

HIGHER MEDICAL TRAINING

CURRICULUM

FOR

IMMUNOLOGY

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INTRODUCTION

Immunology in the UK is a medical discipline which encompasses both clinical and laboratory aspects. In addition to carrying responsibility for running service laboratories, Immunologists are increasingly engaged in clinical management of patients. Their training has thus to address both the technical and managerial skills of the laboratory and the clinical skills relating to patient care. The discipline of immunology also significantly underpins the scientific and laboratory aspects of Allergy and the training programmes for both specialties include a common core element which, in the case of Immunology, is undertaken during the first two years..

Entry requirements

Applicants for Higher Medical Training (HMT) in Immunology must have completed a minimum of two years general professional training in approved posts and obtained the MRCP(UK) or MRCP(I).

GPT is defined as follows:

A minimum of 2 years in approved posts with direct involvement in patient care and offering a wide range of experience in a variety of specialties.

18 months of the 2 years must be spent in posts providing experience in the admission and early follow-up of acute emergencies.

At least 6 of these 18 months must be spent on a service or services on which the emergency take is 'unselected'.

'Unselected take' is defined as acute medical intake encompassing the broad generality of medicine ie not restricted to any single or small group of specialties. If any major component of acute medicine (eg cerebrovascular accidents, myocardial infarctions) is excluded from the take, this experience must be obtained in other posts. During the period on 'unselected take' trainees should have an on-call commitment which averages no less than 4 takes per month.

Non-UK graduates who compete for HMT posts must provide evidence of appropriate knowledge, training and experience, particularly in the care of acute medical conditions.

Duration and organisation of training

The duration of HMT in Immunology will be a minimum of five years. On entering the unified training grade trainees will embark on a modular core training programme (CTP) lasting two years. Exit from the CTP will be marked by the achievement of MRCPath Part I examination, taken after a minimum of two years. This examination is normally taken after three years training but one year of training credit will be given in recognition of the achievement of the MRCP(UK) or MRCP(I) diplomas. The MRCPCH qualification would be an acceptable alternative to the MRCP. A minimum of two years further training will be required before the MRCPath part II may be taken and a fifth year is required to complete CCST requirements. The MRCPath examination (both parts) is essential before obtaining a CCST.

Throughout every component of the 5 year programme, trainees will be supervised by named consultants (Educational Supervisors). In addition, one consultant in their Region will act as Programme Director.

Training Record

A Training Record will be maintained by the trainee. It will be counter-signed as appropriate by the Educational Supervisors to confirm the satisfactory fulfilment of the required training experience and the acquisition of the competencies that are enumerated in the Specialty Curriculum. It will remain the property of the trainee, and must be produced at the annual assessments.

Flexible training

Trainees who are unable to work full-time are entitled to opt for flexible training programmes. EC Directive 93/16/EEC requires that:

- i Part-time training shall meet the same requirements as full-time training, from which it will differ only in the possibility of limiting participation in medical activities to a period of at least half of that provided for full-time trainees;*
- ii The competent authorities shall ensure that the total duration and quality of part-time training of specialists are not less than those of full-time trainees*

The above provisions must be adhered to. Flexible trainees should undertake a pro rata share of the out of hours duties (including on-call and other out of hours commitments) required of their full-time colleagues in the same programme and at the equivalent stage.

For details of appointment and funding arrangements for flexible trainees, please see the revised 'Guide to Specialist Registrar Training' (February 1998).

Assessment

Assessment of trainees will be based upon the standard format of annual review, including the Penultimate Year Assessment (PYA) to which particular important attaches. Full details may be found in the Introduction to the JCHMT handbook. The award of the CCST will be based on satisfactory completion of the entire series of annual assessments. As noted above, trainees in Immunology are required to obtain the MRCPPath in addition to fulfilling annual assessment requirements.

AIM OF CURRICULUM

The goal of the training programme is to enable trainees to acquire the requisite highly specialised scientific knowledge, clinical skills and laboratory skills required to :

- (i) diagnose, treat and where relevant, prevent diseases characterised by immunodeficiency or autoimmunity.
- (ii) direct a diagnostic immunology laboratory service

Subject Matter

The principal areas of subject matter within the curriculum for Immunology are :

- Acquisition of a core body of knowledge in fundamental immunology and its applications
- Investigation and management of patients with congenital and acquired immunodeficiency disorders
- Investigation and management of patients with autoimmune (including rheumatic) disease and systemic vasculitides
- How to deliver a diagnostic immunology laboratory service .

In addition trainees should

- (a) be able to explain the principles underlying the diagnosis, investigation and management of allergic (hypersensitivity) diseases and be able to liaise with Specialists in Allergy (see Allergy curriculum for details of specific disorders) and,
- (b) be able to explain the principles underlying organ and Bone Marrow transplantation.

Note: Immunological diseases may have both adult and paediatric presentations. Collaborative training with paediatricians from appropriate sub-specialties will be undertaken. This will allow the trainee to develop the required skills essential for liaising with paediatric colleagues.

