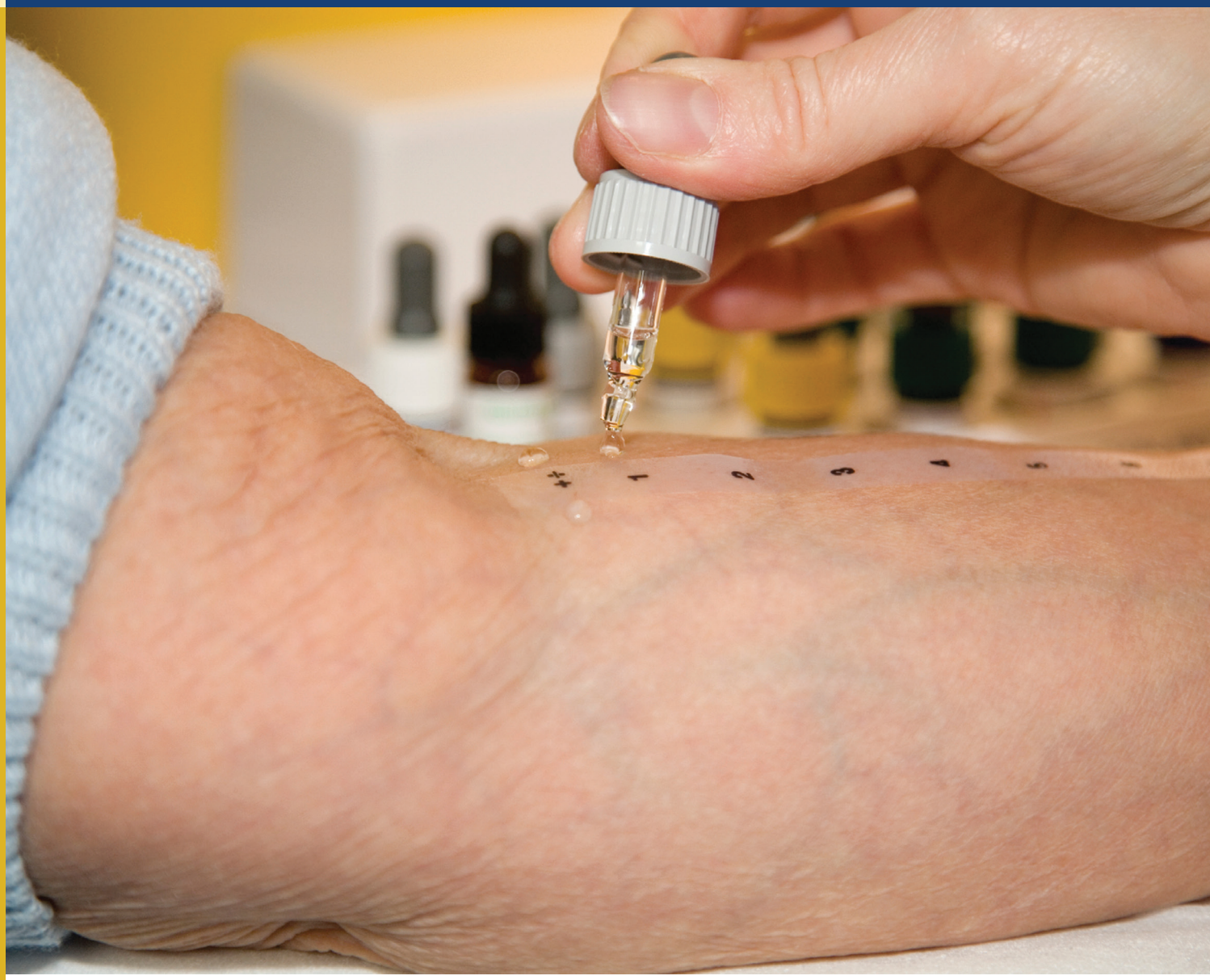
The Royal Australasian College of Physicians

Clinical Immunology and Allergy

Advanced Training Curriculum

Adult Medicine Division

Paediatrics & Child Health Division



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australasian society of clinical immunology and allergy

The Royal Australasian College of Physicians

Physician Readiness for Expert Practice (PREP) Training Program

Clinical Immunology and Allergy Advanced Training Curriculum

TO BE USED IN CONJUNCTION WITH:

Basic Training Curriculum – Adult Internal Medicine

Basic Training Curriculum – Paediatrics & Child Health

Professional Qualities Curriculum

ACKNOWLEDGEMENTS

The Royal Australasian College of Physicians (RACP) Fellows, trainees, and staff have contributed to the development of this document.

The College specifically thanks those Fellows and trainees who have generously contributed to the development of this curriculum, through critical comments drawn from their knowledge, experience and the donation of their time and professional expertise.

The following Fellows and trainees, in particular, deserve specific mention for their contribution:

- Dr Stephen Adelstein, FRACP, FRCPA
- A/Prof Matthew Cook, FRACP, FRCPA
- A/Prof David Fulcher, FRACP FRCPA
- Prof Bradley Frankum, FRACP
- Dr Robert Heddle, FRACP, FRCPA
- Dr Tiffany Hughes, FRACP, FRCPA
- Dr Fredrick Lee
- Prof Dominic Mallon, FRACP, FRCPA
- Dr Sam Mehr, FRACP
- Dr Karen Morwood, FRACP
- A/Prof Mimi Tang, FRACP, FRCPA
- Dr Melanie Wong, FRACP, FRCPA
- Dr Richard Wong, FRACP, FRCPA

The RACP gratefully acknowledges the contribution of the Australasian Society of Clinical Immunology and Allergy to the development of this curriculum.

The process was managed by the Curriculum Development Unit within the College's Education Deanery, who designed this document, drafted content material, organised and facilitated writing workshops, developed resource materials, and formatted the final document.

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1st edition 2010 (revised 2013).

Please note: No Domains, Themes or Learning Objectives have been updated for this edition; design changes ONLY.

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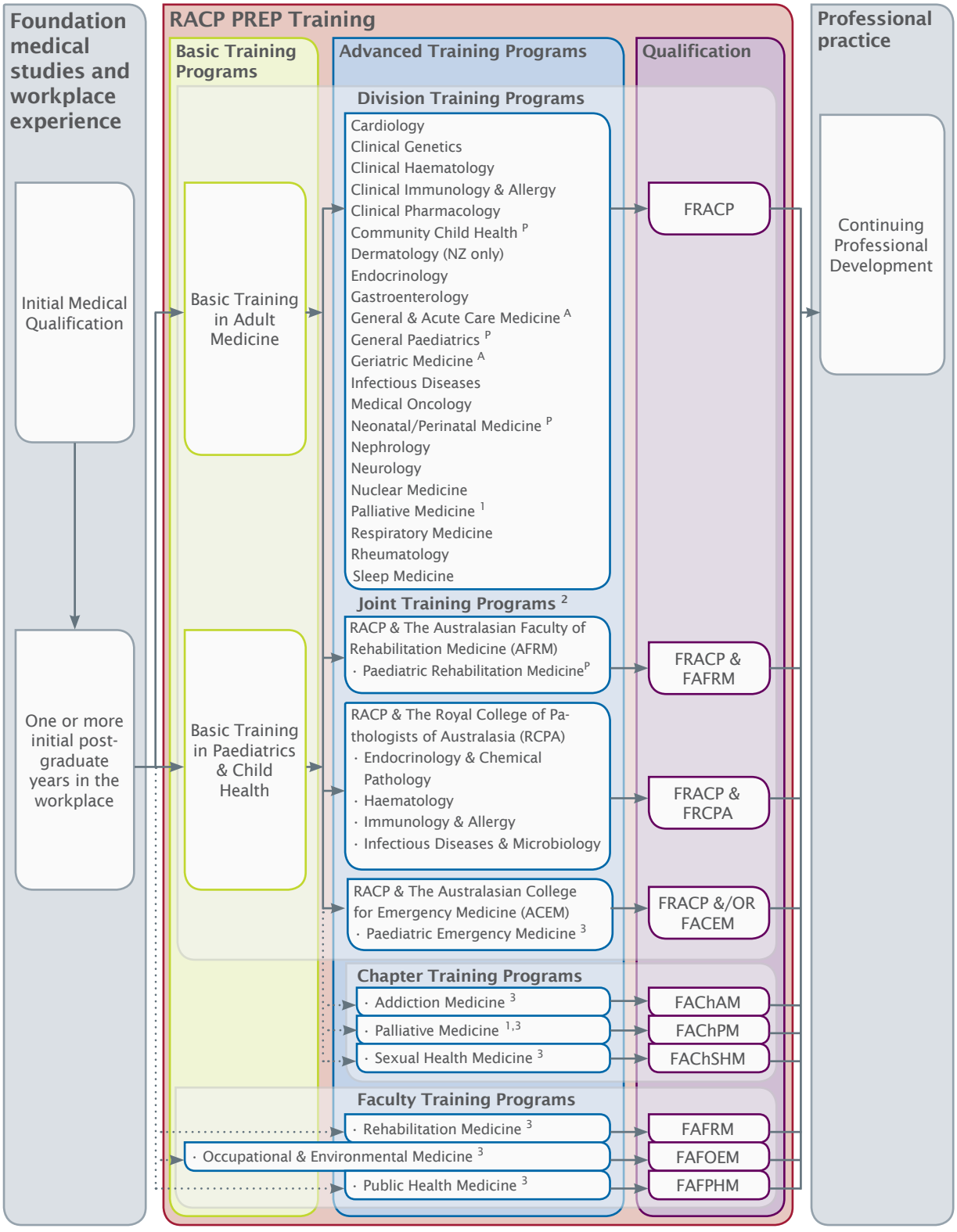
RACP FELLOWSHIP TRAINING PATHWAYS AND THE CONTINUUM OF LEARNING



