

# Immunology

## **i Description of the specialty and clinical needs of patients**

The clinical practice of immunology, as defined by the World Health Organisation (WHO), encompasses clinical and laboratory activity dealing with the study, diagnosis and management of patients with diseases resulting from disordered immunological mechanisms, and conditions in which immunological manipulations form an important part of therapy.<sup>1</sup> In the UK, the practice of immunology largely conforms to this WHO definition with immunologists providing combined clinical and laboratory services for patients with immunodeficiency, autoimmune disease, systemic vasculitis and allergy.

Patients with immunologically mediated diseases comprise a diverse group who present to a variety of medical specialties. Within this group, patients with primary immunodeficiency disorders (PID) have particular clinical needs given the relative rarity of their chronic conditions and the attendant diagnostic delay, with the need for complex therapy and lifelong immunological follow up. Such patients require access to a specialist clinical immunology service for optimal care. Patients with autoimmune disease, systemic vasculitis and serious allergy require access to the relevant organ-based specialty working in partnership with a high quality immunology laboratory to ensure prompt diagnosis and optimal management of their condition.

Allergy has recently been recognised as a specialty in its own right. Historically, in view of the immunological principles underlying allergic disease and the patchy development of allergy services, many immunologists established, and continue to provide, a significant allergy service including desensitisation therapy. There are insufficient specialist allergists in the NHS at present.

## **ii Organisation of the service and patterns of referral**

Clinical immunology has evolved over the past two decades from a laboratory base to a combined clinical and laboratory specialty. A typical immunology service is based in a teaching hospital and led by a consultant immunologist, and comprises a mixture of clinical and laboratory staff. The clinical team will include specialist registrars (SpRs) in immunology and immunology nurse specialists, while the laboratory team is comprised of biomedical and clinical scientists.

The advent of laboratory accreditation has led many district general hospitals (DGHs) to seek formal consultant immunology input into their diagnostic immunology services. In many instances laboratory duties are combined with clinical work. In some parts of the country, this arrangement has enabled the development of a clinical network linking the regional immunology service to surrounding DGHs, thus ensuring wider delivery of clinical immunology services.

The majority of referrals to immunologists involve patients with suspected immune deficiency, severe allergy, systemic autoimmune disease and vasculitis. Referrals emanate from colleagues in both hospital and primary care.

### iii Working with patients: patient-centred care

#### *Patient choice and involving patients in decisions about their care*

Patients with immunodeficiency disorders have a lifelong need for specialist immunological care. As their primary physician, immunologists work in close partnership with colleagues from other disciplines to ensure that their patient's complex multisystem complications are managed optimally across disciplines.

#### *Access to information, patient support groups and the role of the expert patient*

The Primary Immunodeficiency Association (PIA) and other patient groups provide a vital source of educational and pastoral support for patients. Both adult and paediatric immunologists serve on the medical advisory panel of the PIA and play an important educational and advisory role in raising awareness of immunodeficiencies among the wider medical profession and policy makers. Immunologists are also actively involved in patient education by making regular presentations to regional and national patient meetings and contributing to patient newsletters.

The concept of the expert patient is particularly apposite to patients with primary immunodeficiency who have a lifetime's experience of the problems associated with defective immunity. The active solicitation of patients' views on the quality of the clinical service afforded to immunodeficient patients is a requirement for accreditation of immunodeficiency services by the United Kingdom Primary Immunodeficiency Network (UKPIN), a multidisciplinary organisation comprising clinicians, nurses and scientists. Regular meetings between UKPIN and the PIA patient body about matters of mutual interest – ranging from the supply of therapeutic immunoglobulin, relative risk of variant Creutzfeld-Jakob disease from blood products and research into PID – ensure that patients' views are well represented in both medical and industrial forums.

### iv Interspecialty and interdisciplinary liaison

Immunologists work as members of multidisciplinary teams (MDTs) that include nurse specialists. Nurse specialists in immunology play a leading role in all aspects of immunoglobulin infusion, from supervision of hospital clinics to the training and supervision of patients who undertake self-infusion of immunoglobulin as part of the home therapy programme. In many centres, immunology nurse specialists undertake skin testing for allergy and train patients with life-threatening allergic disease in the use of self-injectable adrenaline. Some immunology nurse specialists have completed the extended prescribing course for nurses and have gone on to set up autonomous clinics for the diagnosis and management of allergic diseases.

Several other complementary services including radiology and cellular pathology are essential for the efficient delivery of a good immunology service. Multidisciplinary meetings provide education and improved liaison for patient care. A comprehensive diagnostic immunology laboratory underpins the diagnosis of all immunological disease.

Considering the propensity of antibody deficient patients to develop complications involving multiple organ systems, immunologists must liaise closely with colleagues in a range of specialties including respiratory medicine, ear nose and throat (ENT) surgery, haematology, ophthalmology and gastroenterology. Access to specialist microbiology and virology laboratories is vital for the early detection and optimal management of the infectious complications of immunodeficiency.

