attached for two weeks to general practices around Basingstoke, Portsmouth, and Winchester and subsequently will be attached to practices in Bournemouth, Poole, Salisbury, and other centres.

Our resources consist of: (*a*) a university practice about half a mile from the medical school consisting of 7500 patients and another practice of 4000 patients which we will "inherit" in two years. These two practices form the bases for our teaching; (*b*) eight members of academic staff, all salaried and full-time; and (*c*) the general practitioners who teach in all three courses.

A teaching programme of this extent could not be sustained without the support of general practitioners. About 40% of general practitioners in Southampton take part in undergraduate teaching, and an increasing proportion are taking part in fifth-year teaching in Wessex. General practitioners must be involved in teaching for two reasons. Firstly, and more importantly, they are teachers; but, secondly, they act as agents of the medical school in that they provide through their registered lists of patients access to a large population for teaching purposes. I hope the medical school gives general practitioners something in return. I believe we add a new dimension to the continuing education of general practitioners. To be in contact with young people who question, who persist in asking you "why," and who sometimes suggest that your assessment and management of a patient might be improved seems to be a relatively painless, effective, and cheap form of postgraduate education. Being a teacher in daily contact with undergraduate students improves standards of patient care.

Evaluation

The overall aims in primary medical care teaching are to add to the knowledge and skills the student has acquired in hospital and to influence his attitudes towards patients whether inside or outside hospital. Evaluation is probably one of the most neglected fields in medical education, indeed in all facets of education. Evidence on whether we are being successful in achieving these aims cannot be given. So far as we can tell in Southampton, most students enjoy themselves in primary medical care, particularly in early medical contact, and this is in itself a highly desirable educational goal. But in the next five years outside observers must evaluate the course scientifically, not just by crude questionnaires but by questionnaire and structured interview and other more sophisticated techniques, and we must attempt "before and after" studies in which we measure the student's skills and attitudes when he first comes to primary medical care and particularly his attitudes after five years as an undergraduate.

We have set up in Southampton what appears to be a successful primary medical care teaching model. But income must equal expenditure, and primary medical care teaching is expensive and administratively difficult on the scale we have aspired to. In the next five years we must try to find out whether we are getting our money's worth.

Reference

[1] General Medical Council, *Recommendations as to Basic Medical Education*. London, GMC, 1967.

VI—The fourth year: study in depth

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Medical science teaching is often a "study in width," in which a very wide range of subject material is covered in a shallow manner. This approach has several disadvantages. Students may have little opportunity to develop their own skills in handling problems and developing answers to them, or gain little experience of the discipline of working in a team. The sheer volume of facts to be learnt means that they are often presented as oversimplified half truths, and the uncertainties surrounding much accepted knowledge remain concealed. There is overemphasis on the solved problems of the past rather than on the unsolved ones of the present.

An alternative approach was advocated by Epstein,[1] who has introduced students into methods of scientific work by discussing a current research topic with them from the outset. No attempt was made to cover all the "facts" of science, but every effort was concentrated on allowing students to grapple with real scientific problems. This is the basis of training offered in most MD and PhD projects and many BSc courses.

In Southampton almost the whole of an academic year has been allocated to this type of learning in which each student chooses a field of interest to himself and studies some aspect of it in detail. It is placed late in the curriculum, after the student has had one year of experience in clinical medicine, so that the options can be in either clinical or in basic science fields, or preferably in a combination of both. All medical students have to take this year and exemption is considered only for graduates who have achieved good examination marks and clinical assessments and whose previous degree was in a subject forming a substantial part of the medical curriculum—for example, biochemistry or physiology—and included work on a project.

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The goals

The goals were established during the early planning of the curriculum and have not been significantly modified. It was agreed that the student should follow a flexible programme of advanced study and project work, suitable for his or her needs, under the guidance of a supervisor. This was intended: (*a*) to enable the student to learn that the extent of medical knowledge is infinitely wider than the extent of his medical undergraduate education; (*b*) to develop in the student a basis for critical self-education so that he is in a position to continue to educate himself after registration; (*c*) to provide the student with an opportunity to study the way in which scientific data are collected and handled, and in particular to illustrate their sources of variability; (*d*) to provide personal experience of the experimental method. These goals anticipated by some years the statement in the Merrison Report[2] that the medical graduate ". . . will recognise the limitations of his own knowledge and abilities and will be prepared for a career in medicine that is based upon continuing education."

It was also recognised that there was a need during this year for continuing clinical contact with patients and the practice of basic clinical techniques. An attempt has been made to meet this need by allotting one day each week to clinical study in the following special subjects: orthopaedics, ophthalmology, ear, nose, and throat, dermatology, sexually transmitted infections, and rehabilitation. For many students the field in which they are working also involves them in clinical work.

One half-day each week is set aside to provide an opportunity for all the students in the year to meet together and discuss their projects and to introduce brief courses on such subjects as medical ethics, legal medicine, experimental design, and management. Debates have also been held on motions such as, "The cancer patient has the right to be told the truth." These activities have acquired the title of the fourth-year club.