P Trainees must complete Basic Training in Paediatrics & Child Health to enter this program.
A Trainees must complete Basic Training in Adult Medicine to enter this program.
1 Trainees who have entered Advanced Training in Palliative Medicine via a RACP Basic Training Program will be awarded FRACP upon completion and may subsequently be awarded FAChPM. Trainees who have NOT entered Advanced Training in Palliative Medicine via a RACP Basic Training Program will only be awarded FAChPM upon completion.
2 The Child & Adolescent Psychiatry Joint Training Program with the Royal Australian and New Zealand College of Psychiatrists (RANZCP) is currently under review by the RACP and RANZCP and closed to new entrants at present.
3 Alternative entry requirements exist for these training programs; please see the corresponding PREP Program Requirements Handbook for further information.

NB1: This diagram only depicts training programs that lead to Fellowship. Please see the RACP website for additional RACP training programs.
NB2: For further information on any of the above listed training programs, please see the corresponding PREP Program Requirements Handbook.

OVERVIEW OF THE SPECIALTY

Clinical immunology and allergy physicians care for patients with a diverse range of disorders of the immune system. These fall into three major categories:

- allergic disorders
- immune deficiency disorders
- autoimmune diseases

The casemix for each practitioner varies according to whether the practitioner sees adult patients or children, whether the practitioner works in the community or in tertiary teaching hospitals, and according to the traditional referral patterns within their geographical location.

The diversity of clinical immunology and allergy means that it is a horizontally rather than vertically defined discipline. As such, many patients are referred with ill defined disorders for which immunological conditions such as immunodeficiency, autoimmunity and allergy form but part of the differential diagnosis. Whilst it is not appropriate to list many of these presentations in the specific curriculum, trainees will encounter and be expected to learn to deal with such patients with skill and compassion.

Clinical immunology and allergy

The location and orientation of practices are as diverse as the specialty. Employment varies from full-time hospital/ university practice through to full-time private practice. Allergy and primary immunodeficiency are major components of many practices; participation in immunopathology varies greatly as does involvement in systemic and organ specific autoimmunity; and acquired immunodeficiency with these latter fields overlapping enormously with other specialties.

Paediatric clinical immunology and allergy

Paediatric clinical immunology and allergy physicians within Australia are smaller in number than their colleagues in adult medicine. The majority of practitioners in this area have trained under the Specialist Adivsory Committee (SAC) in general paediatrics before or while training in immunology and allergy. Relatively few have trained under the Joint Specialist Advisory Commitee (JSAC), and fewer still have trained in immunopathology. Employment is again diverse. Allergy is a major component of most practices, involvement in primary immunodeficiency varies. These practitioners will see relatively few children with chronic systemic autoimmune or inflammatory disorders, or children with HIV, as these are rare conditions in childhood in Australia and New Zealand and referral patterns overlap with those of paediatric rheumatologists and infectious diseases physicians. This group will also include practitioners who have a specific interest in vaccine immunology.

All consultants within the specialty will require a working knowledge of the natural history of immune disorders across the life span. Many practitioners, especially in areas with severe shortages of consultants, see children and adults. There is an obligation upon all practitioners to recognise and practise within their limits of competence.

More clinical immunology and allergy physicians are required to care for the rising numbers of patients with immunological disorders.

Trainees who choose this diverse and challenging subspecialty are guaranteed to be busy.

There has been a substantial rise in prevalence of disorders of immune regulation (most notably allergic, inflammatory and autoimmune disorders) and of acquired immunodeficiency diseases in the last 30 years of the 20th century. The impact of this rise is already being felt in paediatrics, and will inevitably flow through to adult practice. This will require our subspecialty to adapt to the increasing number of patients that require specialist care.

Although accurate manpower statistics for the subspecialty are not available at the present time, rising waiting times for new appointments for immunologists and allergists suggest a significant shortage of practitioners in this subspecialty.

CURRICULUM OVERVIEW

Clinical Immunology and Allergy – Advanced Training Curriculum

This curriculum is to be used in conjunction with the Professional Qualities Curriculum (PQC) which outlines the broad concepts, related learning objectives; associated theoretical knowledge, clinical skills, attitudes and behaviours required and commonly used by clinical immunology and allergy physicians within Australia and New Zealand.

The purpose of Advanced Training is for trainees to build on the cognitive and practical skills acquired during Basic Training. At the completion of the Clinical Immunology and Allergy Advanced Training Program, trainees should be competent to provide at consultant level, unsupervised comprehensive medical care in clinical immunology and allergy.

Attaining competency in all aspects of this curriculum is expected to take three years of training. It is expected that all teaching, learning and assessment associated with the Clinical Immunology and Allergy Curriculum will be undertaken within the context of the physician's everyday clinical practice and will accommodate discipline-specific contexts and practices. As such it will need to be implemented within the reality of current workplace and workforce issues and the needs of health service provision.

There may be learning objectives that overlap with or could easily relate to other domains. However, to avoid repetition, these learning objectives have been assigned to only one area. In practice, it is anticipated that within the teaching/learning environment, the progression of each objective would be explored.

Note: The curricula should always be read in conjunction with the relevant College Training Handbook available on the College website.

Professional Qualities Curriculum

The PQC outlines the range of concepts and specific learning objectives required by, and used by, all physicians, regardless of their specialty or area of expertise. It spans both the Basic and Advanced Training Programs and is also used as a key component of the CPD program.

Together with the various Basic and Advanced Training curricula, the PQC integrates and fully encompasses the diagnostic, clinical, and educative-based aspects of the physician's/paediatrician's daily practice.

Each of the concepts and objectives within the PQC will be taught, learnt, and assessed within the context of everyday clinical practice. Thus, it is important, that they be aligned with, and fully integrated into, the learning objectives within this curriculum.

EXPECTED OUTCOMES AT THE COMPLETION OF TRAINING

Graduates from this training program will be equipped to function effectively within current and emerging professional, medical, and societal contexts. At the completion of the Advanced Training Program in Clinical Immunology and Allergy, as defined by this curriculum, it is expected that a new Fellow will have developed the clinical skills and have acquired the theoretical knowledge for competent clinical immunology and allergy practice.

The following generic skills will be developed by the trainee and applied to the assessment and care of patients with suspected immunological disorders:

- take a relevant history and competently perform a clinical examination
- formulate a differential diagnosis
- request appropriate diagnostic tests
- explain the details of diagnosis, natural history and outcome of immunological disorders and the required therapeutic measures to clinical colleagues, patients, and their carers
- develop management plans, including education about triggering or exacerbating factors, specific treatment, disease prevention and longer term management
- communicate effectively with patients, their families and working colleagues
- work effectively within a multidisciplinary team to plan the optimal long-term management of patients
- evaluate and use available evidence to solve difficult diagnostic and management problems
- recognise the limitations of their own expertise and refer patients appropriately.

Related generic skills include the ability of the trainee to:

- access available disease registries and be able to use them
- maintain involvement in a CPD program
- advise patients of patient support organisations and how to access them.

In addition, this training program will ensure that trainees are:

- knowledgeable and competent in the diagnosis and management of common immunological and allergic diseases
- skilled in quality assurance activities, such as clinical audit
- advocates for, and responsible managers of, the available health care resources
- continuing to learn about new developments in this rapidly expanding field
- able to impart their knowledge to all levels of society
- honest, compassionate and display the highest standards of personal and interpersonal professional behaviours.

Teaching and learning methods

The teaching and learning methods within this document cater for the range of adult learning styles, situations, and processes likely to be experienced within the majority of professional environments.
A range of core teaching and learning strategies is presented in the following list.

