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**Hong Kong Society for Paediatric Immunology
and Infectious Diseases (HKSPIID)**

(Revised version 3)



**A proposal of training curriculum for Paediatric Subspecialty Training Programmes:
Paediatric Immunology and Infectious Diseases (PIID)**

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Source of document

We gratefully acknowledge the inputs from **Professor Andrew Cant** and various stakeholders. The current document is shaped largely by the influence of the following essential documents with the due considerations of our local setting and existing programmes.

Hong Kong College of Paediatricians

- Guidelines on the Criteria for the Accreditation of a Paediatric Subspecialty Training Programme

Royal College of Paediatrics and Child Health, United Kingdom

- A Framework of Competences for Level 3 Training in Paediatric Immunology, Infectious Diseases and Allergy, July 2006
- A Framework of Competences for Level 3 Training in Paediatric Rheumatology, July 2006

World Allergy Organization

Michael A. Kaliner, Sergio Del Giacco, Carlos D. Crisci, et al and WAO Specialty and Training Council Requirements for Physician Competences in Allergy: Key Clinical Competences Appropriate for the Care of Patients With Allergic or Immunologic Diseases: A Position Statement of the World Allergy Organization

ACGME Program Requirements for Graduate Medical Education in Allergy and Immunology, USA – Effective July 1, 2007

Journal

Fiona J Cooke, Prabha Choubina, Alison H Holmes. Postgraduate training in infectious diseases: investigating the current status in the international community. *Lancet Infect Dis* 2005; 5: 440–49

Preface (for the revised version)

Since we have rolled out the first draft in early 2009, we have gone through a consultative process with all the stakeholders. By doing so, we have facilitated the exchange of ideas and views among paediatricians, physicians and other specialists who have a shared vision of the development and accreditation of this subspecialty. We all share the dream of achieving excellence in the practice of Paediatric Immunology & Infectious Diseases (PIID) in Hong Kong. We are now able to consolidate our curriculum and effect some changes. We thus are grateful to all the invaluable input made by all the stakeholders.

We have incorporated most of the positive and constructive suggestions. The major change that has been made is we have separated out rheumatology training, and assigned it as an optional module instead of an obligatory module, since we also share the long-term view that Paediatric Rheumatology should be developed as a distinct subspecialty. This document shall provide a single authoritative curriculum for future trainees and trainers who are engaged in Paediatric Infectious Diseases, Immunology & Allergy in Hong Kong so as to pursue the development of this discipline for the benefit of patients with such diseases. It bears great resemblance with most of the existing training programmes in developed nations such as those in Europe. We hope to achieve subspecialty accreditation by the College, and thereby help in shaping future generations of paediatricians with the mind and heart to pursue evidence-based clinical practice and to develop research into the causes, mechanisms, assessment and management of these groups of diseases.

YL Lau

28 October 2009

Preface (for the first version)

We must know where we came from and where we are now, before we can embark on the next stage of our journey with a clear mind of where we should arrive at. Of course for now this is merely the next stage of a forever journey and one needs not to be so absolute in ideology to preclude due consideration to practicalities of our present environment.

Paediatrics as a discipline in Hong Kong started in earnest during the early 1960's when the Department of Paediatrics was established in the Queen Mary Hospital, with the corresponding academic department within the University of Hong Kong. In the next 5 decades, many more departments of paediatrics in large regional hospitals and another academic department of paediatrics in the Chinese University of Hong Kong came into being mirroring the rapid economic development of our society. In anticipation of the return of sovereignty in 1997, an Academy of Medicine with specialty Colleges was established in the early 1990's, charged with the statutory duty to ensure proper training and accreditation of paediatric specialists. With more than 10 years of experience now in both the College and the "One Country, Two Systems", as well as in anticipation of the establishment of the Centre of Excellence in Paediatrics in Hong Kong, there is without doubt that we should start the next stage of our journey in establishing paediatric subspecialty development, including paediatric immunology and infectious diseases.

Looking at our present environment of these 2 subspecialties development, they are both vibrant and thriving, with a young but extremely active and progressive professional society uniting these 2 subspecialties into an integrated discipline as well as a number of professors and consultants appointed in various institutions.

The spirit and philosophy that unite these 2 subspecialties is the scientific conceptual framework of how the immune system interacts with microbes and other environmental triggers including allergens and autoantigens, manifesting as diseases that we call infectious, allergic and autoimmune diseases respectively. The practical consideration that unites these 2 subspecialties is the realisation that the patients with these diseases overlap considerably in their presentations and indeed immunopathologies. This in turn leads to the recent development of many biological therapeutics for these diseases, which demand a thorough understanding of how our immune system interacts with the environment. It is based on this understanding of where we are now in terms of both scientific and practical consideration that our European colleagues have decided to integrate the subspecialty training of paediatric immunology and infectious diseases into one programme, which can better cater for the diversity of developmental stages of various European countries. With a population of 7 million in Hong Kong, we strongly believe this approach better suits our developmental stage

by allowing different emphasis in an overall integrated training curriculum in paediatric immunology and infectious diseases.

We are of the view that this stage of our journey will probably take many years before another major shift is required when there will be full integration of Hong Kong and mainland Chinese paediatric training and practice at the end of the 50 years of the One Country, Two Systems. With open-mindedness, dedication and care we shall create a future secure for our next generation of subspecialists and patients which is the centre of this training programme.

YL Lau

12 January 2009

Introduction

The programme of General Paediatrics has been steered by the College since its inception in 1991 with remarkable success. Now the College is entering a new era and facilitating subspecialty groups to accomplish subspecialty accreditation.

We as a subspecialty group under the auspice of HKSPIID envisage a genuine need in Hong Kong to establish a training programme encompassing paediatric immunology and infectious diseases. The recommendation of integrating immunology and infectious diseases has been made by overseas professional societies and experts such as the Royal College of Paediatrics and Child Health and Professor Andrew Cant. Professor Cant acted as an advisor for the Society, sponsored by HM LUI Memorial Fund, and submitted his report to our College in 2006. This proposed training programme fulfils the current UK and European training requirements for the subspecialty.

