



## Perspective

### The Journey to Create the New Allergy Centre in Hong Kong

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#### Abstract

There is a severely unmet need for allergy clinical services in Hong Kong (HK) especially for the adult population. This review chronicles the steps taken and the challenges faced in establishing a new Allergy Centre in HK from scratch. While the experience described is for only one Centre in one country, the information provided may help others who are starting up a new allergy service as it seems likely that they could undergo a similar journey.

**Keywords:** Allergy centre; Hong Kong

#### Introduction

Allergic diseases are prevalent worldwide and Hong Kong (HK) is no exception [1-11]. This includes allergic asthma, rhinitis, eczema, food allergies and anaphylaxis. The diseases can cause significant morbidity and are sometimes life-threatening. Allergy services can help these patients as reported in the two examples below.

The first example is a 10 year old boy with severe milk allergy who had experienced an anaphylactic reaction after ingesting a very small volume of milk which resulted in admission to pediatric intensive care. The milk allergy was confirmed by both positive skin prick

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**Citation:** Lee WL, Chan J, Chi SF, Lee L, Lau PC, et al. (2018) The Journey to Create the New Allergy Centre in Hong Kong. J Pract Prof Nurs 2: 005.

**Received:** August 03, 2018; **Accepted:** August 25, 2018; **Published:** September 11, 2018

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testing and specific IgE (sIgE) to milk (13x6 mm weal; 80.7 KU/L respectively). When he was a baby he was breast fed for 5 months before switching to formula. He suffered with diarrhea and blood in stools and the symptoms resolved when he was given a hydrolyzed milk formula. He also had a history of asthma and rhinitis. He was referred to the allergist for oral desensitization to milk and this was conducted successfully. He is now able to consume 120 mls of fresh milk daily without any problems and his skin prick test to milk is 5x5 mm weal with a sIgE of 10.1 KU/L.

The second example is a 50 year old business woman who started to have asthma after an upper respiratory tract infection when she was 43 years old. She was very short of breath with nocturnal asthma and difficulty sleeping with a long history of rhinosinusitis and nasal polyposis for 10-15 years. No improvement was observed even after using systemic and inhaled corticosteroids in addition with other anti-asthma medications. She was allergic to cat fur and house dust mites. She received desensitization injections, which resulted in improvement for few months and then she tried Chinese medicine without benefit. She suffered with urticaria due to new world wines during an Australian trip. There was no history of Non-Steroidal Anti-Inflammatory Drug (NSAID) intolerance. Her total IgE was slightly raised and she had a peripheral blood eosinophilia. House dust mite allergies were confirmed on skin prick testing. Her FEV1 was only 57% predicted value. A clinical diagnosis of Aspirin Exacerbated Respiratory Disease (AERD) was made by the allergist but her FEV1 was considered too low to undertake aspirin challenge so she was started on a low-salicylate diet. She started to recover within 3 weeks and her FEV1 improved to 92%. Now she is using only seretide ac-cuhaler 50/250 bd and montelukast 10 mg daily without other medicines. Classical AERD consists of nasal polyposis, late onset asthma and NSAID intolerance. Patients often have recurrent urticaria. It can be associated with alcohol intolerance. Patients are often non-atopic to common aeroallergens but have NSAID intolerance, although 30% will not give a history and require formal challenge [12].

Both patients benefitted from consulting an allergist but there is a severely unmet need for allergists in many countries [13]. HK is about 426 sq miles (1104 sq km). There are about 1.3 million children younger than 18 years old and 5.7 million adults in HK. The health services are delivered by the public and private sectors (Figure 1). HK is among the top 14 countries in the world for gross domestic product per capita [14] with an average annual growth rate of 2.6% and prides itself in having an excellent and mature health service [15]. Hongkongers top life expectancy rankings worldwide [16]. It is therefore disappointing that between the public and private sectors HK has only 1 allergy specialist serving 1.17 million head of population. This is very low and HK ranks 6<sup>th</sup> out of 7 countries in Australia and the Asia Pacific and 30<sup>th</sup> out of 36 countries in the rest of the world in allergists per head of population [13,17]. There are only two public hospitals that have Pediatric Allergy Centers in HK

and until last month there was no other Allergy Center looking after adult patients. Thus the demand from allergic patients for treatment is high and the appointment of more allergists and the creation of the new Allergy Center helped to fill an important gap in health service provision.

