

records, Information and Statistics Division, Common Services Agency, Edinburgh). Clearly, many factors influence reinsertion rates,^{2,3} but these factors and alternative treatments, such as hearing aids,^{4,5} need to be evaluated to avoid repeated operations in young children.

I thank Mr E Alexander and Dr J Clarke for supplying information on the Scottish morbidity records.

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- 1 De Melker RA. Treating persistent glue ear in children. *BMJ* 1993;306:5-6. (2 January.)
- 2 Otitis media with effusion in children. *Lancet* 1990;336:23-4.
- 3 Curley JWA. Grommet insertion: some basic questions answered. *Clin Otolaryngol* 1986;11:1-4.
- 4 Currie E, Stillfried D. *Otitis media: a purchaser's guide to cost-effective screening and treatment*. York: York Health Economics Consortium, 1992. (Occasional paper 5.)
- 5 The treatment of persistent glue ear in children. *Effective Health Care* 1992;No 4.

EDITOR,—Ruut A De Melker failed to mention the important contribution of allergy to secretory otitis media (glue ear).¹

Successful treatment of glue ear by attention to underlying allergic disease has been previously reported.^{2,3} Our experience at the Royal National Throat, Nose, and Ear Hospital over the past two years in a study of over 200 children aged 3-8 years with chronic (more than six months) or recurrent (more than three episodes) glue ear is that a high proportion (over 80%) have allergic rhinitis and that treatment of this is associated with resolution of the secretory otitis media in most cases. With further respiratory tract infections there remains a tendency to impaired hearing, but this is transient.⁴ Evidence in support of this comes from a further study of 80 children with perennial allergic rhinitis and no hearing complaints. These underwent audiometry and tympanometry, which showed that only 17 (21%) had entirely normal hearing.

The children with secretory otitis media also had a high prevalence of asthma (over 35%), often previously undiagnosed, and eczema (20%), with blood eosinophilia in 35%. Such children obviously need general assessment, not merely an examination of their ears and hearing.

Allergy, although probably not the cause of glue ear, is a factor in its persistence and recurrence and should be taken into consideration when evaluating treatment methods.

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- 1 De Melker RA. Treating persistent glue ear in children. *BMJ* 1993;306:5-6. (2 January.)
- 2 Borge P. Atrophy and secretory otitis media. Immunological studies and responses to corticosteroid therapy. *J Laryngol Otol* 1983;97:117-29.
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Medical education

EDITOR,—The recent series of articles by Stella Lowry offers some profound insights into the problems, current and long standing, in medical education. We are particularly struck by the concern that doctors are now expected to work in multidisciplinary teams, not automatically as their leaders.¹

To respond to this development in a positive way, in Southampton we have introduced multi-

professional teaching for students from physiotherapy, occupational therapy, nursing, podiatry, and medicine. Problem based learning techniques are used, and students work in teams to define professional roles and develop management plans for patients.

Feedback suggests that students enjoy the experience, acquire knowledge about professional roles and patient management, improve their teamworking skills, and develop positive attitudes towards multidisciplinary teamworking which might serve them well in their later professional practice. As facilitators, we have also learned a great deal about our professional roles.

If medical education is to respond to modern developments in health care, we believe that more of this sort of teaching will be required.

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- 1 Lowry S. What's wrong with medical education in Britain? *BMJ* 1992;305:1277-80. (21 November.)

EDITOR,—There is a general perception that change in medical education is starting to occur. It may be difficult for a medical school, itself relatively small, to plan and implement this. The City and East London Confederation for Medicine and Dentistry consists of Queen Mary and Westfield College, the London Hospital Medical College, and St Bartholomew's Hospital Medical College. Cooperation between their staff and students has been extremely effective in providing a critical mass for generating ideas and implementing new teaching methods.

The students of Queen Mary and Westfield College (not of St Bartholomew's as incorrectly stated in Stella Lowry's article¹), which is next to the Royal London Hospital (Mile End), undertake at Queen Mary and Westfield College the innovative phase I of the curriculum which she describes. This is taught by staff of all colleges including basic and behavioural scientists, clinicians, and community staff. The educational content of all phases is supervised by the curriculum management committee of the City and East London Confederation, on which the three colleges are represented, and to which all local implementation groups are responsible. During phase II (in which behavioural sciences, statistics, ethics and the law, and clinical and communication skills are taught, and further project and community experience is gained), the students go to their "parent" medical colleges (the London or St Bartholomew's colleges).

The main clinical modules constitute phase III, and their aims and teaching methods are carefully scrutinised by the phase III committee to ensure suitability and avoidance of factual overload. This, again, includes members of all three colleges and incorporates clinicians, basic and behavioural scientists, and students. Such cross college and interdisciplinary pressure has been found invaluable in replacing passivity and resistance to change by enthusiasm and a desire to innovate and improve.

The modules in each medical college are similar but utilise local strengths to best advantage. For students at the London Hospital Medical College the "core" attachments will be supplemented in their final year by two months of electives and three months for the study of more strictly defined "options."

There is a point of particular concern. The cheapest and easiest way of teaching subject matter is by large group lectures. The cheapest and easiest

way to teach clinically is by apprenticeship. These are educationally unsatisfactory and unlikely to generate the deep thinking referred to by Lowry or produce caring doctors with a holistic attitude to illness and their patients. Good education is not cheap, as we have already found.

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- 1 Lowry S. Curriculum design. *BMJ* 1992;305:1409-11. (5 December.)