Infectious diseases and infection remain a major cause of morbidity and mortality in children. The emergence of new problems such as SARS and avian influenza, the re-emergence of old problems such as tuberculosis and the rising incidence of drug resistance amongst many different pathogens mandate that there will be an increasing and urgent need for specialists in this field. Clinical immunology and allergy deal with various diseases of immunodeficiency, immunodysregulation and immunointolerance. Furthermore, because of increasingly complex immunosuppressive treatments used in paediatrics generally, specialists in this field will need to be involved in the management of infections in immunocompromised hosts. Consultants specialising in the field with an emphasis on immunological disorders (particularly primary immunodeficiencies) will be needed to manage the increasing range of recognised disorders requiring highly specialised treatments. Patients with autoimmunity are increasingly recognized to have immunological pathology that requires specific biologics treatment deserves specific attention in training.

Our members are recognised at institutional level with the appointment of professors, associate professors and consultants in the respective subspecialty in both Universities and Hospital Authority in Hong Kong. Most of them are recognised locally, regionally and/or internationally as the leading experts. With widespread consultation to all parties / stakeholders interested and involved in the subspecialty, we are able to have a consensus in the current document. With due consideration of workload statistics and training opportunities for trainees, we conclude that there will be one subspecialty board to accredit this programme in Hong Kong. Under the template of subspecialty training programme, there can be more than one training programme involving different training centres or hospitals.

Programme Description

The Paediatric Immunology and Infectious Diseases (PIID) subspecialty training programme offers a 3-year training programme in Hong Kong. It is formed by a network of hospitals to optimize the training opportunities.

Candidates must have completed 3 years basic training in general paediatrics and have passed the Joint MRCPCH (UK) / Hong Kong College of Paediatricians Intermediate Examination. At their 3rd year of higher training in general paediatrics or 6th year of total training (the overlapping year), they are eligible for commencing the subspecialty training with the approval of the Subspecialty Board of PIID. Applications from candidates seeking academically oriented training with an interest in basic or clinical research are encouraged.

The curriculum is designed to train candidates in an environment which prepares them to provide outstanding clinical care and to develop the fundamental skills with which to pursue a life-long career in the relevant subspecialty. The first 2 years of training include inpatient and outpatient clinical rotations in at least 2 of the following 4 regional hospitals: Princess Margaret Hospital, Prince of Wales Hospital, Queen Elizabeth Hospital, and Queen Mary Hospital.

Candidates have to go through the obligatory rotations of infectious disease and immunology, then proceed with the elective rotations of infectious disease and/or immunology and related fields (Appendix). Training should be competence based that integrates clinical care with small group tutorials, clinical case write-ups, postgraduate courses, journal clubs, clinical and/or laboratory meetings, interdisciplinary conferences, and grand rounds. During the 3rd year, trainees pursue basic or clinical research projects developed during the first 2 years of training. Supervision is provided by trainers who have achieved stature as clinicians, educators, and scientists.

In addition, it is desirable that during the 3rd year of training the trainee should receive at least 6 months of training in an overseas institution (tertiary care centre) with a recognised programme subject to approval by the Training Director.

Obtaining the qualification of a postgraduate diploma or degree (e.g. MSc, MPhil, PhD or MD) related to Immunology and/or Infectious Diseases may also be recognized as completion of training for up to a maximum of 6 months subject to approval by the Training Director.

Mission

The mission of all PIID training programmes is to produce paediatricians who (1) are clinically competent in the field of PIID, (2) are capable of working in a variety of settings, and (3) possess habits of life-long learning to build upon their knowledge, skills and professionalism.

Specific Goals:

The specific goals of our training program are derived from the Mission Statement: (1) clinical competence, (2) capable of working in a variety of settings, and (3) a life-long learner. These specific goals are further amplified as follows:

1. Clinical competence is defined as:

- a. A basic core of knowledge of clinical manifestations, pathophysiology, management and prevention of PIID. This knowledge base should include an appropriate content of anatomy, genetics, biochemistry, physiology, pharmacology, epidemiology, statistics, ethics, and human behavior relative to the practice of PIID.
- b. The clinical skill of data collection including history-taking, physical examination and the appropriate request of laboratory and imaging studies.
- c. The ability to formulate appropriate differential diagnoses and therapeutic plans based on an ability to critically analyze the clinical data, and integrate this analysis with the basic foundation of medical knowledge.
- d. The ability to perform as a consultant or a healthcare team leader when summoned.
- e. The knowledge to treat the common and uncommon diseases found in the practice of PIID. To develop the understanding of the principles, indications, contraindications, risks, costs and expected outcomes of the various treatments. To recognize the need for appropriate consultation and the reasonable expectations from a consultant.
- f. The performance and/or interpretation of diagnostic and therapeutic procedures common in the practice of PIID. This skill should include the understanding of the principles, indications, contraindications, risks, costs and expected outcomes of these procedures.
- g. The further development of communication skills with patients, peers and paramedical personnel.
- h. The further development of qualities of professionalism and humanistic skills including integrity, ethics, compassion, willingness to teach and inspire juniors, and respect for patients, peers and paramedical personnel.
- i. Competent PIID specialists must possess a level of skill and expertise in research. All fellows must be capable of demonstrating competence in the understanding of

the design, implementation and interpretation of research studies; specifically including research methodology, critical interpretation of data, critical interpretation of published research, and the responsible use of informed consent.