Objectives of study in depth

At the end of the year students should be able to justify their own conclusions on some problem of medical science which they have studied in depth. This will be shown by: (*a*) an assessment of the nature and relevance of the problem, with some knowledge of the background information obtained from published reports; (*b*) the ability to talk about the topic in some detail and argue the evidence orally. This should take place either at a departmental meeting or at the open day organised at the end of the session for student papers and exhibits; (*c*) a written report of not more than 5000 words (excluding tables, figures, etc) with a critical account of some aspect of the topic they have studied. The report should include an account of earlier studies and the hypotheses, methods of study, analysis of results (even if incomplete or inconclusive), and personal conclusions; (*d*) presentation of either a paper or an exhibit at the fourth-year open day.

Organisation of the year

Initially one course co-ordinator was responsible for distributing the students among the various options. Matching the available resources to the interests of the students is a major undertaking and now two co-ordinators are needed to do this. Other important functions that they undertake are maintaining contact with students who are scattered among many different disciplines and workplaces, and organising the activities of the fourth-year club and the open day. A small working party oversees the general working of the year.

The open day is held at the end of the year. On the first occasion this was an opportunity for all students to present their projects in a series of 10-minute papers. The standard was well up to that of many scientific meetings and in particular the quality of presentation and the students' ability to handle questions from their audience was gratifying.

Study topics

The topics studied have covered a wide range of subjects, and the following list gives an idea of some of the 100 topics already covered: electron microscopy, insulin secretion, health education, medical care audit, metabolic rhythms, neoplastic histopathology, drug trials, epidemiology, wound healing, intrapartum asphyxia, patients' fears, psychotherapy, cross infection, calcium and vitamin D, biomechanics, stretch reflexes, teratogenesis, parenteral nutrition, chromosomes and drugs, lung function, immune complexes, bronchial metaplasia, sequelae of heart disease, renal malformations, diet and anaemia.

Although students were in close contact with their supervisors in their chosen field from the beginning, few had a clear idea of their specific project for two or three months and this was often a period of considerable anxiety for them. As the picture became more clear there was a universal upsurge of morale and enthusiasm leading up to the detailed experimental work, production of results, and the final report.

Benefits of the year

Several interesting benefits have become apparent by incorporating this year into the medical curriculum. Students have learnt to: define problems and organise methods of answering them; become critical of their own work and that of the experts; use a variety of research equipment, sometimes expensive and complex, and undertake complicated analytical procedures; work in practical teams; develop as individuals, rather than as part of the herd; become colleagues participating actively in the work of the hospital and laboratories, rather than consumers of other people's time and efforts; find time to think and read in science, arts, and ethics.

Not all of these benefits apply to every student and they may vary according to his involvement in the practical work of the department. There has clearly been great opportunity for individual development and the manner in which this opportunity has been seized has been remarkably encouraging.

Problems of the year

The student's work depends in large measure on the quality and extent of his supervision. The standard of supervision will become increasingly difficult to maintain as the numbers grow. Students may easily become isolated since they are scattered around the medical school and several different hospitals. Morale has tended to drop uncomfortably in the third and fourth month of the session as they try to define their project and struggle with practical realities. It has almost always improved once their project is under way. Some have found the clinical day and the fourth-year club to be troublesome intrusions into their project work. There is a distinct preference for clinically oriented projects. This may impose unacceptable demands on the supervisors in clinical disciplines as student numbers increase. There is a need to link some of the projects in the basic sciences with appropriate clinical problems. Several students have felt uneasy about what they regard as a long gap away from daily contact with patients. To meet this extra clinical sessions will in future be provided for students who need them. One or two students have sensed a complete lack of relevance in what is seen by them as research "rather than part of their training as a doctor."

Conclusions

In spite of the problems and the constraints which this year imposes on the rest of the curriculum, early assessment suggests that it has been a substantial if qualified success. Feedback about its value is still needed from students who have completed the year, but many have testified to the value of learning to overcome practical difficulties. They have learnt that original work is full of frustrations and that success in achieving any sort of conclusion depends on perseverance and hard work. They have also testified to the reward of seeing their own work in completed form. The validation of this year may also require that there be some independent assessment of the completed projects, perhaps by the refereeing of a random sample by an external assessor. This is being arranged.

The continued success of the year, however, will rest primarily on the commitment of supervisors to their students. With increasing numbers of students and an already tightly scheduled curriculum, this is an onerous responsibility. Provided the supervisors can continue to meet it, the Southampton fourth year can perhaps be seen as an all too rare example of a medical student's education genuinely meeting the more general objectives of a university education.

We must place on record our gratitude to Dr Graham Rabey who was the initial co-ordinator and to the students and supervisors who have been prepared to learn together.

References

[1] Epstein, H E, *A Strategy for Education*. London, Oxford University Press, 1970.
[2] Committee of Inquiry into the Regulation of the Medical Profession, *Report*, Cmnd 6018, p 25. London, HMSO, 1975.

We are warned not to look into the sun as eyes are sensitive to a short exposure of intense sunlight. Yet babies lie flat on their backs looking straight into a sunlit sky. Does this affect their vision and could it be a cause of amblyopia?

No harm is likely to come to a baby or to an adult from looking at a sunlit sky, provided that the direct rays of the sun do not enter the eye. There is certainly a theoretical risk of a baby developing a solar burn from looking at the sun, but I suspect that the normal protective reflexes are sufficient to cause a rapid alteration of gaze and screwing up of the lids if the child did look directly at the sun. I have never heard of amblyopia in a child being caused in this way.