

## **ALLERGY IN HONG KONG – AN UNMET NEED IN SERVICE PROVISION AND TRAINING**

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## DECLARATIONS OF INTEREST

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The Allergy Alliance is a group of individuals with an interest in allergy drawn from academia; HA hospitals; private practitioners; representative from HA; Hong Kong Institute of Allergy; HK Thoracic Society; Allergy HK; patients and drug company representatives.

## **FOREWORD**

There is a global epidemic of allergic diseases and Hong Kong is not spared. In recent years it has become increasingly clear that there are insufficient Allergy specialists in Hong Kong to meet the clinical demand. It is equally obvious that there are an inadequate number of Immunology and Allergy trainees coming through the training programmes and in adult medicine the situation is dire. One might even wonder very reasonably how one could train future Allergy specialists when there are insufficient trainers. In addition and regrettably as the clinical burden is so heavy there is little time or capacity to generate new knowledge to advance understanding of allergic diseases to develop novel approaches to therapy. This problem is not unique to Hong Kong and a number of countries face similar problems.

Against this background, a group of clinicians, allied health professionals and others with an interest in Allergy met in March 2014; now named the “Allergy Alliance”. The participants were drawn from academia; HA hospitals; private practitioners; representative from HA; Hong Kong Institute of Allergy; HK Thoracic Society; the Charity Allergy HK; patients and drug company representatives. There were also emails of support from colleagues who could not attend the meeting but nonetheless wished to contribute to the debate.

There were informative presentations at the meeting about Allergy in Hong Kong and discussions on how to improve local Allergy service provision, training and research. There was a consensus to develop a case for growing the discipline of Allergy. Nonetheless it was felt essential by members of the Allergy Alliance that an authoritative review should be written first to summarise the epidemiology as well as current provision of Allergy services and training in Hong Kong. Further discussions with the major stakeholders to seek a way forward could then proceed in an informed manner.

This review sets out the case for growing Allergy and we hope it is the first step of a journey to address an unmet need in Allergy service provision, training and research for patient benefit in Hong Kong.

## 1.0 EXECUTIVE SUMMARY

### 1.1 WHAT IS ALLERGY AND HOW COMMON IS IT?

- An allergic reaction occurs when the immune system reacts inappropriately to otherwise harmless substances.
- Many children in HK have allergic diseases and the rate of the potentially fatal type of allergy, i.e. anaphylaxis, is high (700/100,000 of the population aged 14 years or less).
- Rhinoconjunctivitis and eczema are on a rising trend.
- Many children have food allergies which can be fatal; 15.6% had anaphylaxis.
- Food allergy also seems to be increasing.
- The prevalence of asthma has stabilized and may even be decreasing a little, but hospitalizations at both extremes of age remained high.
- There is very little data on the prevalence of allergic diseases in adults in HK. But only a minority of children will grow out of their allergic diseases so the problem will persist into adulthood. There are no grounds for optimism that the allergic disease burden would be substantially reduced in the adult population.

### 1.2 WHAT IS ALLERGY AND CLINICAL IMMUNOLOGY?

- Allergy and Clinical Immunology is a sub-specialty of Internal Medicine and/or Paediatrics.
- Most patients with allergies have multi-system involvement. Instead of consulting multiple specialists, care can often be streamlined under one Allergy-trained specialist making it easier for patients and often saving on resources.
- The Allergist's approach aims to correct the underlying cause and they are uniquely positioned to help patients understand how to prevent allergic diseases from developing.

### 1.3 HOW MANY ALLERGISTS ARE THERE IN HK?

- There are very few registered Allergists in HK (overall about 1:1.46 million head of population). This ratio is low compared to international figures.
- The ratio of paediatric Allergists per head of population is around 1:460,000 and the ratio for Allergists per adult patients is 1:2.8 million, so there is a severe lack of adult Allergists and paediatric Allergists only work a fraction of their time on allergy.

- There are no Allergists in adult medicine in public hospitals.
- Many patients with allergies are seen by General Practitioners and non-specialists in Allergy.
- In the absence of Allergists patients may suffer because they may find it hard to get state-of-the-art medicine and diagnostics.
- Unproven diagnostic procedures and therapies could be introduced if mainstream medicine is unavailable, or conventional tests could be used / interpreted inappropriately if there are no specialists.
- If there is a lack of Allergy specialists, it becomes difficult to train future generation of clinicians, researchers and teachers in allergy.
- In HK there are two Medical Council registered Immunologists (S44) who have received some Allergy training. One of them directs a public laboratory service in Immunology and Allergy at QMH and also provides a limited weekly service for drug allergy, while the other runs a HLA typing service and is not involved with allergy. Their budget does not allow a comprehensive menu of relevant tests to support the speciality. These two pathologists are distinct from specialists in Immunology and Allergy (S35) of which there are four, but only two of these are Allergists (both in private practice).

#### 1.4 ALLERGY SERVICES IN HONG KONG

- Delivery of allergy services in public hospitals is limited and fragmented.
- Existing Allergy services are led mainly by non-specialists.
- There is no dedicated Allergy clinic for adults in the public sector.
- Paediatric Immunology and Infectious Disease (PIID) speciality has given some cohesion by developing a network of four contributing Centres but the service is still limited by insufficient manpower.
- Waiting times for even the simplest of allergy testing such as skin prick testing is unacceptably long (6 months).
- Demand for Allergy services and Allergists are largely unmet.
- Drug Allergy is a huge potential clinical workload that can impact on the practice of medicine by many specialties and this problem also needs to be addressed urgently.
- There are very few local guidelines for managing allergic diseases.

- The use of allergen immunotherapy - an essential tool in allergy treatment - is very limited.
- The laboratory support for Allergy/Immunology in the public sector is inadequate and cannot offer a complete portfolio of allergy tests. The Division of Clinical Immunology of the Department of Pathology at Queen Mary Hospital hosts the only laboratory in HK that is supervised by accredited Immunologists which provides support for Allergy and Immunology. The portfolio of tests is not comprehensive.

#### 1.5 TRAINING

- There are inadequate numbers of trainees in Allergy and not enough trainers.
- GPs have either no or only minimal training in Allergy.
- The subspecialty of Paediatric Immunology and Infectious Diseases (PIID) that includes Allergy has recently been approved. This is well structured and operational with a network of four training Centres. However only a fraction of a clinician's time is spent on management of allergic diseases.
- Adult Internal Medicine has a training curriculum that encompasses Allergy and it is being updated.
- There have been no trainees in Allergy and Immunology in adult medicine since 1998.
- Training in adult Allergy is hampered by the lack of trainers and the virtually non-existence of an Allergy clinical service in the public sector.
- There is no HK-wide school policy on training of teachers / school nurses on use of adrenaline in allergic emergencies, or any decision made on desirability for schools to hold generic adrenaline auto-injectors.

#### 1.6 RECOMMENDATIONS

- We recommend that the best model for Allergy service delivery is a "hub and spokes" model. The "hub" would act as a central point of expertise with outreach clinical services, education and training provided to doctors, nurses and allied health professionals in primary and secondary care (the "spokes"). In this way, knowledge regarding the diagnosis and management of allergic conditions could be disseminated throughout the region. The hub and spokes in its entirety forms the "Allergy Centre". The hub should lead and coordinate the activities of the entire Centre.

- Each hub should have an Allergy service for both adults and children to increase critical mass and can share in knowledge transfer and resources.
- These hubs should be located eventually in such a way to optimize access for patients across the clinical clusters.
- In addition a network of satellite allergy services (spokes) could be established at other hospitals (for instance by allocating new resources, or more likely by changing the emphasis of one or two existing clinics a week designated for Respiratory Medicine, Otorhinolaryngology and/or Dermatology to become Allergy clinics). These Allergy clinics can then link to one of the Allergy hubs for academic, clinical and educational support. This solution might not require many more resources as the complex multi-system allergy cases could be siphoned off from the other clinics and collected up for management in a new dedicated Allergy service.
- We recommend that paediatric and adult services in an Allergy Centre should each be led by an Allergy specialist and each should be supported by at least one other clinical colleague (another Allergy specialist or an organ specialist with a special interest in Allergy), at least one trainee, specialist dietitian and specialist nursing support +/- a technician for routine allergy testing, counselling and education.

### 1.7 *Adult Allergy*

- Adult allergy is in a particularly parlous state with no specialists and no dedicated allergy service in the public sector. It requires an urgent remedy. We recommend that two pilot Allergy Centres are created and an Allergy specialist is recruited (from overseas if necessary) to each Centre to kick start the adult service and to oversee a training and research programme.
- We recommend that each new appointee is a joint appointment between the HA and an university. Each appointee should be supported by 3 trainees, specialist nurse and dietitian.
- We recommend that the two pilot Allergy Centres should be located at QMH/HKU and PWH/CUHK (hubs), so that Hong Kong, Kowloon and New Territories are covered. Two pilot Centres are required because of the heavy burden of allergic disease and the capacity of a solitary Centre in HK would very soon be overloaded. Both QMH and PWH have a long distinguished history for looking after children with allergic and immunological diseases, but both lack a dedicated Allergist in adult medicine. Creation of an Allergy Centre that integrates existing strengths in paediatric clinical/academic/education in allergy with a new adult clinical/academic/education allergy service would be a major catalyst to bridging the obvious gaps in service and academic provision. Formal designation of both hospitals as pilot Allergy Centres could also provide formal encouragement to hospital

and university management for some internal realignment of resources. Finally creating these innovative Allergy Centres could provide significant opportunities to attract private funding from benefactors to grow the discipline subsequently.

- We recommend that metrics for success of each pilot Centre be pre-defined and progress in the first 5 years be assessed against those goals. If the pilot is successful, then the model should be continued and could even be extended to other suitable clinical-academic Centres.
- We recommend that the HKCP training curriculum for Immunology and Allergy is updated as soon as possible. In addition we suggest that the HKCP and HKCPATH consider creating an intercollegiate training programme in Immunology and Allergy to produce Clinical Immunologists who will direct Allergy/Immunology laboratories and consult for allergic patients.
- We recommend the training of Allergy as a major to be included in the College training guidelines in Allergy & Immunology.

#### 1.8 *Paediatric Allergy*

- When the HK Children Hospital (HKCH) is operational there will need to be some reorganisation with parts of the top tier paediatric Allergy services in the current network hospitals (QMH, QEH, PMH, PWH) being decanted to the HKCH (which will become the hub), leaving satellite services in previous hospitals (the spokes) in situ.
- To facilitate a smooth transition to the HKCH we recommend at least 4-5 FTE PIID specialists majoring in Allergy/Immunology to be appointed to run the top tier service in HKCH, to provide training and conduct local relevant audit/research (hub). A further 12 PIID specialists will be required to provide step-down and secondary services in both the training (PMH, PWH, QEH, QMH) and non-training (other HA paediatric units) posts for the specialty and general paediatrics (spokes).
- We recommend that four PIID trainees are recruited every 3 years, of which at least 2 Resident Specialists (RS) should be trained majoring in Allergy / immunology indefinitely. This will maintain a sustainable public workforce for specialty development and to cover for normal turn over. It should then be possible to produce 12 PIID specialists in 3 cycles (around 9 years) of whom 50% will have majored in allergy/immunology with the rest in Infectious Diseases. Therefore the estimated total required workforce for PIID in the public sector for the hub and spoke model could be 18-20 with 8 in the hub (4-5 in Allergy and Immunology and 2-3 in Infectious Diseases) and about 12 in the spokes working in both the specialty and General Paediatrics.
- We recommend that **Allergy** is added to the title of the PIID training programme so it will become Paediatric Immunology Allergy and

Infectious Diseases (**PIAID**) programme and the paediatric discipline should also be so named.