1. lectures
2. tutorials and seminars
3. demonstrations/observation
4. task performance/practice/observation
5. assignments/projects
6. research, including audits
7. conferences/workshops
8. journal clubs
9. clinics/tailored clinical experiences
10. ward rounds
11. grand rounds
12. committee/multidisciplinary team meetings
13. mentoring
14. coaching
15. simulations – computer/virtual reality
16. interactive multimedia, including audio/video conferencing
17. role play exercises
18. critical incident analysis
19. case studies
20. online mediated/tutor monitored discussion groups

CURRICULUM THEMES AND LEARNING OBJECTIVES

Each of the curriculum documents has been developed using a common format, thereby ensuring a degree of consistency and approach across the spectrum of training.

Domains

The domains are the broad fields which group common or related areas of learning.

Themes

The themes identify and link more specific aspects of learning into logical or related groups.

Learning Objectives

The learning objectives outline the specific requirements of learning. They provide a focus for identifying and detailing the required knowledge, skills, and attitudes. They also provide a context for specifying assessment standards and criteria as well as providing a context for identifying a range of teaching and learning strategies.

DOMAIN 1	FOUNDATIONS OF CLINICAL IMMUNOLOGY AND ALLERGY
Theme 1.1	Fundamental Immunology
Learning Objectives	
1.1.1	Explain the organisation and mechanisms of the immune system
1.1.2	Describe the immunological mechanisms of disease
1.1.3	Describe the pathophysiology of autoimmune and autoinflammatory diseases
1.1.4	Describe the pathophysiology and genetics of immunodeficiency diseases
1.1.5	Describe the pathophysiology and cell biology of allergic disease
DOMAIN 2	**INVESTIGATIONS AND MANAGEMENT**
Theme 2.1	Investigations and Therapy
Learning Objectives	
2.1.1	Diagnose and manage immunodeficiency disorders and autoimmune and allergic diseases
2.1.2	Interpret common immunopathology tests
2.1.3	Explain the principles of immune-based therapeutics
2.1.4	Explain the pharmacological and therapeutic management of patients with immune, inflammatory and allergic disease, including immunosuppressive therapy and the use of biologic agents
2.1.5	Prescribe immunoglobulin and manage patients undergoing this therapy
2.1.6	Prescribe and manage vaccines and active and passive immunisation
2.1.7	Describe the assessment of potential donor-recipient pairs of solid organ or bone marrow transplants (BMT)
DOMAIN 3	**DISEASES AND DISORDERS**
Theme 3.1	Immunodeficiency
Learning Objectives	
3.1.1	Assess and manage primary immunodeficiency diseases (PIDs), including inherited disorders of immune regulation
3.1.2	Describe the assessment and management of acquired immunodeficiency
3.1.3	Describe the assessment and management of HIV infection

Theme 3.2	Autoimmune and Autoinflammatory disease
Learning Objectives	
3.2.1	Assess and manage autoimmune systemic diseases
3.2.2	Assess and manage vasculitis
3.2.3	Assess and manage systemic autoinflammatory diseases and related disorders
3.2.4	Diagnose and manage organ-specific autoimmune and inflammatory disease as part of a clinical team
Theme 3.3	Allergy
Learning Objectives	
3.3.1	Assess and manage rhinitis and related conditions
3.3.2	Assess and manage allergic conjunctivitis and related conditions
3.3.3	Assess and manage asthma and related conditions
3.3.4	Assess and manage atopic eczema/dermatitis and related conditions
3.3.5	Assess and manage urticaria and related conditions
3.3.6	Assess, manage, and prevent anaphylaxis
3.3.7	Assess, manage, and prevent adverse reactions to drugs, latex, and immunisations
3.3.8	Assess, manage, and prevent adverse reactions to foods
3.3.9	Explain the principles of primary prevention
3.3.10	Assess, manage, and prevent adverse reactions to stinging or biting insects
3.3.11	Assess and manage systemic mast cell disorders
Theme 3.4	Clonal Disorders
Learning Objectives	
3.4.1	Assess and manage systemic disorders as part of a multidisciplinary team

DOMAIN 1	FOUNDATIONS OF CLINICAL IMMUNOLOGY AND ALLERGY
Theme 1.1	Fundamental Immunology
Learning Objective 1.1.1	Explain the organisation and mechanisms of the immune system

Knowledge

Evolution and development:

- selective pressure on immune system during evolution
- principles of immune organ development (progenitor cells and molecular regulators)

Structure and organisation of the immune system:

- location, structure, and basic development of primary and secondary lymphoid organs.
- thymus, bone marrow, lymph nodes (LNs), spleen (white pulp), Peyer's patches, colonic patches, mucosa-associated lymphoid tissue (MALT), including tonsils etc
- organisation of secondary lymphoid organs – primary and secondary follicles, T zones, principles of lymphocyte traffic in LNs
- lymphocyte circulation in the body – anatomy and signals, including cellular adhesion and chemokines

Cellular components of the immune system:

- cells with recombinant receptors for antigen:
  - ontogeny and distribution of T- and B-cells
  - antigenic markers of cell subsets at different stages of ontogeny
- cells with germline receptors for antigen - phagocytes, atypical lymphocytes, and dendritic cells

Antigen receptors – signal one:

- molecular mechanisms of V(D)J recombination
- molecular mechanisms of somatic hypermutation
- class switch recombination
- toll-like receptors, dectins, and leucine rich repeats
- antigen-presentation to T-cells – antigen processing and presentation and human leukocyte antigen (HLA) molecules

Accessory signals – signal two:

- B7 family
- tumour necrosis factor receptor (TNFR) superfamily
- cytokine receptor families
- adhesion molecules
- complement

Cell signalling:

- proximal signalling after T-cell receptor or B-cell receptor ligation – smac organisation and constituents

DOMAIN 1	FOUNDATIONS OF CLINICAL IMMUNOLOGY AND ALLERGY
Theme 1.1	Fundamental Immunology
Learning Objective 1.1.1	Explain the organisation and mechanisms of the immune system

Knowledge

Cell signalling:

- Toll like receptors signalling via myeloid differentiation primary response gene 88 (MyD88) and nuclear factor kappa-light-chain-enhancer of activated B-cells (NF-kB)
- principles of cytokine signalling via janus kinase (JAK) and signal transducers and activators of transcription (STATs)

DOMAIN 1	FOUNDATIONS OF CLINICAL IMMUNOLOGY AND ALLERGY
Theme 1.1	Fundamental Immunology
Learning Objective 1.1.1	Explain the organisation and mechanisms of the immune system

Tolerance:

- central tolerance in the thymus and bone marrow – clonal deletion, anergy, and receptor editing
- two-signal models of peripheral tolerance
- dominant tolerance by regulatory T-cells – FoxP3+ T-cells and other regulatory T-cells

Immunological memory:

- B-cell differentiation in germinal centres, including affinity maturation
- memory B-cells (phenotype and location)
- plasma cells – long-lived and short-lived
- T-cell memory subsets – Th1, Th2, Th17, Tfh

Effector mechanisms:

- cytotoxicity
- antibody function
- complement
- polymorphonuclear cell recruitment and action
- mast cell mediators
- acute phase response
- fibrosis.

Teaching and Learning Methods

1, 2, 5, 6, 7, 8, 14, 16, 20

DOMAIN 1	FOUNDATIONS OF CLINICAL IMMUNOLOGY AND ALLERGY
Theme 1.1	Fundamental Immunology
Learning Objective 1.1.2	Describe the immunological mechanisms of disease

Knowledge

- explain the immunological mechanisms of disease including:

Hypersensitivity responses – Type I:

- cells of the allergic reaction – mast cells, basophils, and eosinophils
- generation and regulation of Th2 responses
- cytokines/chemokines relevant in allergic responses
- immunoglobulin E (IgE) and receptor interactions
- IgE-mediated acute-phase and late-phase reactions

Biology of Allergens:

- allergens

Hypersensitivity responses – types II – IV:

- antibody-mediated cytotoxicity responses
- immune complexes – immunologic properties and mechanisms of clearance
- cell mediated immunity; types IV a,b,c,d

Transplantation immunology:

- allograft rejection
- graft vs. host reactions
- maintenance of tolerance

Tumour immunology:

- tumour specific and tumour associated antigens
- oncogenes, translocations and tumour suppressor genes
- immune surveillance

Immune response to infections:

- intestinal parasites
- extracellular bacteria
- viruses
- intracellular bacteria – mycobacteria
- protozoa

DOMAIN 1	FOUNDATIONS OF CLINICAL IMMUNOLOGY AND ALLERGY
Theme 1.1	Fundamental Immunology
Learning Objective 1.1.2	Describe the immunological mechanisms of disease

Biology of HIV:

- HIV life cycle – entry, latency and mechanisms of replication
- describe the differences between HIV-1 subtypes M, O and N, and HIV-2, and the resulting implications on diagnostic and monitoring testing strategies
- pathogenesis of HIV-induced immunodeficiency.

