morphology assessments.
2. Perform embryo transfer.
3. Assess, interpret and report embryology results.

Indicative Content

- Human embryonic development and differentiation at all stages of the pre-implantation embryo
- Genetic regulation of early embryonic development, including maternal and embryonic gene activity
- Cellular and molecular aspects of embryo development
- Chromosomal abnormalities, including meiotic origins and causes of monosomy and trisomy
- Process of implantation and endometrial function
- Grading methodologies from oocyte to blastocyst stage, assessment at all preimplantation stages
- Identification of damaged, non-viable or abnormal gametes, zygotes or embryos
- Assessment of gametes and embryos for intended use and implications for direct patient treatment
- Handling and manipulation of embryos, including preparation of embryos and process of embryo transfer
- Reporting outcomes of ART procedures

Appendix 1: Contributor List

Members of the STP MSc and Work Based Programme Life Sciences: Cellular Sciences and Genetic Science (for rotational programme)

Development of the STP curriculum for the MSc Clinical Sciences and Work Based programme for Cellular Sciences has been coordinated by the Modernising Scientific Careers team and the National School of Healthcare Science working with NHS and Higher Education colleagues. The professionals who have contributed to the development of STP Programme since 2009 include:

Sue	Avery	Birmingham Women's Hospital NHS Foundation Trust
Alison	Baker	Brighton and Sussex Universities Hospitals NHS Trust
David	Baty	Ninewells Hospital, Dundee
Jennie	Bell	Birmingham Women's Hospital
Derek	Bishop	Ninewells Hospital, Dundee
Jane	Blower	University Hospitals of Leicester NHS Trust
Rachel	Cutting	Sheffield Teaching Hospitals
Anne	Dalton	Sheffield Children's NHS Foundation Trust
Val	Davison	National School of Healthcare Science
Karen	Denton	North Bristol NHS Trust
Andrew	Evered	Llandough Hospital, Penarth
Lorraine	Gaunt	St Mary's Hospital, Manchester
Anne	Goodall	Oxford Radcliffe NHS Hospitals Trust
Tracey	de Haro	Leicester Royal Infirmary
Nick	Kirk	Papworth Hospital, Cambridge
Paul	Knaggs	Neath Port Talbot Hospital
Christine	Leary	University of Sheffield
Kevin	Lindsay	Hammersmith Hospital, London
Barbara	Lloyd	Addenbrooke's Hospital, Cambridge
Gordon	Lowther	Southern General Hospital, Glasgow
Gordon	McNair	Antrim Area Hospital, Northern Ireland
Julia	Sarson	Oxford Radcliffe NHS Hospitals Trust
Karen	Schnauffer	Liverpool Women's Hospital
Anneke	Seller	Churchill Hospital, Oxford
Behdad	Shambayati	Ashford Hospital, Kent
John	Smith	Royal Hallamshire Hospital, Sheffield
Jane	Stewart	Newcastle Hospitals
Ian	Sturdgess	Addenbrooke's Hospital, Cambridge
Kevin	West	Leicester Royal Infirmary
Allan	Wilson	Monklands Hospital, Airdrie
Eileen	Williams	Southmead Hospital, Bristol
Richard	Winder	NHS Cancer Screening Programmes

Professional bodies and societies were invited to review this STP Programme and their feedback has shaped the final publication:

Association of Biomedical Andrologists
Association of Clinical Cytogeneticists

Association of Clinical Electron Microscopists
Association of Clinical Embryologists
British Society for Clinical Cytology
Clinical Molecular Genetics Society
Institute of Biomedical Science
Royal College of Obstetricians and Gynaecologists
Royal College of Pathologists
UK National External Quality Assessment Schemes

The National School of Healthcare Science Themed Board reviewed the MSc Clinical Science (Cellular Sciences) Curriculum on 10 January 2013 and their feedback has also shaped the final publication.

Modernising Scientific Careers Professional Advisors
Dr Graham Beastall
Ms Nicky Fleming
Mr Barry Hodgson

National School of Healthcare Science Professional Leads
Ms Nicky Fleming
Dr Barbara Lloyd

Appendix 2: Programme Amendments

This section lists the programme amendments following first publication.

Amendments – May 2011

1. Page 3 section 1.1 High level MSc Framework – title change to read 'High Level Framework MSc in Clinical Science'.
2. Page 5 section 1.2 Cellular Sciences Route Map.
3. Title in table of Year 2, Cellular Sciences (Genetics) – removed 'Clinical Genetics' and replaced with 'Genetics of Neuromuscular Disorders'.
4. The content in the curriculum was correct and is unaltered.

The refreshed version is called MSc Cellular Sciences 2010-11 v2 on the footer.

For any queries regarding this change please email: msc.hee@nhs.net

Amendments – March 2013

These amendments apply to trainees commencing STP in the academic year 2013/14.

1. A generic introduction to all STP MSc Clinical Science programmes has been added.
2. In order to improve the alignment to QAA level 7 the word 'understand' has been replaced with an appropriate verb from Bloom's Taxonomy for the Knowledge domain.
3. The generic module Healthcare Science has been renamed 'Introduction to Healthcare Science, Professional Practice and Clinical Leadership'.
4. The generic modules Healthcare Science (which incorporates Professional Practice) and Research Methods have been revised and updated.
5. The Research Project has been revised and all students are expected to complete a single 60-credit research project spanning Years 2 and 3, see relevant section.
6. *Good Scientific Practice* (GSP) sets out for the healthcare science profession and the public the standards of behaviour and practice that must be achieved and maintained in the delivery of work activities, the provision of care and personal conduct. GSP has been added in the Appendices of each curricula and aspects of professionalism strengthened to reflect areas such as the need to ensure the shared nature of clinical decision making.
7. The learning outcomes related to 'Personal Attitudes and Behaviours' now appear in the Professional Practice section of this document but apply to all modules.
8. The role of buffers and the importance of controlling pH has been added to the indicative content within Reproductive Science (RS-4

The new version is called: STP MSc Cellular Sciences Version 3.0 for 2013-14

For any queries regarding this change please email: msc.hee@nhs.net

Appendix 3: Good Scientific Practice

Good Scientific Practice

Section 1: The purpose of this document

There are three key components to the Healthcare Science workforce in the UK:

1. Healthcare Science Associates and Assistants who perform a diverse range of task based roles with appropriate levels of supervision.

2. Healthcare Science Practitioners have a defined role in delivering and reporting quality assured investigations and interventions for patients, on samples or on equipment in a healthcare science specialty, for example Cardiac Physiology, Blood Sciences or Nuclear Medicine. They also provide direct patient care and more senior Healthcare Science Practitioners develop roles in specialist practice and management.

3. Healthcare Scientists are staff that have clinical and specialist expertise in a specific clinical discipline, underpinned by broader knowledge and experience within a healthcare science theme. Healthcare scientists undertake complex scientific and clinical roles, defining and choosing investigative and clinical options, and making key judgements about complex facts and clinical situations. Many work directly with patients. They are involved, often in lead roles, in innovation and improvement, research and development and education and training. Some pursue explicit joint academic career pathways, which combined clinical practice and academic activity in research, innovation and education.

This document sets out the principles and values on which good practice undertaken by the Healthcare Science workforce is founded.

Good Scientific Practice sets out for the profession and the public the standards of behaviour and practice that must be achieved and maintained in the delivery of work activities, the provision of care and personal conduct.

Good Scientific Practice uses as a benchmark the Health Professions Council (HPC) Standards of Proficiency and Standards of Conduct, Performance and Ethics, but expresses these within the context of the specialities within Healthcare Science, recognising that three groups of the workforce, Biomedical Scientists, Clinical Scientists and Hearing Aid Dispensers are regulated by the HPC. The aim is that the standards are accessible to the profession and understandable by the public.

Good Scientific Practice represents standards and values that apply throughout an individual's career in healthcare science at any level of practice. The standards will be contextualised by the role within Healthcare Science that an individual undertakes. This means that the standards must be interpreted based on the role that an individual performs. For example, in supervised roles where individuals work within defined procedures, rather than autonomously, some standards will need to be interpreted appropriately for the context of the specific role. There will, however, always be a requirement for an individual to work within the limits of their scope of practice and competence.

Students and trainees will be expected to be working towards meeting the expectations set out in this document. However, if an individual is undertaking further training and development following qualification from a professional training programme, he or she will be expected to be able to meet the standards in this document within their scope of practice.

The standards have been used to support curriculum development and will be used to underpin the process of judging individual equivalence, particularly for emerging specialisms.

The standards have been divided into five domains. The domains of *Good Scientific Practice* detailed in section 2 are:

1. Professional Practice
2. Scientific Practice
3. Clinical Practice
4. Research and development
5. Clinical Leadership

Section 2: The domains of Good Scientific Practice

Domain 1: Professional Practice

All patients and service users are entitled to good standards of professional practice and probity from the Healthcare Science workforce including the observance of professional codes of conduct and ethics. In maintaining your fitness to practice as a part of the Healthcare Science workforce, you must:

1.1 Professional Practice

1.1.1 Make the patient your first concern
1.1.2 Exercise your professional duty of care
1.1.3 Work within the agreed scope of practice for lawful, safe and effective healthcare science
1.1.4 Keep your professional, scientific, technical knowledge and skills up to date
1.1.5 Engage fully in evidence based practice

1.1.6 Draw on appropriate skills and knowledge in order to make professional judgements
1.1.7 Work within the limits of your personal competence
1.1.8 Act without delay on concerns raised by patients or carers or if you have good reason to believe that you or a colleague may be putting people at risk
1.1.9 Never discriminate unfairly against patients, carers or colleagues
1.1.10 Treat each patient as an individual, respect their dignity and confidentiality and uphold the rights, values and autonomy of every service user, including their role in the diagnostic and therapeutic process and in maintaining health and well-being.
1.1.11 Respond constructively to the outcome of audit, appraisals and performance reviews, undertaking further training where necessary

1.2 Probity

1.2.1 Make sure that your conduct at all times justifies the trust of patients, carers and colleagues and maintains the public's trust in the scientific profession
1.2.2 Inform the appropriate regulatory body without delay if, at any time, you have accepted a caution, been charged with or found guilty of a criminal offence, or if any finding has been made against you as a result of fitness to practice procedures, or if you are suspended from a scientific post, or if you have any restrictions placed on your scientific, clinical or technical practice
1.2.3 Be open, honest and act with integrity at all times, including but not limited to: writing reports, signing documents, providing information about your qualifications, experience, and position in the scientific community, and providing written and verbal information to any formal enquiry or litigation, including that relating to the limits of your scientific knowledge and experience
1.2.4 Take all reasonable steps to verify information in reports and documents, including research
1.2.5 Work within the Standards of Conduct, Performance and Ethics set by your profession

1.3 Working with colleagues

1.3.1 Work with other professionals, support staff, service users, carers and relatives in the ways that best serve patients' interests
1.3.2 Work effectively as a member of a multi-disciplinary team
1.3.3 Consult and take advice from colleagues where appropriate
1.3.4 Be readily accessible when you are on duty
1.3.5 Respect the skills and contributions of your colleagues
1.3.6 Participate in regular reviews of team performance.