2. The ability to work in a variety of settings is desirable. The fellows will be able to demonstrate clinical competence in the following settings:
 - a. As the primary healthcare provider in the acute inpatient setting, the ambulatory clinic, the emergency department, and the intensive care setting
 - b. As the consultant to other general paediatricians or other physicians in the acute inpatient setting, the ambulatory clinic, the emergency department, and the intensive care setting
 - c. As the leader of a multidisciplinary healthcare team
3. Life-long learning is an essential component for clinically competent physicians and required for the acquisition, critical analysis, synthesis and assessment of knowledge, skills and professionalism. All fellows will be capable of demonstrating their ability to be life-long learners by their:
 - a. Independent study habits in the acquisition of clinical and research knowledge and skills
 - b. Attendance, presentation and participation in the organization of local educational conferences
 - c. Attendance and presentation at regional and international professional scientific conferences
 - d. Commitment in the design, implementation, analysis and reporting of clinical audits and research projects

Specific Objectives:

At the completion of the PIID fellowship training, the fellow should have mastered the following specific objectives as they pertain to each of the specific goals of the curriculum:

1. Clinical competence in a variety of clinical settings:
 - a. All fellows should have mastered those specific clinical objectives for the majority of diseases seen in the practice of PIID, including the uncommon and complicated diseases.
 - b. Demonstrate proficiency as a consultant and/or leader of a multidisciplinary healthcare team.
 - c. Possess communication skills that will allow the fellow to perform as the healthcare team leader.

- d. The clinical proficiency of the fellow will be mastered at a level where they not only demonstrate their proficiency, but are capable of teaching these skills to trainees at junior levels.
- e. Qualities of professionalism and humanistic skills will be demonstrated at a level which serves as a role model for trainees at a junior level.
- f. All fellows should have mastered those specific research objectives outlined for the fellowship program and have produced sufficient research work to enable them to submit their work for presentation at scientific meetings, publication in peer reviewed journals, thesis preparation or grant application for research funding.

2. Life-long learning:

- a. Fellows will demonstrate proficiency at attending and participating in conferences, and coordinating conferences, conference topics, and conference schedules.
- b. Fellows will demonstrate mastery of teaching skills in their interaction with trainees at junior levels. This may include supervised teaching interactions with trainees such as junior-level fellows, residents, and medical students.
- c. Fellows will demonstrate mastery of research skills in their systematic approach in reviewing clinical experience, designing of clinical audits for improving quality of care, and performing translational research to create and integrate new knowledge into clinical practice.

Methodology for Teaching PIID

In order to achieve the goals and objectives for the competence based fellowship program the following experiences have been established for the purpose of teaching PIID fellows. These include:

- A) Inpatient PIID experience
- B) Ambulatory PIID experience
- C) Interdisciplinary interactions
- D) Didactic conferences
- E) Research experience
- F) Continuing medical education and participation in professional societies
- G) Development of teaching skills,
- H) Case reports / Case write-ups.

A) Inpatient PIID experience

The fellows assigned to this rotation will be responsible for organizing the activities of this service. This primarily includes the supervised evaluation of inpatient consultations and patients admitted to the PIID service as well as the continued follow-up of these patients during their hospitalization. Essential in this role is the development and refinement of clinical evaluation competences for patients with PIID. These competences include the formulation of appropriate differential diagnosis, assessment of the need for hospitalization, and development of diagnostic evaluation strategies and treatment plans. Essential in this rotation will be developing skills in providing consultation services, to include communicating with the referring physicians and ensuring support for continued care of the patients. A fellow will be called upon to perform literature search on topics appropriate to the case at hand. They will participate actively in the teaching activities of the consultation team. Through this experience the fellow will also develop a comprehensive understanding of the indications, contraindications, techniques and complications of various procedures, as well as the interpretation of results from such procedures. The fellow will also acquire the knowledge and skills in educating patients about the procedure and in obtaining informed consent. Supervision by trainers is required in developing these competences.

B) Ambulatory PIID experience

All fellows will be required to attend at least one subspecialty clinic session per week for the 24 months looking after patients with PIID. This experience will continue with

progressive responsibility during the fellowship training and will be appropriately supervised by dedicated trainers. The goal of this experience will be for the fellows to gain competences in the outpatient evaluation and management of PIID problems. The experience provides an opportunity to develop an understanding of the natural history of these conditions over an extended period of time.

C) Interdisciplinary interactions

The fellow should be provided elective training in other disciplines whose experience is required for the care of patients with PIID. These disciplines may include: (1) adult infectious disease, immunology, allergy, transplantation or rheumatology (2) HIV/AIDS medicine (3) tuberculosis and chest medicine (4) sexually transmitted disease, venereology or genitourinary medicine (5) critical care (6) haematology / oncology (7) nephrology (8) dermatology (9) rehabilitative medicine (10) public health such as experience within Centre for Health Protection (e.g. Surveillance and Epidemiology Branch or Infection Control Branch) (11) microbiology, virology or laboratory immunology. The goal of these experiences is for the fellow to appreciate the approach to the specific conditions that relate to PIID within these subspecialties. This interdisciplinary interaction can occur in the form of a clinical rotation in one discipline for up to 6 months, or 2-3 disciplines of 2-3 months each, subject to approval by the Training Director. Acquisition of clinical experience should be under the direct supervision of attending clinicians or trainers in the respective discipline who participate fully in the educational goals of the rotation.

D) Didactic conferences

Conferences will be held on a regular basis with attendance required of all fellows and trainers. At a minimum there should be at least one monthly clinical case conference and one bimonthly literature review conference (journal club). Basic science or clinical research conference may be held quarterly. It is encouraged that the content of these conferences will include members from other disciplines as outlined in section C as well as radiologists and pathologists who have specific interests in the field of PIID. Fellows will be required to attend a minimum of 75% of each of the conferences.