**v Delivering a high quality service**

A high quality clinical immunology service will be well staffed (medical, scientific, nursing and secretarial), well resourced and consultant led. It must be supported by an accredited immunology laboratory providing a full repertoire of investigations encompassing immunochemistry, auto-immunity, allergy, and cellular and molecular immunology.

**vi Quality standards and measures of the quality of specialist services**

The Department of Health (DH) has recently published specialist definitions for clinical immunology (definition number 16) and laboratory immunology (included in definition number 25 pertaining to specialised pathology services), which provide a benchmark for the practice of immunology.<sup>2,3</sup> The quality of the laboratory immunology service has been underpinned by Clinical Pathology Accreditation UK (CPA) since 1993. Enrolment with CPA was made a mandatory requirement by the DH for all laboratory disciplines including immunology in 2003.

The process of accreditation of clinical immunology services for immunodeficiency through a system of peer review by UKPIN is actively underway. Participation in both clinical and laboratory accreditation ensures that immunology services comply with current standards of clinical governance. UKPIN fulfils an important educational role in the development of guidelines on the diagnosis and management of immunodeficiencies ([www.pinguidelines.org.uk](http://www.pinguidelines.org.uk)). The Network also develops the immunodeficiency register and works closely with governmental agencies involved in the provision of therapeutic agents for patient care.

**CLINICAL WORK AND/OR LABORATORY WORK OF CONSULTANTS IN IMMUNOLOGY****Contributions made to acute medicine**

Most immunologists do not participate in the on-take rota for unselected medical emergencies.

**Direct clinical care**

The clinical work of consultant immunologists is largely outpatient based, with the following broad work patterns:

- Immunologists are solely responsible for patients with primary immunodeficiencies (antibody deficiency, combined T and B cell deficiency, complement deficiency and phagocytic defects).
- Stem cell transplantation is increasingly being considered for young adults and children with primary immune deficiencies. The long-term follow up of these patients is an expanding area of work for immunologists.
- In centres without dedicated allergists, consultant immunologists are responsible for patients with severe allergic disease (food allergy, drug allergy, venom allergy, anaphylaxis).
- In most centres, consultant immunologists perform joint clinics with paediatricians to care for children with immunodeficiencies and allergy.
- Many immunologists have an interest in connective tissue disease and perform joint clinics with rheumatologists for patients with autoimmune rheumatic disease and systemic vasculitis.

- Immunoglobulin infusion clinics for patients with antibody deficiency form an integral part of the clinical workload of consultant immunologists. A recent audit of primary antibody deficiency in the UK and discussions within the specialty suggest that a single consultant should be responsible for a maximum of 50 patients with antibody deficiency in order to deliver optimum care.<sup>4</sup> With the increasing recognition of intravenous immunoglobulin as a therapeutic immunomodulator, these infusion clinics have expanded in some centres to include non-antibody deficient patients, for example inflammatory neuropathies.

*Outpatient work, including day cases*

- primary immunodeficiency clinics
- severe allergic disease clinics
- combined clinics with paediatricians for children with immunodeficiency and allergy
- combined clinics with rheumatologists
- immunoglobulin infusion clinics for antibody replacement and therapeutic immunomodulation.

The complexity of clinical referrals requires that assessment of patients at the first consultation is given sufficient time, which limits the number of patients that can be seen in a single outpatient session. A consultant immunologist working alone will typically see 5–10 patients (new and follow up) in a single session, depending on the complexity of the patients' problems. A consultant should be responsible for a maximum of 50 patients with antibody deficiency in order to deliver optimum care.<sup>4</sup>

*Laboratory immunology*

Consultant immunologists are responsible for directing diagnostic immunology services and perform a wide range of duties including clinical liaison, interpretation and validation of results, quality assurance, assay development, and supervision of biomedical and clinical scientists and SpRs. Some consultants perform a limited amount of 'hands on' laboratory work.

In view of the work pressures on immunologists, CPA guidelines stipulate that a single consultant immunologist should not support more than two laboratories outside their base hospital at any one time and the weekly off-site commitment to these should not be more than two programmed activities (PAs) (including travelling time).

The nature of on-call duties in immunology only rarely warrants the out-of-hours attendance of consultant immunologists. However, it is essential that an on-call specialist immunology service is available for discussion of clinical problems and emergency laboratory investigations. The frequency of on-call duties for consultant immunologists will be determined by the number of colleagues in a centre. Where possible, an on-call rota with a frequency of one in two or one in three is recommended although it is recognised that single-handed consultants will have difficulty with this arrangement. In such cases, the possibility of forming a consortium with colleagues in adjacent regions to provide an acceptable level of cover should be explored.