1.4 Training and developing others

1.4.1 Contribute to the education and training of colleagues

1.4.2 If you have responsibilities for teaching, develop the skills, attitudes and practices of a competent teacher
1.4.3 Ensure that junior colleagues and students are properly supervised
1.4.4 Support colleagues who have difficulties with performance, conduct or health
1.4.5 Share information with colleagues to protect patient safety
1.4.6 Provide work-based development for colleagues to enhance/improve skills and knowledge

Domain 2: Scientific Practice

As a part of the Healthcare Science workforce, you will keep your scientific and technical knowledge and skills up to date to effectively:

2.1 Scientific Practice

2.1.1 Develop investigative strategies/procedures/processes that take account of relevant clinical and other sources of information
2.1.2 Provide scientific advice to ensure the safe and effective delivery of services
2.1.3 Undertake scientific investigations using qualitative and quantitative methods to aid the screening, diagnosis, prognosis, monitoring and/or treatment of health and disorders appropriate to the discipline
2.1.4 Investigate and monitor disease processes and normal states
2.1.5 Provide clear reports using appropriate methods of analysing, summarising and displaying information
2.1.6 Critically evaluate data, draw conclusions from it , formulate actions and recommend further investigations where appropriate

2.2 Technical Practice

2.2.1 Provide technical advice to ensure the safe and effective delivery of services
2.2.2 Plan, take part in and act on the outcome of regular and systematic audit
2.2.3 Work within the principles and practice of instruments, equipment and methodology used in the relevant scope of practice
2.2.4 Demonstrate practical skills in the essentials of measurement, data generation and analysis
2.2.5 Assess and evaluate new technologies prior to their routine use
2.2.6 Identify and manage sources of risk in the workplace, including specimens, raw materials, clinical and special waste, equipment, radiation and electricity.
2.2.7 Apply principles of good practice in health and safety to all aspects of the workplace
2.2.8 Apply correct methods of disinfection, sterilisation and decontamination and deal with waste and spillages correctly.

2.2.9 Demonstrate appropriate level of skill in the use of information and communications technology

2.3 Quality

2.3.1 Set, maintain and apply quality standards, control and assurance techniques for interventions across all clinical, scientific and technological activities
2.3.2 Make judgements on the effectiveness of processes and procedures
2.3.3 Participate in quality assurance programmes
2.3.4 Maintain an effective audit trail and work towards continuous improvement

Domain 3: Clinical Practice

As a part of the Healthcare Science workforce, you will keep your clinical skills up to date and undertake the clinical duties appropriate to your role in order to effectively:

3.1 Clinical Practice

3.1.1 Ensure that you and the staff you supervise understand the need for and obtain relevant consent before undertaking any investigation, examination, provision of treatment, or involvement of patients and carers in teaching or research
3.1.2 Ensure that you and the staff you supervise maintain confidentiality of patient information and records in line with published guidance
3.1.3 Ensure that you and your staff understand the wider clinical consequences of decisions made on your actions or advice
3.1.4 Demonstrate expertise in the wider clinical situation that applies to patients who present in your discipline
3.1.5 Maintain up to date knowledge of the clinical evidence base that underpins the services that you provide and/or supervise and ensure that these services are in line with the best clinical evidence
3.1.6 Plan and determine the range of clinical/scientific investigations or products required to meet diagnostic, therapeutic, rehabilitative or treatment needs of patients, taking account of the complete clinical picture
3.1.7 Plan and agree investigative strategies and clinical protocols for the optimal diagnosis, monitoring and therapy of patients with a range of disorders
3.1.8 Ensure that detailed clinical assessments are undertaken and recorded using appropriate techniques and equipment and that the outcomes of these investigations are reviewed regularly with users of the service
3.1.9 Ensure the provision of expert interpretation of complex and or specialist data across your discipline in the context of clinical questions posed
3.1.10 Undertake and record a detailed clinical assessment using appropriate techniques and equipment

3.1.11 Provide specialised clinical investigation and/or analysis appropriate to your discipline
3.1.12 Provide interpretation of complex and/or specialist data in the context of the clinical question posed
3.1.13 Provide clinical advice based on results obtained, including a diagnostic or therapeutic opinion for further action to be taken by the individual directly responsible for the care of the patient
3.1.14 Provide expert clinical advice to stakeholders in order to optimise the efficiency and effectiveness of clinical investigation of individuals and groups of patients
3.1.15 Prioritise the delivery of investigations, services or treatment based on clinical need of patients
3.1.16 Represent your discipline in multidisciplinary clinical meetings to discuss patient outcomes and the appropriateness of services provided
3.1.17 Ensure that regular and systematic clinical audit is undertaken and be responsible for modifying services based on audit findings.

3.2 Investigation and reporting

3.2.1 Plan and conduct scientific, technical, diagnostic, monitoring, treatment and therapeutic procedures with professional skill and ensuring the safety of patients, the public and staff
3.2.2 Perform investigations and procedures/design products to assist with the management, diagnosis, treatment, rehabilitation or planning in relation to the range of patient conditions/equipment within a specialist scope of practice
3.2.3 Monitor and report on progress of patient conditions/use of technology and the need for further interventions.
3.2.4 Interpret and report on a range of investigations or procedures associated with the management of patient conditions/equipment

Domain 4: Research, Development and Innovation

As part of the Healthcare Science workforce, research, development and innovation are key to your role. It is essential in helping the NHS address the challenges of the ageing population, chronic disease, health inequalities and rising public expectations of the NHS. In your role, you will undertake the research, development and innovation appropriate to your role in order to effectively:

4.1 Research, Development and Innovation

4.1.1 Search and critically appraise scientific literature and other sources of information
4.1.2 Engage in evidence-based practice, participate in audit procedures and critically search for, appraise and identify innovative approaches to practice and delivery of healthcare

4.1.3 Apply a range of research methodologies and initiate and participate in collaborative research
4.1.4 Manage research and development within a governance framework
4.1.5 Develop, evaluate, validate and verify new scientific, technical, diagnostic, monitoring, treatment and therapeutic procedures and, where indicated by the evidence, adapt and embed them in routine practice
4.1.6 Evaluate research and other available evidence to inform own practice in order to ensure that it remains at the leading edge of innovation.
4.1.7 Interpret data in the prevailing clinical context
4.1.8 Perform experimental work, produce and present results
4.1.9 Present data, research findings and innovative approaches to practice to peers in appropriate forms
4.1.10 Support the wider healthcare team in the spread and adoption of innovative technologies and practice

Domain 5: Clinical Leadership

All patients and service users have a right to expect that Healthcare Science services efficiently and effectively managed to meet service needs. As a leader in Healthcare Science, you will seek to effectively:

5.1 Leadership

5.1.1 Maintain responsibility when delegating healthcare activities and provide support as needed
5.1.2 Respect the skills and contributions of your colleagues
5.1.3 Protect patients from risk or harm presented by another person's conduct, performance or health
5.1.4 Treat your colleagues fairly and with respect
5.1.5 Make suitable arrangements to ensure that roles and responsibilities are covered when you are absent, including handover at sufficient level of detail to competent colleagues
5.1.6 Ensure that patients, carers and colleagues understand the role and responsibilities of each member of the team
5.1.7 Ensure that systems are in place through which colleagues can raise concerns and take steps to act on those concerns if justified
5.1.8 Ensure regular reviews of team performance and take steps to develop and strengthen the team
5.1.9 Take steps to remedy any deficiencies in team performance
5.1.10 Refer patients to appropriate health professionals
5.1.11 Identify and take appropriate action to meet the development needs of those for whom you have management, supervision or training responsibilities
5.1.12 Act as an ambassador for the Healthcare Science community

Appendix 4: Glossary

Term	Definition
Clinical experiential learning	The cyclical process linking concrete experience with abstract conceptualisation through reflection and planning.
Clinical experiential learning outcomes	The activities that the trainee will undertake to enable and facilitate their learning in the workplace.
Competence	The ability of an individual to perform a role consistently to required standards combining knowledge, understanding, skills and behaviour.
Competence statements	Active and outcome-based statements that provide a further breakdown of the Learning Outcomes –reflecting what the trainee will be able to do in the workplace at the end of the programme. Each competence should be linked back to the numbered Learning Outcomes.
Component	An indication of the type of module within a learning guide, i.e. rotational, specialist, or elective.
Curricula	An outline of the expected educational outcomes across a subject area. The learning that is expected to take place during the Scientist Training Programme described in terms of knowledge, skills and attitudes.
Division	A high-level description of an area of practice within healthcare science. There are three divisions: Life Sciences, Physical Sciences, and Biomedical Engineering and Physiological Sciences.
Domains of learning	Cognitive (knowledge and intellectual skills), affective (feelings and attitudes), interpersonal (behaviour and relationships with others) and psychomotor (physical skills).
Feedback	Specific information about the comparison between a trainee's observed performance and a standard, given with the intent to improve the trainee's performance (van de Ridder JMM, Stokking KM, McGaghie WC and ten Cate OT. What is feedback in clinical education? *Medical Education* 2008: 42: 189–197).
Good Scientific Practice	Non-statutory guidance on the minimum requirements for good practice for the healthcare science workforce.
Host department	The department which is responsible for the three-year training programme and in which the training officer is based.
Job	A specific definition of the work activities, requirements and skills required to undertake work activities within a local context. This differs from a role – see below.
Key learning outcome	A defined learning outcome linked to relevant competence(s) within the workplace Learning Guide.
Knowledge and understanding	The knowledge and understanding that must be applied in the workplace to achieve the stated competence.
Learning framework	The specification for work based learning contained

	within the Learning Guide.
Learning module	A distinct set of learning outcomes and competences that form part of a programme. Modules may be rotational, specialist, elective, or professional practice and can be combined to meet the needs of specific programmes.
Learning outcome	A high-level, outcome-based statement that describes what a trainee will be able to do at the end of the module.
Mentoring	Mentoring is *a process in which a trainer (mentor) is responsible for overseeing the career and development of the trainee.* The emphasis is therefore on the relationship (rather than the activity).
Module aim	The overall objective of a work based learning module – defining the intended learning achievements of the trainee. The aim works together with the 'Scope' statement to define the overall objectives and scope of the module.
Module scope	A statement within work based learning modules that defines the range/limits of the learning undertaken by the trainee in a module – patients/investigations/equipment/modalities, etc.
National Occupational Standards	Nationally recognised standards of expected workplace performance and level of competence for a role. The standards are outcome based, defining what the role holder should be able to do, as well as what they must know and understand to demonstrate competent work performance. National Occupational Standards are supported by nationally agreed frameworks of expected attitudes, behaviour and skills.
Practical skill	A cognitive, psychomotor, physical, or communicative ability that supports performance of the required role.
Programme	The package of learning, teaching assessment and quality assurance leading to an award.
Provider	An organisation that delivers required training and learning activities, to specified quality assurance requirements.
Role	A collection of functions undertaken in the workplace that represent the main broad areas of work for all similar workers at national level. A role differs from a job, the latter being defined specifically for a local context.
Specialism	A focused area of practice within a theme of healthcare science.
Trainer	A qualified individual who provides learning and development support for trainees.
Theme	A cluster of related specialisms within a division of healthcare science.
Work based learning	Learning that takes place in a real work setting and involves the application of academic learning to real

	work activities.
Work performance	The requirements of satisfactory and consistent demonstration of competence in specified functions for a work role.
Workplace	A real work setting in which the trainee can apply learning.