Teaching and Learning Methods

1, 2, 5, 6, 7, 8, 14, 16, 20

DOMAIN 1	FOUNDATIONS OF CLINICAL IMMUNOLOGY AND ALLERGY
Theme 1.1	Fundamental Immunology
Learning Objective 1.1.3	Describe the pathophysiology of autoimmune and autoinflammatory diseases

Diseases and Disorders	Knowledge

• autoimmune systemic disorders
• vasculitis
• systemic autoinflammatory and related disorders
• organ specific autoimmune disease as part of a clinical team
• immune mediated reno-pulmonary syndromes.
	• describe the following for common autoimmune diseases:
	  • pathophysiology, including the cell biology and molecular basis of autoimmune diseases
	  • pathogenic mechanisms underlying autoimmune diseases and features
	  • clinical presentations and features
	  • natural history
	  • genetic contributors
	  • environmental contributors
	  • epidemiology.

Teaching and Learning Methods

1, 2, 5, 6, 7, 8, 14, 16, 20

DOMAIN 1	FOUNDATIONS OF CLINICAL IMMUNOLOGY AND ALLERGY
Theme 1.1	Fundamental Immunology
Learning Objective 1.1.4	Describe the pathophysiology and genetics of immunodeficiency diseases

Diseases and Disorders	Knowledge

• the major PID as in the International Union of Immunological Societies (IUIS)*
• combined T- and B-cell deficiencies
• predominant antibody deficiencies
• other well defined immunodeficiencies
• disorders of immune regulation:
  • defects of programmed cell death, e.g. autoimmune lymphoproliferative syndrome (ALPS)
  • defects of cytotoxicity, e.g. haemophagocytic syndromes
  • defects of regulatory T-cell signalling, e.g. deficiency of Foxp3
  • congenital defects of phagocyte number, function or both
  • defects of innate immunity
  • autoinflammatory disorders
  • complement deficiencies
Acquired immunodeficiency disorders, including those related to:
  • infections, including HIV infection and others
  • protein-losing conditions
  • nutrition and metabolic disorders
  • immunosuppression, malignancy and its therapies.
	• describe the following for common immunodeficiency diseases:
	  • pathophysiology, including the molecular basis and cell biology
	  • pathogenic mechanisms underlying immunodeficiency disease states
	  • clinical presentations and features
	  • natural history
	  • genetic contributors
	  • environmental contributors.

Teaching and Learning Methods
1, 2, 5, 6, 7, 8, 14, 16, 20

**Correct as of 2007. For full article details please refer to the reference list.*

DOMAIN 1	FOUNDATIONS OF CLINICAL IMMUNOLOGY AND ALLERGY
Theme 1.1	Fundamental Immunology
Learning Objective 1.1.5	Describe the pathophysiology and cell biology of allergic disease

Diseases and Disorders	Knowledge

Upper airway diseases:
• rhinitis
• sinusitis
• allergic fungal sinusitis
• nasal polyposis
• otitis – bacterial and serous
Lower respiratory tract diseases:
• wheezing disorders of early childhood
• exercise-induced asthma
• allergic asthma
• bronchopulmonary aspergillosis
• sulfite-related asthma
• aspirin-induced asthma
• occupational asthma
• infection-related asthma
• intrinsic asthma
• extrinsic allergic alveolitis
Allergic eye diseases:
• allergic conjunctivitis
• atopic and vernal keratoconjunctivitis
Dermatological diseases which have or may have an immunological basis:
• urticaria
• angioedema
• dermatographism
• atopic eczema/dermatitis
• contact dermatitis
• urticaria pigmentosa
• bullous diseases
	• describe the following for common allergic diseases:
	  • pathophysiology, including the molecular basis and cell biology
	  • clinical presentations and features
	  • natural history
	  • genetic contributors
	  • environmental contributors
	  • epidemiology
	• describe normal physiology of the upper and lower airways, skin and gastrointestinal (GI) tract
	• describe the biology of allergens and antigens
	• explain the pathological effects of allergic and other immunologic diseases on airway physiology
	• explain the pathogenic mechanisms underlying allergic diseases
	• recognise the cellular phenotypes of asthma
	• describe the pathophysiology of anaphylaxis and the common food, insect sting/bite and drug triggers
	• describe the role of genetics in immunological adverse drug reactions.

DOMAIN 1	FOUNDATIONS OF CLINICAL IMMUNOLOGY AND ALLERGY
Theme 1.1	Fundamental Immunology
Learning Objective 1.1.5	Describe the pathophysiology and cell biology of allergic disease

Dermatological diseases which have or may have an immunological basis:

- drug rashes
- erythema multiforme and toxic epidermal necrolysis
- erythema nodosum
- other immunologic skin diseases.

Anaphylaxis

Drug reactions.

Teaching and Learning Methods

1, 2, 5, 6, 7, 8, 11, 13, 16, 19

DOMAIN 2	INVESTIGATIONS AND MANAGEMENT
Theme 2.1	Investigations and Therapy
Learning Objective 2.1.1	Diagnose and manage immunodeficiency disorders and autoimmune and allergic diseases

Knowledge

- describe indications, limitations, costs, and availability of tests
- describe the principles of investigations, including:
  - in vitro tests for sIgE and sIgG
  - use of total IgE
  - tests of airway inflammation
  - rhinoscopy and bronchoscopy
  - tests for physical urticaria
  - skin and in vitro testing for autoantibodies
  - provocation testing of both upper and lower airways
  - imaging
- describe the use of immunisation as tests of immune competence
- select and monitor immune based therapies to treat immunological disorders.

Skills

- diagnose (including differential diagnosis), treat and monitor allergic diseases
- identify unproven or inappropriate methods of allergy testing used in the community
- diagnose (including differential diagnosis), treat and monitor immunodeficiency disorders and autoimmune diseases
- perform the following investigations:
  - skin prick and intradermal testing
  - spirometry
  - skin patch testing
  - elimination diets and food challenges
  - uncomplicated skin biopsy.

DOMAIN 2	INVESTIGATIONS AND MANAGEMENT
Theme 2.1	Investigations and Therapy
Learning Objective 2.1.2	Interpret common immunopathology tests*

Knowledge	Skills

• outline the variety of immunopathology tests, including their strengths, limitations, indications, contraindications, and complications
• describe the techniques used and their clinical interpretation
• advise on the use of common immunopathology tests for the assessment and/or monitoring of patients with the following suspected or known immunological diseases, including:
  • primary and secondary immunodeficiency
  • systemic, e.g. systemic lupus erythematosus and organ specific, e.g. autoimmune liver disease, autoimmune, and autoinflammatory diseases
  • systemic vasculitis
  • patients with possible allergic symptoms, including angioedema
  • describe the anticipated responses to polysaccharide and protein immunisations in healthy individuals, and how this contrasts to that in individuals with functional antibody deficiencies
  • describe the status of in vitro tests for drug allergy
  • describe the role of genetic tests for immunologically mediated conditions, e.g. coeliac disease and abacavir hypersensitivity.
	• assess when an immunopathology test is required
	• observe and interpret the results of the following:
	  • lymphocyte subset enumeration
	  • lymphocyte and neutrophil, functional assays, including cytokine release assays
	  • measurement of serum immunoglobulins (IgG/A/M) and IgG subclasses
	  • immunochemical complement assays C3/C4/C1 esterase inhibitor, C1q
	  • functional complement assays, including CH50 AH50, assays for mannose-binding lectin (MBL) pathway and functional C1 inhibitor
	  • serum, urine and cerebral spinal fluid protein electrophoresis and immunofixation, including quantitation of serum light chains
	  • antineuclear antibodies (ANA), anti-extractable nuclear antigens (ENA) and anti-double stranded DNA (dsDNA)
	  • anti-neutrophil cytoplasmic antibody (ANCA), including indirect immunofluorescence and enzyme linked immunosorbent assay (ELISA)
	  • antiphospholipid related antibodies, including lupus anticoagulant, anticardiolipin, and anti-beta2-glycoprotein
	  • 'organ specific' auto-antibodies, including antibodies to smooth muscle, mitochondria, gastric parietal cell, intrinsic factor, thyroid microsomes, thyroid receptor, adrenal gland, ovary, glomerular basement membrane, islet cell, glutamic acid decarboxylase and insulin, skin
	  • rheumatoid factor and cyclic citrullinated peptide (CCP) antibodies
	  • total SIgE and in-vitro allergen-specific IgE radioallergosorbent testing, including use of recombinant allergens
	  • mast cell tryptase
	• use immunisation with pneumococcal polysaccharide vaccine and protein vaccines, e.g. tetanus, diphtheria toxoids, to assess immune competence in patients with immunodeficiency.