1.9 *Drug Allergy*

- Drug Allergy is a specialised branch of Allergy. It is common and constitutes a major clinical problem, which needs to be managed by Allergy specialists. We recommend resources to be made available to establish two separate supra-regional Drug Allergy Services at QMH and PWH (as they already have a limited service) to cover Hong Kong Island and Kowloon/New Territories. This could be part of the new pilot Centres.

1.10 *Laboratory Support*

- We recommend that two supra-regional labs for HK should be created with a focus on drug and food Allergy that are directed by accredited Immunologists. They should be adequately funded so they have sufficient manpower, equipment and budget for reagents to widen the scope of routine laboratory service to include tests for specific IgE to a wider spectrum of whole allergen extracts and to allergen components; basophil activation tests; and lymphocyte function tests. This can be incorporated into existing laboratory support at QMH and PWH with only a relatively modest increase in resources. They could then support the new pilot Centres.

1.11 *Education*

- We recommend that a collaboration is established between HK Institute of Allergy (as the professional platform) and Allergy HK (as the Allergy Charity) to create an agenda for professional CPD (such as regular workshops) as well as engaging and educating the public about Allergy. These organizations are strongly encouraged to involve other professional societies and charities as appropriate when designing their strategy.

1.12 *Schools*

- We recommend that the appropriate Government department should audit the level of allergy training staff in schools receive, and consider taking urgent remedial action to improve this training where required.
- We recommend that the Government should review the desirability for schools holding one or two generic auto-injectors for adrenaline.

1.13 *Air quality*

- Acute health effects on respiratory morbidities from short term exposure to air pollution are well recognised, but the long term effects are, as yet, less well studied but may be of more serious consequence. Solving the urban air pollution problem is a huge challenge. Bold, realistic and moral leadership by national leaders is required to address this increasing important public health issue. We recommend that it is essential not only to develop effective strategies to reduce pollution but also to monitor whether the strategies result in a significant

improvement in the prevalence of pollution related diseases in HK and the mainland.

## 2.0 **How common are allergic diseases?**

2.1 The International Study of Asthma and Allergies in Childhood (ISAAC) was a multi-country cross-sectional survey that provided a global epidemiology map of asthma and allergic diseases as well as the trend of changes in the prevalence of common allergic diseases. The study instruments included standardized questionnaires related to symptoms of asthma, allergic rhinoconjunctivitis, and eczema. Three phases of ISAAC were conducted in 1995, 2000 and 2003. In these important global epidemiological surveys, the rates of eczema, asthma and rhinoconjunctivitis were examined in detail in children of two age groups, namely 6-7 years and 13-14 years. ISAAC Phase Three was a repetition of ISAAC Phase One that aimed to evaluate the possible trend of disease prevalence after a period of 5-10 years. Insight on the prevalence and changing trends for some allergic diseases in Hong Kong was obtained by analyzing data from ISAAC (1-6) and other relevant local studies (7-11).

2.2 Some of the key findings about asthma and allergies in Hong Kong children and adolescents are summarized below.

- In 2001 the prevalence of those who had ever been diagnosed with asthma in 6-7 year olds was 7.9%. This reflected an increase of about 0.04% compared to 1995. In 2002 the prevalence of having asthma ever in 13-14 year olds was 10.1%, representing a decrease in prevalence of 0.15% per year since 1995.
- In 2001 prevalence of life time eczema in 6-7 year olds was 30.7% and current eczema was 4.6%. This reflected an increase in current eczema prevalence of 0.12% per year since 1995. In 13-14 year olds prevalence of life time eczema was 13.4% and current eczema was 3.3%. This reflected an increase of 0.08% per year since 1995.
- In 2002 rhinoconjunctivitis prevalence in 13-14 year olds was 22.6% and showed a decrease of 0.2% per year since 1995. Similar figure for 6-7 year olds was 17.7% in 2001 and this represented an increase of 0.7% per year since 1995.

2.3 In order to gain insight of how asthma was managed in Asia-Pacific, the Asthma in Reality in Asia-Pacific study has been conducted twice in Asian countries including mainland China, Hong Kong, Korea, Malaysia, Philippines, Taiwan and Vietnam (12). In the first survey of more than 3,000 adults and children, more than 40% of asthmatics had at least one hospitalization or visit to the emergency department for acute exacerbation. Inhaled corticosteroid use was reported by only 13.6% of the respondents. Another study performed 10 years after the first survey showed that less than 5% of subjects achieved a level of complete control while more than one third of the subjects were in the uncontrolled asthma category. Similar to asthmatics in other parts of the world, patients in Asia tended to overestimate their level of control and tolerated a high degree of impairment of their daily activities (12-14). Most participants younger than 16 years old had inadequately controlled asthma (53.4%

‘uncontrolled’ and 44.0% ‘partly controlled’). The demand for urgent healthcare services (51.7%) and use of short-acting  $\beta$ -agonists (55.2%) were high (15).

- 2.4 There is little epidemiological data on asthma and allergy in Hong Kong adults. In a review of local data from public hospitals in 2005, asthma ranked fourth and fifth highest as a cause of respiratory hospitalizations (5.7%) and respiratory inpatient bed-days (2.6%) respectively, adjusted to the world population structure in 2002 for comparison purposes (16). The overall crude hospitalization rate for asthma in 2005 was 76/100,000, and was especially high at both extremes of age. The age-standardized mortality rate of asthma increased between 1997 (1.33/100,000) and 1998 (1.82/100,000), but decreased thereafter to 1.4/100,000 in 2005. The overall annual change in asthma mortality was -2% between 1997 and 2005, which was not statistically significant. The prevalence of current wheeze increased from 7.5% in 1991/1992 to 12.1% in 2003/2004 among subjects older than 70 years. The corresponding figures for asthma were 5.1% and 5.8% respectively.
- 2.5 A number of other significant studies have examined the prevalence of food allergies and adverse food reactions in a wide age range of Hong Kong children (9-11). These studies included a community study called EuroPrevall-INCO survey that reported the prevalence of food allergies among primary schoolchildren in China, India and Russia (17). This survey was funded by the European Commission in connection with the multi-national EuroPrevall study.
- 2.6 The main findings about food allergies in Hong Kong children are summarized below.
- In 2009 parent reported adverse reactions in preschoolers aged 2-7 years old was 8.1%. A study involving primary school children aged 7-10 years reported in 2010 that ‘probable’ food allergy in Hong Kong was 2.8%. In 2012 the prevalence of food allergy in children from birth to 14 years old was 4.8% of which shellfish was by far the commonest food causing allergic symptoms, alongside egg, milk, peanut and fruits. The variability of rates from the different surveys is likely caused partly by different methodology of the surveys; different diagnostic criteria for food allergies; and by the different age groups surveyed. Nonetheless, all the surveys suggest that a large number of children in Hong Kong have food allergies or intolerances.
  - Children with food allergies have 2-4 times higher rates of co-morbid conditions including asthma, rhinoconjunctivitis and eczema.
  - Strikingly 700/100,000 of the population (15.6% of children with food allergies) aged 14 years or less is estimated to have a risk of anaphylaxis which is high relative to other countries. Anaphylaxis is the most severe allergic reaction and can be fatal. Almost 50% of cases are estimated to be caused by foods with drug allergy also being a cause.

- 2.7 Regarding the epidemiology of other allergic diseases, Leung et al. reported glove-related symptoms in nearly one-third of 1,472 employees in a teaching hospital in Hong Kong (18). The majority of these subjects could be classified as glove dermatitis, whereas only 3.3% had symptoms suggestive of latex allergy. About 7 percent of 133 subjects had positive skin prick testing to one or more of the five latex extracts. There has not been any community study on the prevalence of other allergic diseases in Hong Kong.
- 2.8 In conclusion, it is clear that many children in Hong Kong have allergic diseases and the rate of the potentially fatal type of allergy, i.e. anaphylaxis, is high. In children allergy commonly affects multiple organs at the same time such as the lung, skin, nose and gut. For many allergic diseases such as rhinoconjunctivitis and eczema epidemiological data supports a rising trend. Many children also have food allergies which can result in anaphylaxis and death. From clinical experience, food allergy seems to be increasing too although there is no strong survey data to support this yet because detailed sequential studies have not been done. The prevalence of asthma has stabilized and may even be decreasing a little. There is very little data on the prevalence of allergic diseases in adults. Because only a minority of children grows out of their allergic diseases, the heavy burden of this problem will likely persist into adulthood. Thus, there are no grounds for optimism that the allergic disease burden would be substantially reduced in the adult population.

#### KEY POINTS

- Many children in HK have allergic diseases.
- The rate of the potentially fatal type of allergy, i.e. anaphylaxis, is high.
- In children allergy commonly affects multiple organs at the same time.
- For rhinoconjunctivitis and eczema epidemiological data supports a rising trend.
- Many children also have food allergies which can result in anaphylaxis and death.
- Food allergy seems to be increasing.
- The prevalence and mortality of asthma have stabilized and may even be decreasing a little, but in 2005 hospitalizations remained high at both extremes of age.
- There is very little data on the prevalence of allergic diseases in adults in HK. But only a minority of children will grow out of their allergic diseases so the problem will likely persist into adulthood. Thus there are no grounds for optimism that the allergic disease burden would be substantially reduced in the adult population.

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### 3.0 **Understanding allergy**

#### 3.1 **Do I have allergies?**

3.2 Many people may already be suffering from allergy symptoms day to day without realizing it. Do you sneeze, have itchy and runny nose when the season changes? Do you suffer symptoms of itching, skin rash or diarrhoea after eating certain foods? These might be signs of allergy.

3.3 Allergy is one of the most common chronic illnesses, and includes allergic rhinitis (nasal allergy), ocular allergy, atopic dermatitis, asthma, food allergy and insect allergy. Things that you commonly come into contact with daily might trigger allergic symptoms, causing significant symptoms.

#### 3.4 **How do allergic diseases develop?**

3.5 Allergic reaction occurs when your immune system reacts inappropriately to otherwise harmless substances.

3.6 One of the functions of the immune system is to identify substances that are harmful to our health and react accordingly to mitigate the danger. When pathogens such as viruses, bacteria and parasites invade and damage body tissue, danger signals are sent that enable the immune system to identify these pathogens as harmful. After the initial immune response, antibodies and memory cells are formed and re-exposure to the same pathogens subsequently will result in a much more rapid immune response.

