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Title: Upskilling healthcare professionals to manage clinical allergy.

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Abstract

It has long been recognised that given the high prevalence and considerable impact of allergic disease globally, there needs to be a focus on appropriate training for clinical professionals. The health-economic consequences of allergic disease are significant, with both direct healthcare costs (doctor, nurse and dietitian consultations, hospital admissions and prescribed medications) and indirect costs (lost school and work time, reduced productivity and over-the-counter medications). There is also a well recognised impairment of quality of life, with less tangible costs including anxiety, distress, discomfort, disability and, occasionally, death. To help to mitigate these effects, there is a need to upskill the professional workforce at all levels, and also to equip those trained with the skills to become future healthcare professional trainers. Upskilling the workforce from the grass-roots of undergraduate study in Medical, Nursing and Allied Health Professionals (AHP) through the entirety of training to senior consultant levels could have a

major beneficial impact on the patient and their families, lead to a reduction in emergency use of clinical service, and help increase economic productivity.

What is the problem?

Allergy is well established as one of the major causes of chronic disease with global sensitisation rates to one or more allergens in school children approaching 40% with an estimated 150 million people in Europe alone suffering from a chronic allergic condition.(1) The prevalence of allergic disease is predicted to continue to increase in the United Kingdom (UK)(2) given that around one in three of the UK adult population has been diagnosed with one or more allergic conditions (3-5) and that this proportion rises to approximately 50% in children.(2) The rise of life-threatening allergic disease in the UK is particularly marked, with a 615% increase in the rate of hospital admissions for anaphylaxis in the 20 years up to 2012.(6) The provision of services within the National Health Service (NHS) for allergic disease has been described as lacking in numerous reports. In 2003, the Royal College of Physicians (RCP)(2) recognised a *“gulf between the need for effective advice and treatment and the lack of appropriate professional services”* in the context of the increasing incidence, severity and complexity of allergic diseases. One of the fundamental contributing issues was a lack of training in the management of allergic diseases available as part of either undergraduate or postgraduate training. Many areas of allergic disease, such as food or drug allergy, do not fit neatly into any of the traditional organ-based medical specialities and hence have failed to gain a foothold in the medical and AHP curricula. Another issue recognised by the RCP was a marked disparity in the number of allergy specialists per patient in the UK compared to other economically-developed countries. A follow-up report published in 2010(7) concluded that little had changed; it thus continued to *“emphasise the need for better allergy services and more allergy specialists”*. There has been some progress, particularly in Paediatrics, in the intervening years, but the scale of any expansion still falls far short of the aspirations of the original 2003 report. Although most allergy sufferers have mild-to-moderate symptoms and can be well managed by competent primary care teams,(8) these teams still need support and guidance from specialists. As we enter into a period where investment in the NHS has slowed and not kept pace with increasing needs resulting from changing demographics, the likelihood of a significant expansion in specialist numbers is unlikely, especially when allergy is not considered a priority area by the Department of Health and Social Care (DHSC) in England. Instead, we need to consider how new models of care in Allergy can align with the wider vision of the future of the NHS, as articulated in the NHS Long Term Plan, with better out of hospital care and use of

digital technology to improve the effectiveness with which we manage chronic allergic conditions. In practice, this means an ever greater need for leadership from specialists and their representative societies to ensure that the general primary, secondary and organ-based tertiary care workforce is adequately equipped to diagnose and manage all but the most severe or complex forms of allergy, which will still require referral to specialist allergy services. There are a variety of models of care that could facilitate more seamless collaboration between primary and secondary care and most models would incorporate integration at least to some degree, re-thinking the way that these sectors interact as part of joined-up network, as opposed to distant and unconnected silos. Developing more integrated models of care is a challenge across all specialities and requires leadership, informed by evidence, of which there is currently very little in allergy,(9) to ensure that patients receive the right care, when they need it, in the best place. A central pillar of integration of care is the need for appropriate upskilling of the professionals who will be delivering front-line care and with only a small number of specialists, the scale of this challenge is significant.

Current state of play

The DHSC, as England's governing body, supports ministers in leading the nation's health and social care for our allergic population to *"live independent, healthier lives for longer"*.(10) Seamless care for the prevention of allergic disease aligns with the UK Government's objectives and commitments and as guardians to NHS England (NHSE) supports its framework for Children and Young People.(11) As of 2018, despite these priorities, statistical data relating to allergy remains poorly represented with only nine accessible articles on the DHSC website related directly to allergy with limited reference to the 53 recommendations made to Parliament by NHSE on Allergy Services.(2, 12, 13) In addition the NHSE 'My NHS' website (14) discloses data to the public on which clinical services are available with neither paediatrics nor allergy featuring in the specialty list.(14) Furthermore, NHSE shares out over £100bn in funds to the Commissioning Board Organisations who are accountable for commissioning their services to 211 Clinical Commissioning Groups (CCGs) and subsequently to General Practitioners (GPs) and AHPs on behalf of patients. Allergy as a specialty remains poorly supported by the CCGs and warrants specialised collaboration across all tiers of service delivery.