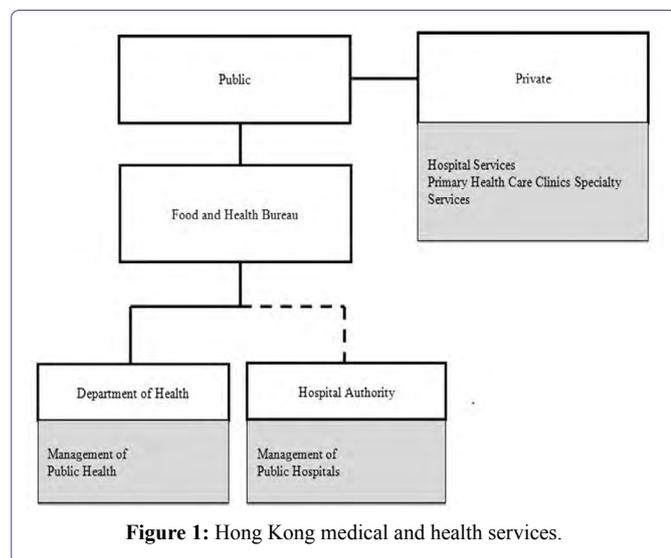


Figure 1: Hong Kong medical and health services.

## Establishing the Allergy Centre from Zero

HK is densely populated and highly urbanized. With the loss of protective factors associated with a rural environment and the emergence of risk factors associated with adopting a western lifestyle, the rising prevalence of allergic disorders will likely continue to escalate [17]. In light of the under-provision of local allergy services [13,17], the largest private hospital group in Hong Kong decided to create the first local comprehensive Allergy Center.

This was not a simple task. The allocation of resources to build the facilities was of course essential and the Allergy Centre could never have proceeded without the hospital's strong support, but this was only one of the challenges. While the logistic hurdle was significant, it was minor compared to the difficulty of recruiting an experienced allergist to be the inaugural Director. This was against a backdrop of a very low profile for the discipline of allergy in HK and the paucity of allergists who could train staff. While the HK Medical Council recognized the specialties of Immunology and Allergy and Pediatric Immunology and Infectious Diseases (that includes allergy), neither the HK Academy of Medicine nor the HK Academy of Nursing included Allergy amongst their constituent Colleges.

Therefore it was a welcomed development when an experienced Chinese-speaking allergist accepted the invitation to meet the challenge. He had worked overseas and was experienced in creating a new allergy service in a public hospital in the UK.

It was recognized early on that there had to be a two-pronged strategy, namely to build an Allergy Centre to deliver an exceptional clinical service, but also a need to increase the profile of allergy as a discipline in HK. It was critical that the community could understand better what an allergist could offer. In both these endeavors it was essential to have a strong team with a clear focus; it could not be done by one individual alone.

With respect to service development, the private hospital sent a senior dietitian and the Allergy Centre's future nurse for further training with the future Director's team in the UK on a 10-week intensive secondment to broaden their existing knowledge in allergy. While this could only be an introduction to the specialty, it was a critical period for key staff to understand how a successful Allergy Centre operated.

Returning from the intensive training, the nurse and the dietitian worked with the Hospital's Project Team under the guidance of the future Director and the Hospital's management board to design the clinical areas. The protocols used by the UK team, supported by international guidelines where available [18-23], were the reference sources for developing the standard operating procedures and patient educational materials for the Centre. The nurse and dietitian also developed staff competency checklists for all procedures, so that newly recruited nurses and dietitians could be mentored and trained in a consistent manner to conduct the procedures at the approved standards.

Eight services were established initially when the Centre was launched in March 2012, including skin prick tests; drug skin tests; drug challenges; food challenges; lung function testing; mannitol challenge; immunotherapy to aeroallergens; and anti-IgE treatment. In addition, there was excellent laboratory support and tests such as extensive sIgE assays, molecular allergology and tryptase measurements were rapidly established.