3.7 On the other hand, when the immune system is exposed to harmless substances such as pollens, dust mites and food, in the absence of danger signals, the immune system identifies these substances as harmless and produces a tolerance response. Antibodies and cells that are capable of blocking or suppressing active immune reactions are produced, which prohibit immune reactions upon subsequent re-exposure to the same substances.

3.8 However, when the immune tolerance mechanism breaks down for whatever reason, the immune system then produces active responses to these harmless substances, which result in allergic diseases. Substances that cause allergy are called allergens.

#### 3.9 **What can cause the development of allergic diseases?**

3.10 Genetic factors

3.11 Allergic diseases are often inherited. During the first few months after birth, an infant's immune system is still developing and immunological tolerance still has not fully developed. Some studies showed that in babies who went on to develop allergies, their immune system might take longer than usual to fully mature, thus prolonging the window when allergies might develop.

- 3.12 Some infants with genetic variations that result in skin barrier dysfunction are also at risk of developing allergies. This might be due to increased exposure to allergens through the skin causing sensitization.
- 3.13 Environmental factors
- 3.14 Environmental factors present during infancy and early childhood have been found to exert a great influence in the development of allergic diseases. Studies have found that exposure to certain infections during early childhood has a protective effect on the development of allergic diseases. Exposure to certain pathogen products can speed up the maturation of the immune system and strengthen the types of immune responses that protect against allergy. Improvement in hygiene conditions in developed nations during the last two generations might be partly responsible for the rapid increase in the rate of allergic diseases seen in these populations.
- 3.15 Allergen exposure
- 3.16 The pattern of allergic sensitizations seen in different populations is closely related to the pattern of allergen exposure during early childhood. For example, patients who grew up in temperate climate are more likely to develop pollen allergy, whereas those patients who grew up in tropical climates might develop sensitivity to house dust mite. The pattern of food allergy is also dependent on the dietary habits of the community. For example, peanut allergy is very common in the UK and the USA, but is rare in Israel and Thailand, although peanut is a staple food in the latter two countries. Sesame allergy is the predominant food allergy in the Middle East and Japan, and sesame features prominently in the cuisine of both cultures.
- 3.17 **What happens during an allergic reaction?**
- 3.18 After you become sensitized to an allergen, whenever you are exposed to that allergen, you might develop allergy symptoms.
- 3.19 There are two main types of allergic reactions; antibody-mediated or cell-mediated reactions.
- 3.20 Antibody-mediated allergic reactions
- 3.21 Allergic reactions mediated by antibodies are also called Type-I hypersensitivity reaction or immediate-type allergic reaction. When the immune system becomes sensitized to the allergen, a type of antibody called IgE is produced to specifically react with that allergen. These antibodies go through the circulation and end up being trapped on the surface of immune cells called mast cells and basophils. These cells are mainly found in the skin, the respiratory tract and the gastrointestinal tract. When the patient is exposed to the allergen, the IgE recognizes the allergen and triggers the mast cells and basophils to release inflammatory mediators. These mediators can lead to swelling and leakage of blood vessels, itching and airway constriction. This type of reaction occurs very rapidly, usually within minutes of allergen

exposure. Allergic rhinitis, asthma, urticaria (hives), acute food allergy, insect sting allergy and some drug allergy reactions are caused by this type of response.

3.22 Cell-mediated allergic reactions

3.23 Cell-mediated allergic reactions are also called Type-IV hypersensitivity reactions or delayed-type allergic reactions. T-lymphocytes, a type of immune cells, become sensitized to an allergen, and upon re-exposure releases inflammatory mediators. This type of reaction typically occurs 24 to 48 hours after allergen exposure. Atopic dermatitis, contact dermatitis, certain food allergy and drug allergy reactions are caused by this type of response.

3.24 As different allergic diseases might involve different immune mechanisms, it is important to choose the correct tests to perform based on the medical history and examination.

3.25 **Determining the risk of developing allergy**

3.26 Since genetics have a strong influence in the development of allergic diseases, children whose parents suffer from allergic rhinitis, asthma, atopic dermatitis or food allergy are at higher risk of developing these diseases themselves.

<b>Parents with allergic diseases</b>	<b>Risk of offspring developing allergies</b>
Mother or father	20-30%
Both parents	50-60%
Both parents with same allergic disease	70% risk of developing same disease

3.27 The genetics of allergy is very complicated, and there is no reliable genetic test that can predict the risk of allergic diseases. Studies of umbilical cord blood samples showed that infants who subsequently develop allergic diseases have on average higher levels of IgE in their cord blood than infants who do not develop allergy. Immune cells from the cord blood of the allergic infants also show differences in certain functions.

3.28 Using cord blood IgE level and family history, it is possible to identify infants who are at high risk of developing allergic diseases. In future it would be interesting to see if measures taken during infancy and early childhood, such as dietary and environmental modifications, might lower this risk.

**KEY MESSAGES**

- Allergy is one of the most common illnesses in the world and may last a life time if not appropriately managed.
- Allergic reaction occurs when your immune system reacts inappropriately to otherwise harmless substances.
- Genetic and environmental factors including infections and allergen exposure contributes to risk of developing allergic disease.

#### 4.0 **What is Allergy and Clinical Immunology and what is the role of Allergists?**

4.1 Allergy and Clinical Immunology is a sub-specialty of Internal Medicine and Paediatrics. While most sub-specialties are organ-based, Allergy and Immunology training is based on knowledge of the immune system. The diseases most commonly seen by Allergists include the following:

1. Allergic rhinitis
2. Allergic conjunctivitis
3. Allergic otitis
4. Persistent cough
5. Hypersensitivity pneumonitis
6. Asthma
7. Atopic dermatitis
8. Contact dermatitis
9. Urticaria and angioedema
10. Cutaneous vasculitides
11. Food allergy
12. Drug allergy
13. Latex allergy
14. Insect allergy
15. Occupational allergy
16. Anaphylaxis
17. Mast cell and eosinophilic disorders
18. Immunodeficiencies (primary and acquired)
19. Systemic vasculitides
20. Conditions that mimic allergic disease (e.g. pseudo-allergy or food intolerance)

#### 4.2 **Role of an Allergist**

4.3 The World Allergy Organisation (WAO; a global federation representing 74 regional and national allergy and clinical immunology societies) (1) and The American Academy of Allergy, Asthma and Immunology (AAAAI) (2) have indicated that the role of an Allergist is to diagnose and manage patients suffering from the conditions listed above and are trained to perform/interpret the following:

1. A thorough clinical history detailing the patient's symptoms, past medical history, drug history, living and work environment and pertinent family history.
2. A thorough clinical examination with emphasis on the skin, eyes, upper respiratory system and lower respiratory system.
3. Skin prick tests for immediate-type hypersensitivity
4. Skin patch tests for delayed-type hypersensitivity
5. Oral challenge for food and drugs
6. Physical challenge such as heat, cold and exercise.
7. Lung function tests and inhalation challenges.
8. Skin biopsy.

9. Environmental assessment in home and work environments
10. Laboratory tests for allergy
11. Laboratory tests for autoimmunity
12. In vivo and in vitro tests for immune function assessment
13. Drug desensitisation treatment
14. Specific immunotherapy for environmental allergens
15. Food desensitisation treatment

#### 4.4 **What is unique about Allergists?**

4.5 The clinical areas covered by Allergists can overlap with other sub-specialties such as Dermatology, ENT, Respiratory Medicine and Rheumatology, but there is greater emphasis on the mechanism of disease rather than the effects on the target organs. Such an approach has the following advantages:

1. Most patients with allergies have multi-system involvement. Whereas an organ-based approach might involve multiple specialists, care can often be streamlined under one allergy-trained specialist.
2. The Allergist's approach is based on the disease mechanism, and aims to correct the underlying aetiology. Without knowledge of causation, any other approach can only deal with the symptoms.
3. A substantial part of an Allergist's training is in clinical and laboratory immunodiagnostic techniques, which is often missing from the training of organ-based subspecialties.
4. There is increasing emphasis on the prevention of allergic diseases, and Allergists are uniquely positioned to educate patients on this important subject.
5. There are allergic and immune conditions that do not fall under any other subspecialty, such as food allergy, drug allergy, insect allergy, occupational allergy, anaphylaxis, and immunodeficiencies. Without Allergists, patients suffering from these conditions would not have access to specialist care. Further allergies are much more common in immunodeficiency patients.

4.6 While most other sub-specialties focus on drug treatment of allergic diseases, Allergists are trained to follow a different approach. The main emphasis is on allergen avoidance, followed by drug treatment and finally allergen immunotherapy / desensitisation. It has been shown clearly that allergen avoidance and allergen immunotherapy can significantly reduce medication requirement, improve quality of life and reduce the cost of healthcare. To effectively implement allergen avoidance and immunotherapy, Allergists have unique training and experience in:

1. The biology of allergens such as pollens, moulds, insects and mites;
2. Food sciences;
3. Local cuisine and dietary habits
4. Occupational health and safety issues

#### KEY POINTS

- Allergy and Clinical Immunology is a sub-specialty of Internal Medicine and Paediatrics.
- Most patients with allergies have multi-system involvement.
- Whereas an organ-based approach to managing allergies might involve multiple specialists, care can often be streamlined under one allergy-trained specialist.
- The Allergist's approach is based on the disease mechanism, and aims to correct the underlying aetiology.
- There is increasing emphasis on the prevention of allergic diseases, and Allergists are uniquely positioned to help patients understand how to do this.

#### References

1. What is an Allergist? WAO Position paper 2008; 19-20.
2. A Rewarding Career in Allergy / Immunology; <http://www.aaaai.org/professional-education-and-training/careers-in-a-i.aspx>.