The National Programme for Care and Clinical Reference Groups (CRGs) in Immunology and Allergy (F06) outlines the Allergy Service Specification (ASS),(15) including the scope, its expert professional and public health membership, and the policies for guidance in the role of adult allergy and immunology with

paediatric allergy aligned with the Specialist Children's Medicine CRG.(2, 7, 16) Alongside, they propose Specialist Allergy Centres (SACs), which aim to improve the quality of clinical allergy diagnosis, prevention, management and resolution strategies to their region and deliver specialised allergy services as part of a provider network used by the 10 Hub Commissioning Teams (HCTs), to contract services funded by NHSE to demonstrate and deliver excellence in the field. There are a limited number of SACs in the UK which provide specialist services to 50 other health systems. There are 31 adult allergy centres in England and Wales (17 staffed by immunologists) and 19 paediatric centres (7 paediatric immunology specialists and 12 allergy specialists) of which some are co-located with the adult service.(7)

To ensure services are aligned to national standards for clinical governance, adult SACs in the UK are registered with a UK Accreditation Scheme, '*Improving Quality of Allergy Services*' (IQAS), administered by the RCP.(17) They register patients on a national database for rare International Classification of Diseases 10 (ICD-10) coded allergic diseases and complex treatments (such as immunotherapy, biologicals and drug desensitisation) via a national or local specialist workload monitoring tool (a web-based database).(17) As information technology (IT) systems evolve, collection of routine activity and performance data related to patients treated in the community and at home continues to develop, with participation in the scheme increasing.

Two British Society of Allergy and Clinical Immunology (BSACI) documents, '*The Patient Journey for Allergic Disease and A Model of Allergy Service within the NHS*'(18) both outlined the need for models of care in allergy. A recent systematic review on pathways of delivery of allergy services(9) highlighted the many models of care trialed and tested within the NHS along with their success, challenges and downfalls. To date, 'Models of Care', outlined by DHSC, remains hindered by the lack of allergy education awareness hence most professionals are turning for leadership and guidance to national and international professional organisations. The influence of reach of such professionals organisations will increase if subscriptions, which are self funded, are reduced. This has already been achieved through collaborative membership schemes such as the one between the BSACI and Europe Academy of Allergy Clinical Immunology (EAACI)(19).

Despite attempts to address the concerns regarding a lack of education raised by the 'House of Lords Science and Technology Committee report'(12), organisations such as the King's College London Allergy Academy (AA), SARA, and RCPCH Paediatric Allergy Training (PAT)(20) level 1-3 courses can only go so far to train healthcare professionals. These are local initiatives, dependent often on commercial sponsorship and with no accountability around educational outcomes in defined geographical areas. However much

they try, they will not be able to plug the gap left from a lack of centrally funded, nationally co-ordinated, formal education.

What is offered?

Education in allergic disease must start at the root of the problem which is within undergraduate medical, nursing and AHP training programmes. Whilst traditional topics in immunology are common place in undergraduate curriculums and very much disease based, an overview of multi-system organ based allergy competencies are ill defined if not non-existent. If there is a limited platform for training in undergraduate curricula, there will remain a deficit in General Practice as well as in General Paediatrics and Medicine. The RCP, RCGP and the Royal College of Paediatrics and Child Health (RCPCH) all facilitate a training programme in Immunology and Allergy for interested undergraduates including General Practitioners with an Extended Role (GPwER),(21) Paediatricians with a Specialist Interest (SPIN) and those training to be a specialist (GRID) with Certificate of Completion of Training (CCT).(22) A recent systematic review(9) reported that there is scope for better training of AHP working in allergy and concluded that the development of better training and competencies could support this.(23, 24)

Many organisations supporting AHPs have published allergy competencies, but a very useful adjunct to such training is available on the AAAAI website(25) and the the EAACI 'Competencies for Allied Health Professionals working in Allergy' published in 2018.(26) These competencies provide a benchmark for the required knowledge and skills of AHPs and others working in allergy and as such are useful for organisations designing study days and courses. The Food Allergy Interest Group of the British Dietetic Association (BDA) is one of the largest specialist groups of the Association and in addition to developing specialist dietary information sheets, the group runs two study days a year for both those practising in or new to food allergy. Members of the group designed and implemented a training package for dietitians on cow's milk protein allergy, based on allergy competencies published by the UK RCPCH.(27) In a similar fashion, the BSACI publish competencies specifically for nurses new to allergy which are available on the BSACI website.(28) Despite these competency driven forums, it remains clear that some professionals already practising in allergy are up-to-date and need a refresher, or feel their proficiency in allergy management is not of a sufficiently high standard to practice independently or up to international standards and thus regular attendance at National and International Conferences remains important.(23)