E) Research experience

An active research component must be included within the fellowship training program. A meaningful research experience must be provided with appropriate protected time for each fellow to achieve a level of competency to initiate independent research project. Exposure to research programmes should be initiated early in the fellowship training to allow the fellow adequate insight into the areas of potential research in preparation for the

ultimate selection of a trainer to serve as research mentor for the remainder of the fellowship training program. The immediate goal of the research experience is for the fellow to learn sound methodology in designing and performing research studies and the correct interpretation and report of research data. During this phase of training the fellow will work under close guidance of the research mentor.

F) Continuing medical education and participation in professional societies

In addition to participating in the organized didactic conferences established within the fellowship program it is also strongly encouraged that all fellows become members of the HKSPIID as well as any local society on infectious disease and immunology. Participation in the continuing medical education (CME) activities of these professional organizations will help foster the standards of professionalism and augment the process of life-long learning. It is envisaged that the CME activities of these professional societies will form the basis of the continuing professional development of the fellows.

G) Development of teaching skills

The programme must provide a nurturing environment and ample opportunity to foster activities of teaching. This includes the education of not only medical students, physicians and other allied health personnel, but also the education of the patients and their families. Development of these competences requires the fellow to receive instruction and feedback in counselling and communication techniques. This latter training must include cultural, social, behavioural and economic issues such as confidentiality of information and indications for life support systems. Delivering health education to professionals and the public at large will also be encouraged.

H) Case reports / Case write-ups/ Dissertations

Details of at least 6 interesting or complicated cases have to be presented. The cases reported need not be confined to the period of higher and subspecialty training. The description and discussion of each case should add up to around 1000 words (excluding the appended references). A word count should be inserted at the end of each case. They should reflect a comprehensive exposure in the field of immunology and infectious diseases. A total of at least 3 immunology and 3 infectious disease case reports have to be presented for final assessment. Examples of reportable cases may include, but by no means restricted to those listed in the Appendix. Alternatively, an essay type of 5,000-word dissertation on one pre-approved topics or case cohorts can serve the same purpose.

Methods of Assessment

In order for the training programme to achieve its goals and objectives, it is essential to establish an evaluation process incorporating interim and summative assessment of the fellows, and a reciprocal evaluation by fellows of the programme itself and the trainers.

Interim Assessment of the Fellows

Interim evaluation should occur at the completion of any substantive interaction with a specific trainer or specific rotation. For each clinical rotation, an assessment form will be completed by the supervising trainer. The assessment form utilized is one distributed and recommended by the Hong Kong College of Paediatricians. All trainers must complete the form prior to the completion of the rotation and review their impressions directly with the fellow. All completed assessment forms are returned to the Training Director for review and placed in the fellow's permanent file. These assessment forms are completed every 3 months, or sooner depending on the duration of the rotation. Completed assessment forms submitted to the Training Director are immediately reviewed upon their receipt. Any forms that contain a rating less than satisfactory in any category will require an immediate meeting between the fellow and the Training Director to identify causes for the poor performance and suggest means for improving the deficiency. All fellows will be required to keep a case and procedure log book, identifying the patients they have managed and the procedures they have performed, including information such as date, diagnosis, indication, outcome, complication, and name of supervising clinician. A copy of this log will be provided to the Training Director 6-monthly for placement in the fellow's permanent file. At least 3-monthly, all fellows will confer individually with the Training Director to review all of their performance. This meeting is to provide feedback to the fellow and to identify areas for enhancement.

Summative Assessment of the Fellows

The overall performance of each fellow is reviewed annually by the Subspecialty Board designated Trainee Monitoring Committee comprising the Training Director and 2 subspecialty board members through assessment of the portfolio and a structured interview. This committee is asked to monitor the performance and assess the level of competence of each fellow through a detailed and structured interview with specific objectives to attain in different domains. The fellow needs to present and discuss the merits of the portfolio based on his/her training in the past year. The committee's assessment is written and recorded in the programme files for future reference. Any adverse judgements regarding the fellow's performance or competence should first be directed to the Training Director. If the fellow feels that the annual review is not to their satisfaction, then the grievance can be addressed by an established appeal mechanism directed by the College.

Evaluation of the Programme and its trainers

All fellows are required to complete and return a programme and trainers evaluation form once every year. Evaluation forms are collected in a fashion to assure the anonymity of the fellow. Fellows are encouraged to maintain a high level of communication with the Training Director and trainers. Annual evaluation meetings to be attended by all trainees and subspecialty board members will be established.. These meetings can be used to disseminate training information and gather timely feedbacks. The feedbacks received during informal and formal meetings, and the annual evaluation forms will be used to suggest and assist in programmatic changes.

Final Exit Assessment

The final Exit Assessment normally takes place in June and/or December each year. The trainee is to submit a collection of case/case series reports (see above) or a 5,000-word dissertation and attend a viva examination conducted by an Assessment Board. The Assessment Board comprises (1) the Chairman of the Subspecialty Board of Hong Kong College of Paediatricians, or his/her nominee, (2) the Chairman of the Education Committee of Hong Kong College of Paediatricians or his/her nominee, (3) the PIID Subspecialty Training Director, (4) a member of the Subspecialty Board, and (5) an External Assessor who is usually a Programme/Training Director in paediatric infectious disease or paediatric immunology from another region, or an overseas expert of renown in paediatric infectious disease or paediatric immunology. Trainees who are successful at the Exit Assessment will be invited to apply for College Subspecialty Fellowship.