**5.0 How does HK compare with the rest of the world in the numbers of Allergy specialists?**

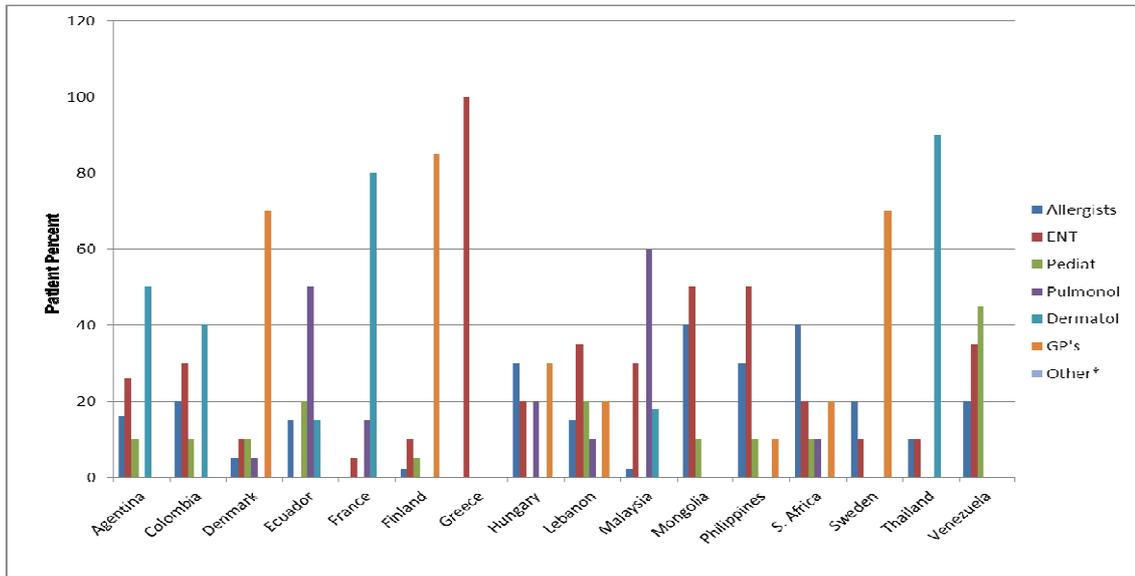
- 5.1 There are only four Immunology and Allergy specialists (Medical Council Specialist Registration S34) in Hong Kong registered by The Medical Council. Two of these Allergists, both of whom were trained abroad, are in private practice and two others are not involved in allergy practice to our knowledge. There are no registered Allergy specialists in adult medicine in public hospitals.
- 5.2 In addition there are 6 specialists in Paediatric Immunology and Infectious Diseases (PIID; (Medical Council Specialist Registration S56) of whom 2 are F/T and 4 are P/T working mainly in Allergy/Immunology practice in HA hospitals/university sector. There is another PIID specialist working in private practice. Most of these clinicians also consult for General Paediatrics; Immunodeficiencies; and other immunological problems in addition to allergic diseases. It is estimated, for example, that 90% of patients with major Immunodeficiencies in HK are under the care of PIID specialists at QMH.
- 5.3 Many patients with allergic diseases in HK are seen by non-allergy specialists, e.g. General Practitioners, or specialists in Dermatology, Respiratory Medicine, ENT, and Paediatrics. While these excellent clinicians undoubtedly have experience in looking after patients with allergies, it is unclear how many have received formal training in managing complex multi-system allergies or whether their CPD activities include allergy.
- 5.4 A recent survey (1) by the World Allergy Organization (WAO) is summarized in Table 1:

Country	Allergists per head of the population	Country	Allergists per head of the population	Country	Allergists per head of the population
Argentina	1:46,353	Honduras*	1:1,380,000	Romania	1:197,577
Australia	1:140,000	Hungary	1:50,000	Serbia/Montenegro	1:500,000
Belgium	1:900,000	Israel	1:52,000	South Africa	1:1,666,666
Brazil*	1:100,000	Italy	1:43,200	Spain*	1:44,000
Bulgaria	1:106,250	Japan	1:61,200	Sweden	1:42,857
Chile*	1:500,000	Lebanon	1:121,000	Switzerland	1:36,649
Colombia	1:571,428	Malaysia	1:25,000,000	Thailand	1:1,000,000
Czech Republic	1:17,543	Mexico*	1:175,000	Turkey	1:1,076,923
Denmark	1:135,000	Mongolia	1:2,250,001	United Kingdom	1:1,083,333
Ecuador	1:2,400,000	N. Zealand	1:440,000	Ukraine	1:94,441
El Salvador*	1:470,000	Paraguay*	1:200,000	Uruguay	1:110,000
Finland	1:94,545	Peru*	1:1,360,000	USA (ACAAI)	1:65,546
France	1:1,240,000	Philippines	1:66,115	Venezuela	1:109,090
Germany	1:16,000	Portugal	1:63,334	Hong Kong	1:1,460,000
Greece	1:183,333				

\*Figures from Latin American Society of Allergy, Asthma and Immunology survey

- 5.5 If one assumes that PIID specialists spend on average 0.4 of their time on Allergy work irrespective of whether they are full or part time (generous estimate), then HK has 2 FTE adult allergists and 2.8 FTE PIID specialists consulting for allergy. The overall ratio is therefore estimated to be around 1 allergist: 1.46 million population in HK, which is near the bottom of the league table 1.
- 5.6 There is a stark contrast in HK between the level of service provision for children compared to that for adults. There are around 1.3 million children <18 years old in HK (2), so the ratio of paediatric Allergists per head of population is around 1: 460,000 (1:540,000 in public hospitals) whereas the ratio for Allergist per adult patient is 1: 2.8 million (there are no Allergists for adult patients in public hospitals).
- 5.7 The very low numbers of Allergists (4.8 FTE) compares unfavourably to those in other specialties in HK, e.g. 226 Cardiologists, 164 Gastroenterologists, 162 Respiratory Physicians, 190 Otorhinolaryngology and 92 Dermatologists.
- 5.8 This data combined with the average waiting times at public hospitals of 6-9 months for a new Allergy appointment clearly indicates that the demands for Allergy services are unmet. The disease burden cannot be absorbed adequately by private practitioners as there are also very few private Allergists.
- 5.9 Laboratory support with a comprehensive portfolio of Allergy and Immunological tests is essential for the good practice of Allergy and Immunology. There are two HK Medical Council registered Immunologists (S44) who have also received some Allergy training. One of them directs a public laboratory service in Immunology and Allergy as well as providing a limited service for drug allergy while the other runs a HLA typing service and is not involved with allergy. Their budget does not allow a comprehensive menu of relevant tests to support the specialty. These two pathologists are distinct from specialists in Immunology and Allergy (S35) of which there are four, but only two of them practice Allergy.
- 5.10 In countries where there are more Allergists per head of population than in HK, patients still consult non-allergy specialists instead of an Allergist even for a condition that often has an allergic cause, ie rhinitis (figure 1). This finding suggests that there is probably a relative global lack of understanding of what Allergists can offer in healthcare. Much needs to be done in public and professional education

Figure 1 Percent of patients with rhinitis consulting different specialists



5.11 In the absence of Allergists patients may suffer because they may find it hard to get state-of-the-art medicine and diagnostics. Pharmaceutical companies are less likely to register their products in a country where the drugs will be prescribed only rarely. In HK drugs can be imported on a named patient basis with special permission from the Department of Health but this delays treatment. Furthermore there is a high probability that unproven diagnostic procedures and therapies could be introduced if mainstream medicine is unavailable, e.g. kinesiology, hair analysis, cytotoxic tests, iridology, vega testing; or conventional tests are used inappropriately, including measurements of specific IgE and IgG (3). Finally, with a lack of Allergy specialists, it becomes difficult to train future generation of clinicians, researchers and teachers in Allergy.

## KEY POINTS

- There are very few registered Allergists in HK (overall about 1:1.46 million head of population). This ratio is low compared to international figures.
- The ratio of Paediatric Allergists per head of population is around 1: 460,000 and the ratio for Allergists per adult patients is 1: 2.8 million, so there is a severe lack of adult Allergists while the Paediatric Allergists only work a fraction of their time on allergy.
- There are no Allergists for adult patients in public hospitals.
- Most patients with allergies are seen by GPs and non-specialists in Allergy who may not be trained in managing complex multisystem allergies.
- In the absence of Allergists patients may suffer because they may find it hard to get state-of-the-art medicine and diagnostics.
- Unproven diagnostic procedures and therapies could be introduced if mainstream medicine is unavailable, or conventional tests could be used / interpreted inappropriately if there are no specialists.
- If there is a lack of Allergy specialists, it becomes difficult to train future generation of clinicians, researchers and teachers in allergy.
- In HK there are two Medical Council registered Immunologists (S44) who have also received some Allergy training. One of them mainly directs a public laboratory service in Immunology and Allergy at QMH but also provides a limited service for drug allergy while the other runs a HLA typing service and is not involved with allergy. Their budget does not allow a comprehensive menu of relevant tests to support the specialty. These two pathologists are distinct from specialists in Immunology and Allergy (S35) of which there are four, but only two of these are Allergists (both in private practice).

## References

1. Warner JO, Kaliner MA, Crisci CD, et al. World Allergy Organization Specialty and Training Council. Allergy practice worldwide: a report by the World Allergy Organization Specialty and Training Council. *Int Arch Allergy Immunol* 2006; 139:166-174.
2. [www.childrenrights.org.hk/v2/web/textversion.php?page=03hksit00&lang=en](http://www.childrenrights.org.hk/v2/web/textversion.php?page=03hksit00&lang=en)
3. Wuthrich B. Unproven techniques in allergy diagnosis. *J Invest Allergol Clin Immunol* 2005;15:86-90.

- 6.0 **What are the requirements in setting up an Allergy service?**
- 6.1 The requirements for a comprehensive service have recently been summarized (1) and include:
- 6.2 A high quality, accessible and sustainable service for patients with allergic disorders that meets the needs of the local community, using resources effectively and incorporating patients' views.
- 6.3 Holistic, excellent and multidisciplinary following best practice guidelines from authoritative bodies whenever possible.
- 6.4 Have the required expertise to diagnose, assess and treat patients with severe and complicated allergic conditions. This should include:
1. Accredited specialists in allergy and immunology who are up-to-date with their CPD
  2. Technicians/nurses who are up-to-date with CPD and trained to perform skin tests, challenge tests and lung function tests
  3. Nurses who are up-to-date with their CPD and trained to administer and monitor allergen immunotherapy.
  4. Dietitians who are up-to-date with their CPD to advise patients on food avoidance
- 6.5 To integrate care with primary and other care providers and to establish links with other Centres at both national and international levels where appropriate.
- 6.6 Address individual needs for environmental control, including home therapy and desensitization treatment (when indicated).
- 6.7 To deliver the aim to improve life expectancy and quality of life for allergic children and adults.
- 6.8 The provider shall deliver a diagnostic package for the investigation of suspected allergic diseases, including; initial consultation and follow-up in a dedicated allergy clinic, allergy tests, food/drug provocation challenges, and respiratory / ENT investigation and desensitization where indicated. Specifically this should include:
1. Complex skin testing using drugs/food/venom/latex (skin prick/intradermal).
  2. Component-resolved and other in-vitro specialist diagnostic testing.
  3. Allergen challenges – e.g. aspirin, Non-steroidal anti-inflammatories, antibiotic, other drug, food or other allergen challenges for high-risk patients where necessary.
  4. Methods, in addition to spirometry, to investigate asthma including: non-specific bronchial challenge with methacholine, mannitol or histamine to define airway hyper-responsiveness, or methods to measure airway inflammation such as induced sputum, exhaled NO where necessary.
  5. Access to bronchoscopy services for investigation of resistant asthma.