Subsequently, more services were added that included autologous serum skin test; drug desensitization; Fractional Expired Nitric Oxide (FENO) test; home additive and preservative challenges; hydrogen breath tests for lactose or fructose intolerance; methacholine challenge; nasendoscopy; oral desensitization to foods; food or drug tolerance tests; patch tests; sweat and semen skin test and desensitization; conjunctival allergen provocation test; and intranasal lysine aspirin challenge and desensitization.

Most recently the Centre launched its Eating Allergens Safely and Early (EASE) programme for the high-risk babies below 1 year old, after finding from a local survey on Chinese parents' practices on infant feeding, which showed contrary to current consensus guidelines, exclusive breast feeding up to 6 months is uncommon in HK. Complementary feeding of solids is often delayed especially when there is a family history of allergy [24]. The 3-year food allergy prevention programme aims to facilitate early introduction of allergenic foods in infants, alongside with breast feeding in order to help lower the risk of food allergies.

The delivery of the Centre's service has been constantly refined as a result of patient feedback and audit. For instance, it became apparent during the first 12 months of the Centre's operation that patients preferred to attend at the end of their working day or at weekends. The Centre initially extended its opening hours by one hour on Mondays to Fridays until 6 pm but this only increased patient flows by a small amount. Therefore a survey of 56 consecutive Centre's patients was conducted. 77% of responders endorsed opening on a Saturday afternoon in addition to the normal Saturday morning service; 23% had no preference and there were no dissenters. With the strong support from patients for a trial period of months, the Centre closed on all Wednesdays and opened on Saturdays twice a month from 9 am to 5 pm. In the 4 months after introduction of the trial, the number of patients attending on Wednesdays and Saturdays showed a 54% increase in patient flows on those days alone.

The reason was probably because allergy is seldom an emergency so patients do not like taking time off work to see the doctor, preferring to come on their days off. As the results of the trial were so clear cut, the Centre felt empowered to continue these opening hours for patient benefit.

## Environment

The recommendations of the House of Lords Science and Technology Committee in 2007 [25] supported by the declaration of the World Allergy Organization in 2013 [26], on the requirements for an allergy service were followed. The model was also the one which the Director had established in the UK but adapted in HK to include enhanced patient comfort and privacy in a private hospital setting; to have dedicated consulting rooms/offices for each of the doctors and dietitian; and to create some unique features such as two specially ventilated challenge rooms with CCTV and an allergy kitchen.

The use of multi-professional consultation was also innovative. Food allergies and intolerances are common in Hong Kong [11]. A Centre policy has therefore evolved that patients with possible food allergies/intolerances routinely have a joint consultation with the doctor together with a dietitian on their first visit. Following skin tests or other investigations as appropriate, the patient sees the doctor plus dietitian again to have the results explained and a management plan agreed. The dietitian then sees the patient one on one at the same visit to elaborate the practical aspects of the required dietary management in detail. This type of multi-professional approach in a “one stop shop” is efficient and time saving.

Some of the patients have both physical symptoms and anxiety/depression. The psychosocial stresses incurred from living with one's own severe food allergies or in looking after a child who has multiple food allergies can often be overlooked. The Centre has therefore also established a care pathway with the hospital's in-house psychologist to help with such individuals.

The Allergy Centre is built in 1500 sq feet (139 sq m). It incorporates 3 consulting rooms, a treatment room, reception/waiting area, two challenge rooms and an allergy kitchen. It is air-conditioned throughout. It is adjacent to the Pediatric Centre on the same floor, facilitating cross referrals when necessary. It has direct access to a hospital pharmacy from the waiting area. The comfortable waiting area is stocked with patient educational pamphlets, current newspapers and many magazines. There is also a TV screen that shows allergy educational materials, which the patients can watch while waiting for their consultations.

The two challenge rooms are designed for provocations and treatments including food challenges and oral immunotherapy. The rooms are equipped with CCTV for patient monitoring. They are well ventilated and under inward pressure to prevent escape of allergens into the general clinic areas. One of the rooms is also used for flexible nasendoscopy. Spirometry, mannitol and methacholine challenges are conducted in a separate treatment room with negative pressure.