DOMAIN 2	INVESTIGATIONS AND MANAGEMENT
Theme 2.1	Investigations and Therapy
Learning Objective 2.1.2	Interpret common immunopathology tests*
Teaching and Learning Methods	
1-14, 16, 19, 20	
** NB: This section is for trainees undertaking FRACP training. Joint trainees should refer to the immunopathology curriculum (www.rcpa.edu.au)*	

DOMAIN 2	INVESTIGATIONS AND MANAGEMENT
Theme 2.1	Investigations and Therapy
Learning Objective 2.1.3	Explain the principles of immune-based therapeutics

Knowledge

- describe the pharmacology and mechanisms of action of immune-based therapies, including the following:
  - immunosuppressive and immunomodulatory drugs, including:
    - steroids
    - azathioprine
    - cyclophosphamide
    - mycophenolate
    - calcineurin inhibitors
    - methotrexate
    - leflunomide
  - intravenous (IV) and subcutaneous immunoglobulin in replacement and immunomodulatory use
  - therapeutic monoclonal antibodies, cytokines, soluble receptors and other biological agents used for modulation of immune and inflammatory responses, e.g. tumour necrosis factor-alpha/interlunkin-1 antagonists, anti-CD20 monoclonal antibodies, etc
  - plasmapheresis
  - allergen specific immunotherapy
  - immunisation as prophylaxis against infectious and/or neoplastic disease
- describe the difference between T-cell dependent and independent responses to antigen and impact on disease spectrum, including age related issues.

Teaching and Learning Methods

1, 2, 5, 6, 7, 8, 11, 13, 16, 19

DOMAIN 2	INVESTIGATIONS AND MANAGEMENT
Theme 2.1	Investigations and Therapy
Learning Objective 2.1.4	Explain the pharmacological and therapeutic management of patients with immune, inflammatory and allergic disease, including immunosuppressive therapy and the use of biologic agents

Knowledge	Skills

• describe the following for the therapies listed below:
  • mechanisms of action
  • indications, including emerging indications and contraindications
  • pharmacology
  • therapeutic rationale
  • allergen preparations, e.g. recombinant allergens; the role of adjuvants in modifying the immune response
  • routes of administration; methods of delivery
  • potential risks, adverse effects, and methods for minimising.
Therapies:
• allergen-specific immunotherapy for allergic diseases; indications, contraindications, routes of immunisation, risks, allergen selection, design of immunotherapy regimes, precautions, management of adverse reactions and stopping points and management of anaphylaxis
• immunosuppressive and immunomodulatory drugs
• therapeutic monoclonal antibodies
• cytokines
• recombinant protein based therapies
• soluble receptors
• plasmapheresis
• immunoglobulin replacement and immunomodulatory therapy – refer to Learning Objective 2.1.5.
	• prescribe allergen specific immunotherapy when indicated
	• prescribe immunomodulatory therapies and plasmapheresis in autoimmune, inflammatory and PID conditions as indicated
	• prescribe individualised management plans for autoimmune and other inflammatory diseases using including corticosteroids and immunomodulatory drugs
	• prevent predictable adverse events of immunosuppressive therapy, including opportunistic infections and glucocorticoid induced osteoporosis
	• monitor, detect, report, and manage response and adverse events of therapy
	• manage IV access, including potential complications associated with intravascular access devices
	• counsel patients and families on the potential benefits, risks, and safety plans of therapies
	• explain the availability, cost of access, potential benefits vs. risks of gene therapy for immune deficiency disorders.

DOMAIN 2	INVESTIGATIONS AND MANAGEMENT
Theme 2.1	Investigations and Therapy
Learning Objective 2.1.5	Prescribe immunoglobulin and manage patients undergoing this therapy

Knowledge	Skills
• describe the indications for IV immunoglobulin (IVIG) and subcutaneous immunoglobulin (SCIG) replacement therapy for PID and systemic inflammatory disease (SID) • describe the indications for IV immunoglobulin (IVIG) therapy for immunomodulation • describe the collection and manufacturing process for immunoglobulin preparations and impact on efficacy and safety • describe the major components of IVIG and describe alternative preparations of immunoglobulin • explain IVIG's potential adverse effects • describe the practicalities of prescribing, administration and monitoring IVIG therapy, including compliance with formal guidelines.	• prescribe and arrange supply of IVIG according to current guidelines and limitations of issuing authorities – currently Australian Red Cross blood transfusion service • advise regarding timing of prophylactic immunisations relative to immunomodulatory therapies such as IVIG • discuss expectations of disease reversal or control with patients and their family • monitor efficacy of immunoglobulin infusions by clinical parameters, such as infections through symptoms and IgG levels.

DOMAIN 2	INVESTIGATIONS AND MANAGEMENT
Theme 2.1	Investigations and Therapy
Learning Objective 2.1.6	Prescribe and manage vaccines and active and passive immunisation

Knowledge	Skills

• describe the innate and adaptive immune responses to immunisations used in clinical practice, including:
  • live attenuated and non-live immunisations against infectious diseases
  • therapeutic immunisations against allergic disorders
  • therapeutic immunisations against malignant disorders
• describe the basis of protein conjugation to T-cell independent antigens to modify vaccine responsiveness
• describe the indications for immunisations to infectious diseases in high risk individuals, e.g. employees of health care facilities and travellers to high prevalence countries
• describe the current age specific immunisation schedules
• describe the infectious diseases that pose a risk, the immunisations available and their potential adverse reactions
• explain the principles, indications, contraindications, risks and benefits of immunisation against infectious agents and cancer in normal patients and those with primary or secondary immunosuppression or asplenia
• discuss prophylactic immunisation using evidence based data and opinion
• describe the use of specific immunoglobulin passive immunisation against infectious disease
• explain the use of allergen specific immunotherapy, refer Learning Objective 2.1.4.
	• prescribe and prepare appropriate allergen specific vaccines
	• prescribe when indicated appropriate 'catch up' vaccine schedules
	• advise on and prescribe immunisation against infectious agents in patients with primary or secondary immunosuppression, asplenia, and an increased risk of allergic reactions to vaccines
	• manage adverse reactions to immunisations and advise patients and their families in regards to future immunisation schedule
	• counsel patients and families regarding the benefits/risks of immunisation
	• discuss vaccines that are inappropriate or require to be given in special conditions according to the immunodeficiency or allergic condition.

DOMAIN 2	INVESTIGATIONS AND MANAGEMENT
Theme 2.1	Investigations and Therapy
Learning Objective 2.1.7	Describe the assessment of potential donor-recipient pairs of solid organ or bone marrow transplant (BMT)*
NOTE	The content in this learning objective table is core for joint trainees but rarely part of FRACP practice in Australia. It is expected that trainees have a basic knowledge of these areas but specific skills are necessary for those who will work in these areas

Knowledge

- recognise the Australian Bone Marrow Donor Registry (ABMDR) and international bone marrow donor registries
- recognise the Australian national network of umbilical cord blood banks and cord blood collection centres (AUSCORD) and international cord blood registries
- describe testing modalities available for the following:
  - HLA/major histocompatibility complex (MHC) typing
  - assessment of donor anti-recipient and recipient anti-donor reactivity
  - assessment of anti-HLA antibodies for bone marrow and solid organ transplantation
- define principles of immunosuppression and the agents/protocols used to prevent the rejection of transplanted tissues, and graft-vs.-host disease.
- describe the principles and indications of immune reconstitution following BMT and stem cell transplantation for immunodeficiency diseases
- advise on the conduct of donor searches, including immediate and extended family members
- use BMT co-ordinators and national/international bone marrow and cord blood donor registries
- explain how to assess anti-HLA antibodies in potential recipients of solid organ transplants, to help determine the risk of hyperacute rejection
- describe the management of potential recipients of solid organ transplants with established significant levels of anti-HLA antibodies
- identify potential risks involved in BMT donor/recipient pairs
- identify risks of donor anti-recipient and recipient anti-donor reactivity, including the ranking of potential donors
- advise on patients undergoing solid organ transplantation to minimise the probability of graft rejection
- outline the management principles for patients undergoing acute/chronic graft rejection
- advise on patients undergoing autologous or allogeneic bone marrow transplantation, including stem cell transplantation, to minimise the probability of graft vs. host disease and graft rejection, and/or manage patients experiencing graft-vs.-host disease.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.1	Immunodeficiency
Learning Objective 3.1.1	Assess and manage primary immunodeficiency diseases (PIDs), including inherited disorders of immune regulation

