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ORIGINAL RESEARCH

# Undergraduate allergy teaching in a UK medical school: mapping and assessment of an undergraduate curriculum

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## Summary

*Background:* Concerns have been expressed by patient and professional bodies, and the UK Parliamentary Health Select Committee, about the poor standard of allergy teaching in UK medical schools. It is argued that this deficiency is an important contributing factor to the generally poor quality of care experienced by patients with allergic disorders. Allergy services are currently being reviewed by the Scottish Executive and Department of Health for England.

*Objective:* To describe and map the teaching of allergy-related topics in the formal undergraduate curriculum of a UK medical school.

*Methods:* We undertook a systematic analysis of learning objectives and other electronic documentation of modules taught during the five years of undergraduate medical training at the University of Edinburgh.

*Results:* Allergy and allergy-related topics are mentioned within the learning objectives of 11 (26%) of the 43 modules in the five-year MBChB curriculum. Our overall assessment reveals significant gaps in the described curriculum regarding allergy-related topics.

*Conclusion:* Although formal teaching on allergic disorders has been identified in a number of modules throughout the five years, it is not comprehensively described in the course documentation and significant gaps exist. We accept that the delivered curriculum may not be captured by the level of detail present in the learning objectives and recommend that further mapping and triangulation is undertaken through student focus groups and information gathering from teaching staff. We also recommend that in the absence of informal and clinical attachment opportunities in allergic disorders, the stated learning objectives be developed into a coherent vertical element throughout the medical curriculum. This, together with an advocate and suitable assessment, would increase the impact of allergy training on students and emphasise the knowledge and skills required to deliver high quality allergy care.

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## Introduction

Approximately one in three of the UK population experience an allergic problem during their lifetime, resulting in considerable morbidity to the individuals concerned and a substantial economic burden to the National Health Service [1-3]. Whilst allergy services are well developed in many other Western countries, this is not true of the UK, as has been highlighted in the Royal College of Physicians' recent report *Allergy: The unmet need* [4]. The conclusions of this report have subsequently been endorsed by the UK Parliamentary Health Select Committee [5].

It has been argued that the deficiencies underpinning poor allergy provision in the UK are multi-factorial, including, amongst other things, a low baseline of knowledge and skills throughout the medical profession [6,7]. This in turn is believed to reflect the lack of adequate training opportunities in UK undergraduate medical curricula. There is, however, a dearth of empirical evidence underpinning this assertion.

In common with most UK medical schools, the University of Edinburgh curriculum underwent significant review and restructuring following the General Medical Council's influential publication *Tomorrow's doctors* in 1993 [8]. This led to the traditional discipline-based curriculum being replaced by an integrated systems-based spiral curriculum with a modular structure in 1998 [9]. All documentation relating to the delivered curriculum is available electronically to staff and students via a managed learning environment called the Edinburgh Electronic Medical Curriculum (EEMeC) [10,11].

We sought to describe and map the teaching of allergy-related topics throughout the University of Edinburgh's undergraduate medical curriculum.

## Methods

Using EEMeC we identified all taught modules during the five year MBChB course and defined other significant units of teaching which were not described under these module headings. Learning objectives for each of these modules were extracted in full and collected into a database.

We also sought to identify whereabouts in the curriculum allergy and allergy-related conditions are taught, by electronically searching all course documents in EEMeC for the following key terms: Allergen; Allergens; Allergic; Allergic conjunctivitis; Allergy; Allergy diagnosis; Anaphylactic; Anaphylaxis; Angioedema; Asthma;

Asthmatic; Atopic; Atopy; Desensitisation; Eczema; Food allergy; Hay fever; Hypersensitivity; Oral allergy syndrome; Perennial rhinitis; Seasonal rhinitis; and Urticaria. Documents containing any of these terms were also extracted in full and collected into the database.

A detailed manual documentary analysis of these course materials was then undertaken independently by two medically qualified physicians, and data were abstracted; any disagreements were resolved through discussion, with a third reviewer arbitrating if agreement could not be reached. This involved looking for text in which allergic disorders were specifically mentioned, but excluding general references which may have included allergic disorders. A good example of such an exclusion was in the year 3 respiratory module, which includes learning objectives on history-taking and diagnosis of wheeze, and "for each of the respiratory diseases covered in the diet of lectures you should be able to describe the relevant epidemiology, pathogenesis, clinical features... investigations and their interpretation, and principles of management (including prevention where appropriate)." There was no documentation relating to the content of the lectures or the specific diseases studied; however, the authors know that one of the major diseases studied during this module is asthma. This is therefore a clear example of course documentation not actually reflecting the teaching of the module.

## Results

A total of 43 distinct units of teaching were identified within the five-year MBChB curriculum (Table 1). Of these, 38 were discrete course modules and five were 'Curriculum Vertical Themes', which are discrete subject areas taught in a progressive manner throughout the five years (these are henceforth described as 'modules' for the purposes of this paper). One of the vertical themes, entitled 'Student Selected Components', allows students to study a very diverse range of non-compulsory subjects, some of which may relate to allergies. Similar student-selected components now exist in most medical curricula [12].