As the Allergy Centre is involved in “high-risk” procedures like food and inhalational challenges, the doctors and the nurses are trained in the management of anaphylaxis. There is a resuscitation trolley containing all the drugs and equipment required for treatment of allergic and other emergencies. Safety checks on the emergency

equipment are conducted weekly. The nurses in the Centre are all certified providers of Basic Life Support and Advanced Cardiovascular Life Support from the American Heart Association. There are regular unannounced emergency resuscitation drills throughout the year.

The Centre is also equipped with a dedicated kitchen, which serves multiple purposes such as preparing foods for allergy testing, challenge and research. Thus the risk of allergen contamination is minimized. It is also used for educating patients and families on how to prevent cross contamination during the cooking process and to teach healthcare professionals and students about safe practices related to food allergies.

## Staffing Structure of the Allergy Centre

The Centre is supported by three nurses, a clinic clerk and a part time secretary, who are supervised by two senior nursing coordinators. The nurses have a very active role within the Centre and are responsible for all the allergy testing and patient education. When the Centre was launched, it was supported on a part time basis by a highly qualified senior dietitian who was trained in the USA and had a special interest in food allergies. However patient referrals were high so a year later the Centre appointed her to work full-time. The dietitian designs the protocols for food challenges and oral immunotherapies. She is responsible for managing the allergy kitchen. It is essential to transfer skills and technology so the Center has been training a further dietitian in allergies. In addition to the Director, a pediatric allergist was appointed recently to help provide a service that spans all ages.

Close collaboration with a dietitian is especially crucial in the management of food allergy, especially in children. While food avoidance is very important in pediatric food allergy management, it is just as vital to ensure adequate nutrition so as not to compromise their growth. In cases of food allergies it is routine in the Centre to hold a joint first consultation with the doctor and dietitian together.

## Teamwork in the Allergy Centre

The Centre fosters team working. It encourages a shared vision and improvements in productivity, operational efficiency and best practice. This is achieved through transparency, open communication and emphasis when possible of function over structures. There is active staff development with training actively encouraged. Appraisal for nursing, dietetic and clerical staff by the senior nursing coordinator involves annual reviews of work performance, attitude, skills and knowledge at a one-on-one interview. It is intended to be a constructive experience promoting a no-blame culture with privacy focusing on strengths and perceived weaknesses for further training rather than a critical review meeting.

## Continued Staff Training

All staff members are actively encouraged to participate in allergy-related seminars and conferences locally or internationally to update their knowledge and skills. For example, the dietitian spent time recently at Stanford University, USA, for a food-allergy-focused clinical attachment and one of the nurses visited the Alfred Hospital, Melbourne, Australia for a drug-allergy-focused attachment.

## Patient education

The Allergy Centre strongly emphasizes patient education, as this

is essential for effective management of allergic diseases. While the dietitian focuses on patient education in dietary management of food allergies and intolerances, the Centre nurses spend a lot of time teaching patients and their families about medicine and inhaler usage; allergen avoidance; and explaining the written action plan for managing allergic emergencies, including when and how to use a self-administered adrenaline auto-injector for anaphylaxis.

### Professional and public engagement

The Centre team is invited or volunteers to speak at many seminars, workshops and conferences; visits schools; convenes patient groups; writes papers for peer reviewed journals; teaches medical and allied health students; gives press briefings and media interviews; collaborates with different allergy related patient organizations and professional societies such as the Hong Kong Institute of Allergy (HKIA), which is the main professional society dedicated to promoting allergy as a discipline in HK. It is estimated that the two clinicians, dietitian and nurses each spend about 4-8 weeks on external educational tasks for the profession and public over a one year period.

This strategy seems to have been at least partly successful. The profile of allergy in HK has risen markedly in the past 3 years as evidenced by the increased local media attention on allergy related news items, professional newsletters and the numbers of peer reviewed publications including management guidelines and commentaries [13,17,27-33]. Several new allergy clinics have been created in the government hospitals. Furthermore in the past 3 years there has been a 2-fold increase in the total numbers of members and a striking 4-fold rise in the numbers of allied health professionals joining the HKIA.