Teaching / Learning Methods

The following teaching/learning methods will be used, and the appropriate letter has been used in the tables to identify how individual objectives will be achieved:

- a) "Apprenticeship learning" with senior clinical and non-clinical staff comprising discussion observation, performance of practical procedures and subsequent evaluation.
- b) tailored clinical experience
- c) personal study
- d) attendance of appropriate post-graduate education courses and meetings (eg: completion of a recognised MSc course in Immunology and/or attendance at meetings and courses run by the Royal Colleges and learned societies eg. British Society for Immunology, British Society for Allergy and Clinical Immunology, Association of Clinical Pathologists.)
- e) participation in multidisciplinary team meetings to plan service provision and individual patient care
- f) use of electronic/web based learning resources
- g) small group teaching e.g. tutorials, journal clubs
- h) carrying out Audit
- i) observation and practise of laboratory methods
- j) undertaking a laboratory based project
- k) secondment to other clinical disciplines, eg. Rheumatology or Nephrology service

Assessment Methods

1. Detailed procedures observed by trainer or other professionals and judged to be satisfactory against established criteria
Portfolio indicating evidence of learning eg. literature reviews, case reports, publications, evidence-based protocols and standard operating procedures authored by trainee
3. Testing knowledge during tutorials conducted by trainer.
4. Annual RITA assessments (see Appendix A)
5. Successful completion of relevant courses/degrees/diplomas (Eg.MSc in medical immunology).
6. Completion of MRCPPath Immunology Parts 1 and 2.

Evidence of competence for inclusion in the trainees record: See Appendix B

Key outcomes of the training period

By the end of training, trainees will:

- Acquire a core body of knowledge in fundamental immunology to underpin clinical and laboratory practice. (detailed topics are set out in Appendix E)
- Understand the patho-physiology, including the molecular basis of (a) immunodeficiency diseases, (b) Autoimmune / rheumatic disease and systemic vasculitides , (c) allergic disease
- Be able to carry out clinical assessment of patients with suspected (a) primary or secondary immunodeficiency (b) Autoimmune/ rheumatic disease and systemic vasculitides (c) allergic disease ; to achieve this goal trainees need to be aware of common and rare modes of presentation these disorders and their differential diagnosis.
- Understand and be able to give advice on the appropriate use of laboratory tests (a) for the prevention, diagnosis and treatment of primary or secondary immunodeficiency (b)the diagnosis and assessment of autoimmune / rheumatic disease and systemic vasculitides; in pursuance of this objective the trainees should be able to perform the analytical phase of serological, cellular and molecular tests, required for assessing immune-competence or autoimmunity using standard operating procedures; they need to be aware of the relevant methods of quality control and quality assurance; they need to be aware of sensitivity, precision and specificity of relevant laboratory tests; they should be able to provide advice regarding clinically appropriate and cost-effective selection of laboratory tests, and be able to interpret these tests in the context of clinical findings.
- Understand and be able to explain principles underlying organ and Bone-Marrow transplantation. Trainees will not be expected to have the skills necessary to take **primary** clinical responsibility for such patients, unless they have undertaken requisite specialist training. Attachments to a tissue-typing laboratory and clinical transplantation units will be required.
- Be able to assess and treat adult patients with Primary Immunodeficiency Diseases. [See Appendix 1 (Primary Immunodeficiency Diseases, report of an IUIS Scientific Committee, Clin Exp Immunol; 1999, 118 (Suppl1): 1-28, for details of Primary Immunodeficiency Diseases].
- Be able to provide consultative advice on the diagnosis and management of secondary immunodeficiency. Most Immunologists will not be expected to take primary clinical responsibility for the management of patients with HIV infection unless they have undergone additional training and appropriate accreditation. However, trainees need to be aware of the clinical consequences of HIV infection, its epidemiology and prevention, current ideas about treatment and techniques required for monitoring HIV-induced disease.
Be able to assess and treat (in association with rheumatologists or relevant organ-based specialists) adult patients with autoimmune rheumatic disease viz SLE, Scleroderma,

Inflammatory muscle disease, and Systemic vasculitides: Wegener's granulomatosis, Microscopic polyangiitis, Cryoglobulinaemic vasculitis, GCA, Takayasu's arteritis, Polyarteritis nodosa, Henoch-Schönlein purpura

- In close collaboration with paediatric colleagues, trainees need to be able to assess children with recurrent or unusual infections or failure-to-thrive to exclude immunodeficiency diseases and provide advice on appropriate referrals to tertiary-care centres, when more complex interventions e.g. bone marrow transplantation, are required.
- In close collaboration with Specialist Allergists, be able to assess and treat patients with serious/acute allergic diseases .
- Be able to liaise with other clinical colleagues for the optimum management of patients under their care e.g. Organ-Based Specialists, Clinical Geneticists, Allergists etc.
- Be able to explain details of diagnosis, natural history, outcome of immunologically mediated diseases and required therapeutic measures, to their clinical colleagues, patients and their carers.
- Be aware of available disease registries and how to use them.
- Be aware of the patient support organisations and how to liaise with them
- Be aware of relevant sources of information including computerised databases and should have the skills to use information resources to keep up to date with the latest developments in this rapidly developing field.
- Have the ability to work as part of a multi-disciplinary team within the clinical sphere of their activity, as well as in the delivery of their laboratory duties
- They should have the requisite skills to maintain their Continuing Professional Development.