Knowledge	Skills
• recognise the age and ethnicity related differences in reference ranges • anticipate, detect, manage and where possible, prevent complications of immunological conditions • describe the defects of central tolerance induction, e.g. autoimmune polyendocrinopathy-candidiasis-ectodermal dystrophy • outline the Australasian PID database • describe the support organisations available for patients with PID.	• diagnose immunodeficiency states and inherited disorders of immune regulation • distinguish primary from acquired immunodeficiency diseases • interpret the results of genetic tests for these disorders • monitor and manage subjects with PID and disorders of immune regulation • anticipate likely infections and neoplasias according to the PID condition • instruct patients and families in use of prophylactic antibiotics and replacement immunoglobulin • explain early detection of infections and neoplasia and provide a management plan • advise on appropriate and inappropriate vaccines according to the PID advise regarding benefits and risks and prescribe as indicated reconstitutive therapy • enrol patients in the Australian PID database • recognise age related differences in infection susceptibility including the impact of transplacental IgG transfer and the effect of ageing on the immune system • distinguish between transient hypogammaglobulinaemia of infancy and primary immunodeficiency of childhood.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.1	Immunodeficiency
Learning Objective 3.1.2	Describe the assessment and management of acquired immunodeficiency

Knowledge

- explain the likely patterns/presentations assessment and management of immunodeficiency when present in patients following immunosuppression, haematological malignancy anti-tumour chemotherapy, bone marrow, or solid organ transplantation.

Teaching and Learning Methods

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.1	Immunodeficiency
Learning Objective 3.1.3	Describe the assessment and management of HIV infection
NOTE	It is expected that trainees have a basic knowledge of this area but specific skills are necessary for those who will work in these areas

Knowledge

- describe the differences between HIV-1 subtypes M, O and N, and HIV-2
- identify the principles of diagnosing HIV infection when present in patients presenting with clinical immunodeficiency states
- describe the therapy for HIV infection, including: indications for use, pharmacology, adverse drug reactions, and the role of resistance testing
- describe testing methodologies for establishing HIV infection, including indications, limitations, costs, and availability
- recognise the process of notification for new HIV diagnoses to public health
- describe testing methodologies for the monitoring of patients infected with HIV
- outline antiretroviral therapy, including the positive and negative aspects; when to start, drug interactions, prevention of short- and long-term toxicity, causes of treatment failure
- describe factors that influence patient compliance with antiretroviral therapy
- describe the social and psychological impact of HIV infection on patients and their families/companions, including the available support options
- describe the community support organisations available to provide advice and assistance to patients with HIV infection
- explain the prevention methods of HIV transmission, including mother to child transmission of HIV
- advise and/or provide pre and post test counselling for individuals suspected of exposure to HIV infection
- describe the principles of occupational and non-occupational post-exposure prophylaxis

DOMAIN 3	DISEASES AND DISORDERS
Theme 3.1	Immunodeficiency
Learning Objective 3.1.3	Describe the assessment and management of HIV infection
NOTE	It is expected that trainees have a basic knowledge of this area but specific skills are necessary for those who will work in these areas

Knowledge

- recognise diagnostic tests used for HIV infection, including testing during suspected seroconversion illness, and patients suspected being infected with HIV-1 subtypes O and N, and HIV-2
- recognise the role of resistance testing and R5/X4 tropism assays
- describe how to diagnose, manage, and prevent complications of advanced HIV, including appropriate prophylaxis against opportunistic infections and early diagnosis and treatment of likely infections and neoplasias and vascular and metabolic disorders
- describe the principles of management of hepatitis B and C, and HIV co-infected patients
- outline the palliative care of late disease.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.2	Autoimmune and Autoinflammatory Diseases
Learning Objective 3.2.1	Assess and manage autoimmune systemic diseases

Conditions include:

- systemic lupus erythematosus, including neonatal lupus syndrome
- Sjögren's syndrome
- mixed connective tissue disease
- dermatomyositis and polymyositis
- scleroderma
- primary Raynaud's disease
- anti-phospholipid antibody syndromes – primary and secondary
- undifferentiated connective tissue diseases
- IgG4 multi-organ lymphoproliferative syndrome.

Additional Conditions
NOTE: It is expected that trainees have a basic knowledge of the following area but specific skills are necessary for those who will work in those areas

DOMAIN 3	DISEASES AND DISORDERS
Theme 3.2	Autoimmune and Autoinflammatory Diseases
Learning Objective 3.2.1	Assess and manage autoimmune systemic diseases

Additional Conditions

NOTE: It is expected that trainees have a basic knowledge of the following area but specific skills are necessary for those who will work in those areas

- rheumatoid arthritis
- seronegative spondyloarthropathies:
  - ankylosing spondylitis
  - seronegative enthesopathy and arthropathy syndrome
  - Reiter's syndrome
  - arthritis and inflammatory bowel disease
  - psoriatic arthritis
  - juvenile idiopathic arthritis
  - Sjögren's syndrome.

Skills

- diagnose and monitor autoimmune systemic conditions, including:
  - laboratory results that pertain to rheumatic conditions, including ANA, ENA, rheumatoid factor, anti-citrullinated protein antibodies, lupus anticoagulant, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), ANCA, anti-phospholipid antibodies, immunoglobulins, complement, biopsies, and urinary sediment
  - imaging studies relevant to patients with systemic autoimmune disorders
  - investigations of respiratory function, including lung volumes and diffusing lung capacity output (DLCO) in patients with rheumatological disorders
- perform uncomplicated skin biopsies
- perform Schirmer's test.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.2	Autoimmune and Autoinflammatory Diseases
Learning Objective 3.2.2	Assess and manage vasculitis

Conditions include:

- small vessel vasculitis:
  - Henoch-Schonlein purpura
  - Wegener's granulomatosis
  - Goodpasture's syndrome
  - Churg-Strauss syndrome
  - microscopic polyangiitis
  - cryoglobulinaemia
  - leukocytoclastic and lymphocytic vasculitis confined to the skin
- medium vessel vasculitis:
  - polyarteritis nodosa
  - central nervous system vasculitis
- large vessel vasculitis:
  - Takayasu arteritis
  - Kawasaki syndrome
  - giant cell arteritis.

Skills

- diagnose and monitor systemic vasculitic conditions including interpretation of:
  - imaging studies relevant to patients with systemic vasculitides
  - tests of respiratory function, including lung volumes and DLCO
  - uncomplicated skin biopsies
- interpret laboratory results that pertain to systemic vasculitides, e.g ANA, ENA, dsDNA, ANCA, protein electrophoresis, cryoglobulins, rheumatoid factor, anti-CCP, ESR, CRP, anti-phospholipid antibodies, lupus anticoagulant, immunoglobulins, complement, biopsies, hepatitis and HIV serologies and urinary sediment.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.2	Autoimmune and Autoinflammatory Diseases
Learning Objective 3.2.3	Assess and manage systemic autoinflammatory diseases and related disorders

Conditions include:

- cyclical neutropenia
- familial Mediterranean fever
- tumour neucrosis alpha receptor associated peroidic syndrome (TRAPS)
- hyper-IgD
- periodic fever with aphthous stomatitis, pharyngitis, and adenitis syndrome
- Behcet's
- sarcoidosis
- chronic infantile neurological, cutaneous and articular/neonatal onset multisystem inflammatory disease syndrome
- Muckel-Wells syndrome
- chronic recurrent multi-focal osteomyelitis.

Skills

- diagnose and monitor systemic autoinflammatory and related disorders, including interpretation of:
  - laboratory results that pertain to the listed inflammatory disorders, e.g. ESR, CRP, serum angiotensin-converting enzyme (ACE), IgD, biopsies and genetic studies
  - imaging studies relevant to patients with systemic inflammatory disorders
  - tests of respiratory function, including lung volumes and DLCO
- treat and manage patients with these disorders.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.2	Autoimmune and Autoinflammatory Diseases
Learning Objective 3.2.4	Diagnose and manage organ-specific autoimmune and inflammatory disease as part of a clinical team
NOTE	It is expected that trainees have a basic knowledge of this area but specific skills are necessary for those who will work in these areas

Conditions include:

- autoimmune cutaneous disorders, including:
  - autoimmune bullous skin disorders
  - vitiligo
  - Sweet's syndrome
  - pyoderma gangrenosum
- autoimmune neurological disorders, including:
  - myasthenia gravis and related syndromes
  - Guillain-Barré syndrome
  - chronic idiopathic demyelinating polyneuropathy
  - multiple sclerosis
  - optic neuritis
  - paraneoplastic syndromes
- inflammatory eye disorders:
  - optic neuritis
  - iritis/uveitis
  - episcleritis
  - orbital myositis
- autoimmune haematological condition, including:
  - autoimmune neutropenia
  - autoimmune thrombocytopenia
  - autoimmune haemolytic anaemia
- autoimmune endocrinolgical disorders, including:
  - thyroid disease – Hashimoto's and Graves'
  - parathyroid disease – autoimmune hypoparathyroidism
  - adrenal disease – Addison's
  - ovarian failure
  - endocrinopathy syndromes – multiple endocrine neoplasia and polyglandular
- autoimmune gastroenterological disorders, including:
  - coeliac disease
  - pernicious anaemia
  - autoimmune hepatitis
  - primary biliary cirrhosis.