6. Access to endoscopy services for patients with eosinophilic enteropathies.
  7. Radiology.
  8. Specialised Immunology Laboratory services with appropriate accreditation for allergy and immunology testing.
  9. Access to molecular techniques to diagnose myeloproliferative disorders involving eosinophils and mast cells including, a full range of fungal IgE testing, parasite serology, T cell phenotyping, radiology including CT scan and cardiac MRI, EMG studies, bone marrow examination and advanced molecular detection of c-kit and FIP1L1-PDGFRalpha mutations associated with mastocytosis and myeloproliferative hypereosinophilic syndromes.
  10. The provider shall provide regular dedicated allergy outpatient clinics for assessment and follow-up.
  11. Access to hospital-based day-care and in-patient facilities. This will comprise:
    1. Adequate clinical space in relation to the number of patients being treated.
    2. Adequate space for patients receiving infusions or training.
    3. A safe working environment for staff.
    4. Access to an appropriately staffed day-case facility that can provide immunotherapy and Biologic infusions. This service should be supported by clear guidelines, protocols, and pathways for patient care.
- 6.9 The provider shall provide support to other clinical specialties for complications of severe and multisystem allergic diseases.
- 6.10 The provider shall have appropriate pharmacy facilities including: appropriate storage and dispensing facilities for drugs and immunotherapeutic products. Pharmacy storage facilities for immunological therapies and good documentation of dispensing to individual patients.
- 6.11 The provider shall provide patient self-care as an option in their management based on the patients' wishes, abilities and circumstances, to include:
1. Provision of information about when to seek advice for new or severe symptoms suggestive of poor control, new sensitivities or increased risk of severe reactions.
  2. Competency testing (for example in use of adrenaline auto-injector devices).
  3. The provider shall ensure that management of those allergies requiring other/new treatments (e.g. monoclonal antibodies or cytokines) on a named patient basis, where there is a suitable evidence base. This includes day case attendance, nursing supervision, the drug, pumps for subcutaneous or intravenous use, monitoring by biochemical tests, specialised immunopathological tests and medical follow-up.
  4. There are mechanisms to ensure there is documented consent before undertaking drug or food provocation.

5. There is emergency equipment immediately available for treating anaphylaxis.
6. There should be development of transition services for children with complex allergy before referral to adult services and shared protocols between child and adult services should be established.

#### KEY POINTS

- The provider shall deliver a diagnostic package for the investigation of suspected allergic diseases, including; initial consultation and follow-up, specialised allergy tests, food/drug provocation challenges, and respiratory / ENT investigation and desensitisation where indicated.
- The service should not only be excellent but be holistic and multidisciplinary following best practice guidelines from authoritative bodies whenever possible.
- The service should be staffed by accredited specialists in Allergy and Immunology. Technicians/nurses should be trained to perform skin tests, challenge tests and lung function tests. Nurses should be trained to administer and monitor allergen immunotherapy. Dietitians to advise patients on food avoidance.
- Integrate care with primary and other care providers and to establish links with other Centres at both local and international levels where appropriate.
- The service should be supported by clear guidelines, protocols, and pathways for patient care.
- Supported by specialised Immunology laboratory services with appropriate accreditation for Allergy and Immunology testing.
- Address individual needs for environmental control.
- There should be adequate dedicated clinical space in relation to the number of patients being treated with immediate access to resuscitation facilities for treating allergic emergencies.

#### Reference

1. NHS Commissioning Board 2013 NHS Standard Contract 2013/4 for Specialised Allergy Services; (BS9/S/b)

## **7.0 What is the provision of allergy services in public hospitals in HK?**

7.1 Current situation for children

7.2 There are 12 acute paediatric units admitting children and adolescent from 0 to 18 years of age for various acute exacerbations of diseases, including systemic allergic reactions and acute asthmatic attacks. The level of acute care is safe, good and comprehensive including intensive care unit (ICU) support when indicated. HA data has suggested 1 in 10 with anaphylaxis attending Acute Emergency Departments (AED) has been admitted to Paediatric ICU (PICU) facility.

7.3 Ambulatory and outpatient care follow up are sometimes fragmented, especially in terms of prevention of anaphylaxis and work up for identifying allergens.

7.4 Adrenaline auto-injector (e.g. EpiPen) availability was very limited although much improved recently probably as the result of an audit report identifying the unmet need.

7.5 Only four units have designated allergy clinics to work on food and drug allergy (QMH, PWH, PMH and QEH). Some paediatricians with gastrointestinal (GI) training also show interest to look after non-IgE mediated food allergy with predominant GI symptoms.

7.6 The scope of allergy service of these units include acceptance of referrals from HA paediatricians for:

7.7 Highly suggested indications:

1. Investigation and management of anaphylaxis\*
2. If multiple food allergy ( $\geq 3$ ) is suspected<sup>^</sup>
3. If problematic drug allergy is suspected<sup>#</sup>
4. For supervised food challenge or drug challenge procedures where appropriate
5. For consideration for allergen immunotherapy
6. Latex and insect allergy with systemic reactions
7. Rare disorders eg Hypereosinophilic Syndrome, mastocytosis etc
8. Drug desensitization
9. Food allergy-Oral tolerance induction
10. Use of various biologics eg Anti-IL 5 antibody, Anti-IgE therapy

7.8 Optional indications:

1. Chronic /recurrent urticaria where allergy is suspected
2. Poorly controlled eczema despite conventional treatment
3. For specialist allergen-avoidance advice
4. For allergen tests where local availability for tasting is a problem

7.9 Remarks:

\*Anaphylaxis

1. Individuals with a severe allergic reaction (anaphylaxis) without an

- obvious or previously defined trigger.
  - 2. Persons with anaphylaxis attributed to food or drugs.
- 7.10 ^Multiple Food Allergy
  - 1. Persons who have limited their diet based upon perceived adverse reactions to foods or additives.
  - 2. Persons who have experienced allergic symptoms (urticaria, angioedema, itch, wheezing, gastrointestinal responses) in association with food exposure.
- 7.11 # Multiple Drug Allergy
  - 1. Patients with a history of penicillin allergy who have a significant probability of requiring future antibiotic therapy or have an infection in which a penicillin-class antibiotic is the drug of choice.
  - 2. Patients with histories of multiple drug allergy/intolerance.
  - 3. Patients with a history of possible allergic reactions to biotherapeutics, NSAIDS, chemotherapy medications, local anesthetics, or other drugs they may need.
- 7.12 Chronic Urticaria/Angioedema
  - 1. Patients with chronic urticaria or angioedema, i.e. those with lesions recurring persistently over a period of six weeks or more.
  - 2. Patients who may have urticarial vasculitis or urticaria with systemic disease (vasculidities, connective tissue disease, rarely malignancies).
- 7.13 Respiratory allergy (patients with following characteristics could also be considered for referral)
  - 1. Patients with potentially fatal asthma (prior severe, life threatening episode or prior intubation)
  - 2. Asthma and rhinitis seeking advice for allergen immunotherapy
  - 3. Patients with multiple allergic/atopic symptoms interfering with quality of life and/or ability to function.
  - 4. Patients who multiple allergic symptoms have found medications to be ineffective or have had adverse reactions to previously prescribed medications
- 7.14 Most of paediatric units in HK have asthma clinics which are run by Paediatricians with respiratory training. The level of care is considered superb.
- 7.15 Care of allergic rhino-conjunctivitis is largely provided by General Paediatricians in conjunction with other organ specialists such as ENT Surgeons and Ophthalmologists in most of the units, with very long waiting time ranging from 6 to 12 months.
- 7.16 Five units have Dermatology clinics (QMH, PWH, United Christian Hospital (UCH), Caritas Medical Centre (CMC), Pamela Youde Nethersole Eastern Hospital (PYNEH) run by Paediatricians with Dermatology training but also seeing some patients with allergies. If referrals are not made to these services they have to be referred to Dermatology Clinics run by Department of Health.

- 7.17 Currently there is one single Immunology/Allergy public laboratory service in QMH that provides limited numbers of specific IgE, HLA and tryptase tests.
- 7.18 Clinical investigational labs for in vivo allergen skin tests and challenge protocols are run by specialists in Paediatric Immunology and Infectious Disease (PIID) or Paediatrics. Food and Drug Challenges are provided at QMH and PWH on a regular basis but may be occasionally provided by other units QEHL, PMH, and Kong Wah Hospital. The waiting time is generally about 6 months. There are no commonly accepted local challenge protocols so those used by internationally esteemed paediatric Allergy Centres are followed.
- 7.19 Currently the four PIID Centres have two FTE staff (QMH (Consultant -HA staff) & PWH (Professor -University staff) ) + four Part time staff ( Associate Consultant-QMH; 2 Associate Consultants –QEHL; Associate Consultant - PMH)) who work mainly on food and drug allergies. The trained dietitian and nurses have been working only on a part-time basis. There is also one private PIID specialist.
- 7.20 A summary of the perceived major service gaps in diagnosis and management of paediatric allergic diseases based on a survey by the Paediatric Allergy Working Group is shown in table 2.

Table 2

<h2>Summary of Major Service Gaps in Diagnosis and Management of Allergy Diseases</h2>	
<p><b>Clinical (Paediatrics)*</b></p> <ul style="list-style-type: none"> <li>• <b>Inadequate coordination of allergy diagnostic service</b> <ul style="list-style-type: none"> <li>– Non-standardised investigation protocol:               <ul style="list-style-type: none"> <li>(i) skin vs blood tests</li> <li>(ii) variable “allergen panel” for foods and inhalants</li> </ul> </li> <li>– Allergy testing performed in:               <ul style="list-style-type: none"> <li>(i) HA lab in QMH</li> <li>(ii) Private labs (SFI or paid by HA)</li> </ul> </li> </ul> </li> <li>• <b>Lack of standardised protocols for food and drug challenges</b></li> <li>• <b>Inadequate manpower</b> <ul style="list-style-type: none"> <li>– PIID subspecialty established in Dec 2012</li> <li>– 4 accredited training centres</li> <li>– 11 First Fellows (only 3 of them have qualified training in allergy)</li> <li>– Multiple food allergy patients seen in all paediatric departments with variable standards of care</li> <li>– Very busy clinics with limited time for patient education (e.g. eczema care, allergen avoidance, EpiPen use, anaphylaxis action plan)</li> <li>– Only QMH and PMH have a dedicated allergy nurse</li> <li>– No dietetic support for food challenges</li> </ul> </li> </ul> <p><small>* Based on a recent survey by the Paediatric Allergy Working Group</small></p>	<p><b>Pathology</b></p> <ul style="list-style-type: none"> <li>• Laboratory testing           <ul style="list-style-type: none"> <li>– Current resource on reagents is insufficient to cover the clinical needs</li> <li>– Existing tests include only a limited number of serum IgE against a panel of common allergens</li> <li>– Tests of better diagnostic values (allergen component tests, cellular assays) have not been developed and hence unavailable to clinicians</li> <li>– Tests for non-IgE mediated immune pathway (delayed hypersensitivity type) such as cytokine induction test and lymphocyte transformation test have not been developed and unavailable to clinicians</li> </ul> </li> </ul>