Therapy of Immunodeficiency Diseases

By the end of the training period:

- Trainees should understand and be able to explain the principles governing immune reconstitution of Immunodeficiency Diseases, including Immunoglobulin Replacement Therapy, bone marrow transplantation and Stem Cell Transplantation, Gene Therapy, Cytokine Therapy
- They should have detailed competence to undertake Immunoglobulin Replacement Therapy, including evidence-based indications for this treatment, the methods of delivery of replacement Immunoglobulin (including intravenous and subcutaneous therapy), potential hazards of this therapy, managing complications of this therapy, organising and delivering home-care therapy, mechanisms for obtaining funding for Immunoglobulin Therapy including liaising with the appropriate tiers of the NHS management system and writing relevant business cases
- In close co-operation with other clinical colleagues (eg. specialists in Infectious Diseases, Microbiology and Virology), they should have the ability to anticipate, prevent, detect and manage infections in immuno-compromised patients

Therapy of Autoimmune diseases

By the end of the training period :

Trainees should understand and be able to explain the principles governing the use of immunosuppressive drugs (Steroids, Azathioprine, Cyclophosphamide Cyclosporin, Tacrolimus, Sirolimus, **and other agents as they enter clinical use**), high dose IVIg, therapeutic monoclonal antibodies (e.g. anti-CD3, anti-CD52, anti-TNF), cytokines (e.g. IL-2, γ -interferon), other biological agents used for immunomodulation e.g. Anti-Cytokine receptors (TNF receptor) and plasma exchange, including evidence-based indications for their use, methods of delivery, adverse effects, precautions needed during therapy (e.g. in the use of immunisation)

1. Be competent to undertake immunosuppressive and immunomodulatory therapy including high-dose intravenous immunoglobulin therapy, plasma exchange, immunosuppressive drugs as above and biological agents as above

Immunoprophylaxis:

(reference: Immunisation against Infectious Disease, Department of Health publication, London, HMSO, 1996)

By the end of the training period the trainees should:

1. Be able to explain the principles of immunoprophylaxis, including potential advances in the field.
2. Be competent to provide consultative advice on immunisation to prevent communicable disease, including (a) how to prevent and deal with adverse reactions, (b) immunisation of patients with immunodeficiency, (c) contraindications to immunisation, (d) the use of test immunisation to assess immune competence, (e) using information resources to keep up-to date with this field.

Laboratory Immunology:

At the end of the training period the trainee will have the following competencies:

1. Be able to select, interpret and provide clinical advice based on laboratory investigations as set out in Appendices C and D, relevant to the diagnosis, assessment and monitoring of patients with suspected immunodeficiency, allergy or autoimmunity.
2. Have the ability to write succinct, relevant and understandable reports in response to a requests for investigation
3. Be able to perform procedures and investigations which are in routine use in the immunology laboratory (Appendix B)
4. Trainees will be able to explain the concept of Quality Assurance and Quality Control. This includes in depth understanding of the following topics: The concepts of internal quality control and external quality assurance , sensitivity and specificity - analytic and clinical, accuracy and precision, false positivity and negativity, positive and negative predictive values, evaluation and standardisation of laboratory reagents, interpretation of QA/QC data and ability to apply the information to the routine operation of the lab as well as its use in assay trouble-shooting and the maintenance of quality, the role of external agencies (CPA, NEQAS and NQAAP) involved / associated with quality assurance, The role of audit in ensuring quality.
5. The Health and Safety : Trainees will be able to explain :
 - a) the importance of Health and Safety in the workplace in general and the laboratory in particular and the ways in which this can be ensured
 - b) the roles of all parties involved in creating a safe environment from which to provide a laboratory Immunology service viz: The Trust, The department, The individual member of staff, The Health and Safety Executive, The Advisory Committee on Dangerous Pathogens, The Radiation Protection officer.
6. Regulations governing Control of Substances Hazardous to Health
 1. Process management : The trainees will be able to
 - a) Distinguish between demand and workload
 - b) Explain the staffing and non-staffing infrastructures required to meet demand & workload.