DOMAIN 3	DISEASES AND DISORDERS
Theme 3.2	Autoimmune and Autoinflammatory Diseases
Learning Objective 3.2.4	Diagnose and manage organ-specific autoimmune and inflammatory disease as part of a clinical team
NOTE	It is expected that trainees have a basic knowledge of this area but specific skills are necessary for those who will work in these areas

Skills

- diagnose the organ specific autoimmune condition, including:
  - laboratory results that pertain to the listed syndromes
  - imaging studies relevant to patients with organ-specific autoimmune diseases
- perform uncomplicated skin biopsies.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.3	Allergy
Learning Objective 3.3.1	Assess and manage rhinitis and related conditions

Knowledge	Skills
• explain the principles of therapy and monitoring of allergic respiratory disease and related conditions • describe the differential diagnoses of allergic nasal conditions • identify normal sino-nasal anatomy and changes associated with allergic or eosinophillic inflammation • describe inflammatory changes in chronic rhinosinusitis with and without nasal polyposis • describe the technique of nasal provocation and assessment • outline surgical therapies of the nasal airway.	• perform and interpret skin testing and in vitro sIgE for aeroallergens relating to respiratory allergic diseases • interpret upper airway imaging studies • perform or refer for rhinoscopy as appropriate • prescribe management plans, including environmental avoidance measures, pharmacotherapy and where indicated, allergen specific immunotherapy • use drug delivery devices.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.3	Allergy
Learning Objective 3.3.2	Assess and manage allergic conjunctivitis and related conditions

Skills

- perform skin and in vitro testing for sIgE to aeroallergens
- prescribe management plans, including environmental avoidance measures, pharmacotherapy, and, where indicated allergen-specific immunotherapy.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.3	Allergy
Learning Objective 3.3.3	Assess and manage asthma and related conditions

Knowledge

- explain the principles of therapy and monitoring of allergic respiratory disease and related conditions
- describe the differential diagnoses of allergic lower respiratory conditions
- explain wheezing disorders of early childhood
- recognise occupational asthma
- explain the mechanisms of aspirin sensitive airway disease.

Skills

- perform and interpret the following tests:
  - skin and in vitro testing for sIgE to aeroallergens
  - in vitro testing for sIgG and use of total IgE
- interpret airway imaging studies
- perform and interpret spirometry
- interpret sputum cytology for asthma
- prescribe management plans, including environmental avoidance measures, pharmacotherapy, and where indicated, allergen-specific immunotherapy
- assess, monitor, and manage patients, including:
  - reliever, preventer and symptom controller therapy
  - immunodulatory therapy
  - drug delivery devices
  - use of action plans
  - aspirin challenge testing and desensitisation
  - community and legislative aspects
  - knowledge of support groups.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.3	Allergy
Learning Objective 3.3.4	Assess and manage atopic eczema/dermatitis and related conditions

Knowledge	Skills

• explain the principles of diagnosis, differential diagnoses and assessment of atopic eczema and related conditions
• describe the indications, contraindications, potential beneficial and adverse effects of medical therapies, including:
  • topical glucocorticoids
  • topical and systemic calcineurin inhibitors
  • other immunosuppressive strategies
• describe immunological comorbidities that may exist in patients with atopic eczema
• identify community resources available to patients with atopic dermatitis
• describe the epidemiology of allergic disorders in childhood
• describe the risk factors for the development of allergic disorders.
	• identify triggers through appropriate use of the following tests:
	  • skin and in vitro testing for sIgE to aeroallergens and foods
	  • perform patch tests to foods
	  • dietary elimination and challenge studies
	• prescribe individualised management plans for patients with atopic eczema and related disorders, including:
	  • environmental avoidance measures
	  • general skin care
	  • topical +/- systemic pharmacotherapy
	  • where indicated, allergen specific immunotherapy
	• diagnose and manage any comorbidities
	• educate families on management and the community resources available
	• counsel parents at high risk of having children with allergies on strategies to reduce the risk of their child/children developing allergic diseases.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.3	Allergy
Learning Objective 3.3.5	Assess and manage urticaria and related conditions

Knowledge	Skills

• describe identifiable underlying causes of acute, recurrent and chronic urticaria and angioedema, physical urticarias and related conditions
• describe the mode of inheritance, complications, laboratory test abnormalities, and treatments available for hereditary angioedema
• describe systemic conditions which may present as urticaria/angioedema
  • vasculitic urticaria
  • familial cold urticaria (vasculitis)
  • systemic mast cell disorders.
	• perform provocative tests for physical urticarias
	• diagnose relevant allergic triggers using history and tests for allergen-specific IgE
	• perform skin biopsies
	• prescribe individualised management plans for patients with urticaria and angioedema, including:
	  • avoidance of exacerbating/precipitating factors
	  • pharmacotherapy, including:
	  • first line agents, such as antihistamines
	  • second line agents, including leukotriene receptor antagonists
	  • immunomodulatory strategies for refractory urticaria
	• diagnose hereditary angioedema when present in a patient presenting with oedema
	• interpret the results of laboratory tests pertaining to patients with hereditary angioedema, including complement levels, quantitative and functional assays of C1 esterase inhibitor
	• monitor the efficacy and adverse effects of treatments for hereditary angioedema
	• advise on the perioperative, peridental and obstetric management of patients with hereditary angioneurotic oedema
	• dental management of patients with hereditary angioedema.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.3	Allergy
Learning Objective 3.3.6	Assess, manage, and prevent anaphylaxis

Knowledge	Skills
• describe the common triggers of anaphylaxis • describe the co-factors, e.g. food and exercise, that may exacerbate anaphylaxis • describe the differential diagnoses of recurrent anaphylaxis • describe the mediators of diagnostic use in anaphylaxis • describe the drugs and dosages, postural and fluid replacement required to manage acute anaphylaxis • describe the tests available to identify triggers and co-factors involved in anaphylaxis • describe the indications, contraindications, risks, and precautions required to perform challenge procedures • describe the indications, contraindications, risks, and benefits of immunotherapy for anaphylaxis • describe the community resources required to prevent and manage acute anaphylaxis in the community • recognise food science, entomology, and drug metabolism as relevant to investigation of anaphylaxis.	• manage and investigate anaphylaxis • manage acute anaphylaxis • interpret serum tryptase • identify responsible triggering allergens, e.g. penicillin, latex, food and insect stings, and co-factors, e.g. heat and exercise, that precipitate each patient's anaphylaxis • counsel patient/patient's family on avoidance strategies • counsel patient/patient's family on recognition and acute management of anaphylaxis, including administration of injectable adrenaline and autoinjectors • liaise with schools/workplaces • use alert systems • prescribe and administer allergen immunotherapy where indicated.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.3	Allergy
Learning Objective 3.3.7	Assess, manage, and prevent adverse reactions to drugs, latex, and immunisations

Knowledge	Skills
• describe the clinical presentation of Gell and Coombs type I, II, III and IV a,b,c,d hypersensitivity to drugs, latex, and immunisations • describe the clinical presentation and natural history of syndromes that may relate to adverse drug reactions including anaphylaxis, a wide spectrum of rashes, phototoxicity, drug fever, 'serum sickness', toxic epidermal necrolysis and Steve-Johnson syndrome • describe the risk factors for and presentations of latex allergy • describe the clinical presentation and natural history of adverse reactions to aspirin and non-steroidal anti-inflammatory drugs • describe the diverse adverse reactions that may result from use of biological agents • advise on use or no-use of chemically related drugs • describe the testing for 'sensitivity' to potential anaphylactic/allergic reactivities to anaesthetic agents.	• diagnose type 1 adverse reactions to drugs • diagnose other severe, adverse drug reactions, including use and interpretation, of skin prick, intradermal, skin patch and in vitro testing for various type IV hypersensitivities • perform and manage challenge procedures when indicated using established protocols • diagnose, manage, and prevent latex allergy • distinguish between hypersensitivity and intolerance • minimise risks of re-exposure through use of alert systems, education, and when indicated, institution of latex free environments • de-label patients • perform desensitisation procedures, when indicated, using established protocols.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.3	Allergy
Learning Objective 3.3.8	Assess, manage, and prevent adverse reactions to foods