- 7.21 *Patient support*  
The Hong Kong Allergy Association (Allergy HK) and Hong Kong Asthma Society are the two charities that support the community most in this area of work and they both collaborate closely with health professionals.
- 7.22 *Clinical guidelines*  
Local anaphylaxis guidelines have been drafted and pending approval and implementation. The College has issued guidelines to improve care for atopic dermatitis. Different units may have different in house guidelines for asthma or adopted from international guidelines.
- 7.23 *Allergen immunotherapy*  
The practice is very limited in public service. The reasons are multifactorial and include reasons of affordability, availability and accessibility.
- 7.24 *Resources*  
Lack of central funding may seem to be a hindrance, but the real bottle neck is the shortage of skilled staff. Many trained nurses have left their job or have been redeployed to other areas. To cater for the current service demands and to achieve reasonable waiting times, more staff should be trained urgently, i.e. Resident Trainee, Advanced Practicing Nurses and even clerical support.
- 7.25 **Current situation for adults**
- 7.26 The situation with adult allergy clinical service provision, training and research is grossly inadequate.
- 7.27 There is currently no formal allergy clinical service being provided in the public sector. Clinicians, including a few Dermatologists, Respiratory Physicians and Otolaryngologists, who have an interest in allergy provide an ad hoc service to patients with various allergic disorders. Limited skin prick tests are provided separately by the Division of Respiratory Medicine and Division of Clinical Immunology (Pathology) at Queen Mary Hospital. There are, however, no specialty nurses or technicians specially trained in this area. In 2013, the Division of Rheumatology and Clinical Immunology, together with the Division of Clinical Immunology (Pathology), set up a Drug Allergy Clinic in Queen Mary Hospital to provide consultations for Hong Kong West Cluster patients. Because of resource restrictions, these consultations are limited to the diagnosis and confirmation of general anaesthetic and antibiotic allergies.
- 7.28 Since the establishment of the Hong Kong Academy of Medicine and the Specialist Register of the Medical Council of Hong Kong in 1993, there have been four accredited specialists in Allergy and Immunology, of whom only two practice Allergy as a major. Both currently work in the private sector. Hong Kong has produced only one locally trained Immunologist who is an HIV specialist currently working under the Department of Health. There have been no trainees in Allergy and Immunology since 1998.

## 7.29 **Drug Allergies**

7.30 This is a specialised area within an Allergy Service. Data retrieved as at 30<sup>th</sup> June 2013 indicated that the numbers of patients with a drug allergy are almost 400,000 with 44,018 having 3 or more drug allergies. Almost 5000 patients (mainly adults) have 3 or more antibiotic allergies. This is a huge potential clinical workload that impacts on many other specialties and is a growing area of allergic disease which needs to be addressed urgently.

## 7.31 **Laboratory support services for Allergy/Immunology**

- 7.32 Only one laboratory service for Allergy/Immunology in HK is directed by accredited Immunologists in the public sector (at QMH). It does not offer a complete portfolio of tests because of budgetary constraints. It has been proposed to:
1. Increase the numbers of specific IgE assays to whole allergen extracts from 1,000 to 9,700 tests per year. This would cover the screening of moderate/severe atopic dermatitis patients and increase the available food allergens from 8 to 15.
  2. Introduce singleplex (food only) and multiplex allergen component tests - 1600 and 100 tests per year respectively.
  3. For drug allergy, it was proposed to introduce serum specific IgE (400 tests per year), basophil activation tests (1200 tests per year) and lymphocyte transformation and elispot tests (80 tests per year).
  4. Introduce molecular allergology.

However all requests for moderate service growth as above have been declined so far.

### KEY POINTS

- Delivery of Allergy services in public hospitals is fragmented and limited. Services where existent are led mostly by non-specialists.
- PIID has tried to give some cohesion by developing a network of four contributing Centres but the service is still limited by insufficient manpower.
- The situation with adult allergy clinical service provision, training and research is grossly inadequate.
- There is currently no formal allergy clinical service being provided in the public sector.
- Waiting times for even the simplest of allergy testing such as skin prick testing is unacceptably long (6 months).
- Demand for allergy services and Allergists are largely unmet.
- Drug Allergy is a huge potential clinical workload that can impact on the practice of Medicine by many specialties and this problem also needs to be addressed urgently.
- There are very few local guidelines for managing allergic diseases.
- The use of allergen immunotherapy - an essential tool in allergy treatment - is very limited.
- Laboratory support for Allergy and Immunology is inadequate.
- There is no HK-wide school policy on training of teachers / school nurses on use of adrenaline in an allergic emergency or the desirability for schools to hold one or two generic adrenaline auto-injectors.

- 8.0 **Training**
- 8.1 **Higher Subspecialty Training in Paediatrics - Paediatric Immunology and Infectious Diseases (PIID)**
- 8.2 The Hong Kong College of Paediatricians bears a statutory responsibility to ensure the standard and quality of paediatric practice through reliable system of training, accreditation, and continuous professional development. The programme in General Paediatrics has been running effectively for many years. With the progress in tertiary services and the planning of the future Hong Kong Children Hospital (HKCH), there is a need for a proper accreditation system of subspecialists.
- 8.3 The College set up a Task Force for Accreditation of Higher Training of Paediatric Subspecialties on 4th May 2000. The Task Force presented to the College a Guideline on the Criteria for the Accreditation of a Paediatric Subspecialty Training Programme in January 2004.
- 8.4 The Task Force was replaced by the Working Group on Accreditation of Paediatric Subspecialties, with broader terms of reference and membership, on 8th September 2008 to continue the work.
- 8.5 At the Council meeting of HK College of Paediatricians on 12th May 2009, the College Council endorsed an amendment of the Byelaws by adding a section on Subspecialty affairs. The Director of Subspecialty Board was appointed on 9 September 2010. Paediatric Immunology( Allergy) and Infectious Diseases became the first Paediatric Subspecialty of the Hong Kong College of Paediatricians and the first Fellowships of the subspecialty was conferred in the 21st Annual General Meeting of the College held on 2nd December 2012. Among the 12 first fellows of PIID, five work principally in the field of Immunology and Allergy.
- 8.6 Paediatric Immunology and Infectious Diseases (PIID) is registered in the Specialist Register in The Medical Council of Hong Kong (Medical Council Registration S56) since 16 November 2012. Four paediatric units of four regional hospitals (QMH/HKU, PWH/CUHK, PMH, QEH) are accredited to be the training Centres and they have formed a training network. Allergy is an integral part of PIID programme.
- 8.7 **Programme for Paediatric Immunology and Infectious Diseases training**  
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 four hospitals to optimize the training opportunities.
- 8.8 According to the newly accredited subspecialty PIID programme by Hong Kong College of Paediatricians, it probably needs at least minimum of 8 years of training before one can call himself a PIID specialist and be registered with Hong Kong Medical Council. Allergy training is an integral training of PIID. Explicitly, trainees must have completed 3 years basic training in General Paediatrics and have passed the Joint MRCPCH (UK) / Hong Kong College of

Paediatricians Intermediate Examination. The trainee then has to complete 3 further years of higher training and pass exit an examination before he or she can be qualified as a General Paediatrician. PIID programme allows one year of overlapping programme during higher training and two additional year of PIID training (total 3 years). This is a long training and high investment costs from both institution and trainees' perspectives. In the public sector, the PIID specialist may not be able to provide a full time allergy service due to the service model constraints in most of the Centres. Due to many competing interests, PIID readily loses trainees to other programmes. A clear career pathway may help to attract those who have a strong interest in allergy practice.

- 8.9 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.
- 8.10 All trainees undergo mandatory core training of 12 months of Immunology module (of which 6 months would be rotated to an accredited Immunology training centre with bone marrow transplantation, currently QMH and PWH) and 12 months of Infectious Diseases module (of which 6 months would be spent in the Infectious Disease Centre of PMH). Trainees are encouraged to have a balanced exposure of ID and Immunology through the 2-year core programme. The Training Programme Director holds responsibility to steer the training profile of individual trainee prospectively.
- 8.11 All trainees are advised to receive 6 months of overseas training in Infectious Disease / Immunology at tertiary referral Centres, and another 6 months of elective training in related disciplines. Prior approval of these programmes by the Training Programme Director is required.
- 8.12 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 3-year training, trainees are encouraged to pursue basic or clinical research projects. Supervision is provided by trainers who have achieved stature as clinicians, educators, and scientists.
- 8.13 **Accredited PIID Training Centres**  
Four hospitals (QMH, PMH, PWH and QEH) have formed a training network to be complementary to each other. Each has 2-3 dedicated senior doctors with suitable PIID subspecialty training as well as impressive nursing and allied professional support. The range, breadth and depth of clinical workload are more than justifies the subspecialty. Allergy Training is provided mainly by 2 teaching units (QMH&PWH).

- 8.14 There are excellent facilities and staff in each centre, different Centres offer different aspects of training and are highly complementary. Rotation of trainees to at least two Centres and ideally 3 or even 4 will give by far the best training opportunities.
- 8.15 **Higher training in Allergy in adult medicine**  
Allergy and hypersensitivity is one of the five areas of knowledge requirement in the training in Allergy and Immunology under the Hong Kong College of Physicians. The other four areas include autoimmune and immune complex diseases, primary and secondary immunodeficiency, transplantation and lymphoproliferative diseases.
- 8.16 Training in a single subspecialty under the Hong Kong College of Physicians normally takes three years although most trainees opt for dual 4-years training in Advanced Internal Medicine (two years) and one other medical subspecialty (two years). With the 3-years Allergy and Immunology programme, trainees are required to undergo two years of supervised and accredited core training in a minimum of two clinical units. Laboratory experience is essential and trainees are required to spend six months full time or 12 months part time in an immunology laboratory. Further, a maximum of six months experience in an elective area or full time engagement in a research project is permitted. Institutional requirements include staffing by a College accredited trainer and support of an immunology laboratory, or be closely affiliated with one. Overseas training requires prior approval by the College.
- 8.17 Training in adult Allergy is hampered by the lack of trainers and the virtually non-existence of an Allergy clinical service in the public sector. Further, the Division of Clinical Immunology of the Department of Pathology at Queen Mary Hospital is the only establishment that provides the necessary laboratory support.
- 8.18 **Immunology**  
Training of Immunology under the Hong Kong College of Pathologists is a 6-year program of which 1-year training in clinical medicine (preferably Internal Medicine or Pediatrics) and 1-year training in other Pathology disciplines are compulsory. The goal of training is to produce specialist Immunologists who are able to direct a laboratory service in Clinical Immunology and tissue typing; to advise clinicians on the management of immunological disorders, including allergy, autoimmunity, immunodeficiency and malignancy of the immune system. At present such training is only available in Queen Mary Hospital where there are two Immunologists.

#### KEY POINTS

- There are inadequate numbers of trainees in Allergy and not enough trainers.
- GPs have either no or only minimal training in Allergy.
- The subspecialty of PIID that includes Allergy has recently been approved, which is well conceived and operational with a network of training Centres.
- Adult Internal Medicine has a training curriculum that encompasses Allergy and it is being updated.
- PIID has many more trainees than the adult specialty.
- There have been no trainees in Allergy and Immunology in adult allergy since 1998.
- Training in adult Allergy is hampered by the lack of trainers and the virtually non-existence of an Allergy clinical service in the public sector.
- The Division of Clinical Immunology of the Department of Pathology at Queen Mary Hospital is the only establishment that is directed by accredited Immunologists which provides limited laboratory support.