2. Human Resource management: The trainees will understand the scope of:
 - a) Hospital policies and the role of the HR department in staff welfare and departmental – hospital interactions.
3. Recruitment training and retention methods and practice.
 - a) The roles, training and developmental needs of the differing professional groupings within the department
 - b) The negotiation process.
 - c) Disciplinary policies and procedures
4. Financial management: The trainees will understand the scope of:
 - a) Budget building, planning and management terminology and methods.
 - b) Resource procurement how to undertake equipment evaluation and direct the procurement process
5. Business Management and organisational structure in the Health Service
 - a) NHS management structures; National, Regional, Hospital and Community
 - b) Planning; Short, Medium and Long term
 - c) Service Contract Negotiations

1. THE ACQUISITION OF A CORE BODY OF KNOWLEDGE IN FUNDAMENTAL IMMUNOLOGY AND ITS APPLICATIONS

Objective	Subject Matter	Teaching/Learning Method	Assessment	Evidence of competence for inclusion in record
To provide the trainee with a core body of knowledge in fundamental immunology to underpin clinical and laboratory practice. (detailed topics are set out in current JCHMT, Immunology Handbook (refer to Key outcomes 1-2, above)	As laid out in Appendix E	Attendance at a recognised MSc course in Immunology and/or Attendance at meetings and courses run by the Royal Colleges and learned societies: British Society for Immunology British Society for Allergy and Clinical Immunology Association of Clinical Pathologists Attendance at journal clubs Personal study	3-6	See appendices B and F

2. STRUCTURED CLINICAL TRAINING

Objective	Subject Matter	Teaching/Learning Method	Assessment	Evidence of competence for inclusion in record
<p>To provide the trainee with the skills and knowledge required to:</p> <p>(a) assess and manage patients with congenital and acquired immunodeficiency - antibody and cell mediated defects, complement deficiency and neutrophil defects , at a consultant level.(Use report of IUIS Scientific Committee : Clin and Exp Immunology 1999; 118 (Suppl): 1-28 or updated equivalent reports as a guide.</p> <p>(b) Investigate and manage patients with autoimmune/ rheumatic diseases and systemic vasculitides</p> <p>(c) In close collaboration with specialist allergists , investigate and manage serious/acute allergic disease</p> <p>(refer to Key outcomes 3-10, 18-24 above)</p>	<p>1. History taking</p> <p>Physical examination</p> <p>Selection of appropriate laboratory and ancillary investigations</p> <p>Formulating differential diagnoses</p> <p>Therapeutic Interventions:</p> <p>Understand, putative mechanisms of action of various immunological therapies including immunoprophylaxis</p> <p>Have a working knowledge of the evidence base for the use of various immunological therapies including immunoprophylaxis</p> <p>Be able to explain the indications for the use of these therapies including immunoprophylaxis</p> <p>Be able to explain adverse effects associated with individual therapies and immunoprophylaxis</p>	a-I, k	1-6	See appendix B

3. STRUCTURED LABORATORY TRAINING

Objective	Subject Matter	Teaching/Learning Method	Assessment	Evidence of competence for inclusion in record
To provide trainees with the skills and knowledge to be able to direct a diagnostic immunology laboratory at Consultant level (refer to Key outcomes 25-32 above)	See Appendices C and D	a, c-j	1-6	See appendix B

APPENDIX -A

INSTRUCTIONS TO ASSESSORS

When assessing competence at the end of each attachment and/or year of training, assessors should use the following guide. It should be noted that grades 2 or 3 may be awarded if the trainee has not started or completed training in any particular aspect of the curriculum: thus, such grades should not, and will not necessarily be taken as evidence of poor performance. These summaries will be used as the basis of the Record of In-training Assessment (RITA) performed yearly.

These grades apply to sections 1-4 in appendix B (summaries of experience), and to the generic skills form (Appendix F, section 7) to be completed by all educational supervisors at the end of each attachment. If a grade 2 or 3 is given, reasons are to be specified separately in writing with evidence against each objective concerned.

OBJECTIVE	GRADE 1 SATISFACTORY	GRADE 2 NEEDS MORE TRAINING	GRADE 3 UNSATISFACTORY OR NOT DONE
Knowledge (clinical and core, sections A and D)	Consistently demonstrates knowledge and understanding	Some gaps in knowledge OR some exposure but requires more	Major deficiencies in knowledge OR not yet had opportunity to gain knowledge
Skills (clinical and laboratory, sections B & C)	Consistently and safely demonstrates appropriate skill	Has difficulty at times OR Requires more training and experience	Major difficulty OR not yet had sufficient training
Attitude and performance (generic skills, Appendix section 7)	Consistently willing and/or able without supervision	Requires to pay more attention to specific areas, needs occasional supervision	Consistently unable, unaware of limitations, needs frequent / continuous supervision

APPENDIX B

OBJECTIVE BASED IMMUNOLOGY CURRICULUM,

RECORD OF PERSONAL EXPERIENCE OF TRAINING IN EACH SECTION
OF THE CURRICULUM

1. FUNDAMENTAL IMMUNOLOGY AND ITS APPLICATIONS

(as part of a flexible modular training programme to be mainly completed within 1- 3 years)