Knowledge	Skills

• describe immune mediated adverse reactions to foods, including:
  • IgE-mediated
  • partially IgE mediated, e.g. eosinophilic inflammatory GI disorders and atopic dermatitis
  • non-IgE mediated, e.g. type 4 reactions to food proteins in infants, coeliac disease
• describe the clinical presentation and natural history of intolerances to foods, additives, lactose, and other substances
• explain the basic concepts of food science as applicable to food allergies and intolerances
• describe the community and legislative matters relevant to managing food allergy
• identify the role of avoidance measures in the management of eosinophilic GI diseases
• describe the preparations available, modes of delivery, indications, and potential adverse effects of pharmacotherapies for eosinophilic GI diseases
• describe the basis of infant nutrition and feeding related immune adaptation, including the role of breast feeding and hypo-allergenic formulae
• describe cross-reactivity of sensitivity to particular foods and latex
• describe food pollen sensitivity syndromes.
	• distinguish between hypersensitivity and intolerance
	• perform skin and in vitro sIgE testing for type I hypersensitivity and provocative
	• perform food challenges, open, single and double blind, when appropriate, use established protocols and be able to evaluate evolving desensitisation procedures
	• institute dietary restrictions whilst ensuring adequate nutrition, especially in infancy
	• counsel patients on foods as hidden allergens
	• implement plans for management of food allergy in the community, including:
	  • action plans
	  • provision of adrenalin autoinjectors when appropriate
	  • school and travel plans
	• diagnose eosinophilic GI diseases on history and interpretation of results of investigations including biopsies obtained at GI endoscopy
	• interpret results of investigations to determine allergic triggers of eosinophilic GI diseases
	• manage patients diagnosed with eosinophilic GI diseases, including:
	  • avoidance strategies to assist in the diagnosis and management of eosinophilic GI diseases
	  • prescription of appropriate pharmacotherapy and monitoring of these interventions
	• counsel when inappropriate restrictions have been in place.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.3	Allergy
Learning Objective 3.3.9	Explain the principles of primary prevention

Knowledge	Skills
• describe the efficacy of interventions to reduce the risk of development of allergic disorders in children.	• counsel parents at high risk of having a child with allergies on strategies to reduce the risk of their child/children developing allergic diseases.

DOMAIN 3	DISEASES AND DISORDERS
Theme 3.3	Allergy
Learning Objective 3.3.10	Assess, manage, and prevent adverse reactions to stinging or biting insects

Knowledge	Skills
• describe the species of stinging and biting insects responsible for life-threatening hypersensitivity reactions in humans, including local relevance • describe the spectrum of adverse reactions to stinging and biting insects • describe the natural history of allergy to stinging insects without, during and after venom immunotherapy.	• diagnose type 1 adverse reactions to stinging and biting insects • prescribe and write anaphylaxis action plans incorporating, when appropriate, adrenaline autoinjectors • teach administration of adrenaline autoinjectors • prescribe and administer venom immunotherapy, where indicated; select and manage immunotherapy protocols appropriate to the clinical situation • advise patients of the risks/benefits of starting, continuing, withholding, or ceasing venom immunotherapy.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.3	Allergy
Learning Objective 3.3.11	Assess and manage systemic mast cell disorders

Knowledge	Skills

• describe the spectrum and prognosis of systemic mast cell disorders
• describe the common triggers of acute activation events in subjects with systemic mast cell disorders
• identify the complications of systemic mast cell disorders.
	• prescribe and monitor therapy for systemic mast cell disorders, including:
	  • symptomatic therapy
	  • when appropriate action plans incorporating adrenaline autoinjectors
	  • when appropriate, specific allergen immunotherapy, e.g. sting allergy
	  • recognise aggressive mast cell disease and refer for systemic suppressive therapy.

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DOMAIN 3	DISEASES AND DISORDERS
Theme 3.4	Clonal Disorders
Learning Objective 3.4.1	Assess and manage systemic disorders as part of a multidisciplinary team

Knowledge
• recognise and describe the following systemic disorders: **Plasma cells:** • disorders related to paraproteins: • plasmacytoma, multiple myeloma, monoclonal gammopathy of uncertain significance, scleromyxedema, light chain deposition disease, amyloidosis and neuropathy etc **B-cell disorders*** **T-cell disorders*** • *especially lymphoproliferative diseases associated with autoimmune manifestations, e.g. angioimmunoblastic T-cell lymphoma **Hypereosinophilia without defined cause:** • aggressive mast cell disorders – refer 3.3.11.

Teaching and Learning Methods
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REFERENCE LIST

Curriculum of the American Academy of Allergy, Asthma and Immunology

Curriculum of the Joint Committee of Higher Medical Training (UK) for Immunology

Curriculum of the Joint Committee of Higher Medical Training (UK) for Allergy

RECOMMENDED READING LIST/LEARNING RESOURCES

Basic Texts

Crowe S, Hoy J and Mills J (eds). Management of the HIV-infected patient. published by Martin Dunitz Ltd, London (last edition 2002)

Hoy J, Lewin S, Post JJ and Street A (eds). HIV Management in Australasia – a guide for clinical care. Published by ASHM. Latest edition 2009.
Free download from http://www.ashm.org.au/images/Publications/Monographs/HIV_Management_Australasia/HIV-Management-Australia-2009.pdf

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Rabson A, Roitt IM, Delves PJ. Really essential medical immunology. 2nd Edition. Blackwell Pub: Malden, Mass. 2005

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Detrick B, Hamilton RG, Folds JD, editors. Manual of molecular and clinical laboratory immunology. 7th ed. Washington DC: ASM Press; 2006.

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Leung DYM, Sampson HA, Geha RS, Szefler SJ, editors, Pediatric Allergy:Principles and Practice. Philadelphia: Mosby/Elsevier; 2003.

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For frequently updated information on HIV refer to online resources listed below

Journals	
Good reviews in clinical immunology and allergy can be found in the following journals.	
Nature Reviews Immunology	www.nature.com.au
New England Journal of Medicine	www.nejm.org
Current Opinion in Immunology	www.elsevier.com/wps/find/journaldescription.cws_home/601305/description?navopenmenu=-2
Trends in Immunology	www.immunology.trends.com
Journal of Allergy and Clinical Immunology	www.jacionline.org
Nature Clinical Practice Rheumatology	www.nature.com/nrrheum/index.html
Useful computer resources	
Australasian Society of Clinical Immunology and Allergy Homepage	www.allergy.org.au
American Academy of Allergy Asthma and Immunology Homepage	www.aaaai.org
ASHM publications	www.ashm.org.au/default2.asp?active_page_id=133
Australian Immunisation Handbook 9th edition	www.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook-home
Criteria for the Clinical Use of IV Immunoglobulin (IVIg) in Australia	www.nba.gov.au/ivig/index.html
RACP Homepage	www.racp.edu.au
RCPA Homepage	www.rcpa.edu.au
Australasian Society of HIV Medicine Homepage	www.ashm.org.au
AIDSinfo: U.S. Department of Health and Human Services (DHHS)	www.aidsinfo.nih.gov

ACRONYMS AND INITIALISMS

ABMDR	Australian Bone Marrow Donor Registry
ACE	angiotensin-converting enzyme
ALPS	autoimmune lymphoproliferative syndrome
ANA	antineuclear antibodies
ANCA	anti-neutrophil cytoplasmic antibody
AUSCORD	Australian national network of umbilical cord blood banks and cord blood collection centres
BMT	bone marrow transplant
CCP	cyclic citrullinated peptide
CRP	C-reactive protein
DLCO	diffusing lung capacity output
DsDNA	double stranded deoxyribonucleic acid
ELISA	enzyme linked immunosorbent assay
ENA	anti-extractable nuclear antigens
ESR	erythrocyte sedimentation rate
GI	gastrointestinal
IUIS	International Union of Immunological Societies
IgE	immunoglobulin E
IV	intravenous
IVIG	intravenous immunoglobulin
JAK	janus kinase
LN	lymph node
MALT	mucosa-associated lymphoid tissue
MBL	mannose-binding lectin
MDT	multidisciplinary team
MGUS	monoclonal gammopathy of uncertain significance
MHC	major histocompatibility complex
MyDD88	myeloid differentiation primary response gene 88
NF-kB	nuclear factor kappa-light-chain-enhancer of activated B-cells

ACRONYMS AND INITIALISMS

PID	primary immunodeficiency disease
SCIG	subcutaneous immunoglobulin
sIgE	serum immunoglobulin E
STAT	signal transducer and activator of transcription
TNFR	tumour necrosis factor receptor
TRAPS	tumour neucrosis alpha receptor associated peroidic syndrome