Educational opportunities in the UK vary from Continuing Professional Development (CPD) events from AA(29) and world wide screening on YouTube from SARA(30), to substantive courses leading to postgraduate qualifications from the MSc Allergy Programmes at both Imperial College(31) and the University of Southampton,(32) plus a competency based e-module at Newcastle University.(33) There are also a large number of regional allergy networks, established either by geographical co-location or through the BSACI, which provide valuable additional means of informal education through the use of shared protocols and policies and teaching sessions.(34, 35) This can be especially helpful where local CCGs are also involved.

Where are the gaps?

The vision of the National Programme for the CCGs has proven difficult to deliver. This vision is a network of SACs based in teaching hospitals with a hub-and-spoke structure involving the specialist allergist and their nursing, dietetic and administrative support services linked to organ-based specialists and immunology laboratories integrated with primary care services. The strategies to fund and educate such seamless collaborative care initiatives have limitations, and new models of care seem difficult to implement.(36, 37) The plan for each SAC, together with their allergy specialists, is to review complex conditions referred for expert guidance or failure of treatment, whilst primary and secondary care continue to assess and manage simpler allergy cases.(38). All hubs would have strategic and clinical governance objectives delivered in accordance with those outlined by the DHSC, NHSE, RCPCH and the National Institute for Health and Care Excellence (NICE).(11, 39, 40)

Whilst DHSC and NHSE set the priorities and strive to allow a public voice within the allergy field, this compassionate and inclusive network is yet to deliver better support for patients. The NHSE's recent "*The NHS Longer Term Plan*"(41) focuses on seamless collaborative care in an increasing, ageing population, using new technology with finite resources. As the diagnosis and management of patients predominantly takes place within primary care,(2) there remains a continued concern that training and education, and subsequent quality of allergy care, throughout all tiers of UK care provision remains suboptimal.(2, 13, 16, 42, 43) In 2004, only 50% of GPs received training in allergy(42) with subsequent UK government reports highlighting the need for improvement in allergy training for primary healthcare professionals. Despite this, a 2009 follow-up survey, supported by the RCGP, reported that only 29% of responding GPs had received any formal allergy training.(44) Under the auspices of the RCGP, a nationwide survey of GPST (General Practitioner Specialist Training) programme directors was undertaken and, informed by the

contents of the RCGP curriculum, a number of core competencies relating to the diagnosis and care of patients with allergic problems were identified. It was concluded that good practice and support for allergy training was required to expand allergy education for trainees.

However, a decade later, there are ongoing concerns that the quality of care provision for allergy in primary and secondary care remains suboptimal. In 2012, Ellis et al identified lack of training provision in allergy for GP trainees and sought to understand the deficit.⁽⁴⁵⁾ A cross-sectional survey of GPST programme directors indicated that two-thirds of programmes were providing some allergy training, with the remaining one-third either providing no training or were unsure. Overall, only one-third of programme directors believed that all the relevant allergy-related curriculum requirements were being met, this mainly being in the context of organ-specific allergic disorders.

The reasons underpinning poor allergy care in the workforce remain multifactorial and include: (i) shortage of allergy specialists at all levels of care, (ii) paucity of allergy education in the UK medical undergraduate and primary care curriculum, (iii) lack of allergy knowledge, (iv) poor availability of diagnostic testing and (v) suboptimal management and treatment, especially for complex disease.⁽¹³⁾

Will upskilling professionals impact on patient outcomes?

Patient and Public Involvement (PPI) should ensure that the patient's voice is at the heart of all levels of any care system. Such forums are well established within patient organisations such as Allergy UK, Asthma UK and Anaphylaxis Campaign (AC) and aim to provide written disease-specific information leaflets and provide educational events for patients, schools (AllergyWise) and professionals.⁽⁴⁶⁻⁴⁸⁾ These forums can contribute to upskilling of the workforce such that it will benefit the patient, the service and the public health. Better patient outcomes through improved education of healthcare professionals have been demonstrated in a number of areas including mental health,⁽⁴⁹⁾ self-management⁽⁵⁰⁾ and stroke.⁽⁵¹⁾ These outcomes have been demonstrated through better self-management of their disease or problem. Two studies have investigated the benefit of an adult asthma educational programme in the acute care setting. They reported that emergency visits and hospitalisations were reduced following a single educational session.^(52, 53) Studies have shown effective treatment will result in cost savings to health providers by reducing emergency attendances and inpatient admissions, and will reduce the burden of illness in the allergic patient in turn improving their overall quality of life.^(54, 55) An increase in education level has been associated with decreased mortality with the RN4CAST study of patients undergoing