Appendix 5 Approval process timeline

A timeline of the programme's interaction with the approval process is given below:

9 January 2015	HCPC Executive received a request to approve the new proposed programme
16 January 2015	HCPC Executive provisionally agreed visit date as 15-16 July 2015, subject to appointing visitors
20 May 2015	HCPC Executive received documentation from the education provider. This was broadly in line with the normal process requirement of receiving documentation eight weeks before the visit.
15-16 June 2015	Stage 1 of the approval process (in-house assessment day)
1 July 2015	Stage 1 feedback sent to the IBMS
15-16 July 2015	Stage 2 / Approval visit (IBMS offices)
13 August 2015	Visitors' report recommending that the programme was approved subject to conditions being met sent to the IBMS
10 September 2015	Deadline for observations from the IBMS. None received.
24 September 2015	Visitors' report considered by the Education and Training Committee (ETC). The ETC agreed the visitors' recommended outcome, including the conditions and the deadline for the IBMS to respond to the conditions
23 October 2015	HCPC Executive received the response to the conditions from the IBMS
28 October 2015	Response to conditions set for SET 4.1 considered by modality specific partners at an assessment day (equivalent to Stage 1)
30 October 2015	Response to all conditions (other than SET 4.1) passed to Visitors (equivalent to Stage 2) for consideration.
2 December 2015	Visitors requested further information from the IBMS with regards to meeting certain conditions. Deadline to respond to outstanding conditions agreed with the IBMS as 5 February 2016
7 December 2015	The HCPC Executive met the IBMS to discuss the second response to outstanding conditions.
8 December 2015	IBMS queried "grounds for appeal"
16 December 2015	HCPC Executive advised the IBMS that they could submit a complaint to ETC and that the approval process would pause while the complaint was considered.
5 February 2016	Complaint received from the education provider

Visitors' report

Name of education provider	Institute of Biomedical Science
Programme name	Certificate of Competence by Equivalence (Clinical Scientists)
Mode of delivery	Flexible
Relevant part of the HCPC Register	Clinical scientist
Date of visit	15 – 16 July 2015

Contents

Executive summary

The Health and Care Professions Council (HCPC) approve educational programmes in the UK which health and care professionals must complete before they can apply to be registered with us. We are a statutory regulator and our main aim is to protect the public. We currently regulate 16 professions. All of these professions have at least one professional title which is protected by law. This means that anyone using the title 'clinical scientist' must be registered with us. The HCPC keep a register of health and care professionals who meet our standards for their training, professional skills, behaviour and health.

The visitors' report which follows outlines the recommended outcome made by the visitors on the approval of the programme. The education provider has until 10 September 2015 to provide observations on this report. This is independent of meeting any conditions. The report and any observations received will be considered by the Education and Training Committee (Committee) on 24 September 2015. At this meeting, the Committee will accept, reject or vary the visitors' recommended outcome. If necessary, the Committee may decide to vary the conditions.

The education provider is due to redraft and resubmit documentary evidence in response to the conditions outlined in this report by 23 October 2015. The visitors will consider this response and make a separate recommendation to the Committee on the approval of the programme. It is anticipated that this recommendation will be made to the Committee on 3 December 2015.

Introduction

The HCPC visited the programme at the education provider as it was a new programme which was seeking HCPC approval for the first time. This visit assessed the programme against the standards of education and training (SETs) and considered whether those who complete the programme meet the standards of proficiency (SOPs) for their part of the Register.

Although they are regulated as a single profession, clinical scientists practise within discrete disciplines known as "modalities" and some requirements in the SOPs are modality-specific.

This visit was an HCPC only visit. The education provider did not validate or review the programme at the visit and the professional body did not consider their accreditation of the programme. The education provider supplied an independent chair and secretary for the visit.

The approval process was formed of two stages. Outcomes from both stages of the process are contained within this report.

The first stage allowed HCPC visitors to review the documentation related to the curriculum and learning for each of the following modalities:

- Cellular science;
- Clinical biochemistry;
- Clinical immunology;
- Clinical microbiology; and
- Haematology.

Visitors from each of the modalities reviewed modality specific documentation to assess whether the programme is able to deliver clinical scientist SOPs in ways relevant to each modality. For this first stage, visitors did not attend the IBMS offices. The stage 1 assessment was undertaken on 15–16 June 2015.

The second stage took the form of a visit to meet with the stakeholders involved with the delivery of the programme. The visit reviewed how the programme meets the SETs.

Visit details

Name and role of HCPC visitors	**Stage one** Ruth Ashbee (Clinical microbiology) Ross Sadler (Clinical immunology) David Simms (Clinical biochemistry) David Stirling (Cellular science and Haematology) **Stage two** Ruth Ashbee (Clinical scientist) David Houliston (Biomedical scientist) Christine Morgan (Lay visitor)
HCPC executive officers (in attendance)	Hollie Latham Jamie Hunt
Proposed student numbers	20 per year
Proposed start date of programme approval	January 2016
Chair	Derek Bishop (Independent)
Secretary	Marie-Helen Jean (Institute of Biomedical Science)

Sources of evidence

Prior to the visit the HCPC reviewed the documentation detailed below, sent by the education provider:

	Yes	No	N/A
Programme specification	☒	☐	☐
Descriptions of the modules	☒	☐	☐
Mapping document providing evidence of how the education provider has met the SETs	☒	☐	☐
Mapping document providing evidence of how the education provider has met the SOPs	☒	☐	☐
Practice placement handbook	☐	☐	☒
Student handbook	☒	☐	☐
Curriculum vitae for relevant staff	☒	☐	☐
External examiners' reports from the last two years	☐	☐	☒
Cellular science Modality Handbook	☒	☐	☐
Clinical biochemistry Modality Handbook	☒	☐	☐
Clinical immunology Modality Handbook	☒	☐	☐
Clinical microbiology Modality Handbook	☒	☐	☐
Haematology Modality Handbook	☒	☐	☐

The HCPC did not review the Practice placement handbook prior to the visit as the documentation does not exist.

The HCPC did not review the external examiners' reports from the last two years prior to the visit as there is currently no external examiner as the programme is new.

During the visit the HCPC saw the following groups or facilities:

	Yes	No	N/A
Senior managers of the education provider with responsibility for resources for the programme	☒	☐	☐
Programme team	☒	☐	☐
Placements providers and educators / mentors	☒	☐	☐
Students	☒	☐	☐
Service users and carers	☒	☐	☐
Learning resources	☐	☐	☒
Specialist teaching accommodation (eg specialist laboratories and teaching rooms)	☐	☐	☒

The HCPC met with potential students for the proposed programme as the programme seeking approval currently does not have any students enrolled on it.

The HCPC did not see the learning resources and specialist teaching accommodation as the proposed model of delivery for the programme does not require learning resources or any specialist teaching or laboratories at the education provider.

The education provider recognised each applicant's employer, along with their nominated mentor, as practice placement providers and educators.

Recommended outcome

To recommend a programme for approval, the visitors must be satisfied that the programme meets all of the standards of education and training (SETs) and that those who complete the programme meet our standards of proficiency (SOPs) for the relevant part of the Register.

The visitors agreed to recommend to the Education and Training Committee that a number of conditions are set on the programme, all of which must be met before the programme can be approved.

The visitors agreed that 32 of the SETs have been met and that conditions should be set on the remaining 26 SETs.

Conditions are requirements that the education provider must meet before the programme can be approved. Conditions are set when certain standards of education and training have not been met or there is insufficient evidence of the standard being met.

The visitors did not make any recommendations for the programme.

Recommendations are observations on the programme or education provider which do not need to be met before the programme can be approved. Recommendations are made to encourage further enhancements to the programme, normally when it is felt that the particular standard of education and training has been met at, or just above the threshold level.

Conditions

2.1 The admissions procedures must give both the applicant and the education provider the information they require to make an informed choice about whether to take up or make an offer of a place on a programme.

Condition: The education provider must provide clear information about the cost and entry requirements for the programme and how this will be communicated to potential applicants.

Reason: To evidence this standard, the visitors were directed to page 2 of the programme specification which states the entry requirements as “Minimum of an MSc or equivalent academic level of qualification”. The visitors asked for clarification on the subject requirements for the MSc and were advised by the programme team that the MSc is expected to be in a subject relevant to the specialism the applicant is applying for. The visitors were satisfied with this requirement, but could not see where this would be communicated to potential applicants. Also, the visitors were unable to identify what would constitute as an “equivalent academic level of qualification” and were therefore also unable to identify how this would be communicated to potential applicants. Lastly, the visitors were unable to locate, within the documentation, a clear cost for the programme. The programme team stated that this is yet to be confirmed but is predicted to be around £300 per applicant. As this has not been confirmed and is not stated within the admissions material, the visitors were unable to locate where this would be communicated to potential applicants. The visitors therefore require the education provider to clarify all costs and entry requirements for the programme, and to confirm how this will be communicated to potential applicants. In this way the visitors can ensure that both the applicant and the education provider will have the information they need to make an informed choice about whether to take up or make an offer of a place on the programme.

2.5 The admissions procedures must apply selection and entry criteria, including appropriate academic and / or professional entry standards.

Condition: The education provider must provide clear information about the subject specific requirements for the MSc as stated in the entry criteria, and clarification on the requirements of HCPC biomedical scientist registration for applicants.

Reason: To evidence this standard, the visitors were directed to page 2 of the programme specification which states the entry requirements as “Minimum of an MSc or equivalent academic level of qualification”. The visitors asked for clarification on the subject requirements for the MSc and were advised by the programme team that the MSc is expected to be in a subject relevant to the specialism the applicant is applying for. The visitors were satisfied with this requirement, but were unable to locate where this was stated within the programme documentation. The visitors note that without confirmation of this requirement within the programme documentation, they cannot be certain that this requirement will be consistently applied in the application process.
In addition, the visitors heard contradicting statements on the requirements for an applicant to be an HCPC registered biomedical scientist before entering onto the programme. The senior team stated that this was not a requirement upon application, but practice placement educators stated that this was a requirement. For this programme, practice placement educators are likely to be the employers of applicants, and would therefore be committed to supporting them through the process. Due to the

role of practice placement educators, it is important that all parties are clear on the education provider's requirements of applicants' HCPC registration status.
The visitors therefore require the education provider to provide further evidence which clarifies that the MSc is expected to be in a subject relevant to the specialism the applicant is applying for, and further clarity on the requirements for HCPC registration before entering onto the programme. In this way the visitors can ensure that admissions procedures apply appropriate academic and / or professional entry standards.

2.7 The admissions procedures must ensure that the education provider has equality and diversity policies in relation to applicants and students, together with an indication of how these will be implemented and monitored.

Condition: The education provider must provide a clear policy for equality and diversity to demonstrate that appropriate equality and diversity procedures are consistently applied throughout the admissions process

Reason: To evidence this standard, the visitors were directed to a number of different documents detailing information on the equality and diversity guidance for the admissions procedures. However, the visitors were unable to locate a clear policy for equality and diversity. The visitors note that without considering a policy, they cannot be sure that equality and diversity will be consistently applied in the application process for the future of the programme. The visitors therefore require the education provider to provide a copy of the equality and diversity policy for the admissions procedures and how this is appropriate to the programme. In this way the visitors can ensure that admissions procedures ensure that the education provider has appropriate equality and diversity policies in relation to applicants and students.