APPENDIX

Knowledge

By the end of training, all trainees will:

- know and understand the ontogeny of the immune response in children
- know and understand the classification of immunodeficiencies
- know and understand the clinical manifestations of the different types of immunodeficiency
- know and understand the diverse conditions and treatments which result in secondary immunodeficiencies
- know and understand the pathophysiology and the principles of treatment of allergic and autoimmune disorders
- know and understand the basis of the immune system including the innate and specific adaptive systems
- understand the developmental aspects of immunity and their relevance to susceptibility to infections in infants and young children
- understand the rationale underlying immunisation strategies in children, including active and passive immunisation
- understand the development and modes of action for active and passive immunisation
- know about routine immunisation schedules as well as immunisation in special situations, for example immunisation of the immunocompromised host
- understand the mechanisms of autoimmunity
- understand the different types of infection commonly associated with different kinds of immunodeficiency
- know when to use chemoprophylaxis and immunoprophylaxis, and which to use
- know when to use immunomodulatory therapy, and which to use
- know about novel, emerging and re-emerging infectious diseases, as well as diseases with a possible infectious aetiology such as Kawasaki disease, chronic fatigue syndrome and haemophagocytic lymphohistiocytosis
- know the principles and details of epidemiology of infectious diseases and be able to apply them
- know and understand how to investigate and manage infections with specific microorganisms
- know and understand about specific infections in the immunocompromised child
- know and understand the complexities of the relationship between the host and infecting organisms

- know and understand the management of situations where the host immune response to infection has triggered a pathological inflammatory response
- know and understand the management of situations where the host inflammatory response has been triggered by a non-infectious condition
- know and understand the principles of quality control in laboratory testing

By the end of training, trainees who have an emphasis on Infectious Diseases will:

- know the fundamental classification of infectious agents and basic microbiological characteristics, especially an understanding of virulence factors, culture requirements and inherent drug resistance
- have an understanding of serological and molecular diagnostic tests for various infectious diseases
- know the pathogenesis of infection and infectious injury, including: bacterial (especially sepsis, septic shock and toxic shock syndromes), viral, fungal, protozoal and helminthic diseases
- know the pathogenesis of immunological disorders with probable infectious aetiology
- know the local, regional and global epidemiology of infectious diseases including novel, emerging and re-emerging infectious diseases (e.g. influenza A H5N1, SARS, EV71), zoonoses and multi-drug resistant microorganisms (e.g. MRSA, MDRTB, XDRTB)
- have thorough understanding of therapeutics in infections and primary and secondary immunodeficiencies (e.g. patients with malignancy, haematopoietic stem cell / bone marrow or organ transplantation, HIV/AIDS) including use of antimicrobials both therapeutically and prophylactically, rationale for usage and interpretation of sensitivity tests (including minimum inhibitory and bactericidal tests), pharmacokinetics of antimicrobials, therapeutic drug monitoring, hospital antibiotic stewardship programmes, and hospital antibiotic policies
- know the principles and practicalities of infection control in hospital settings, including prevention of nosocomial infections (e.g. catheter-related infections, ventilator-associated pneumonia, multi-drug resistant bacterial infections) and outbreaks of common childhood infections in the hospital (e.g. RSV, rotavirus, norovirus, measles and chickenpox), handling and care of intravascular catheters, and handling of biohazardous specimens
- know the principles and practicalities of infection control in community settings, including notification programmes, disease surveillance, preventive measures (e.g. contact tracing, outbreak control) and statutory requirements in the management of infection

- know the details about immunisation, including global importance of vaccination programmes and new developments in vaccinology
- know about the investigation and management of travel-related infections and imported infectious diseases of global, regional and local importance, and how to advise on travel health (e.g. personal protection and hygiene, anti-malarial measures, pre- and post-exposure prophylaxis)
- know about the recognition, diagnosis, investigation, treatment and prevention of infections in different situations, such as life-threatening infectious emergencies, zoonoses, occupational exposures, nosocomial transmissions, and biological attack / bioterrorism

By the end of training, trainees who hve an emphasis on Immunolog will:

- know the structure and function of the specific and non-specific immune systems, especially the basis of normal and abnormal immunological responses to microbial infections and the developmental aspects of such responses
- know the laboratory basis of immune function tests and the diagnosis of immunological disorders
- know the classification and diagnosis of primary immunodeficiencies
- know the use of immunomodulating agents – corticosteroids, immunoglobulins, cytokines, growth factors and immunosuppressive drugs
- know the role of haematopoietic stem cell / bone marrow transplantation in the management of immunological disorders
- understand the cellular and molecular pathology of common allergic diseases
- understand the epidemiology, clinical history and natural history of common allergic conditions
- know and understand the ontogeny of the allergic immune response in early life
- know and understand basic allergic mechanisms
- know and understand local tissue responses in allergic diseases
- know and understand the immunopathogenesis of the immediate and late phase allergic response
- know and understand the way in which allergy, allergen exposure and infection interact and manifest as disease
- know and understand the relationship between immunodeficient states and allergic disease
- know about primary and secondary prevention of atopic disease
- know and understand about cross-reactive antigenic determinants and know common cross-reactivities

- know and understand the use and limitations of skin-prick testing and measurement of total and specific IgE
- know the value of diagnostic allergy testing set against the advantages and problems of direct organ challenge
- know about the epidemiology, clinical presentations and risk factors for autoimmune conditions in children and adolescents
- know and understand current theories on aetiopathogenesis of autoimmune diseases
- be aware of the extra-articular associations of rheumatologic conditions, in particular juvenile arthritis and eye disease
- know the epidemiology, spectrum of clinical presentation and laboratory features that constitute multi-system autoimmune diseases
- know how to assess the clinical features and function of all potential target organs that may be involved in autoimmunity, including acute and chronic conditions

Skills

By the end of training, all trainees will:

- be capable of providing independent consultation to patients with infectious and immunological diseases
- be capable of providing continuity of care and out-patient follow-up of individual patients whom they have managed during consultation
- know about and have experience in caring for patients with intravascular catheters
- have experience working in clinical microbiology, virology or immunology laboratories so as to understand the range and limitations of diagnostic tests available
- know how to obtain and handle appropriately the necessary diverse clinical specimens for diagnosis of infectious and immunological diseases
- understand immune function testing and be able to interpret the results including specific antibody assays, complement, phagocytic cell and T cell tests
- understand and be able to request for molecular genetic tests available for diagnosis of primary immunodeficiencies
- be able to interpret relevant ancillary diagnostic tests such as radiologic imaging studies and lung function tests
- have developed links with laboratory staff so as to become familiar with the practicalities and personnel involved in the performance of tests such as cultures, microscopy, rapid antigen detection, polymerase chain reaction, immunoglobulin assay and flow cytometry
- be capable of liaising and cooperating with the hospital infection control team and public health officials in the surveillance, investigation, prevention and control of

nosocomial infections and outbreaks of infectious diseases

- be able to present a clinical audit and have participated in drafting a clinical guideline or protocol for management of a specific infectious or immunological disease under the supervision of a trainer