Category	Key to experience: Extensive knowledge must be acquired in categories 1-12 and 16-22, adequate knowledge in categories 13-14 Grade 1 - 3 (see appendix A)	Year 1	Year 2	Year 3	Year 4	Year 5
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1. Cells of the immune system						
2. Cytokines, chemokines and other inflammatory mediators including lipid mediators						
3. Phagocytic cells and their function						
4. Antibody mediated immunity						
5. Complement system						
6. Cell mediated immunity						
7. Natural immunity						
8. Regulation of the immune system						
9. Hypersensitivity mechanisms						
10. Pathogenesis of immunodeficiency						
11. Pathogenesis of allergic diseases						
12. Immunological Tolerance and the pathogenesis of autoimmunity						
13. Immunobiology of transplant rejection and its prevention						
14. Classification and biology of malignancies of the lymphoid system						
15. Scientific basis of allergen immunotherapy						
16. Scientific basis of immunoprophylaxis						

17. Scientific basis of therapy of primary immunodeficiency					
18. Scientific basis of immunosuppressive and immunomodulatory therapy					
19. New developments in therapy of immunodeficiency					
20. New developments in therapy of allergic disease					
21. Scientific basis of laboratory immunology					

I confirm that experience has been acquired	DATE
Educational supervisor's signature for Year 1:	
Educational supervisor's signature for Year 2:	
Educational supervisor's signature for Year 3:	
Educational supervisor's signature for Year 4:	
Educational supervisor's signature for Year 5:	

2. CUMULATIVE CLINICAL EXPERIENCE

Category	Key to experience: All trainees are required to become fully competent in categories 1-5 by the end of Year 5. Grade 1 - 3 (see appendix A)	Year 1	Year 2	Year 3	Year 4	Year 5
1. Diagnosis and management of Immunodeficiency disorders in adults and children	<ul style="list-style-type: none"> • Antibody deficiencies • T-Cell /Severe Combined Immunodeficiencies • HIV diseases • Complement deficiencies • Phagocyte deficiencies • Asplenia • Rare conditions • Protocols for genetic studies of immunodeficiency syndrome • Clinical features of congenital and acquired immunodeficiency syndromes • Requesting and interpreting specific antibody titres and vaccination responses • Management of i.v. immunoglobulin replacement therapy • Management and prophylaxis of infections in the immunosuppressed patient 					
2. Systemic autoimmune disorders	<ul style="list-style-type: none"> • Diagnosis and management of SLE • Diagnosis of rheumatoid arthritis and seronegative arthropathies • Differential diagnosis of rheumatic diseases • Rare Rheumatic Disorders: diagnosis • Periodic fever syndromes - Diagnosis • Systemic vasculitis including Cryoglobulinaemia 					

3. Organ Specific autoimmune diseases	<ul style="list-style-type: none"> • Diagnosis of autoimmune skin diseases • Diagnosis of autoimmune liver diseases • Diagnosis of autoimmune endocrine diseases • Diagnosis of autoimmune gastro-intestinal diseases • Diagnosis of autoimmune neuro muscular diseases • Diagnosis of rare autoimmune diseases 					
4. Diagnosis and management of allergic diseases in adults and children	Anaphylaxis Urticaria / Angiooedema Drug allergy Anaesthetic reactions Food allergy Respiratory allergy Venom hypersensitivity					
5. Laboratory Diagnosis of Lymphoproliferative disease and myelomatosis	Myelomatosis and paraproteinaemias B-Cell malignancies T-Cell malignancies Rare disorders					

I confirm that experience has been acquired	DATE
Educational supervisor's signature for Year 1:	
Educational supervisor's signature for Year 2:	
Educational supervisor's signature for Year 3:	
Educational supervisor's signature for Year 4:	
Educational supervisor's signature for Year 5:	

3. CUMULATIVE EXPERIENCE IN PRACTICAL PROCEDURES

Category	Key to experience: All trainees are required to become fully competent by the end of Year 5. Grade 1 - 3 (see appendix A)	Year 1	Year 2	Year 3	Year 4	Year 5
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Practical procedures	<ul style="list-style-type: none"> • Administration of. Immunoglobulin (IV) • Administration of. Immunoglobulin (SC) • Lung function tests: performance and interpretation • Skin prick testing • Imaging • Patch Tests • Skin biopsies • Protocol for systematic investigation of anaphylaxis • Protocol for emergency management of anaphylaxis in adults and children • Management of home therapy programmes 					
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I confirm that experience has been acquired	DATE
Educational supervisor's signature for Year 1:	
Educational supervisor's signature for Year 2:	
Educational supervisor's signature for Year 3:	
Educational supervisor's signature for Year 4:	
Educational supervisor's signature for Year 5:	

4. CUMULATIVE LABORATORY EXPERIENCE

Category	Key to experience: All trainees are required to become fully competent in categories 1-7 by the end of Year 5. Grade 1 - 3 (see Appendix section 9)	Year 1	Year 2	Year 3	Year 4	Year 5
1. IMMUNO-CHEMISTRY / SEROLOGY	<ul style="list-style-type: none"> • Immunoglobulins • Total and specific IgE • Mast cell tryptase • ECP • Autoantibodies • ANCA • Precipitins • Paraprotein assessment • Cryoglobulin assessment • Complement components/activation products • Mannose binding lectin • Functional complement activity • C1 inhibitor concentration/activity • Specific anti-microbial antibodies 					
2. IMMUNO-HISTOLOGY	<ul style="list-style-type: none"> • Skin • Renal • techniques 					
3. CELLULAR STUDIES	<ul style="list-style-type: none"> • Cell markers/sub-populations (immunodeficiency, reactive, neoplastic states) • Lymphocyte function, i.e. activation • Neutrophil function • <i>In-vitro</i> / <i>in vivo</i> cytokine production • Intracellular signalling 					