## 9.0 **Conclusions and recommendations**

- 9.1 Allergic diseases are becoming increasingly common in HK as in the rest of the world, but allergy service provision and training in HK lags behind many countries. This is especially true in adult Allergy which is grossly deficient. Development of Paediatric Allergy and Allergy/Immunology laboratory support are also being held back by resource and manpower constraints.
- 9.2 With the introduction of potent targeted biologics; greater understanding of the genetics and epigenetics determining allergic disease expression; improved strategies and vaccines for allergen-specific desensitization; novel approaches to allergy prevention; and the advent of an era of stratified medicine; the need for more Allergists, allergy services, research and trainees in the specialty have never been more urgently required.
- 9.3 In an otherwise high quality healthcare landscape in HK, allergy services and training are a seriously unmet need and for adult allergy the situation is shocking. The deficiencies should be remedied without delay for the benefit of our patients.

## 9.4 **Recommendations**

- 9.5 We recommend that urgent advice is sought from the major stakeholders, including but not limited to HA; HK Colleges of Physicians, Paediatricians, General Practitioners and Pathologists; HK Academy of Medicine; and the Universities, on how one might remedy the unmet need for Allergy services and Training in HK.

## 9.6 *Model and location*

1. We recommend that the best model for Allergy service delivery is a “hub and spokes” model. The “hub” would act as a central point of expertise with outreach clinical services, research, education and training provided to doctors, nurses and allied health professionals in primary and secondary care (the “spokes”). In this way, knowledge regarding the diagnosis and management of allergic conditions could be disseminated throughout the region. The hub and spokes in its entirety forms the “Allergy Centre”. The hub should lead and coordinate the activities of the entire Centre.
2. Each hub should have an Allergy service for both adults and children to increase critical mass and can share in knowledge transfer and resources.
3. In addition to hubs a network of satellite allergy services could be established at different hospitals (for instance by changing the emphasis of one or two existing clinics a week designated for Respiratory Medicine, Otorhinolaryngology and/or Dermatology to become allergy clinics), which can then link to one of the allergy hubs for academic, clinical and educational support. This solution might not incur substantially more resources as the complex multi-system allergy

cases could be siphoned off from the other clinics and collected up for management in a new dedicated allergy service.

4. We recommend that paediatric and adult services in an Allergy Centre should each be led by an Allergy specialist and each should be supported by at least one other clinical colleague (another Allergy specialist or an organ specialist with a special interest in allergy), at least one trainee, specialist dietitian and specialist nursing support +/- a technician for routine allergy testing, counselling and education.

#### 9.7 *Adult Allergy*

1. Adult allergy is in a particularly parlous state with no specialists and no dedicated allergy service in the public sector. It requires an urgent remedy. We recommend that two pilot Allergy Centres are created and an Allergy specialist (from overseas if necessary) is recruited to each Centre to kick start the adult service and to oversee a training and research programme.
2. We recommend that each new appointee is a joint appointment between the HA and an university. Each appointee should be supported by 3 trainees, specialist nurse and dietitian.
3. We recommend that the two pilot Allergy Centres should be located at QMH/HKU and PWH/CUHK (hubs), so that Hong Kong, Kowloon and New Territories are covered. Two pilot Centres are required because of the heavy burden of allergic disease and the capacity of a solitary Centre in HK would very soon be overloaded. Both QMH and PWH have a long distinguished history for looking after children with allergic and immunological diseases, but both lack a dedicated Allergist in adult medicine. Creation of an Allergy Centre that integrates existing strengths in paediatric clinical/academic/education in allergy with a new adult clinical/academic allergy service would be a major catalyst to bridging the obvious gaps in service and academic provision. Formal designation of both hospitals as pilot Allergy Centres could also provide formal encouragement to hospital and university management for some internal realignment of resources. Finally creating these innovative Allergy Centres could provide significant opportunities to attract private funding from benefactors to grow the discipline subsequently.
4. We recommend that metrics for success of each pilot Centre be pre-defined and progress in the first 5 years be assessed against those goals. If the pilot is successful, then the model should be continued and could even be extended to other suitable clinical-academic Centres.
5. We recommend that the HKCP training curriculum for Immunology and Allergy is updated as soon as possible. In addition we suggest that the HKCP and HKCPATH consider creating an intercollegiate training programme in Immunology and Allergy to produce Clinical

Immunologists who will direct Allergy/Immunology laboratories and consult for allergic patients.

6. We recommend the training of Allergy as a major to be included in the College training guidelines in Allergy & Immunology.
7. We recommend that Fellowships are established to allow trainees to go overseas for a period of intense allergy training until a time that they can be fully trained in HK.
8. We recommend four Allergy & Immunology trainees majoring in Allergy are recruited every four years.

#### 9.8 *Paediatric Allergy*

1. It is envisaged to develop an Immunology and Allergy Centre in HKCH for management of complex allergy cases from 2018 onwards (a hub). A team of core medical and nursing staff will be based at HKCH but will have an outreach programme by linking up with other network hospitals (Figure 2).
2. When the HK Children Hospital (HKCH) is operational there will need to be some reorganisation with parts of the top tier paediatric Allergy services in the “hub” hospitals being decanted to the HKCH (which will then become the new hub), leaving satellite services in previous “hub” hospitals (the spokes) in situ.
3. To facilitate a smooth transition to the HKCH we recommend at least 4-5 FTE PIID specialists majoring in Allergy/Immunology to be appointed to run the top tier service in HKCH, to provide training and conduct local relevant audit/research (hub). A further 12 PIID specialists will be required to provide step-down and secondary services in both the training (PMH, PWH, QEH, QMH) and non-training (other HA paediatric units) posts for the specialty and general paediatrics (spokes).

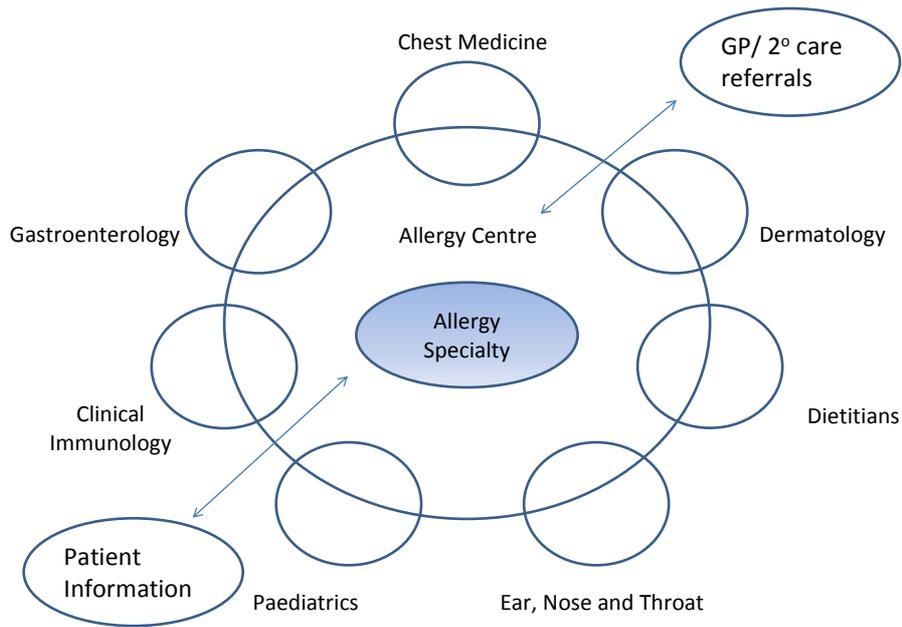


Figure 2: Hub and spoke model for a Paediatric Allergy Centre

4. We recommend that common protocols, guidelines, care pathway and a referral network especially for complex cases should be agreed and formally created.
5. We recommend that four PIID trainees are recruited every 3 years, of which at least 2 Resident Specialists (RS) should be trained majoring in Allergy / immunology indefinitely. This will maintain a sustainable public workforce for specialty development and to cover for normal turn over. It should then be possible to produce 12 PIID specialists in 3 cycles (around 9 years) of whom 50% will have majored in allergy/immunology with the rest in Infectious Diseases. Therefore the estimated total required workforce for PIID in the public sector for the hub and spoke model could be 18-20 with 8 in the hub (4-5 in Allergy and Immunology and 2-3 in Infectious Diseases) and about 12 in the spokes working in both the specialty and General Paediatrics.
6. We recommend that Allergy is added to the title of the PIID training programme so it will become Paediatric Immunology Allergy and Infectious Diseases (PIAID) programme and the Paediatric discipline should also be so named.

### 9.9 Drug Allergy

1. Drug Allergy is a specialised branch of Allergy. It is common and constitutes a major clinical problem, which needs to be managed by Allergy specialists. We recommend resources to be made available to establish two separate supra-regional Drug Allergy Services at QMH and PWH (as they already have a limited service) to cover Hong Kong Island and Kowloon/New Territories. This could be part of the new pilot Centres.

#### 9.10 *Laboratory Support*

1. We recommend that two supra-regional labs for HK should be created with a focus on drug and food Allergy that are directed by accredited Immunologists. They should be adequately funded so they have sufficient manpower, equipment and budget for reagents to widen the scope of routine laboratory service to include tests for specific IgE to a wider spectrum of whole allergen extracts and to allergen components; basophil activation tests; and lymphocyte function tests. This can be incorporated into existing laboratory support at QMH and PWH with only a relatively modest increase in resources. They could then support the new pilot Centres.

#### 9.11 *Education*

1. We recommend that a collaboration is established between HK Institute of Allergy (as the professional platform) and Allergy HK (as the Allergy Charity) to create an agenda for professional CPD (such as regular workshops) as well as engaging and educating the public about Allergy. These organizations are strongly encouraged to involve other professional societies and charities as appropriate when designing their strategy.

#### 9.12 *Schools*

1. We recommend that the appropriate Government department should audit the level of allergy training staff in schools receive, and consider taking urgent remedial action to improve this training where required.
2. We recommend that the Government should review the desirability for schools holding one or two generic auto-injectors.

#### 9.13 *Air quality*

1. Acute health effects on respiratory morbidities from short term exposure to air pollution are well recognised, but the long term effects are, as yet, less well studied but may be of more serious consequence. Children are thought to be more vulnerable to ambient air pollution as they spend more time outdoors, are more physically active, and have higher ventilation rates than adults. Increasingly, it is realised that breathing impure air is responsible for health problems ranging from growth restriction in the very young to chronic disease in the elderly (1). Solving the urban air pollution problem is a huge challenge. It is highly unlikely that the world's major cities will ever be able to boast 'clean air' especially if urban strategies focus on small areas of an overall road network. For example London's Low Emission Zone (2, 3) is not nearly ambitious enough to provide the air quality benefits required. Bold, realistic and moral leadership by national leaders is required to address this increasing important public health issue. We recommend that it is essential to develop effective strategies to reduce pollution and to monitor whether the strategies result in a significant improvement in the prevalence of pollution related diseases in HK and the mainland.