By the end of training, trainees who have an emphasis on Infectious Diseases will:

- be able to assess and initiate acute and long-term management of patients presenting with immunological and infectious diseases including emergency management of life-threatening infections and coordination of care for the critically ill
- be able to investigate and manage infections with specific micro-organisms
- be able to investigate and manage infections of the foetus and newborn
- be able to investigate and manage the protean presentations of tuberculosis in a child and its contacts
- be able to investigate and manage infection and/or inflammation of specific organ systems
- be able to use appropriate treatments for infectious agents, including antibacterials, antivirals, antiretrovirals, antifungals, and anti-parasitic agents
- be able to investigate and manage systemic infections and/or inflammation, including sepsis, septic shock and toxic shock syndromes
- have experience in the management of HIV/AIDS in infants and children, be able to manage HIV in pregnancy to prevent transmission to the fetus, and be able to coordinate multidisciplinary management of the child and family affected by HIV/AIDS
- be able to investigate and manage infections in the immunocompromised host including those undergoing bone marrow transplantation and/or solid organ transplantation (e.g. severe or disseminated infection with herpes group of viruses, invasive mycosis, disseminated mycobacterial infection, *Pneumocystis jirovecii* pneumonia)
- be able to investigate and manage fever of unknown origin or fever without localizing signs, periodic fever syndromes, opportunistic infections, recurrent infections, travel-related infections and imported infections (e.g. malaria, dengue fever)
- be able to retrieve, synthesize, review, interpret, discuss and apply current information on infectious disease epidemiology and guidelines on clinical management, prevention and control of infectious diseases in a knowledgeable manner in day to day clinical practice
- be able to supervise and carry out infection control and proper personal protection in the management of patients infected with transmissible agents, especially highly infectious agents capable of transmission by the airborne route

By the end of training, trainees who have an emphasis on Immunology will:

- be able to recognize the different patterns of clinical presentation of primary and secondary immunodeficiency disorders, investigate with laboratory testing, interpret the findings, and institute appropriate management
- know the specificity, sensitivities and predictive values of skin-testing and in vitro IgE antibody measurement for individual allergens
- ensure that guidelines for the management of anaphylaxis are implemented
- be able to recognise multiple presentations of food allergy
- be able to interpret a dietary diary and be able to advise about its management, including the risks and benefits of avoidance diets, use of alternative and hypoallergenic milk formulas and a hypoallergenic weaning diet
- know the indications for food challenges, challenge protocol procedures (open, single blind and double blind placebo controlled) and safety precautions
- be able to use measurements of specific IgE and skin test results to optimise the timing of food challenges
- know the relationship and cross-reactivities between food, pollen and food, and latex and be able to advise patients appropriately
- know how to assess future risk of allergic reactions and which patients require the prescription of injectable adrenaline
- understand the role of allergen triggers and avoidance in the pathogenesis and management of eczema and be able to advise patients appropriately
- be able to examine and assess the severity of eczema in an affected child
- know the sensitivity and specificity of measuring total and specific IgE and skin testing in children with eczema and be able to investigate them appropriately
- be able to manage patients with severe eczema including the use of emollients, anti-inflammatory preparations and wet wraps
- know the indications for, limitations of and protocols for drug challenges and desensitisation

Attitudes

- Appreciation of the scope and limitations of microbiological, virological and immunological investigations.
- Appreciation of the need to participate in formulation of clinical guidelines and protocols for infectious and immunological diseases to maintain the standard of care.
- Appreciation of the importance of infection control in the hospital and community, as well as prevention of infectious diseases globally.

- Appreciation of the need for cooperation with infection control personnel and public health officials in the control and prevention of community and hospital acquired infections
- Understanding the importance of appropriate, effective and timely communication with children, parents, colleagues and other healthcare professionals.
- Willingness to contribute to team work, and interact and liaise with various disciplines such as adult infectious disease specialists, microbiologists, virologists, immunologists, radiologists, pathologists, other paediatric organ specialists, general paediatricians, family physicians, general practitioners, pharmacists, epidemiologists, researchers, academics, public health officials, and hospital infection control team in delivering an integrated infectious disease and immunology service.
- A supportive approach to supervision and training of junior staff, and influence by role modelling.
- Appreciation of the need to develop quality as a team leader in mobilizing input from allied medical professionals including clinical psychologist, physiotherapist, occupational therapist, nurses and medical social worker.
- Commitment to self-directed continuous professional development and fostering a scholastic approach to maintain understanding of recent advances and current concepts of the subspecialty over a professional lifetime.
- Keen interest in participating in the formulation of clinical guidelines and protocols for better management of infectious and immunological diseases.