common surgeries, showing a 30% lower mortality in disease where nurses had been educated to a higher level than other centres.(56) A number of studies in inhaler technique and administration of adrenaline auto-injectors (AAI) suggest inferior medical device education of health professionals leads to poor patient outcomes.(56-59) Patients often have poor knowledge as to how and when to use an adrenaline auto-injector.(60, 61) However this is unsurprising when a study by Sicherer et al(60) showed that less than two-thirds of patients remember receiving a demonstration of how to use one and highlighted that many GPs and paediatricians do not know how to use an AAI. Ewan and Clarke(55) reported how a simple education intervention in patients with nut allergy resulted in a significant reduction in the number and severity of subsequent adverse reactions. A UK based study reviewing the added value of a Multi-Disciplinary Team clinic in paediatric allergy, noted a reduction in allergic reactions and improved patient knowledge from the baseline visit and therefore argued that additional medical evaluation will improve parental knowledge.(62)

What are the solutions and what do we still need to do?

Despite the good intentions of the governing professional bodies, DHSC, NHSE, NICE, the Royal Colleges, there remain important gaps in the training of GP and undergraduate trainees in relation to allergy care. Currently, the task of upskilling the workforce falls to the international and national organisations committed to providing direct educational outreach programs, symposia and lectureships in allergy to professionals. Despite these excellent functioning reference bodies (WAO, EAACI, AAAAI, ASCIA, BSACI), regional academies (AA, SARA) and MSc's, there remains a lack of allergy education within most medical schools and universities across the UK. Whilst the majority of training programmes are delivering some allergy education, many programme directors would agree that enhanced attention needs to be paid to the improvement of allergy training for undergraduate, primary, secondary and tertiary healthcare professionals. This training needs to focus on minimum competencies of care and in so doing devise appropriate non-proprietary training materials aimed at undergraduates, AHPs in training, and established clinicians, be they in primary, secondary or tertiary care. There also needs to be a plethora of opportunities for informal learning – through working relationships, placements, and shared models of care. Such collaborations of opportunity would allow the development of Massive Open Online Courses (MOOCs), certificate and diploma level courses to evolve worldwide. Such online courses could become an affordable and flexible way to learn new skills, advance professionals careers and deliver high quality educational experiences at scale. Future educational programmes in allergy must extend the tools

involved to include smart technology such as apps, with smartphones and tablet platforms currently focusing upon limited clinical areas such as food allergy, asthma and rhinitis and criteria for specialist referral. Once delivered, there is a need to establish whether such training is perceived as being useful by those being trained and, importantly, whether this then translates into the much needed improvements in care provision for people with allergic disease. Publications including position papers and national guidelines from NICE, EAACI, WAO and BSACI provide impetus,(63, 64), alongside the eModule at Newcastle University,(33) and the MSc Allergy and PhD courses at both Imperial College(31) and the University of Southampton(32) which provide opportunities for improved training in these important clinical areas.

In summary, it has long been recognised that given the prevalence and impact of allergic disease, there needs to be a focus on training clinical professionals.(65) The health economic consequences of allergic disease are significant, exceeding £1 billion in the UK, with both direct healthcare costs (GP consultations, hospital admissions and prescribed and over-the-counter medications) and additional indirect costs (lost school and work time, and reduced productivity). There is also a well recognised severe impact on patient quality of life, with more intangible costs including distress, discomfort, disability and occasionally death.(2, 66) We need to upskill the workforce at all levels, and equip those trained with the skills to become the future trainers. Upskilling the workforce from the grass-roots of undergraduate study through the entirety of training to consultant level could have a major impact on the patient and their families, the clinical service, public health and the economy.

	Where we are currently:	What we could achieve:
Education/ Clinical expertise	Poor NHS health and allied health professional training	Collaborative seamless care training for primary, secondary and tertiary care
	Poor undergraduate and postgraduate training	Establish allergy training as part of undergraduate and postgraduate medical syllabus
Finance	Vast direct health economic NHS burden (consultations, admissions, prescriptions)	Establish seamless care initiatives to reduce burden
	Vast indirect health economic NHS burden (Reduced school/work attendance, poor exam outcome, reduced productivity)	Trained diagnosis, rapid intervention and treatment, reduced co-morbidities will all improve outcomes and productivity
Quality of Life	Reduced quality of Life (distress, discomfort, disability, death)	Improved Quality of Life
Multisystem allergic diseases	Poor recognition of multisystem allergic diseases with poor resolution of disease and prevention of the allergic march	Improved recognition of multisystem allergic diseases and improved recognition of disease and halting of the allergic march

Figure 1: Upskilling the allergy care workforce and what we could achieve: Enhanced education, subsequent improvement in medical care (diagnosis, management) and quality of Life.

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