4.MOLECULAR STUDIES	Southern/western/northern/blotting PCR Ig/T cell receptor gene rearrangement HLA typing					
5.Quality assurance	Internal and external quality assurance					
6. Laboratory safety	Biological safety Health and safety at work COSHH					
7. Laboratory management	Management Accreditation					

I confirm that experience has been acquired	DATE
Educational supervisor's signature for Year 1:	
Educational supervisor's signature for Year 2:	
Educational supervisor's signature for Year 3:	
Educational supervisor's signature for Year 4:	
Educational supervisor's signature for Year 5:	

5. RECORD OF ALLERGY CLINICS ATTENDED

Date	No. pts seen	Practical procedures performed ¹	S/I ²

¹ Briefly list all practical procedures which you personally performed (include procedures such as skin testing, challenge, following of diagnostic protocols, issue of allergen avoidance advice, etc. as listed in cumulative list of practical procedures). Each procedure need only be listed once.

³ Supervised or independent

6. RECORD OF ADULT AND PAEDIATRIC IMMUNODEFICIENCY CLINICS ATTENDED

Date	No. pts seen	Practical procedures performed ¹	S/I ²

¹ Briefly list all categories of patients that you have seen and diagnostic and therapeutic procedures that you have performed

²Supervised or independent

7. IMMUNODEFICIENCY - SUMMARY OF COMPETENCE

I certify that I have assessed this trainee through direct observation and critique of technique and management, and that he/she is competent to perform the following procedures without supervision:

Procedure	Supervisor's name	Signature	Date	Year of training
Clinical assessment of patients with suspected Primary Immunodeficiency				
Clinical assessment of patients with suspected secondary immunodeficiency (including HIV infection)				
Selection and interpretation of laboratory investigations				
Management of Primary Immunodeficiency				
Management of patients with HIV infection				
Selection and interpretation of ancillary investigations (eg lung function tests, CT scan of chest etc.)				
Assessment and interpretation of specific antibody responses				
Functional analysis of complement components				

Cell surface and cytoplasmic markers in immunodeficiency diagnosis				
Lymphocyte function tests				
Granulocyte function tests				
Management of IVIG therapy				
Management prophylaxis of infections in the immunosuppressed patient				

N.B. More than one educational supervisor may have taught you these procedures. Obtain the signature of the relevant supervisor in each case.

Signature of trainee:	NTN:
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8. RECORD OF ADDITIONAL CLINICS ATTENDED

Up to three months in each speciality during GPT/HST ;

Date	Speciality	No. pts seen	Types of patients seen	S/I ¹
	Rheumatology			
	Haematology			
	Transplantation			
	Bone marrow Transplantation centre			
	Nephrology			

	Infectious diseases			
	Dermatology			
	Respiratory Medicine			
	Other - please specify			

¹Supervised or independent

N.B. More than one educational supervisor may have supervised these clinics.

Obtain the signature of the relevant supervisor in each case.

Signature of trainee:	NTN:
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APPENDIX C