Documentation from 11 (26%) of the 43 modules contained explicit reference to allergy-related topics (Table 2). Detailed analysis revealed that asthma was the most comprehensively described allergic disorder, followed by eczema and anaphylaxis; there was also some mention of teaching of allergic rhinitis and urticaria. There

**Table 1** Learning Objectives relating to allergy teaching within course modules

Year of study	Course module/identified unit of teaching	Specific learning objectives on allergic disorders
Years 1 & 2	Introduction to Life	Yes
	Cardiovascular Health	No
	Respiration	Yes
	Bones & Joints	No
	Neuroscience	No
	Nutrition	No
	Clinical Genetics	No
	Renal	No
	Endocrinology	No
	The Virtual Clinic	No
	Introduction to Clinical Practice	Yes
	Health & Society	No
Problem-Based learning	Yes	
Year 3	Locomotor System	No
	Gastroenterology	No
	Respiratory System	Yes
	Cardiovascular System	No
	Psychiatry	No
Year 4	Oncology & Palliative Care	No
	Psychiatry	No
	Neurology	No
	General Practice	No
	Obstetrics & Gynaecology	No
	Renal Medicine	No
	Urology	No
	Haematology	No
	Breast	No
	Otolaryngology	Yes
	Dermatology	Yes
Ophthalmology	No	
Genitourinary Medicine	No	
Year 5	Child Life & Health	No
	Geriatric Medicine	No
	General Practice	Yes
	Acute & General Medicine	Yes
	General Surgery	Yes
	Anaesthetics, Critical Care, A&E	No
All 5 Years	Pharmacology & Therapeutics	Yes
	Social Sciences & Public Health	No
	Psychological Aspects of Medicine	No
	Clinical Skills, Personal Professional Development	No
	Student Selected Components	No

were, however, important omissions of individual disorders – for example, angioedema and food allergy.

In some instances there were documented learning objectives about conditions which encompass allergic disorders, but are non-specific, such as “*You should be able to describe the cause and management of a patient presenting with... conjunctivitis*”. No documentation was

identified relating to the concept of allergy prevention, allergy investigation and diagnosis, or desensitisation therapy.

## Discussion

This analysis of the University of Edinburgh’s formal undergraduate medical curriculum has found that

**Table 2** Detailed allergy teaching within the module learning objectives

Year	Module and description of subjects covered
Years 1 & 2	<p><b>Introduction to Life</b>  <i>Cells to organs</i>            (lectures &amp; learning objectives on acute and chronic inflammation)  <i>Defending the body</i>            (lectures &amp; learning objectives on the immune system, antibodies and antibody technology)</p> <p><b>Respiration</b>  <i>Physiology and biochemistry</i>            With respect to changes in lung function in obstructive and restrictive disorders, the student should be able to name the main types of obstructive disorders of asthma and chronic obstructive pulmonary disease  <i>Drugs and respiratory disease</i>            For each of the major lung diseases (COPD, asthma) list the main classes of drug used to treat the disorder and explain why the chosen drugs are appropriate            Describe the unwanted effects of (NSAIDs) on the airways in bronchial asthma</p> <p><i>Immunology</i>            In relation to the inappropriate immune responses students should be able to:</p> <ul style="list-style-type: none"> <li>• Explain the concept of hypersensitivity reactions</li> <li>• Describe the processes responsible for each of the four types of hypersensitivity reaction and illustrate each with appropriate examples</li> </ul> <p><b>Introduction to Clinical Practice</b>            Respiratory system illustrative diseases: Asthma &amp; COPD</p> <p><b>Problem-Based learning</b>            There is a Problem-Based learning topic in Semester 2 (which is designed to integrate biomedicine and social sciences) based on a case of Bakers' asthma</p>
Year 3	<p><b>Respiratory System</b>            The student should be able to describe the pathological processes underlying allergy</p>
Year 4	<p><b>Otolaryngology</b>            Allergic rhinitis            (learning objectives relating to use of antihistamines, steroids and decongestants in ENT disorders)</p> <p><b>Dermatology</b>            Recognise important cutaneous signs of systemic disease or adverse reactions to drugs            Very common and important skin diseases: Dermatitis (atopic, contact irritant and allergic)            Student should be aware of the clinical features and treatment of (with limited knowledge of pathophysiology and aetiology)... urticaria            Knowledge of dermatological emergencies... angioedema            Also highlight allergies as causes of certain conditions such as balanoposthitis (to spermicidal lubricants), and in the immune response and sensitisation to scabies</p>
Year 5	<p><b>General Practice</b>            Be able to formulate &amp; justify a continuing care programme for the following common continuing conditions largely managed in the community: asthma            To learn the core therapeutic drugs and problems (Severe asthma, Acute anaphylaxis, Allergy)</p> <p><b>Acute/General Medicine</b>            The student should be aware during Breathlessness patient's medical history taking of wheeze/Asthma/stridor, cough/sputum/smoking            By the end of the attachment you should be able to describe the clinical features and pathogenesis of common medical conditions, and outline their immediate management... Severe asthma</p> <p><b>General Surgery</b>            Describe pathophysiology of the common forms of shock (hypovolaemic, septic, anaphylactic, neurogenic and cardiogenic)</p>
All 5 Years	<p><b>Pharmacology &amp; Therapeutics</b>            Core therapeutic problems... asthma, eczema and allergic rhinitis            Case on anaphylaxis            Core skills... Drug history: recording current and past adverse drug reactions and allergies            Allergy, asthma and eczema in the context of paediatric and child health</p>