3.1 The programme must have a secure place in the education provider's business plan.

Condition: The education provider must provide further information on the proposed business plan for the programme, specifically the collection and allocation of funds.

Reason: To evidence this standard, the visitors were directed to a number of documents which provided an overview of the overarching funding and management structure for the IBMS as an organisation. However, within this documentation, the visitors were unable to identify a clear structure for the collection and allocation of funds specific to this programme. Specifically, the senior team stated that they have not yet agreed the application fee for the programme. In addition, the visitors were unable to identify how staff resources will be disseminated and managed from the IBMS specifically for this programme. The visitors note that without clarity on the specific funding and resources available for this programme they cannot be certain that the programme has, and will continue to have, a secure place in the education provider's business plan. The visitors therefore require further information on the funding and resources available specific to this programme and how these will be disseminated to ensure that the programme has a secure place in the education providers business plan.

3.2 The programme must be effectively managed

Condition: The education provider must provide further information to demonstrate an effective management structure for this programme.

Reason: To evidence this standard, the visitors were directed to a number of documents which provided an overview of the overarching management structure for the IBMS as an organisation. However, within this documentation, the visitors were unable to identify a clear management structure specific to this programme. Specifically, the visitors were unclear on how the structure of governing panels, such as the Education Committee, linked to individual roles and responsibilities. The visitors note that without clarity on the specific management structure for this programme they cannot be certain that the programme is effectively managed. The visitors therefore require further information on the management structure and lines of responsibility specific to this programme to ensure that the programme is effectively managed.

3.3 The programme must have regular monitoring and evaluation systems in place.

Condition: The education provider must provide documentary evidence to demonstrate that an effective monitoring and evaluation system is in place for the programme.

Reason: To evidence this standard, the visitors were directed to a number of documents which showed various forms of monitoring and evaluation for the programme. However, within this documentation, the visitors were unable to identify clear communication channels specific to this programme, to ensure that the monitoring and evaluation systems were maintained. The senior team articulated the communication channels for the programme and highlighted that monitoring and evaluation information initially comes into the Executive Head of Education and is then passed to the Education Committee who meet every three months. The visitors were satisfied with the information provided by the senior team, but were unable to locate this information within the programme documentation. The visitors note that without seeing a clear outline in the programme documentation they cannot be sure that the programme has regular monitoring and evaluation systems in place and will consistently apply them for the future of the programme. The visitors therefore require documentary evidence of the communication channels for monitoring and evaluation as stated by the programme team to ensure that this standard is met.

3.5 There must be an adequate number of appropriately qualified and experienced staff in place to deliver an effective programme.

Condition: The education provider must provide further evidence to demonstrate that the criteria, including the professional and academic qualifications, required to successfully apply and be appointed as one of the portfolio verifiers is appropriate to the programme

Reason: The education provider identified the staff in place to deliver the programme as the members of the assessment panel, known as portfolio verifiers. Portfolio verifiers make a recommendation about whether or not the student's portfolio demonstrates that they have meet the standards of proficiency (SOPs) for clinical scientists. The programme team stated that the assessment panel is made up of three portfolio reviewers and that panel members are selected from an existing pool of trained

assessors who are in place for other programmes. The assessment panel consists of three members; one HCPC registered biomedical scientist, one HCPC registered clinical scientist, and a lay representative. During the visit the visitors were presented with the role description of the lay representative and were satisfied with the recruitment criteria for this panel member position. However, the visitors were unable to identify a clear criteria or job specification for either the clinical scientist or the biomedical scientist panel members. Specifically, the visitors were unable to identify the criteria for specialist skills relating to each modality, and how the programme team would assess the qualifications and experience of panel members in this respect. In addition to this, the programme team stated that the modality specific knowledge could be covered by the biomedical scientist panel member. The visitors were therefore unclear how modality specific judgements could be made at a clinical science level. The visitors therefore require further evidence demonstrating the criteria, including the professional and academic qualifications required to apply and be appointed as a portfolio reviewer on the programme.

3.7 A programme for staff development must be in place to ensure continuing professional and research development.

Condition: The education provider must provide further evidence demonstrating appropriate staff development requirements and opportunities for members of the portfolio review panel.

Reason: To evidence this standard, the visitors were directed to information regarding training opportunities for internal IBMS staff. However, the visitors were unable to locate any information on the staff development in place for portfolio reviewers. Specifically, the visitors were unable to locate any staff development opportunities and how the uptake of these opportunities would be monitored. The visitors note that without seeing a clear strategy in place for the staff development available to portfolio reviewers, they cannot be certain that a programme for staff development is in place to ensure continuing professional and research development. The visitors therefore require further information on the staff development opportunities in place for portfolio reviewers to ensure that reviewers have the opportunity to develop their professional skills.

3.17 Service users and carers must be involved in the programme.

Condition: The education provider must provide further evidence to support their choice of service user and carer representatives for the programme.

Reason: To evidence this standard the education provider provided information on two groups of people who would act as a service user and carer representatives on the programme.

Firstly, the education provider identified the lay panel member on the portfolio review panel as a service user and carer representative. The programme team stated that the lay panel member would act as a service user and carer representative as they would have background experience in this field. However, this visitors were unable to locate any information in the lay panel member job description or the person specification that identified service user and carer experience as a requirement. The visitors were satisfied that the lay panel member could be a suitable platform for service user and carer involvement, however due to this detail not being present in the job or person specification the visitors cannot currently see how this will be implemented and

monitored. The visitors note that without this clarification, they cannot be certain that the lay panel member appropriately represents service user and carer involvement in the programme.

Secondly, the education provider identified members of the advisory panel as service user and carer representatives for the programme. The visitors met with two of these panel members at the visit. The visitors were told that the panel members were not necessarily service users and / or carers themselves, but represented the views of service users and carers through patient interaction. Whilst the visitors could see that this could be a way of feeding service user and carer views into the programme, they could not clearly identify how the panel members themselves understood their role as service users and carer representatives. In addition to this, the visitors heard contradicting statements regarding the expectation of the panel members' role. For example, the programme team stated that the role of panel members was to represent their organisation whereas the panel members stated that their role was to represent the patient voice. The visitors note that without consistency in the expectations of the service user and carer role, they cannot be certain that service users and carers are involved with the programme, and, that there is a clear strategy for their involvement. The visitors therefore require further evidence to support the education provider's choice of service user and carer representatives for the programme, or, evidence of other mechanisms in place to ensure that service users and carers are involved in the programme.

4.1 The learning outcomes must ensure that those who successfully complete the programme meet the standards of proficiency for their part of the Register.

Condition: The education provider must clearly articulate how the curriculum and learning outcomes, as listed in the modality specific handbooks, ensure that the following standards of proficiency (SOPs) are delivered specific to the scope of practice of a clinical scientist.

Reason: To evidence how and where the programme delivers the SOPs, the visitors were directed to the module handbooks for each modality. In the Modality Handbooks, there was limited information on the level and scope of knowledge required for a clinical scientist in relation to the SOPs listed below. Applicants to the programme will likely be registered biomedical scientists, and there are parallels in wording between the biomedical scientist and clinical scientist SOPs, but the scope of practice for clinical scientists and biomedical scientists is different. Considering the information provided, the visitors noted that there is a risk that individuals could demonstrate that they meet a clinical scientist SOP because they meet the equivalent biomedical scientist SOP. The visitors were unclear how the education provider will ensure that the curriculum for this programme ensures the SOPs are considered as relevant to a clinical scientist, rather than a biomedical scientist. Therefore, further evidence is required to demonstrate how the curriculum ensures each SOP listed below is delivered specific to the scope of practice of a clinical scientist.

1 be able to practise safely and effectively within their scope of practice

- **1.1** know the limits of their practice and when to seek advice or refer to another professional
- **1.2** recognise the need to manage their own workload and resources effectively and be able to practise accordingly

4 be able to practise as an autonomous professional, exercising their own professional judgement

4.1 be able to assess a professional situation, determine the nature and severity of the problem and call upon the required knowledge and experience to deal with the problem

9 be able to work appropriately with others

9.4 be able to contribute effectively to work undertaken as part of a multi-disciplinary team

- Specifically for SOP 9.4, the visitors require clarity on the education provider's understanding of the role of the clinical scientist within the multi-disciplinary team

11 be able to reflect on and review practice

11.2 recognise the value of case conferences and other methods of review

- Specifically for SOP 11.2, in the Modality Handbooks, there was limited evidence of the education provider's understanding of the wider clinical context and clinical scientists' role within case conferences

12 be able to assure the quality of their practice

12.1 be able to engage in evidence-based practice, evaluate practice systematically and participate in audit procedures

12.5 be aware of, and be able to participate in, quality assurance programmes, where appropriate

12.7 be able to evaluate intervention plans using recognised outcome measures and revise the plans as necessary in conjunction with the service user

13 understand the key concepts of the knowledge base relevant to their profession

13.1 understand the structure and function of the human body, together with knowledge of health, disease, disorder and dysfunction, relevant to their profession

13.2 be aware of the principles and applications of scientific enquiry, including the evaluation of treatment efficacy and the research process

13.6 understand the theoretical basis of, and the variety of approaches to, assessment and intervention

14 be able to draw on appropriate knowledge and skills to inform practice

14.2 be able to conduct appropriate diagnostic or monitoring procedures, treatment, therapy or other actions safely and effectively

14.12 be able to select and use appropriate assessment techniques

14.14 be able to undertake or arrange investigations as appropriate

14.15 be able to analyse and critically evaluate the information collected

14.16 be able to demonstrate a logical and systematic approach to problem solving

14.17 be able to use research, reasoning and problem solving skills to determine appropriate actions

4.1 The learning outcomes must ensure that those who successfully complete the programme meet the standards of proficiency for their part of the Register.

Condition: The education provider must revisit the curriculum, as defined in the modality specific handbooks, to demonstrate the scope and depth of understanding and knowledge required by the programme regarding the clinical scientist standards of proficiency (SOPs) as listed below, as related to the profession and, where applicable, the modality.

Reason: Throughout the Modality Handbooks, there was insufficient detail of the scope and depth of knowledge and understanding required by the programme. Therefore the visitors were unclear how the education provider is able to make judgements that applicants have the knowledge and understanding required relevant to clinical science, and where applicable the modality, for the following SOPs:

2. be able to practise within the legal and ethical boundaries of their profession

2.2 understand what is required of them by the Health and Care Professions Council

- In the Modality Handbooks, there was no evidence to show how applicants will be made aware of the HCPC's requirements for professional indemnity insurance. In particular, how this is different for biomedical scientists and clinical scientists.

2.5 know about current legislation applicable to the work of their profession

- Further evidence is required in the referencing and understanding of the Human Tissue Act (2004), and the Human Tissue (Scotland) Act (2006), as appropriate to each modality. The UK act was referenced in the Cellular Science Modality Handbook, but does not feature in other Modality Handbooks.

2.5 know about current legislation applicable to the work of their profession

- **Clinical microbiology** – further evidence is required on the Advisory Committee on Dangerous Pathogens (ACDP) categorisation of the hazard group of micro-organisms and the appropriate containment levels relating to working with organisms in different hazard groups.

12 be able to assure the quality of their practice

The handbooks did not clearly define what the education provider understands, relevant to the profession, of audit procedures.