### Challenges for the nurses and other staff

The challenge faced by nursing staff and others when creating any new service is the necessity to perform procedures for which they have no prior training or experience. This was predictable for the new Center too, especially as allergy was a very low profile discipline in HK and there was nobody who can train the staff locally. This was the reason why staff was supported to study with the Director's team in the UK prior to the Centre opening. However a 10-week secondment was very short and it was impossible for them to learn everything required so there was a steep learning curve when the Allergy Center was first launched. This could mean staff working initially outside their comfort zone.

One example of the difficulties that arose was the Centre's novel strategy to introduce peanut oral desensitization under anti-IgE cover. The nurses and dietitian were understandably concerned about the safety of the procedure due to lack of experience and were reluctant to offer oral desensitization. It was only after much discussion and reassurance that it was eventually agreed to undertake a pilot study [33] to assess feasibility and safety after approval by the Ethics committee and Hospital Management; with patients' informed consent; and with establishment of an ethics and data monitoring committee. The study was successful and in 2014 the hospital was able to offer the first peanut oral desensitization programme in HK and mainland China.

To date, an unpublished internal audit has shown that 19 patients have been desensitized to peanut, and data from 2014 to 2017 indicates mean peanut oral tolerance increased >1400 fold after

desensitization. Most patients were able to maintain their peanut intakes at the target dose of 9 peanut kernels daily. Patients were delighted with the outcome. If the Centre had never embarked on peanut desensitization, many patients would not have benefitted from this innovative treatment.

The oral immunotherapy programme has been extended to milk and egg. Many of the milk allergic patients (including one child who had life threatening anaphylaxis) can tolerate >120 ml milk daily which is a >244 fold increase from their initial tolerance levels. Eight patients so far have undergone egg desensitization, and many of them can now tolerate 1 egg daily, which is >500 fold more than their initial tolerated doses.

In 2015, oral desensitization for multiple foods was introduced. To date 5 patients have undergone desensitization to 2 or 3 foods, peanut, egg, milk or wheat simultaneously. This method saves both time and costs for the patients.

Oral immunotherapy has been a major service success and can be conducted safely in the Center. In the next few years the Centre will grow its immunotherapy programmes cognizant of international guidelines and practices. It will remain vigilant about patient selection and safety.

### Conclusion

The profile of allergy as a discipline in HK has risen markedly [17] and the community has benefitted. However more needs to be done to highlight its place in the wider context of healthcare and to have it recognized by the different authoritative bodies in medicine, nursing and allied health professions.

The current provision of allergy training in HK for health care professionals is still too low and acquisition of specialist knowledge and skills in the discipline is very difficult. As a result the number of healthcare professionals specializing in allergy in HK are limited. It will take many years for a local programme of allergy training to provide enough manpower and a career path to fill the unmet need. In the interim it is urgent to search for solutions to fill the gap, for example by training health professionals overseas or recruiting trained allergists from outside HK to bolster allergy healthcare provision and training in the specialty [17].

This review describes the experience of only one Center in one country. Nonetheless it is likely that the experience reported in this article will be shared by others wishing to start up a new allergy service or have already done so. It is clear that the lessons learned include the need to work cohesively under a strong leadership; to have strong support from the host institution for developing the discipline; the absolute necessity to be well trained and to participate in continuing professional development; adopting an evidence based approach that is supported by local and international guidelines; service provision should be refined by patient feedback and audits; promoting a multi-professional approach and close collaborations with colleagues in other specialties to provide holistic care; and finally an active programme of professional and public engagement to highlight what the discipline offers to the community.

The journey has been exciting and challenging but the team has overcome the obstacles so far and learned a lot in the process.

The Centre will try to sustain and enhance its clinical excellence so that it sets clinical standards for the discipline in Hong Kong and elsewhere. It will continue to be innovative within the boundaries of evidence-based strategies, so that it can meet the new era of personalized medicine with insight, confidence and enthusiasm.

## Acknowledgement

We acknowledge the help and support of the allergy team at the Guy's and St. Thomas' Hospital Trust, who gave us the seeding knowledge in allergy; and the Hong Kong Sanatorium and Hospital for its vision and support without which the Allergy Centre could not have been created.

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