Core curriculum of Laboratory Immunology Assays of which knowledge is essential

1. Quantification of Immunoglobulins i.e. IgG, IgA, IgM, IgD, IgG subclasses, IgE and fragments (light and heavy chains) in serum and other body fluids e.g. urine & CSF
2. Immunochemical Procedures: Trainees should be familiar with procedures for: (a) isolating and purifying serum protein fractions by gel filtration (exclusion chromatography) and purifying antibodies by specific immunoadsorption and elution using solubilized antigens; (b) labelling relevant proteins by fluorescent dyes, enzymes, radioactive tracers, etc. (c) fractionating proteins by salting out and chromatographic methods
3. Methods for measuring specific IgG and IgE antibodies i.e. functional antibodies (tetanus, H influenzae and Pneumococcus), precipitins (avian, aspergillus), anti-venom and other allergen specific antibodies
4. Detection and quantification of Paraproteins (monoclonal immunoglobulins)
5. Detection and quantification of Cryoglobulins
6. Detection and quantification of acute phase proteins
7. Detection and quantification of other relevant proteins and molecules e.g. Beta 2 microglobulin, Tryptase, Histamine
8. Fluid phase Immunoprecipitation e.g. nephelometry and turbidimetry,
9. Radioimmunoassay (RIA)
10. Fluoroenzyme immunoassay (FIA)
11. Investigation of Complement activation pathways (classical and alternate), individual components and products resulting from complement activation
12. C3 nephritic factor and other complement component autoantibodies
13. Detection of auto antibodies including gastric parietal cell and related autoantibodies to smooth muscle, mitochondria, LKM, intrinsic factor, ANA and related rheumatic and connective tissue disease associated autoantibodies Rheumatoid factor, dsDNA, ENA, ANCA, MPO, PR3 and GBM antibodies, Antiphospholipid antibodies, Antidesmosome and epidermal basement membrane antibodies, Thyroid, pancreatic islet cell, adrenal, ovarian, sperm, acetylcholine receptor and other anti-neuroendocrine or exocrine specific antibodies
14. Serological methods for the diagnosis of Coeliac disease
15. Histopathology Procedures: Trainees must have knowledge of basic histology and be familiar with immunopathological changes seen in patients with immunologically mediated diseases (i.e., auto-immunity, hypersensitivity, lymphoid malignancy), affecting the kidney, bone-marrow, skin, blood vessels and the lymphoid system
16. Assessment of Neutrophil function: Neutrophil phagocytosis, respiratory burst and killing capacity e.g. using fluorochrome activation by flow cytometry, chemiluminescence Candidal /S. aureus killing, NBT reduction, chemotaxis studies
17. Methods for determination of clonality of lymphocytes by Ig and TcR gene rearrangement; studies
18. The preparative isolation of mononuclear cells using density gradient and magnetic bead separation techniques
19. Assessment of lymphocyte function by determining proliferation after stimulation with mitogens and antigens including allo-MHC; investigation of cytokine synthesis and secretion profiles and effector function characterisation e.g. analysis of Th1 and Th2 profiles HLA typing by serological (Lymphocytotoxicity) and molecular genetic methods; PCR Sequence Specific Primer/Oligonucleotide (SSP/SSO)
20. Procedures used in Molecular Biology:
 - Theoretical knowledge of procedures used in gene cloning and the basic principles of gene cloning including preparation of DNA, use of vectors, screening of gene libraries and the potential use of products resulting from gene cloning, for diagnostic tests in the Clinical Immunology Laboratory.

- Preparation and storage of DNA from peripheral blood cells.
- Knowledge of digestion of DNA by restriction enzymes for the examination of restriction fragment length polymorphisms (RFLP) for genetic analyses.
- Knowledge of the technique of Southern blotting, the preparation of probes for RFLP analyses, Polymerase Chain Reaction, Northern Blotting, extraction of the probe from plasmids and the isotopic or enzymatic labelling of probes.
- The application of molecular methods for the detection of gene defects causing primary immunodeficiency

21. HLA typing by serological (Lymphocytotoxicity) and molecular genetic methods; PCR Sequence Specific Primer/Oligonucleotide (SSP/SSO).

APPENDIX D

Core curriculum of Laboratory Immunology Procedures and Methodologies for which competent performance is essential

- 1) Gel Immunoprecipitation, simple and electrodiffusion, single or double diffusion in one or two dimensions / phases e.g. radial immunodiffusion and Countercurrent Immunoelectrophoresis.
- 2) Protein Electrophoretic separation ± immunoprecipitation e.g. Serum /Urine protein electrophoresis, capillary-zone electrophoresis, immunofixation, isoelectric focusing,
- 3) Enzyme linked immunosorbant assay (ELISA)
- 4) Haemolytic complement assays fluid and gel based
- 5) Direct and indirect immunofluorescence for autoantibodies indicated in Appendix E,
- 6) Passive particle agglutination,
- 7) Western (Immuno) blotting utilising patient serum probes
- 8) Assessment of Neutrophil function: Respiratory burst and killing capacity e.g. Fluorochrome activation by flow cytometry ; NBT reduction / chemotaxis studies
- 9) The enumeration of the major and minor lymphoid populations employing flow cytometric techniques of phenotyping and sorting.
- 10) The preparative isolation of lymphocytes and subsequent assessment of functional responses to stimulation with mitogens

APPENDIX E

Fundamental Immunology and its Applications

Principles of body defence

Cell injury/death and inflammation

Non-specific defence mechanisms (barriers/humoral/cellular)

Specific defence mechanisms (humoral/cellular)

Complement

Genetics, structure, function, control in defence and in disease

Deficiencies

The acute phase response and inflammation

Cells of myelomonocytic lineage, NK cells and non-specific defence

Ontogeny, structure, phenotype, function and activation

Chemokines and migration from the blood vasculature

Complement and Fc receptors, adhesion molecules

Phagocytosis, intracellular/extracellular killing

Respiratory burst and secretory products.