13 understand the key concepts of the knowledge base relevant to their profession

13.1 understand the structure and function of the human body, together with knowledge of health, disease, disorder and dysfunction, relevant to their profession

- The handbooks for all modalities did not clearly define what the education provider understands, relevant to the profession, of:
  - the structure and function of the human body;
  - health;
  - disease;

- disorder; and
- dysfunction.

13.7 know the basic science underpinning the modality in which they practise, understand relevant basic clinical medicine and be aware of the fundamental principles of clinical practice

- The handbooks did not clearly define what the education provider understands of:
  - the basic science underpinning each modality;
  - relevant basic clinical medicine; and
  - fundamental principles of clinical practice.

13.8 understand the wider clinical situation relevant to the service users presenting to the speciality

- The handbooks did not clearly define what the education provider understands of the wider clinical situation relevant to the service users presenting to the speciality.

13.9 understand the clinical applications of the speciality and the consequences of decisions made upon actions and advice

- The handbooks did not clearly define what the education provider understands of:
  - the clinical applications of the speciality; and
  - the consequences of decisions made upon actions and advice.

13.10 understand the evidence base that underpins the use of procedures employed by the service

- The handbooks did not clearly define what the education provider understands of:
  - the evidence base that underpins the use of procedures employed by the service; and
  - what the procedures are.

13.11 understand the principles associated with a range of techniques employed in the modality

- The documentation described a list of tests, rather than techniques. The handbooks did not clearly define what the education provider understands of the techniques employed. In addition to this, the visitors were unable to locate sufficient detail on the following modality specific areas:
  - **Cellular science** – There is insufficient description of disease relevant to the profession and modality. In the Cellular Science Modality Handbook, there were very brief descriptions around pathological processes (page 15), but no reference to other diseases relevant to the modality or profession.
  - **Haematology** – There is insufficient description of functions of the human body. In the Haematology Modality Handbook, there was no mention of knowledge of blood cell characteristics. There was also no mention of world health organisation classification of haematological malignancies.
  - **Clinical microbiology** – There is insufficient description of disease, disorder, and dysfunction. In the Medical Microbiology Modality Handbook, there was no virology included in the overarching modality. This was instead split out for the sub modality. The HCPC needs to ensure that

individuals are not overspecialised, and that they can meet the standards as they relate to the modality, but also more broadly across the profession.
    - **Clinical immunology** – There is insufficient description of disease, disorder, and dysfunction. In the Clinical Immunology Modality Handbook, the curriculum did not reference all relevant areas within immunology. For example, there was no mention of the itemised basics of disease repertoire. The judgement that the visitors made for this modality were impacted by the lack of a logical systematic structure in the handbook.
    - **Clinical biochemistry** – There is insufficient description of disease, disorder, and dysfunction. In the Clinical Biochemistry Modality Handbook, there was mention of gastrointestinal inherited metabolic diseases and new born screening, however this could cause confusion as these areas are not always gastrointestinal.
    - For **cellular science** and **haematology**, some elements of the curriculum were split into the sub modalities, meaning that they were not always covered in the overarching modality. In these cases, it was not clear to the visitors whether key areas of the modality would be covered by all students.

13.12 know the standards of practice expected from techniques

- The handbooks did not clearly define what the education provider understands of:
    - the standards of practice expected from techniques; and
    - what the techniques are.

14 be able to draw on appropriate knowledge and skills to inform practice

14.2 be able to conduct appropriate diagnostic or monitoring procedures, treatment, therapy or other actions safely and effectively

- The handbooks did not clearly define what the education provider understands appropriate diagnostic or monitoring procedures, treatment, therapy or other actions to be.

14.4 be able to perform a range of techniques employed in the modality

- The handbooks did not clearly define what the education provider understands the range of techniques employed in each modality to be.

14.7 be able to solve problems that may arise during the routine application of techniques

- The visitors were not satisfied that the increased level of autonomy required of a clinical scientist (when compared to a biomedical scientists) was sufficiently reflected in the Modality Handbooks.

14.8 be able to formulate specific and appropriate management plans including the setting of timescales

- Further evidence is required for medical microbiology and clinical biochemistry only. The handbooks did not clearly define what the education provider understands, relevant to the modalities, of specific and appropriate management plans. For example:
    - **Medical microbiology** – There was no mention of the management of antibiotics.

- **Clinical biochemistry** – There was no mention of testing through pregnancy or of parathyroid disease.

14.9 be able to develop an investigation strategy which takes account of all the relevant clinical and other information available

- The handbooks did not clearly define what the education provider understands to be appropriate investigation strategies in the context of this standard.

14.11 be able to identify the clinical decision which the test or intervention will inform

- The handbooks did not clearly define the knowledge underpinning clinical decisions in the context of this standard.

14.12 be able to select and use appropriate assessment techniques

- The handbooks did not clearly define what the education provider understands to be appropriate assessment techniques in the context of this standard.

14.13 be able to undertake and record a thorough, sensitive and detailed assessment, using appropriate techniques and equipment

- The handbooks did not clearly define what the education provider understands to be appropriate techniques and equipment in the context of this standard.

14.14 be able to undertake or arrange investigations as appropriate

- The handbooks did not clearly define what the education provider understands of investigations in the context of this standard.

14.19 be aware of a range of research methodologies

- Modality Handbooks referenced “techniques” rather than “methodologies”. The handbooks did not clearly define what the education provider understood as “techniques” in this context

14.22 be able to interpret data and provide diagnostic and therapeutic opinions, including any further action which the individual directly responsible for the care of the patient or service user should take

- The handbooks did not clearly define what the education provider understands of data and diagnostic and therapeutic opinions in the context of this standard.

4.2 The programme must reflect the philosophy, core values, skills and knowledge base as articulated in any relevant curriculum guidance.

Condition: The education provider must demonstrate how the programme reflects the philosophy, core values, skills and knowledge base as articulated in any relevant curriculum guidance.

Reason: The visitors were directed to a number of documents to evidence this standard. However, they were unable to locate any information about how the programme reflects the philosophy, core values, skills and knowledge base as articulated in any relevant curriculum guidance. In addition to this, from a review of the module handbooks, the visitors identified a number of areas of the curriculum which were insufficient to ensure that students would meet the standards of proficiency (SOPs) on successful completion of the programme. The visitors were therefore unable to see how the programme had used relevant curriculum guidance to inform the programme. Therefore, the visitors require further evidence to show how the education provider uses relevant curriculum guidance to ensure that the programme reflects the philosophy, core values and knowledge base for the programme curriculum.

4.4 The curriculum must remain relevant to current practice.

Condition: The education provider must provide further evidence of the processes in place to ensure currency in the curriculum, with specific reference to each modality.

Reason: To evidence this standard, the visitors were directed to a number of documents including the modality specific handbooks. However, within this documentation, the visitors were unable to identify clear processes for ensuring the curriculum remained relevant to current practice. The programme team identified that the programme does not deliver any formal teaching and stated that it was therefore their intention to ensure currency of curriculum in the assessment of applicants. Specifically the education provider intends to assess whether the applicant's experience and prior learning is relevant to current practice in the face to face meeting that supports the portfolio assessment. However, the visitors could not identify any clear criteria, specific to each modality, which assessors would use to enable them to make an informed decision on whether an applicant's portfolio is relevant to current practice. The visitors note that it is the responsibility of the education provider to ensure that the curriculum remains relevant to current practice and it is therefore necessary for the education provider to demonstrate the internal mechanisms they have in place to support this. The visitors therefore require further evidence of the processes in place to ensure the curriculum remains relevant to current practice, and the criteria used to inform this assessment.

4.8 The range of learning and teaching approaches used must be appropriate to the effective delivery of the curriculum.

Condition: The education provider must provide further clarity on which methods of learning would be considered appropriate to meet each learning outcome in the assessment of applicants' portfolios.

Reason: To evidence this standard, the visitors were directed to the evidence requirement in the IBMS Registration Equivalence Portfolio (Clinical Scientist). Within this document the visitors identified a number of learning outcomes that applicants are required to demonstrate. However the visitors could not locate any information on which methods of learning would be considered appropriate to meet each learning outcome. Further to this, the visitors could not identify where any such criteria would be communicated to assessors and potential applicants. The visitors note that some areas of learning and learning outcomes will require a specific learning and teaching approach to ensure effective delivery of the curriculum. For example, some practical requirements could not be demonstrated through a paper based or online learning platform. The visitors therefore require the programme team to revisit programme documentation to ensure that, where necessary, examples of appropriate learning and teaching methods are highlighted to both assessors and applicants. In this way the visitors can ensure that the range of learning and teaching approaches are appropriate to the effective delivery of the curriculum.

5.3 The practice placement settings must provide a safe and supportive environment.

Condition: The education provider must provide further evidence of the audit process and criteria used to approve placements, to demonstrate the effective audit of the placement environment.

Reason: The education provider identifies the applicant's place of work as their placement setting. To evidence this standard, the visitors were directed to the Laboratory training self-assessment form. However, this form did not contain any information on the process used to assess placements, or criteria against which placements would be assessed. The programme team talked through the process and criteria that would be used to assess placement settings which included completing a placement audit, a visit to the placement setting, and placement review meetings every three months. The visitors were satisfied that the process communicated by the programme team was appropriate to audit placements, but the visitors were unable to locate this information within the programme documentation. The visitors note that without having a clear process and criteria identified within the programme documentation, they cannot be certain the processes will be consistently applied to assess all placement settings, for the duration of the programme. The visitors therefore require the education provider to provide documentary evidence of the placement audit process and criteria used to assess if placement settings provide a safe and supportive environment.

5.4 The education provider must maintain a thorough and effective system for approving and monitoring all placements.

Condition: The education provider must provide further evidence of the audit process and criteria used to demonstrate the effective approval and monitoring of placements.

Reason: The education provider identifies the applicant's place of work as their placement setting. To evidence this standard, the visitors were directed to the Admittance criteria (laboratory approval). However, this document did not contain any information on the process used to assess placements, or the monitoring processes used once a placement has been approved. The programme team talked through the process and criteria that would be used to assess placement settings which included completing a placement audit, a visit to the placement setting, and placement review meetings every three months. The visitors were satisfied that the process communicated by the programme team was appropriate to approve and monitor placements, but the visitors were unable to locate this information within the programme documentation. The visitors note that without having a clear process identified within the programme documentation, they cannot be certain the processes will be consistently applied to all placement settings, for the duration of the programme. The visitors therefore require the education provider to provide documentary evidence of the processes in place to approve and monitor all placements.

5.5 The placement providers must have equality and diversity policies in relation to students, together with an indication of how these will be implemented and monitored.

Condition: The education provider must provide further evidence of the audit process and criteria used to demonstrate the effective approval of placements, specific to equality and diversity policies.

Reason: The education provider identifies the applicant's place of work as their placement setting. To evidence this standard, the visitors were directed to the Laboratory training self-assessment form. However, this form did not contain any information on the process used to assess placements, or clear criteria against which placements would be assessed. The programme team talked through the process and criteria that would be used to assess placement settings which included completing a placement audit, a visit to the placement setting, and placement review meetings every three months. The visitors were satisfied that the process communicated by the programme team was appropriate to audit placements, but the visitors were unable to locate this information within the programme documentation. The visitors note that without having a clear process and criteria identified within the programme documentation, they cannot be certain the processes will be consistently applied to assess all placement settings, for the duration of the programme. The visitors therefore require the education provider to provide documentary evidence of the placement audit process and criteria used to ensure that placement providers have equality and diversity policies in place in relation to students.

