Annotation

Teaching of clinical genetics in Britain: a report from the Royal College of Physicians of London

A W Johnston

Abstract
A report from the Royal College of Physicians of London shows support from a wide range of specialties for the teaching of a core curriculum and basic skills in clinical genetics. However, there is a marked variation in the hours timetabled for clinical genetics, averaging 20 in the preclinical and six in the clinical section.

The exponential increase in knowledge in medical science threatens to overwhelm the medical student, with each specialty pressing its own claims on the curriculum. True education is concerned with principles, rather than with a mountain of minutiae. The training of the medical student, in particular, has to recognise that far reaching advances in knowledge and significant changes in practice will occur during his or her professional lifetime. The concept of a core curriculum, which will provide a firm foundation for future development, has therefore emerged. The 'New Genetics' has dramatically altered the approach to genetic disorders, not merely for Mendelian diseases, but also by providing a way of exploring the genetic basis of common diseases of adult life, such as hypertension, atopy, and diabetes mellitus.

It is essential to set in context for our colleagues the frequency of these diseases in developed countries. Genetic and part-genetic diseases may affect as many as 1 in 20 persons by the age of 25, while the lifetime risk may be perhaps 60%. Yet, deficiencies in the teaching of clinical genetics in British medical schools were recognised as long ago as 1978 by the Medical Research Council, who stated that "what is required is a programme of genetic teaching spread between clinical and pre-clinical departments and integrated, so that the subject can be seen to have real clinical value." These deficiencies have naturally been particularly well documented by the General Medical Council (GMC) in a series of reports. In their survey of basic medical education in Britain, they suggested a strategy of teaching genetics as a single course coordinated by the same staff, though given over the preclinical and clinical years. The GMC developed this theme in their 1980 report, stating that the student should be made "aware of the influence of heredity on health and disease, both in terms of the individual and the population as a whole. He should learn the principles of genetic counselling and also those governing the antenatal diagnosis and prevention of inherited disease and of mental retardation and/or handicap". Yet, in their 1988 report, the GMC found considerable deficiencies in genetic teaching.

The report
A working party from the Clinical Genetics Committee of the Royal College of Physicians of London has recently sought to ascertain from the staff of British medical schools what would be regarded as the core curriculum and basic skills required in clinical genetics. The full report with the detailed analyses has now been published*, as well as a shortened version. Altogether, 429 clinicians and other medical teachers across a wide range of specialties were sent a questionnaire asking what genetic topics should be taught and what genetic skills should have been

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*Available from the Royal College of Physicians, 11 St Andrew's Place, London, NW1 4LE (£5.00). Membership: R Harris (Chairman), A W Johnston, (Secretary), H Harris, I Young (co-opted).
Table 1  Genetic topics.

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<th>Patterns of inheritance</th>
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<td>Genetics of common disease</td>
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<td>Chromosome structure and function</td>
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<td>Medical applications of molecular genetics</td>
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<td>Prevention of genetic disease</td>
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Table 2  Genetic skills.

| Know where to get information and help |
| Construct family tree and identify patterns of inheritance |
| Be aware of stress caused by genetic disease in families |
| Perceive major ethical issues in medical genetics |
| Discuss role of genetics in common disease |

acquired by the end of the medical course. The largest clinical group (73) was from general medicine and its specialities. There were 47 persons in both paediatrics and in psychiatry and 36 from obstetrics and gynaecology, while 63 were preclinical teachers. It should be noted that only 39 had a professional involvement in clinical genetics, while another 28 were non-medical professors of genetics. Great care was taken to show that those who did not reply initially held similar views to those who did and to check data with the local clinical geneticist. Respondents were asked to assess skills and topics as either obligatory, valuable, optional, of little value, or not required. The scores reported were then grouped for the purposes of statistical analysis, either as obligatory/valuable or optional or of little value/not required. There was quite remarkable agreement across the specialities as to the skills and topics regarded as obligatory/valuable. No less than 85% of respondents considered 11 of the 25 topics to be in this category (table 1). Five out of the 14 skills were similarly regarded as obligatory or valuable by more than 85% of respondents (table 2). Perhaps a little surprisingly, the recognition of high risk pregnancies scored only 78%, while counselling and reproductive options, together with the organisation and localisation of genetic services, each merited 75%. Yet, when and where to seek help is recognised as the prime skill!