The basis of specific immunity

Antigens: types, structures, processing and presentation

Immunogenetics: polymorphisms, generation of diversity and rearranging gene families

Immunoglobulins: structure, function and antigen binding

Major Histocompatibility Complexes: structure, function and regulation

T cell receptors: structure, function and antigen binding
T and B Lymphocytes
Ontogeny, phenotype, subpopulations
Receptor/ligand interactions and cell activation
Effector functions
Organisation of the Lymphoid system
Primary and secondary Lymphoid organs
Population dynamics
Lymphocyte migration
Mucosal and other compartments of the Lymphoid system
Cytokines, chemokines and immunomodulators
Cytokines and Chemokines: origin, structure, effect, site(s) of action (receptor), metabolism, regulation and gene activation
Inflammatory mediators (e.g. leukotrienes, prostaglandins and platelet-activating factor): origin, structure, effect, site(s) of action (receptor), metabolism and regulation
Hypersensitivity mechanisms
IgE-mediated: acute and late phase reactions
IgE-, IgA-, and IgM-mediated: opsonization, complement fixation, antibody dependent, cell-mediated cytotoxicity, stimulation and blocking
Immune complex mediated: physicochemical properties and clearance
Cell-mediated: participating cells, effector mechanisms and granuloma formation
Other: natural killer cells; Lymphokine-activated killer cells and cutaneous basophil hypersensitivity
Immunoregulation
Tolerance: clonal selection, suppression and antigen paralysis
Cell-cell interactions: help and suppression
Idiotypic networks: inhibition and stimulation
Mechanisms of autoimmunity
Transplantation immunology
Histocompatibility: major and minor antigens and principles of cross matching
Graft rejection: mechanisms
Graft-versus-host reactions and their mechanisms
Tumour immunology
Tumour markers: leukaemias and lymphomas; cancer immunology
Oncogenes: translocation and breakpoints
Clinical aspects of immune disorders induced by drugs

APPENDIX F

ADDITIONAL ACTIVITIES DURING HIGHER MEDICAL TRAINING

- 1. Advanced life support**
- 2. Courses / study leave**
- 3. Teaching commitments**
- 4. Research**
- 5. Publications**
- 6. Audit**
- 7. Generic skills form**

Sections 1 - 6 should be updated serially throughout the course of training

ADDITIONAL ACTIVITIES (1): Advanced life support

SHEET.....OF.....

Attendances at advanced life support training sessions should be listed serially here.
Appropriate attendance certificates (or copies) should be appended.

Date(s)	Course name	Instructor(s)	Location

Signature of trainee:	NTN:
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RESEARCH SUPERVISION REPORT

Project No:

Trainee to complete BEFORE commencement of project:

Name of trainee:	NTN
Title of project:	
Area of research (e.g. laboratory-based, survey etc.):	
Grant support (if appropriate):	
Full-time/part-time (if P/T indicate weekly sessional commitment)	Date of commencement:

Research Supervisor to agree to undertake supervision of the project BEFORE commencement:

Name of research supervisor:	Signature of research supervisor:
Unit/department:	Date:

Outcome (e.g. thesis submitted/awarded, journal publication/poster presentation):

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Research Supervisor's comments on COMPLETION of project

Signature:	Date:

Signature of trainee:	NTN:	Year of training (please circle) 1 2 3 4 5 6
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ADDITIONAL ACTIVITIES (5): PUBLICATIONS

SHEET NO.....OF.....

Record here all published work of any nature.
Where possible append copies of these publications.

Author(s)	Title	Reference	Type

Name of trainee:	Signature of trainee:	NTN:
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GENERIC SKILLS

Trainees should assess their skills and experience, with input from their educational supervisors, for each post/attachment.

Grade 1 – 3 as in Appendix, A

	Trainee's assessment	Educational supervisor/other Consultant to endorse with signature or comment	Date
CLINICAL			
History taking and case presentation			
Clinical examination			
COMMUNICATION and ATTITUDES			
Verbal communication with patients, relatives, staff and others			
Written casenotes, letters and reports			
SUPERVISION OF JUNIOR STAFF			
Supervision of junior staff			
COMPUTING AND USE OF LIBRARY			
Wordprocessing Databases Graphics Statistical tests			
Use of library and film technology			
ETHICAL AND LEGAL ISSUES			
Ethical issues affecting patients, families and communities			
Legal procedures associated with patient care, e.g. data protection, death certification			

Name of trainee:	Signature of trainee:	NTN:
Signature of educational supervisor:		Date
Date of post/clinical attachment: From _____ To _____		
Year of training (please circle)	1	2
	3	4
	5	6

Trainees should assess their skills and experience, with input from their educational supervisors, for each post/attachment.

Grade 1 - 3 as in Appendix, A

	Trainee's assessment	Educational supervisor/other Consultant to endorse with signature or comment	Date
MANAGEMENT AND ADMINISTRATION			
NHS organisation			
Quality control			
Prescribing			
Health and safety			
AUDIT			
Appreciation of value of audit			
Awareness of different Methods of undertaking clinical audit			
RESEARCH			
Ability to undertake a literature search			
Understanding of the basic principles of research methodology			
Ability to evaluate a research report			
Understanding of the process of seeking approval from an Ethics Committee			

Name of trainee:	Signature of trainee:	NTN:
Signature of educational supervisor:		Date
Date of post/clinical attachment: From _____ To _____		
Year of training (please circle) 1 2 3 4 5 6		