5.6 There must be an adequate number of appropriately qualified and experienced staff at the practice placement setting.

Condition: The education provider must provide further evidence of the audit process and criteria used to demonstrate the effective approval of placements, specific to the number of appropriately qualified and experienced staff.

Reason: The education provider identifies the applicant's place of work as their placement setting. To evidence this standard, the visitors were directed to the Laboratory training self-assessment form. However, this form did not contain any information on the process used to assess placements, or clear criteria against which placements would be assessed. The programme team talked through the process and criteria that would be used to assess placement settings which included completing a placement audit, a visit to the placement setting, and placement review meetings every three months. The visitors were satisfied that the process communicated by the programme team was appropriate to audit placements, but the visitors were unable to locate this information within the programme documentation. The visitors note that without having a clear process and criteria identified within the programme documentation, they cannot be certain the processes will be consistently applied to assess all placement settings, for the duration of the programme. The visitors therefore require the education provider to provide documentary evidence of the placement audit process and criteria used to ensure that there is an adequate number of appropriately qualified and experienced staff at the practice placement setting.

5.7 Practice placement educators must have relevant knowledge, skills and experience.

Condition: The education provider must provide further evidence of the audit process and criteria used to demonstrate the effective approval of placements, specific to staff knowledge, skills and experience.

Reason: The education provider identifies the applicant's place of work as their placement setting. To evidence this standard, the visitors were directed to the Laboratory training self-assessment form. However, this form did not contain any information on the process used to assess placements, or clear criteria against which placements would be assessed. The programme team talked through the process and criteria that would be used to assess placement settings which included completing a placement audit, a visit to the placement setting, and placement review meetings every three months. The visitors were satisfied that the process communicated by the programme team was appropriate to audit placements, but the visitors were unable to locate this information within the programme documentation. The visitors note that without having a clear process and criteria identified within the programme documentation, they cannot be certain the processes will be consistently applied to assess all placement settings, for the duration of the programme. The visitors therefore require the education provider to provide documentary evidence of the placement audit process and criteria used to ensure that practice placement educators have relevant knowledge, skills and experience.

5.8 Practice placement educators must undertake appropriate practice placement educator training.

Condition: The education provider must provide further evidence of the requirements for practice educators to undertake initial and refresher training.

Reason: To evidence this standard, the visitors were directed to the laboratory training self-assessment form. However, this form did not contain any information on the initial or ongoing training requirements for practice placement educators. The programme team stated that training is currently being developed. The visitors note that without seeing content and a process for the delivery of practice educator training, they cannot be certain that training will be appropriate and consistently applied, for the duration of the programme. The visitors therefore require the education provider to provide evidence of the initial and refresher training content and delivery for practice educators and how this will be monitored.

5.9 Practice placement educators must be appropriately registered, unless other arrangements are agreed.

Condition: The education provider must provide further evidence of the audit process and criteria used to demonstrate the effective approval of placements, specific to the assessment of HCPC registration.

Reason: The education provider identifies the applicant's place of work as their placement setting. To evidence this standard, the visitors were directed to the application form where potential applicants are required to state the name of their chosen mentor and their HCPC registration number. The visitors were satisfied that this form was a way of capturing information on proposed mentors, but they could not see

how this information would be monitored alongside the audit process for practice placements. The visitors note that without having a clear process and criteria identified within the programme documentation, they cannot be certain the information gathered will be fed into the audit process. The visitors also noted that that the education provider has not submitted a clear audit process for practice placements. The visitors therefore require the education provider to provide further evidence of the monitoring of practice placement educator registration and how this feeds into the placement audit process.

5.10 There must be regular and effective collaboration between the education provider and the practice placement provider.

Condition: The education provider must provide evidence to demonstrate the regular and effective communication with practice placement providers.

Reason: To evidence this standard the visitors were provided with the statement “IBMS Education Team” in the SETs mapping document. The visitors were not provided with any additional evidence to support how the programme meets this standard. The programme team communicated a number of processes that would be used to collaborate with practice placement providers which included completing a placement audit, a visit to the placement setting, and placement review meetings every three months. The visitors were satisfied that the process communicated by the programme team was appropriate to ensure regular and effective collaboration with the placement providers, but the visitors were unable to locate this information within the programme documentation. The visitors note that without having a clear process and criteria identified within the programme documentation, they cannot be certain the process will be consistently applied to all placements, for the duration of the programme. The visitors therefore require the education provider to provide documentary evidence of the regular and effective collaboration between the education provider and the practice placement provider.

5.12 Learning, teaching and supervision must encourage safe and effective practice, independent learning and professional conduct.

Condition: The education provider must provide the training approval standards as referenced in the SETs mapping document, or alternative evidence of how this standard is met, which effectively demonstrates that learning, teaching and supervision encourage safe and effective practice, independent learning and professional conduct.

Reason: To evidence this standard, the visitors were directed to the training approval standards. However, the visitors were unable to locate this information within the programme documentation. Further to this, the visitors were unable to see how the training approval standards would be applied throughout the placement audit process. The visitors were therefore unable to make a judgement on this standard being met. The visitors require the education provider to provide the training approval standards as articulated in the SETs mapping document, or, alternative evidence of how this standard is met, which effectively demonstrates that learning, teaching and supervision encourage safe and effective practice, independent learning and professional conduct.

5.13 A range of learning and teaching methods that respect the rights and needs of service users and colleagues must be in place throughout practice placements.

Condition: The education provider must provide the training approval standards as referenced in the SETs mapping document, or alternative evidence of how this standard is met, which effectively demonstrates that a range of learning and teaching methods that respect the rights and needs of service users and colleagues is in place throughout practice placements.

Reason: To evidence this standard, the visitors were directed to the training approval standards. However, the visitors were unable to locate this information within the programme documentation. Further to this, the visitors were unable to see how the training approval standards would be applied throughout the placement audit process. The visitors were therefore unable to make a judgement on this standard being met. The visitors require the education provider to provide the training approval standards as articulated in the SETs mapping document, or, alternative evidence of how this standard is met, which effectively demonstrates that a range of learning and teaching methods that respect the rights and needs of service users and colleagues is in place throughout practice placements.

6.1 The assessment strategy and design must ensure that the student who successfully completes the programme has met the standards of proficiency for their part of the Register.

Condition: Considering the conditions applied to SET 4.1 for this programme, the education provider must articulate how the assessment strategy and design ensures that the student who successfully completes the programme is able to demonstrate that they meet the standards of proficiency (SOPs) for clinical scientists.

Reason: To evidence how and where the programme assesses whether students meet the SOPs, the visitors were directed to the module handbooks for each modality. In the Modality Handbooks, there was limited information on the level and scope of knowledge required for a clinical scientist in relation to the particular SOPs mentioned in the conditions for SET 4.1. The visitors note that without clarification on the level and scope of knowledge required in the delivery, they cannot be satisfied that the assessment strategy and design is appropriate to assess the learning outcomes, and therefore ensures that a student who successfully completes the programme has met the SOPs for clinical scientists. Therefore further evidence is required to demonstrate how each of the SOPs listed in each condition under SET 4.1 of this report are assessed specific to the scope of practice of a clinical scientist, and where relevant, of the specific modality.

6.1 The assessment strategy and design must ensure that the student who successfully completes the programme has met the standards of proficiency for their part of the Register.

Condition: The education provider must provide evidence to demonstrate that the assessment criteria to be used by portfolio assessors is appropriate to ensure that a student who successfully completes the programme has met the standards of proficiency (SOPs) for clinical scientists, and, how this will be communicated to both assessors and applicants.

Reason: To evidence this standard, the visitors were directed to a number of documents, including the assessor guidance. However, the visitors were unable to locate any information within this documentation which outlined the criteria against which an applicant would be assessed. Specifically, the visitors were unable to identify guidance or criteria on what would be considered as appropriate evidence and therefore enable an applicant to meet each of the SOPs for clinical science. Further to this, the visitors were unable to locate where this information would be made available to applicants. The visitors note that due to the proposed model of delivery for this programme, the assessment criteria for portfolios is imperative in ensuring that applicants are able to meet the SOPs and also to ensure parity in the assessment process. The visitors therefore require further evidence of the guidance and criteria for the assessment of SOPs within the applicant's portfolio. In addition to this the visitors require evidence to show how this information will be made available to both portfolio assessors and applicants.

6.4 Assessment methods must be employed that measure the learning outcomes.

Condition: The education provider must provide evidence to demonstrate that the assessment criteria to be used by portfolio assessors is appropriate to measure the learning outcomes, and, how this will be communicated to both assessors and applicants.

Reason: To evidence this standard, the visitors were provided with a statement that "Portfolio evidence must demonstrate individual standards of proficiency have been met." The visitors were not provided with any supporting documentation for this standard. The visitors considered the assessor guidance, but were unable to locate any information within this document that outlined the criteria against which an applicant would be assessed. Specifically, the visitors were unable to identify guidance or criteria on what would be considered as appropriate evidence for each learning outcome. Further to this, the visitors were unable to locate where this information would be made available to applicants. The visitors note that due to the proposed model of delivery for this programme, the assessment criteria for portfolios is imperative in ensuring that applicants are able to meet the learning outcomes and also to ensure parity in the assessment process. The visitors therefore require further evidence of the guidance and criteria for the assessment of learning outcomes within the applicant's portfolio. In addition to this the visitors require evidence to show how this information will be made available to both portfolio assessors and applicants.

6.6 There must be effective monitoring and evaluation mechanisms in place to ensure appropriate standards in the assessment.

Condition: The education provider must provide evidence of the mechanisms for the moderation of the portfolio assessment panel.

Reason: To evidence this standard, the visitors were directed to a number of documents which evidenced the monitoring and evaluation mechanisms in place for the overall assessment process. However, the visitors were unable to locate any information on the monitoring and evaluation of the portfolio assessment panel. Specifically, they were unable to identify any clear moderation of panel decisions that would ensure appropriate standards and parity in the assessment of portfolios. The visitors therefore require further evidence to show how the portfolio assessment panel will be moderated to ensure parity and appropriate standards in the assessment of each applicant's portfolio.

Ruth Ashbee
David Houliston
Christine Morgan
Ross Sadler
David Simms
David Stirling

Additional documentation request form

Education provider: Institute of Biomedical Science
Programme name: Certificate of Competence by Equivalence (Clinical Scientists)
Mode of delivery: Flexible
Relevant part of the HCPC Register: Clinical scientist
Relevant modalities:

- Cellular science;
- Clinical biochemistry;
- Clinical immunology;
- Clinical microbiology; and
- Haematology.

Date of visit: 15 – 16 July 2015

Introduction

Visitors from each of the modalities reviewed modality specific documentation to assess whether the programme was able to deliver clinical scientist SOPs in ways relevant to each modality. For this first stage, visitors did not attend the IBMS offices. The stage 1 assessment was undertaken on 15–16 June 2015.

The second stage took the form of a visit to meet with the stakeholders involved with the delivery of the programme. The visit reviewed how the programme meets the SETs.

Following this process, the visitors wrote a report, which recommended to our Education and Training Committee that conditions were set on us approving the programme. The recommended outcome and the conditions were agreed by the Committee on 24 September 2015.