### **Work to maintain and improve the quality of care**

#### *Leadership role and development of the service*

Immunologists are proactive in embracing service developments and developing initiatives that deliver improved patient care. Training patients to use home immunoglobulin therapy via intravenous or subcutaneous routes is evidence of this. Home intravenous immunoglobulin (IVIg) therapy, initially developed for patients with primary antibody deficiency, has now been extended in some centres to patients with autoimmune neuropathies in whom it is used for maintenance immunomodulatory therapy.

In the laboratory, immunologists take a lead role in the assessment of new diagnostic tests for immunological diseases, followed, if appropriate, by their introduction into routine clinical practice.

#### *Education and training, clinical governance and management duties*

Immunologists are actively involved in a range of duties which are essential to the maintenance of high standards of clinical practice. These include education and training of SpRs, laboratory scientists and nurses; continuing medical education (CME); clinical governance; local management; and national work for the Royal Colleges of Physicians and Pathologists and specialist immunological societies (the British Society of Immunology (BSI), the British Society for Allergy and Clinical Immunology (BSACI) and UKPIN). With the development of a competency-based curriculum in immunology, it is envisaged that a consultant will need to devote one weekly PA to teaching and training activities.

#### *Research – clinical studies and basic science*

The direct relevance of immunology to much of clinical medicine and its strong scientific foundations provides ample opportunities for clinical studies of new immunomodulatory therapies, the recognition of new diseases (as shown by recent descriptions of new forms of severe combined immunodeficiency and type I cytokine deficiency) and translational research. Despite their heavy NHS commitments, many immunologists are actively involved in clinical and laboratory studies at national and international levels.

## ACADEMIC MEDICINE

The few full-time academic immunologists make a proportionately greater contribution to research whilst shouldering a significant clinical workload for the NHS, as detailed in the preceding paragraphs. With the disappearance of many university immunology departments and recent medical school expansion, consultant immunologists have major undergraduate and postgraduate teaching commitments.

## WORKFORCE REQUIREMENTS FOR IMMUNOLOGY

Currently, 49 consultant immunologists serve the entire population of England and Wales.

Limited data are available on the workload of immunologists, who are based mainly in teaching hospitals. Increasing awareness of immunological diseases, coupled with the need to provide specialist

advice and direction to immunology laboratories, including those in larger DGHs, has placed a traditionally understaffed specialty with many single-handed consultants under great strain.

An estimate of the number of consultant immunologists required in England and Wales is based upon the recent workload survey undertaken by the Royal College of Pathologists, the College Census and extensive consultation within the specialty.<sup>5,6</sup> The RCPATH survey showed that immunologists worked a median of 57 hours a week (14.4 PAs) while the Census showed that an individual immunologist worked 23.8 hours in excess of his or her contractual obligation performing the various activities detailed above.

Workforce requirements have been calculated on the basis that most immunologists are based in teaching hospitals, and the population served by existing consultant immunologists is 38.9 million.

Since there is insufficient data on immunology workload at a DGH level, it is not possible to calculate workforce requirements for a population of 250,000. Instead, the projected estimates are based on the assumption that each consultant will not be expected to exceed his or her contractual obligation of 10 PAs and no consultant will have to practise single-handedly (currently 19% of consultant immunologists work single-handedly).

On this basis, it is estimated that 114 WTE consultants in immunology are required to serve the population of England and Wales (53.4 million). This translates into one consultant immunologist per 513,400 of the population compared to the existing provision of one per 1.1 million of the population. This is 0.49 WTE for 250,000 population, which is an expansion of 128%. This estimate is approximately in line with the DH's own recent estimate of consultant requirements in immunology. Consultant numbers will need to expand by 5.5% per annum over the next 10 years to achieve this figure.

## CONSULTANT WORK PROGRAMME/SPECIMEN JOB PLAN

<b>Activity</b>	<b>Workload</b>	<b>Programmed activities (PAs)</b>
<b>Direct clinical care</b>		
Outpatient clinics	5–10 patients per clinic	<b>3–4</b>
New patients	3–4 patients per clinic	
Follow-up patients	6–8 patients per clinic	
IVlg infusion	6–10 patients per clinic	
Ward consultation and telephone advice		<b>0.5</b>
Allergy, including desensitisation immunotherapy		<b>1</b>
<b>Laboratory work</b>		
Clinical liaison, interpretation of results		<b>3–4</b>
Quality assurance		
Assay development		
Hands on laboratory work		
Supervision of DGH immunology laboratories		
<b>Total laboratory work</b>		
<b>Total number of direct clinical care PAs</b>		<b>7.5 on average</b>
<b>Supporting professional activities (SPA)</b>		
Work to maintain and improve the quality of healthcare	Education and training, appraisal, departmental management and service development, audit and clinical governance, CPD and revalidation, research	<b>2.5 on average</b>
<b>Other NHS responsibilities</b>	eg medical director/clinical director/lead consultant in specialty/clinical tutor	<b>Local agreement with trust</b>
<b>External duties</b>	eg work for deaneries/Royal Colleges/specialist societies/Department of Health or other government bodies etc	<b>Local agreement with trust</b>

## References

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