Programme for paediatric immunology and infectious disease training

IMMUNOLOGY (with a rotation of at least 12 months to a centre providing service for clinical immunology and transplantation with the emphasis of training objectives as stated)

Primary immunodeficiency -

Molecular and genetic basis

Clinical syndromes

Natural history

Management (e.g. immunoglobulin replacement and bone marrow transplant)

Secondary immunodeficiency (e.g. oncology / ICU / transplant recipients)

Infections in the immunocompromised child

Development of immunity – innate and adaptive / specific

Host defense mechanisms – age-related infections

Immunisation – mechanism of action, contraindications, precautions and vaccine-associated adverse events

Autoimmunity

Laboratory diagnosis of immunological disorders

Prefer to have Allergy exposure (preferably in an allergy tertiary service with the emphasis of training objectives as stated)

Atopy - genetic / environmental factors in development

Mechanics of allergic sensitivities and tolerance

Urticaria / angioedema

Anaphylaxis

Food allergy

Drug allergy

Skin prick testing, RAST

Challenges

Immune modulation

INFECTIOUS DISEASE (with a rotation of at least 12 months to an infectious disease tertiary referral centre with the emphasis of training objectives as stated)

Pathogenesis of infection and infectious injury – bacterial / viral / fungal / protozoal / helminthic

Approach to fever and fever management

Periodic fever, fever of unknown origin, fever without localizing signs

Exanthematous infections

Congenital infections

Perinatal infections

Neonatal bacterial and fungal sepsis

Specific infections:

Ocular and periorbital infections

ENT infections

Suppurative and non-suppurative lymphadenitis (including BCG and mycobacterial lymphadenitis)

Pneumonia – community-acquired, nosocomial, ventilator-associated, atypical

Empyema thoracis and lung abscess

CNS infections

Skin and soft tissue infections (including necrotizing fasciitis)

Musculoskeletal infections

Surgical and orthopaedic infections

Device-associated infections (e.g. catheter-related infection, CSF shunt infection, prosthetic infection)

Pericarditis, myocarditis, infective endocarditis
Acute and chronic hepatitis
Enteric infections including typhoid and paratyphoid fever
Genitourinary and sexually-transmitted infections
Mycobacterial infections – tuberculous and non-tuberculous, focal and disseminated
HIV/AIDS
Toxin-mediated diseases (e.g. scarlet fever, staphylococcal and streptococcal toxic shock syndrome)
Systemic inflammatory response syndrome, sepsis and septic shock
Travel-related and imported infections including malaria and dengue fever
Notifiable infectious diseases of local importance not listed above
Anti-infectives - pharmacokinetics, pharmacodynamics, therapeutic and prophylactic use and abuse, resistance mechanisms, drug interactions, adverse effects and toxicity, therapeutic drug monitoring, antibiotic stewardship programme, hospital antibiotic policy
Use of anti-inflammatory and immunomodulating agents in infectious diseases

Overseas training for 6 months is mandatory. Prior approval of a recognized programme by Training Director is required.

Elective modules of related fields subject to prior approval by Training Director (each module of 3-6 months duration in 4 to 2 rotations).

Elective modules of high priority:

Infectious Epidemiology (rotation of 3-6 months to gain public health experience in the Surveillance and Epidemiology Branch +/- Infection Control Branch of the Centre of Health and Protection with the emphasis of training objectives as stated is strongly recommended)

Burden of childhood infections in HK, China and worldwide
Surveillance methods
Notification mechanisms
Epidemiology intelligence
Field epidemiology
Outbreak control
Interaction with the media and public
Vaccination programme management
Port health and travel clinic
Statutory requirement of notification
International Health Regulations
Public health education
Social and ethical issues in the prevention and control of infectious diseases

Microbiology (rotation of 3 months to a microbiology or virology laboratory with the emphasis of training objectives as stated is strongly recommended)

Classification of microbes

Sample collection and specimen handling

Microbiological characteristics (bacteria, viruses, fungi, protozoa, helminths) – methods of identification

Virulence factors

Antimicrobial resistance

Non-culture diagnostic tests – antigen tests, serology, PCR, in situ hybridization, immunohistochemistry

Infection control in hospital – multi-drug resistant organisms, infectious waste disposal, occupational hazards, employee health, immunization of health care workers

Paediatric rheumatology (rotation of 3 months in a rheumatology tertiary service with the emphasis of training objectives as stated is strongly recommended)

Management of SLE

Management of JIA

Recognize various vasculitis and uncommon rheumatologic condition

Use of various DMARDS

Use of intra-articular steroids

Use of biologics

Elective modules of related fields

subject to prior approval by Training Director (may be taken in combination of 2 to 3 disciplines with total duration not exceeding 6 months)

(1)adult infectious disease, immunology or transplantation (2) HIV/AIDS medicine (3) critical care (4) haematology / oncology (5) pediatric nephrology including renal transplantation (6) tuberculosis and respiratory medicine (7) sexually transmitted disease, venereology or genitourinary medicine (8) dermatology (9) laboratory immunology

Case Reports / Write-ups

Examples of reportable cases may include, but by no means be restricted to the followings:

Immunology:

1. Wiscott-Aldrich Syndrome (WAS)
2. Perianal abscess / Chronic granulomatous disease (CGD)
3. Mycobacterium infection in CGD
4. Disseminated TB / interferon deficiency
5. BCGosis / Severe combined immunodeficiency (SCID)
6. Common variable immunodeficiency / lymphoma
7. X-linked agammaglobulinaemia (XLA) / pneumococcal meningitis
8. XLA / bronchiectasis / recurrent otitis media / recurrent sinopulmonary infection
9. EBV/ haemophagocytic lymphohistiocytosis (HLH) / X-lined lymphoproliferative disease (XLP)
10. Chronic urticaria: CINCA
11. Recurrent herpes simplex: IL-12 deficiency
12. Recalcitrant eczema / abscesses/ hyper-IgE
13. Pneumatocoele / Hyper-IgE
14. Recurrent respiratory/gut infection / Hyper-IgM
15. APECED
16. Immunodysregulation, polyendocrinopathy, enteropathy, X linked IPEX
17. GVHD / nephritis
18. PID / cord blood transplant
19. Di George syndrome / transplant / white lung at engraftment
20. WAS associated with Takayasu disease / other autoimmunity
21. WAS / post-transplant autoimmunity
22. JIA / autotransplant / full remission
23. LAD / mycobacterial colonic stricture
24. AT / bronchiectasis / malignancy / death
25. HIES / STAT3 mutation/ horrific abscesses / cause of death
26. IgG subclass deficiency / asthma / eczema / controversial association
27. CVID / autoimmune hepatitis
28. IDDM / hypothyroidism / mycobacterial infection / candida infection / cause
29. CGD / neonatal aspergillosis and mycobacterial infections
30. CGD / *Chromobacterium violaceum* infection / death
31. CGD / disseminated TB / persistent salmonellosis
32. Agammaglobulinaemia / suspected SARS / death