allergy and allergy-related disorders are currently taught throughout the five years of undergraduate training. However, mapping of allergy-related topics using curriculum documentation indicates significant topics which appear not to be covered – such as food allergy, allergy investigation and diagnosis, and management of those patients with multi-organ allergic disease. Our findings also suggest a need to pull together the disparate components of the allergy curriculum into a coherent theme.

### **Main strengths and limitations of this work**

The principal strengths of this work are the systematic manual searching of all course learning objectives and electronic searches of all core course documentation throughout the five years of study.

The main limitations of this study are that it was confined to one medical school and focused on the formal described curriculum. Although the curriculum in each UK medical school is different, and there are some very different approaches to teaching and learning in some (for example, Glasgow University's predominantly problem-based learning approach), Edinburgh is a fairly typical example of the integrated systems-based curricula which many medical schools have adopted in response to *Tomorrow's doctors* [8]. Whilst it is impossible to generalise broadly from our findings, we are not aware of any other medical schools in the UK highlighting allergic disorders as a key theme, and so they are likely to have similarly incomplete documentation relating to the teaching of these disorders.

Probably the most significant limitation was that we were unable to make any formal assessment of students' actual knowledge, attitudes, or skills in relation to the management of allergic problems. This is important, since there is often considerable difference between planned, described, and delivered curricula, and also between delivered and learned curricula [13]. The lack of detail in the learning objectives may also be misleading, as we found some examples of topics which could possibly include allergic disorders but in which this was not made explicit (such as conjunctivitis and inflammation). Also, whilst the managed learning environment search engine would identify key terms within the majority of course documentation (encoded in html), it would not identify these in text embedded within PowerPoint presentations, Word documents, or Adobe Acrobat files.

Given the high prevalence of allergic disorders it is likely that students will come into contact with patients suffering from these disorders and may receive opportunistic informal teaching about them in most clinical attachments. Due to the lack of allergy specialist services in Edinburgh, however, the opportunities for students to receive structured, comprehensive and cohesive informal training about allergic disorders as a whole are likely to be minimal, and we feel that such teaching should not be left to chance.

### **Considering these findings in relation to the published literature**

Although allergy and allergy-related topics are covered throughout the formal medical curriculum, there appear to be important deficiencies in the way allergic disorders are described and presented to students. A recent national survey has revealed general practitioners' lack of confidence in managing patients with, for example, possible food allergies, those with multiple allergies, and in interpreting related diagnostic tests [14]. In view of the overlap between these areas and the gaps we have identified in the described curriculum, these shortcomings clearly need to be addressed.

### **Conclusions: implications for curriculum development and research**

Given the frequency of allergy, its typical multi-organ manifestations, and the lack of informal and specialist clinical training opportunities available, it is important that a more coherent approach to teaching allergy is developed at undergraduate level. Identifying and developing allergy as a curriculum vertical element should be relatively straightforward. This would involve: appointing an advocate for the theme; negotiating learning objectives; developing the curriculum map we have created on the managed learning environment in order to emphasise to students and staff how and where allergic disorders are taught; highlighting and addressing any omissions or weaknesses; and supporting the teaching and learning of allergic disorders with written materials, computer-aided learning packages, and other resources [15,16]. The University of Edinburgh has recently undertaken a similar approach to curricular development with respect to the key clinical themes 'Alcohol', 'Disability' and 'Diabetes', and has, through this approach, improved the comprehensiveness and coherence of the training provided in these areas.

Highlighting allergic disorders in this way will now be formally proposed to the Edinburgh Medical Undergraduate Studies Committee.

In addition, we recognise the need to gather information from module organisers to identify teaching in their modules on allergic disorders which is not currently described in the learning objectives – i.e. to compare the delivered curriculum with the described curriculum. We also plan to organise focus groups of students to identify their learning in allergic disorders in order to compare student learning with the described curriculum.

Thinking strategically, and beyond the confines of Edinburgh, and with the Scottish Executive and the Department of Health currently reviewing allergy services, there may also be merit in developing a core allergy curriculum that can be adapted for use in all UK medical schools.

### Potential conflict of interests

**Aziz Sheikh** gave evidence to the Health of Commons Health Committee review on *The provision of allergy services*, is part of the Department of Health Allergy Review Stakeholder Group and serves on the Scottish Executive's Review of Allergy Services in Scotland Working Group.

**Michael Ross** is a member of the University of Edinburgh's Medical Teaching Organisation.

**Yasser Shehata** has no conflicts of interest.

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Aziz Sheikh conceived the idea for this study and together with Michael Ross devised the methodology. Yasser Shehata and Michael Ross undertook data analysis. All three authors were involved in writing the paper.

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