Visitors have reviewed the additional documentation submitted by the education provider in response to the conditions set. This report should be read in conjunction with the original visitors' report.

The visitors consider that conditions for the following standards are met:

2.7 The admissions procedures must ensure that the education provider has equality and diversity policies in relation to applicants and students, together with an indication of how these will be implemented and monitored.

3.1 The programme must have a secure place in the education provider's business plan.

3.2 The programme must be effectively managed

3.3 The programme must have regular monitoring and evaluation systems in place.

3.7 A programme for staff development must be in place to ensure continuing professional and research development.

4.2 The programme must reflect the philosophy, core values, skills and knowledge base as articulated in any relevant curriculum guidance.

5.12 Learning, teaching and supervision must encourage safe and effective practice, independent learning and professional conduct.

5.13 A range of learning and teaching methods that respect the rights and needs of service users and colleagues must be in place throughout practice placements.

Conditions where further information is required

The visitors consider that the following conditions are not met at this time. A reason has been included explaining why they consider each condition has not been met, and gives an indication of the type of documents and / or information that could evidence how the conditions are met.

2.1 The admissions procedures must give both the applicant and the education provider the information they require to make an informed choice about whether to take up or make an offer of a place on a programme.

Condition: The education provider must provide clear information about the cost and entry requirements for the programme and how this will be communicated to potential applicants.

Reason condition not met: The visitors received a statement from the education provider which outlines the amended entry requirements for the programme and the cost for applicants. However, the visitors were not provided with evidence which shows where these changes have been made within the programme documentation, or how this will be communicated to potential applicants. The visitors are satisfied with the stated requirements, but to ensure this condition is met, they need to receive documentation that supports the education provider's statement.

Suggested Documentation: Amended admissions material showing where applicants are informed of the entry requirements and costs for the programme.

2.5 The admissions procedures must apply selection and entry criteria, including appropriate academic and/or professional entry standards.

Condition: The education provider must provide clear information about the subject specific requirements for the MSc as stated in the entry criteria, and clarification on the requirements of HCPC biomedical scientist registration for applicants.

Reason condition not met: The visitors received a statement from the education provider which outlines the revised entry requirements for the programme. According to this statement, the entry requirements will state that that applicants must have a relevant MSc or equivalent in a subject relevant to the specialism the applicant is applying for, and that HCPC registration as a biomedical scientist will be a requirement for applicants. However, the visitors were not provided with evidence which shows where these changes have been made within the programme documentation. The education provider has also stated they feel that to meet all other entry criteria an applicant would already need to be HCPC registered and that it is "…proposed that the original wording is retained" In the documentation. Therefore the visitors were not provided with evidence which shows where the required changes have been made within the programme documentation and subsequently that clarity has been provided. The visitors are satisfied with the requirements themselves, but to ensure this condition is met, they need to receive documentation that supports the education provider's requirements.

Suggested Documentation: Programme documentation which outlines the entry requirements for the programme and clarification of the requirements for HCPC registration upon application.

3.5 There must be an adequate number of appropriately qualified and experienced staff in place to deliver an effective programme.

Condition: The education provider must provide further evidence to demonstrate that the criteria, including the professional and academic qualifications, required to successfully apply and be appointed as one of the portfolio verifiers is appropriate to the programme

Reason condition not met: The visitors reviewed recruitment criteria for the appointment of the biomedical scientist and clinical scientist panel members. This criteria was supported by a statement from the education provider that applications for the panel member role will be reviewed by "specialist advisory panels" to ensure their scope and level of practice is at M level. The visitors note that the current criteria for the recruitment of the biomedical scientist panel member is not sufficient to ensure they are able to assess modality specific skills at a clinical science level. The education provider also stated that the biomedical scientist panel members will assess the modality specific knowledge and will "…be individuals with the knowledge and experience that extends beyond the threshold level for clinical scientist registration." The visitors considered that this statement is not evidence in itself, and therefore had not been provided with any evidence to demonstrate how the education provider will ensure that they recruit individuals with this knowledge and experience. The visitors consider that the education provider can meet this condition in one of two ways;

- They could ensure that modality specific skills are assessed by a clinical scientist with appropriate modality specific experience; or,
- They could provide documentary evidence which demonstrates how they ensure that the biomedical scientist panel member has the ability to assess modality specific skills at a clinical scientist level. This could be demonstrated in a number of ways, but should include a detailed role brief with criteria for the modality specific experience at or beyond the clinical scientist level required, and that suitable processes are in place to ensure appropriate judgements are made against this criteria.

Suggested Documentation: Evidence that either:

- the clinical scientist panel member will make modality specific assessments; or
- which demonstrates how the biomedical scientist panel member is appropriately qualified to make modality specific assessments at a clinical science level.

3.17 Service users and carers must be involved in the programme

Condition: The education provider must provide further evidence to support their choice of service user and carer representatives for the programme.

Reason condition not met: The visitors received a statement from the education provider which outlines the revised criteria for the recruitment of lay

representatives on the assessment panel. However, the visitors were not provided with evidence which shows where these changes have been made within the programme documentation. The visitors also received a statement from the education provider which states “The provision of input and insight from the service user and carer perspective is now a specific item in the terms of reference role descriptor for all advisory panel members.” However, the visitors were not provided with evidence which shows where these changes have been made within the programme documentation. The visitors are satisfied with the above stated requirements but to ensure this condition is met, they need to receive documentation that supports the education provider’s statement.

Suggested Documentation: Lay representative criteria document which outlines the criteria for recruitment and appointment and advisory panel member role descriptor.

4.1 The learning outcomes must ensure that those who successfully complete the programme meet the standards of proficiency for their part of the Register.

Condition: The education provider must provide further evidence demonstrating how the curriculum and learning outcomes, as listed in the modality specific handbooks, ensure that the following standards of proficiency (SOPs) are delivered specific to the scope of practice of a clinical scientist.

Reason condition not met: The visitors reviewed amended module handbooks for each of the modalities. However, the visitors noted there is still insufficient detail on the level and scope of knowledge required for a clinical scientist in relation to some of the SOPs. The visitors therefore require further information to support how the following SOPs are met specific to the scope of a clinical scientist:

4 be able to practise as an autonomous professional, exercising their own professional judgement

4.1 be able to assess a professional situation, determine the nature and severity of the problem and call upon the required knowledge and experience to deal with the problem

- **Clinical microbiology** - The Modality Handbook did not clearly define the education provider’s understanding of the wider clinical context and clinical scientists’ role to understand:
  - important and widely used tests and investigations for virology;
  - important antiviral therapies;
  - examples of antiviral resistance;
  - areas of viral load monitoring;
  - virology within clinical physiology and pathology;
  - important viruses and viral infections for:
    - respiratory infections;
    - enteric infections:
    - sexually transmitted diseases;
    - neurological disease including prion disease;
    - rashes and systemic infections;

        - blood-borne infections; and
        - investigation of viral hepatitis.
    - key infections in specific patient groups (for example immunocompromised hosts) for all microorganisms;
    - important antiviral therapies;
    - examples of antiviral resistance; and
    - areas of viral load monitoring.

11 be able to reflect on and review practice

11.2 recognise the value of case conferences and other methods of review

- In all Modality Handbooks, there is no professional education or training outcome related to this SOP.

13 understand the key concepts of the knowledge base relevant to their profession

13.2 be aware of the principles and applications of scientific enquiry, including the evaluation of treatment efficacy and the research process

- **Clinical microbiology** - The Modality Handbook did not clearly define the education provider's understanding of the wider clinical context and clinical scientists' role to understand:
    - important and widely used tests and investigations for virology;
    - important antiviral therapies;
    - examples of antiviral resistance; and
    - areas of viral load monitoring.
- **Cellular Science –** The Modality Handbook did not clearly define the education provider's understanding of the wider clinical context and clinical scientists' role to understand:
    - aetiology and epidemiology of cervical cancer, risk factors, world wide variations;
    - analysis of data on incidence and mortality from national statistics; and
    - operation of call and recall systems, rationales for the age range and intervals for cervical screening.

Suggested documentation: Amended Module Handbooks for clinical microbiology, haematology and cellular science to include the above mentioned criteria and curriculum areas.

4.1 The learning outcomes must ensure that those who successfully complete the programme meet the standards of proficiency for their part of the Register.

Condition: The education provider must provide further evidence demonstrating how the curriculum, as defined in the modality specific handbooks, demonstrates the scope and depth of understanding and knowledge required by the programme regarding the clinical scientist standards of proficiency (SOPs) as listed below, as related to the profession and, where applicable, the modality.

Reason condition not met: The visitors reviewed amended module handbooks for each of the modalities. However, the visitors noted there is still insufficient detail on scope and depth of knowledge and understanding required by the programme in relation to some of the SOPs. The visitors therefore require further information to support how the following SOPs are met specific to the scope of a clinical scientist:

13 understand the key concepts of the knowledge base relevant to their profession

13.7 know the basic science underpinning the modality in which they practise, understand relevant basic clinical medicine and be aware of the fundamental principles of clinical practice

- **Clinical microbiology** - The handbooks did not clearly define what the education provider understands of:
  - virology within clinical physiology and pathology;
  - important viruses and viral infections for:
    - respiratory infections;
    - enteric infections:
    - sexually transmitted diseases;
    - neurological disease including prion disease;
    - rashes and systemic infections;
    - blood-borne infections; and
    - investigation of viral hepatitis.
  - key infections in specific patient groups (for example immunocompromised hosts) for all microorganisms;
  - important antiviral therapies;
  - examples of antiviral resistance; and
  - areas of viral load monitoring.
- **Cellular Science** - The handbooks did not clearly define what the education provider understands of:
  - the role of the gynaecologist, NHS cervical screening programme quality assurance team and the relationships with the hospital based Programme Co-ordinator;
  - the process of metaplasia and the types of metaplastic process;
  - diagnosis and treatment of malignancies of the female genital tract, the role of the gynaecologist and multidisciplinary team meetings in the management of cancer;
  - normal cytological features of sputum, bronchial washings, brushings and lavages;
  - cytological features of contaminants and artefacts including those related to treatment of disease;
  - cytological features and cytopathic effects of malignancy; and
  - the theory, practice and role of cytology and multidisciplinary nature, for example the role of primary care staff, of screening programmes in the UK and other countries.

Suggested documentation: Amended Module Handbooks for clinical microbiology, haematology and cellular science to include the above mentioned criteria and curriculum areas.

4.4 The curriculum must remain relevant to current practice.

Condition: The education provider must provide further evidence of the processes in place to ensure currency in the curriculum, with specific reference to each modality.

Reason condition not met: The visitors received a statement from the education provider outlining IBMS members involvement with curriculum reviews for the NHS Scientist Training Programme (STP), and their responsibility to feed this into the IBMS three and five year cyclical reviews of the programme. The education provider also states that this will be reflected in a revised programme specification, however, the visitors were not provided with the revised programme specification. The visitors are satisfied with the above stated requirements but they need to receive further documentation to evidence its implementation. In addition to this the visitors are still unable to identify a clear criteria, specific to each modality, which assessors will use to enable them to make an informed decision on whether an applicant's portfolio is relevant to current practice. The visitors are therefore unable to make a judgement on the criteria used to inform the assessment and are consequently unable to say if this condition is met.

Suggested Documentation: A revised Programme Specification as mentioned in the conditions response and clear criteria, specific to each modality, which ensure portfolios are assessed as relevant to current practice.