9.14 **International perspective**

9.15 The recommendations for HK should be seen in the context of the declaration of the WAO in 2011 (4) that it was necessary to involve multiple stakeholders in a concerted effort to:

1. To conduct more epidemiological studies to establish burden of Allergic Diseases;
2. to initiate more allergen and environmental control measures;
3. to enhance the level of research and clinical practice;
4. to ensure that medical students, primary care physicians and generalists, as well as system specialists who look after allergic patients have a higher level of training.
5. to recognize Allergy as a specialty;
6. to provide sufficient numbers of specialist tertiary Allergy Centres in each country that are able to set standards, advance research and organize training at a local level and to support secondary and primary care by establishing appropriate networks;
7. Allergists should be able to prescribe the most cost-effective medication to manage a patient's disease. Consultations with Allergists, timely diagnosis and treatment are necessary to improve long-term patient outcomes and quality of life and to reduce the unnecessary direct and indirect costs to the patient, payer and society;
8. to increase public awareness;
9. to promote ways to prevent allergic diseases.

9.16 Against this background it is also germane to highlight the detailed recommendations of a report from The House of Lords Science and Technology Committee's enquiry into Allergy published in 2007 (5). Some of the key recommendations contained therein are as relevant to HK as for the UK and the key proposals where relevant have been summarised below so that our recommendations for HK can be seen in light of one example of international good practice:

9.17 *Clinical service*

Recommended that Allergy Centres are established that would act as clusters of expertise of those with an interest in Allergy, and could each contain a Chest Physician, Dermatologist, ENT specialist, Clinical Immunologist, Gastroenterologist, Occupational Health Practitioner and Paediatrician. Specialist nurse and dietitians trained in allergy would also be core members (Fig 3).

9.18 New Allergy Centres should enhance and build on existing pockets of excellence to bring together existing clinics and specialists, and to develop and expand upon the services already offered. Where specialist Allergist posts already exist, these Allergists should take the administrative lead with the appropriate time commitment. In other areas, new Allergist posts should be established and until this is done specialists with substantial experience of looking after patients with allergic disorders should lead.

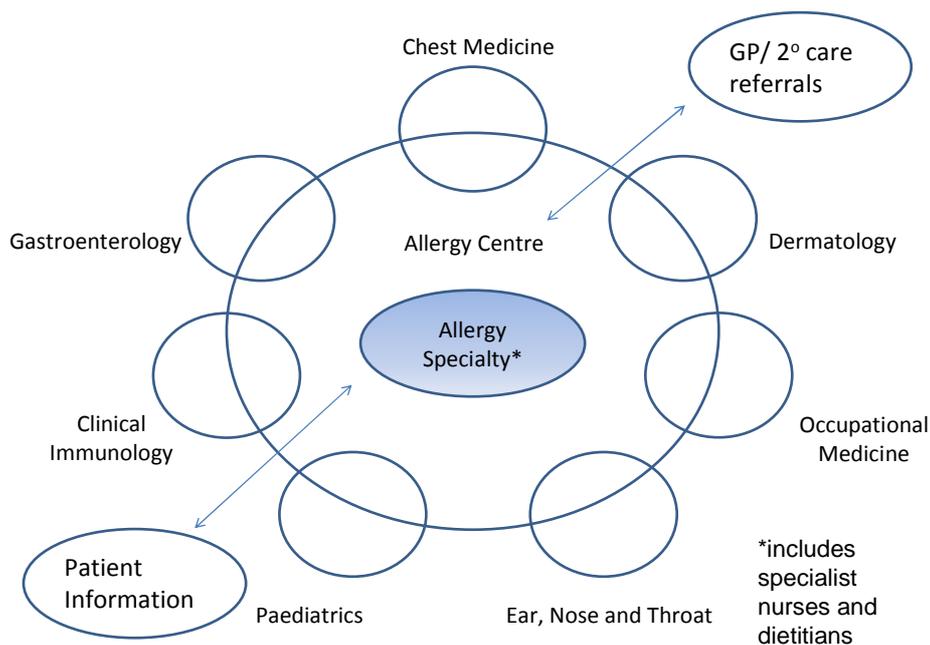


Figure 3 Hub and spoke model for an Allergy Centre

- 9.19 Each allergy centre should provide the diagnostic facilities necessary to investigate complex allergies, and should ensure that those who perform these tests have received accredited Allergy training. Specialty clinics held in parallel could avoid the need for multiple referrals and separate visits to hospital for those with multi-system Allergic Disease. Regular multi-disciplinary team meetings will ensure knowledge is shared and complex cases are discussed. The inclusion of paediatric Allergists within Allergy Centres will ensure that children with allergic conditions are treated appropriately and will enable a smooth transition from paediatric to adult Allergy care.
- 9.20 Once a diagnosis is obtained and a treatment plan developed at an Allergy centre, the patient's disease can often be managed back in primary or general secondary care. However, patients with severe or complex allergic conditions may need long-term follow-up from specialists in the Allergy Centre. Allergen immunotherapy by injection should always be carried out by specialists within the Allergy Centre because of the risk of anaphylaxis.
- 9.21 It is not necessary for every Allergy Centre to provide every service; some should become national reference Centres for less common allergies, such as anaesthetic allergy. Therefore patients may need to travel to a national reference centre for their condition, for accurate diagnosis and management planning. The patient should then be referred back to their local service and primary care practitioners for ongoing management.

- 9.22 Collaboration between clinicians in primary, secondary and tertiary care is key to improving the diagnosis and management of people with allergic conditions. Once established, the Allergy Centre in each region should encourage and co-ordinate the training of local GPs and other healthcare workers in Allergy. In a “hub and spokes” model, the Allergy Centre, or “hub”, would act as a central point of expertise with outreach clinical services, education and training provided to doctors and nurses in primary and secondary care, the “spokes”. In this way, knowledge regarding the diagnosis and management of allergic conditions would be disseminated throughout the region.
- 9.23 The Allergy Centre should act as a lead in providing public information and advice. Specialists at the centre should work in collaboration with allergy charities, schools and local businesses to provide education and training courses for allergy patients, their families, school staff and employers, in how to prevent and treat allergic conditions. Feedback between patient groups and Allergy Centres would enable the Allergy Centres to assess whether they were providing the necessary services, and would ensure that the advice offered by patient groups was accurate and updated in the light of rapidly changing scientific evidence.
- 9.24 Once established, Allergy Centres in different regions should have a contractual obligation to share the resources they develop, such as standard operating procedures, clinical guidelines and patient information.
- 9.25 The lead Allergist in each Allergy Centre should be responsible for maintaining a patient database to support clinical research. The establishment of Allergy Centres would thus provide the clinical environment to undertake future clinical evaluations of immunotherapy and complementary therapies.
- 9.26 *Professional education*  
It is vital that medical practitioners are adequately educated in the diagnosis and treatment of occupational allergic disorders. We recommend that the training undergraduate medical students receive enables them to recognise the role of allergy in disease processes and to refer patients appropriately. It is imperative that general practitioners develop their allergy knowledge through continuing professional development.
- 9.27 *Research and product development*  
Although high quality research into cellular and molecular mechanisms of allergy is advancing, the factors contributing to allergy development and the “allergy epidemic” are poorly understood. It is imperative that further research should focus on the environmental factors, such as early allergen exposure, which may contribute to the inception, prevention or exacerbation, of allergic disorders. Long-term cohort studies are a vital part of this research, and interventional studies are key to verifying the role which of these factors may play.
- 9.28 It is of concern that the knowledge gained from cellular and molecular research is not being translated into clinical practice. Allergy research directly related to health care is an area of unmet need that requires greater priority.

Therefore, a comprehensive patient database within each Allergy Centre will be key to epidemiological and other studies.

- 9.29 Immunotherapy is a valuable resource in the prophylactic treatment of patient with life-threatening allergies, or whose Allergic Disease does not respond to other medication. Although initially expensive, immunotherapy can prevent a symptomatic allergic response for many years, and may prevent the development of additional allergic conditions, so its wider use could potentially result in significant long-term saving for the health service.
- 9.30 *The air we breathe*  
Controlled trials should be encouraged that involve multiple interventions, to examine the effect of ventilation, humidity and mite-reduction strategies on allergy development and control. As chemicals used in the construction industry may play a role in triggering symptoms in some allergic patients, further evaluation of their role is also required in order to inform procurement policies.
- 9.31 As climate change and air pollution may significantly impact upon the development of allergic disease, it is recommended that when developing policies for industry, transport or housing, the Government should take account of the inter-linkages between air quality, climate change and human health.
- 9.32 *Schoolchildren*  
It is of concern that many teachers and support staff within schools are not appropriately educated in how to deal with allergic emergencies. It is recommended that the appropriate Government department should audit the level of allergy training these staff receive, and should take urgent remedial action to improve this training where required.
- 9.33 It is of concern that there is a lack of clear guidance regarding the administration of auto-injectors to children with anaphylactic shock in the school environment, and it is recommended that the Government should review the cases for schools holding one or two generic auto-injectors.
- 9.34 *Workforce*  
Once Allergy Centres have been developed it recommended that the relevant Government department should liaise with the Occupational Allergy specialist in each centre to inform its policies and develop strategies to prevent occupational allergic disorders.
- 9.35 *Information for consumers*  
Vague defensive warnings on labels for consumers with food allergy can lead to dangerous confusion and an unnecessary restriction of choice. It is recommended that the Government Agency should ensure the needs of food allergic consumers are clearly recognized with unequivocal food labeling legislation. The phrases “hypoallergenic” and “dermatologically tested” are almost meaningless, as they only demonstrate a low potential for the products to be a topical irritant. It is recommended that such products should warn

those with a tendency to allergy that they may still get a marked reaction to such products.

9.36 *Advice for allergy sufferers*

Allergy charities play an important role in providing public advice, but must continue to work together and with clinical services to avoid duplication of work, and ensure that consistent, evidence-based policies and public advice are provided.

9.37 *Evaluation of complementary techniques*

Robust research should be conducted into the use of complementary diagnostic tests and treatments for allergy in terms of the holistic needs of the patients, assessing not only the clinical improvement of allergy symptoms, but also analysing the impact of these methods upon patient wellbeing. Such trials should have clear hypotheses, validated outcome measures, risk-benefit and cost-effectiveness comparisons made with conventional treatments. Allergy Centres will allow the collection of information about any indirect consequences of misdiagnoses or delayed treatment. It is of concern that the results of allergy testing are being interpreted without the advice of appropriately trained healthcare personnel, and that the IgG food antibody test is being used to diagnose food intolerance in the absence of stringent scientific evidence. It is recommended further research into the relevance of IgG antibodies in food intolerance, and with the establishment of more Allergy Centres, the necessary controlled clinical trials should be conducted. General practitioners, pharmacists and charities are urged not to endorse the use of these products until conclusive proof of their efficacy has been established.

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