Despite this strong support from a wide range of teachers, there is remarkable variation in the number of hours allocated to clinical genetics, from two hours of preclinical lectures (with six clinical hours) to 66 preclinical hours (with two clinical hours). The mean number of hours in the preclinical course is 20 and in the clinical section six. It is difficult to believe that these extremes can provide for a balanced course. It is, however, appreciated that a significant amount of teaching does take place throughout the curriculum in other subjects, but, as the GMC pointed out, it is difficult to quantify or to assess its quality. It should be regarded as complementary and supplementary, rather than as part of the core curriculum. It was perhaps a little surprising to find that only half of the medical schools provide for scheduled visits to the genetic clinic. A video recording does not easily provide the same insight into the impact on families. A one way mirror could provide a possible solution. A video can, however, provide a suitable opening for a seminar and we, like others, have found it works well.

Inclusion of written questions in the examinations at the end of the preclinical and clinical courses was explored. Twelve medical schools have questions at the end of the preclinical course and 11 have questions set by the clinical geneticist as part of the final examination, so that 18 schools in all formally tested students’ knowledge.

The report concludes that there is strong support for improving the teaching of genetics to medical students and provides clear guidelines as to the content of a core curriculum and basic clinical skills required. Increased expectations on the part of families on one hand, and the speed of developments in molecular biology on the other, necessitate such training. The recommendations may be summarised by stating that the course in medical genetics should be coordinated from first to final year with much greater emphasis on clinical relevance. Judging by the responses, this may well necessitate a different balance between the average 20 preclinical hours and six clinical hours in the formal timetable by increasing the number of more clinically orientated lectures in the preclinical course. Curriculum Committees should ensure that the clinical geneticists are participating in the planning of such a course. Although this will place a further burden on them, overstretched as they are, nearly all teaching centres now have a clinical geneticist, so that such involvement ought to be possible.

The formal and informal contributions of other disciplines, such as paediatrics and obstetrics, will continue to be welcomed. A coordinated course would be modelled along the lines of table 1. Some expansion of the clinical course would enable students to apply the knowledge already gained and to develop their genetic skills (table 2). Ad hoc teaching by clinical geneticists in the context of staff rounds etc should be encouraged. It needs to be emphasised that those involved in teaching this course should be genetically literate and, at least some, clinically trained, to ensure awareness of research and developments and of their relevance to the patient.

To ease the demands of teaching, the report makes the important suggestion that there should be a Genetic Education Task Group (GETG) to coordinate implementation and acceleration of the pace of genetic
education. It would not in any way seek to usurp the prerogative of individual medical schools to develop their own curriculum, but rather to provide topic outlines, lists of references, even slides of pedigrees, karyotypes, etc, which would support and supplement the core curriculum or, where appropriate, provide a starting point or background for a revised genetics course. Short videos might also be prepared to provide an introduction of a particular topic or skill. Longer videos and slide/tape sets, complete in themselves, could be held at library level.

Another interesting idea is the use of a clinical genetic log book to document the actual experience of each student and intended to encourage their involvement, though it would not be used for assessment.

Other views
The parallel and independent report from the Royal College of Physicians on *Prenatal diagnosis and genetic screening* also concluded that medical genetics should be part of the core education curriculum of doctors and nurses, as well as emphasising the place of allied professions in providing counselling and support. They also noted that, though there were clinical genetics centres in most regions, few had adequate staff, counselling, or diagnostic resources and very few brought together all the relevant services on one site.

Reports from North America have also indicated inadequacies in the teaching of genetics, yet with a consistency in the designated topics similar to those in table 1.

**Conclusion**
This report on teaching genetics to medical students provides a mandate from clinical and preclinical teachers of many disciplines for strengthening the teaching of clinical genetics so that it can fulfil its fundamental role in the practice of medicine in the 21st century.

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