4.8 The range of learning and teaching approaches used must be appropriate to the effective delivery of the curriculum.

Condition: The education provider must provide further clarity on which methods of learning would be considered appropriate to meet each learning outcome in the assessment of applicants' portfolios.

Reason condition not met: The visitors received additional documentation to show a list of the range of learning and teaching activities that applicants will be expected to have used within the portfolio as a whole. The visitors note that this particular condition requires clarification of particular learning outcomes that may require a specific learning and teaching approach to ensure effective delivery of the curriculum. However, the visitors were not provided with evidence to this level of detail. The visitors therefore require further documentation which outline that, where necessary, examples of appropriate learning and teaching methods are highlighted to both assessors and applicants.

Suggested Documentation: Mapping or direction within the module handbooks to highlight examples of appropriate learning and teaching methods against relevant learning outcomes.

5.3 The practice placement settings must provide a safe and supportive environment.

Condition: The education provider must provide further evidence of the audit process and criteria used to approve placements, to demonstrate the effective audit of the placement environment.

Reason condition not met: The visitors reviewed the "Clinical Laboratory Standards for IBMS Qualifications" as evidence of the criteria to assess placements locations. The visitors noted that much of the criteria is acceptable for assessing the placement setting, however, there is no reference to particular criteria relevant to clinical science. In particular the visitors were unable to locate where it was stated that applicants would require access to multidisciplinary teams or ward rounds to ensure ability to interact with medics at case discussion meetings. The visitors therefore require further documentation to evidence that the placement assessment criteria is appropriate to assess the placement setting with particular emphasis on the requirements for clinical science. The visitors also require any changes to be reflected in the programme documentation. The visitors are satisfied with the stated criteria to assess placement locations but to ensure this condition is met, they need to receive documentation that supports the education provider's statement.

Suggested Documentation: Amended placement audit criteria which outlines requirements specific to clinical science. Amended programme handbook and feedback form which outline the approval and monitoring requirements and processes in place.

5.4 The education provider must maintain a thorough and effective system for approving and monitoring all placements.

Condition: The education provider must provide further evidence of the audit process and criteria used to demonstrate the effective approval and monitoring of placements.

Reason condition not met: The visitors reviewed the "Clinical Laboratory Standards for IBMS Qualifications" as evidence of the criteria to assess placements locations. The visitors noted that much of the criteria is acceptable for approving and monitoring the placement setting, however, there is no reference to particular criteria relevant to clinical science. In particular the visitors were unable to locate where it was stated that applicants would require access to multidisciplinary teams or ward rounds to ensure ability to interact with medics at case discussion meetings. The visitors therefore require further documentation to evidence that the placement assessment criteria is appropriate to approve and monitor the placement setting with particular emphasis on the requirements for clinical science. The visitors also require any changes to be reflected in the programme documentation. The visitors are satisfied with the stated criteria to assess placement locations but to ensure this condition is met, they need to receive documentation that supports the education provider's statement.

Suggested Documentation: Amended placement audit criteria which outlines requirements specific to clinical science. Amended programme handbook and

feedback form which outline the approval and monitoring requirements and processes in place.

5.5 The placement providers must have equality and diversity policies in relation to students, together with an indication of how these will be implemented and monitored.

Condition: The education provider must provide further evidence of the audit process and criteria used to demonstrate the effective approval of placements, specific to equality and diversity policies.

Reason condition not met: The visitors received a statement from the education provider which outlines intended changes to the processes which will ensure that placement providers will have equality and diversity policies in place. However, the visitors were not provided with evidence which hows where these changes have been made within the programme documentation.
The visitors are satisfied with the processes as stated in the education provider's response but to ensure this condition is met, they need to receive documentation that supports the education provider's statement.

Suggested Documentation: Amended programme documentation which outlines the processes and requirements for practice placement providers to have equality and diversity policies in place.

5.6 There must be an adequate number of appropriately qualified and experienced staff at the practice placement setting.

Condition: The education provider must provide further evidence of the audit process and criteria used to demonstrate the effective approval of placements, specific to the number of appropriately qualified and experienced staff.

Reason condition not met: The visitors reviewed the "Clinical Laboratory Standards for IBMS Qualifications" as evidence of the criteria to assess whether there are adequate numbers of appropriately qualified and experienced staff at the placement setting. The visitors were satisfied that this part of the criteria was evidenced clearly, but is not sufficient to meet this condition alone. In addition to this the visitors received a statement from the education provider which outlines the processes in place for the approval and monitoring of placements, including requirements to assess staff resources specific to clinical science. The education provider stated that additional monitoring requirements are now included in the course handbook and Laboratory Training Assessment Form. However, the visitors were not provided with evidence which shows where these changes have been made within the programme documentation. The visitors are satisfied with the above stated processes but to ensure this condition is met, they need to receive documentation that supports the education provider's statement.

Suggested Documentation: Amended Laboratory Training Assessment Form and Course Handbook which reflect the approval and monitoring processes as stated in the conditions response.

5.7 Practice placement educators must have relevant knowledge, skills and experience

Condition: The education provider must provide further evidence of the audit process and criteria used to demonstrate the effective approval of placements, specific to staff knowledge, skills and experience.

Reason condition not met: The visitors reviewed the "Clinical Laboratory Standards for IBMS Qualifications" as evidence of the criteria to assess whether the knowledge, skills and experience of staff at the placement setting is relevant. The visitors were satisfied that this part of the criteria was evidenced clearly, but is not sufficient to meet this condition alone. In addition to this the visitors received a statement from the education provider which outlines the processes in place for the approval and monitoring of placements, including requirements to assess staff resources specific to clinical science. The education provider stated that additional monitoring requirements are now included in the course handbook and Laboratory Training Assessment Form. However, the visitors were not provided with evidence which shows where these changes have been made within the programme documentation. The visitors are satisfied with the above stated processes but to ensure this condition is met, they need to receive documentation that supports the education provider's statement.

Suggested Documentation: Amended Laboratory Training Assessment Form and Course Handbook which reflect the approval and monitoring processes as stated in the conditions response.

5.8 Practice placement educators must undertake appropriate practice placement educator training.

Condition: The education provider must provide further evidence of the requirements for practice educators to undertake initial and refresher training.

Reason condition not met: The visitors reviewed an agenda for the training session for this programme. This was supported by a statement from the education provider which stated that the IBMS holds regular update days for trainers and assessors. However the visitors note that the training session agenda does not contain any reference to sessions specifically for practice educators to support applicants whilst on placement. The visitors were also unable to identify any proposed learning outcomes from the training agenda, or where it is articulated in the programme documentation that placements educators are required to attend this training.
In addition to this, the visitors were not provided with any evidence of refresher training opportunities for placement educators, or where in the programme documentation it is articulated that placement educators are required to attend refresher training sessions.

Suggested Documentation: Detailed breakdown of the content for both initial and refresher placement educator training and the learning outcomes associated with this. Amended programme documentation which outlines the requirements for placement educators to attend initial and refresher training sessions.

5.9 Practice placement educators must be appropriately registered, unless other arrangements are agreed.

Condition: The education provider must provide further evidence of the audit process and criteria used to demonstrate the effective approval of placements, specific to the assessment of HCPC registration.

Reason condition not met: The visitors were provided with a statement from the education provider outlining the processes that will be in place to ensure practice placement educators are appropriately registered with the HCPC as a clinical scientist. In particular, the education provider makes reference to a particular policy that has been prepared. However the visitors were not provided with evidence which shows where these changes have been made within the programme documentation. The visitors are satisfied with the above stated processes but to ensure this condition is met, they need to receive documentation that supports the education provider's statement.

Suggested Documentation: Amended programme documentation which outlines the processes in place to ensure practice placement providers are appropriately registered. A copy of the policy document as referenced in the conditions response.

5.10 There must be regular and effective collaboration between the education provider and the practice placement provider.

Condition: The education provider must provide evidence to demonstrate the regular and effective communication with practice placement providers.

Reason condition not met: The visitors were provided with a statement from the education provider which highlights a number of communication channels that will be in place between the placement mentor and IBMS. The visitors note that this could be suitable as part of ensuring regular and effective collaboration, however, this does not demonstrate regular and effective communication within the wider context of the practice placement setting. In addition, the visitors were not provided with evidence which shows where these changes have been made within the programme documentation. At the visit the education provider referenced a number of processes that would be used to collaborate with practice placement providers including placement audits, a visit to the placement setting and placement review meetings. The visitors were satisfied that these could be appropriate platforms to ensure this condition is met. However, the visitors were still not able to see any clear evidence of this in the conditions response or the programme documentation.

Suggested Documentation: Updated placement handbook which outlines the mentor communication as outlined in the conditions response. Updated placement handbook which outlines effective communication channels between the education provider and the wider practice placement setting.

6.1 The assessment strategy and design must ensure that the student who successfully completes the programme has met the standards of proficiency for their part of the Register.

Condition: Considering the conditions applied to SET 4.1 for this programme, the education provider must articulate how the assessment strategy and design ensures that the student who successfully completes the programme is able to demonstrate that they meet the standards of proficiency (SOPs) for clinical scientists.

Reason condition not met: The visitors reviewed amended module handbooks for each of the modalities which would act as assessment criteria for portfolios. However, the visitors noted there continues to be insufficient detail on the level and scope of knowledge required for a clinical scientist in relation to the particular SOPs mentioned in this additional documentation request for SET 4.1 where further information is required. The visitors require further evidence which demonstrates an appropriate criteria for the assessment of SOPs within the applicant's portfolio.

Suggested documentation: Amended Module Handbooks for clinical microbiology, haematology and cellular science to include the criteria and curriculum areas as mentioned under SET 4.1 of this additional documentation request.

6.4 Assessment methods must be employed that measure the learning outcomes.

Condition: The education provider must provide evidence to demonstrate that the assessment criteria to be used by portfolio assessors is appropriate to measure the learning outcomes, and, how this will be communicated to both assessors and applicants.

Reason condition not met: The visitors reviewed amended module handbooks for each of the modalities which would act as assessment criteria for portfolios. However, the visitors noted there continues to be insufficient detail on the level and scope of knowledge required for a clinical scientist in relation to the particular SOPs mentioned in this additional documentation request for SET 4.1 where further information is required. The visitors require further evidence which demonstrates a criteria for the assessment of SOPs within the applicant's portfolio which is appropriate to measure the learning outcomes.

Suggested documentation: Amended Module Handbooks for clinical microbiology, haematology and cellular science to include the criteria and curriculum areas as mentioned under SET 4.1 of this additional documentation request.

6.6 There must be effective monitoring and evaluation mechanisms in place to ensure appropriate standards in the assessment.

Condition: The education provider must provide evidence of the mechanisms for the moderation of the portfolio assessment panel.

Reason condition not met: The visitors were provided with a statement regarding modality curriculum and an extract from the external examiner candidate guidance in response to this conditions. However, the visitors were not provided with any information which outlines the monitoring mechanisms in place specific to the moderation of panel decisions. The education provider has stated that where the panel cannot reach a decision or additional evidence is required the decision will be referred to the Education and Professional Standards Committee. However, there was no information provided on the moderation of all other decisions, for example where the panel all agree to pass a portfolio.

Suggested Documentation: Amended programme documentation which outlines the processes for the moderation across a range of assessment panel decisions.