33. Genetic counselling of asymptomatic carrier (ethical consideration)
34. Chronic benign neutropenia
35. Partial albinism and neutropenia
36. SLE / Kikuchi lymphadenopathy
37. Kikuchi disease / aplastic anaemia / SLE
38. SLE / lymphoma
39. SLE / pericardial effusion / tamponade
40. SLE / Crohns' disease
41. SLE / neuropsychiatric lupus
42. SLE / miliary TB
43. SLE / steroid-induced avascular necrosis (AVN) of hip
44. SLE / thrombotic thrombocytopenia purpura (TTP)
45. Post-transplant lymphoproliferative disease (PTLD) / EBV
46. JIA / macrophage activation syndrome (MAS) / CMV
47. JIA / leukemia / bone pain
48. JIA / septic arthritis
49. Atypical mycobacterial monoarthritis
50. Joint pain / slipped femoral epiphysis / patient on GH treatment
51. Suspected arthritis / bone tumour
52. PUO / systemic onset JIA
53. Refractory Kawasaki Disease / Use of steroid
54. Kawasaki disease / reactive arthritis
55. Atypical Kawasaki Disease
56. Acute rheumatic fever
57. HSP / abdominal pain / gastrointestinal bleeding
58. PAN / gut perforation
59. DRESS
60. Bechet syndrome / vasculitis
61. Systemic sclerosis / dermatomyositis
62. Polymyositis
63. Autoimmune hepatitis
64. Uveitis / biologic treatment
65. JIA / biologic treatment
66. Back pain / schwannoma of spine
67. Antithyroid drug / acquired SLE / nephropathy
68. Chronic relapsing osteomyelitis CROM
69. Fibromyalgia / chronic fatigue syndrome / chronic demyelinating rediculomyelitis
70. Caffey's disease

71. VAS-HLH
72. SLE / refractory thrombocytopenia / anti-CD 20 / splenectomy
73. Autoimmune lymphoproliferative syndrome (ALPS)
74. Multiple food allergy of infancy
75. Acquired / hereditary angioedema
76. Hypereosinophilic syndrome
77. Protein-induced enteropathy
78. Peanut and tree nut anaphylaxis
79. Oral allergy syndrome
80. Contact dermatitis
81. Latex allergy
82. Paracetamol anaphylaxis
83. Perioperative anaphylaxis
84. Asprin / sinusitis / nasal polyposis
85. Chronic idiopathic urticaria
86. Atopic march
87. Eczema / psoriasis
88. Eczema herpeticum
89. Eczema / use of systemic immunosuppressives
90. Erythema multiforme
91. Takayasu vasculitis

Infectious diseases:

1. Epidemiology of specific infectious diseases
2. Clinical microbiology of specific microbes
3. Exanthematous infections
4. Measles and complications
5. EV 71 infections and complications
6. Pertussis and complications
7. Infections caused by herpes viruses (HSV, VZV, CMV, EBV, HHV-6, HHV-7)
8. Human parvovirus B19 infection
9. Group A streptococcal infections and complications
10. Atypical pneumonia
11. Opportunistic pneumonia
12. Empyema thoracis
13. Lung abscess
14. Meningitis / Encephalitis / Meningoencephalitis / ADEM
15. Brain abscess

16. Periorbital cellulitis
17. Sinusitis
18. Mastoiditis
19. Parapharyngeal / retropharyngeal infection
20. *Mycoplasma pneumoniae* infection – pulmonary and extrapulmonary
21. Tuberculosis – intrathoracic / extrathoracic / miliary
22. Nontuberculous mycobacterial infection – focal and disseminated
23. Fulminant sepsis – Gram +ve and Gram -ve
24. Toxin mediated diseases – scarlet fever and toxic shock syndromes
25. Neuraminidase-associated haemolytic uraemic syndrome
26. Life-threatening infections and infectious emergencies
27. Necrotizing fasciitis and ecthyma gangrenosum
28. Travel-related and imported infections
29. Traveler's diarrhea
30. Parasitic infestations
31. Tropical infectious diseases
32. Malaria
33. Typhus and spotted fevers
34. Dengue infection
35. Typhoid fever
36. PUO
37. Periodic fever syndromes
38. *Helicobacter pylori* infection
39. Acute and chronic hepatitis
40. Infective endocarditis – treatment and prophylaxis in congenital heart diseases
41. Congenital infections and complications
42. Perinatal infections
43. Catheter-related sepsis
44. CSF shunt infection
45. Sexually transmitted diseases
46. HIV/AIDS
47. Skin, soft tissue and skeletal infections
48. Food and water-borne infections
49. Viral gastroenteritis associated encephalopathy
50. Zoonoses and pet-borne infections
51. Opportunistic infections in immunocompromised hosts
52. MDR bacterial infections
53. Infectious disease outbreaks in institutions – investigation, control and prevention

54. Systemic fungal infections
55. Novel infectious agents
56. Avian influenza
57. SARS
58. Prion disease
59. Agents of biological attack / Bioterrorism
60. Kawasaki disease
61. Infection-associated haemophagocytic lymphohistiocytosis
62. Relationships of infections to cancer and chronic inflammatory disorders
63. Chemoprophylaxis and immunoprophylaxis of specific infections
64. Immunomodulation of infectious diseases
65. Novel antimicrobial agents
66. New vaccines
67. Infection control
68. Emergency and pandemic preparedness