EDITOR,—The logistic problems that Stella Lowry associates with community based teaching¹ could be resolved by funding in proportion to that supporting teaching hospitals.²

Such teaching is certainly feasible. As distinct from the four week experience of general practice which all of our final year students receive (with a final objective structured clinical examination (OSCE) in general practice) this university department of general practice has over many years provided generic clinical teaching for the department of medicine.

In year 1 all 130 students now have four introductory sessions—dealing with people, professional ethics, problem solving, and population based medicine—at local practices. General practitioner tutors are paid at NHS consultant rates for both teaching and training sessions. Patients' expenses are reimbursed and buses are hired for students. The total cost is about £100 per student. This is a realistic estimate of the cost of "casual" systematic teaching. Major resources and imaginative mechanisms² are, however, required to enlarge the scale.

The infrastructure of teaching hospitals is largely NHS (rather than university) funded and there has only recently been a welcome extension of this mechanism to general practice. Including this, the combined funds in my region are about £20m a year for hospital as against £0.3m for general practice. Per student per year, general practitioners' funding is about 50% of the hospital rate. These differences merely reflect the current balance of locus of academic activity and the obviously higher unit costs of hospital infrastructure.

General practice based education is still a marginal activity. Even modest expansion will need funds to provide accommodation and resources for good systematic teaching and protected academic time through enhanced staff levels.³ Our vision should not be clouded by present logistic and structural constraints: the NHS reforms have shown how quickly these can be changed. Although a fivefold increase in funding for academic general practice may seem inconceivable it is a comparatively modest sum that would drive change in the balance of clinical education and pay handsome dividends for both the patients and the profession as a whole.

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- 1 Lowry S. Medical education: strategies for implementing curriculum change. *BMJ* 1992;305:1482-5. (16 December.)
- 2 Taylor RJ. General practice in the medical school: the way ahead. *Update* 1985;30:615-8.

EDITOR,—The recent articles by Stella Lowry^{1,2} have highlighted several important issues in medical education arising from the recommendations of the recent GMC report.³ At Manchester University, "core plus option" curricular changes have already been implemented. Most traditional style, discipline oriented lectures have been discontinued. We anticipate that our integrated clinical practice course will encourage students to

adopt a more holistic approach. The new "option" teaching gives each student the opportunity to study a particular area of interest in depth, and may well influence their final career choice. We hope that the enthusiasm and effort that we are investing in these options will be reflected in the recruitment of graduates into obstetrics and gynaecology.⁴

To complement these curricular changes the nature and timing of the examinations have been changed. Students receive their "core" teaching in the fourth year, with a clinical examination in each core specialty. In obstetrics and gynaecology we have implemented an objective structured clinical examination (OSCE). Lowry highlighted the organisational problems associated with such examinations.² We have overcome these problems and now have what we consider to be a much fairer and more objective examination. The examination (for each group of 90 students) starts at 9 am, and by 6 pm the final results have been confirmed at the examiners' meeting. We have identified the "core" skills which we feel are essential—these include communication skills assessed by history taking, obstetric and gynaecological examination (the latter using a dummy). We have incorporated written short answer questions and clinically oriented slides.

The marking of the examination is weighted towards the assessment of clinical skills. The final result awarded to each candidate takes into consideration the formative assessment results obtained during their clinical attachment, which incorporates a summative assessment obtained before the examination. A criterion referenced marking schedule is used to assess the students at each clinical station. We use a norm referenced method on the cumulative result to identify those students who require further tuition in our discipline. Any student who fails the examination has a compulsory revision "option" in final year. Students who do not achieve a satisfactory pass in the fourth year have a formal clinical examination and viva during their final MB examination. The final MB now consists of three integrated papers: multiple choice questions, slides with short answers, and a paper consisting of patient management problems encompassing all disciplines.

The new curricular teaching and examinations are very labour intensive and have considerable resource implications. University departments operating within close margins with respect to staffing and clinical resources have to rely on a large measure of good will to achieve continued high standards in teaching and evaluation, which can be difficult to sustain if, for example, re-appointments of staff are delayed. Proposals for resource allocation according to quality of teaching as well as research endeavour are undoubtedly overdue.

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- 1 Lowry S. Curriculum design. *BMJ* 1992;305:1409-11. (5 December.)
- 2 Lowry S. Assessment of students. *BMJ* 1993;306:51-4. (2 January.)
- 3 General Medical Council. *Undergraduate medical education. The need for change*. London: GMC, 1991.
- 4 Elstein M. Undergraduate education and recruitment in obstetrics and gynaecology. *Eur J Obstet Gynecol Reprod Biol* 1991;41:37-42.

EDITOR,—In her article "Teaching the teachers" Stella Lowry points out that few medical teachers in Britain have any formal training in educational skills or theory.¹ Since so few doctors possess such skills, perhaps we can learn them from teachers outside the medical profession (at least until there is a sufficiently large body of trained teachers within the profession).

One possibility is the City and Guilds course

730, the further and adult education teacher's certificate. This course is very widely available and it is pitched at the right level for the medical teacher. It is taught in colleges of further education and polytechnics (now universities) throughout the country. (In London, courses are listed in *Floodlight*.)² The first term, part 1, covers lesson planning and presentation skills. It would be suitable for any doctor, even if he or she does not specialise in teaching. The remaining two terms cover the basic theory of education and teach how to plan an effective educational programme. This would be ideal for any doctor who wished to be a clinical tutor, or who had a special interest in education.

When I did this course (in 1988 at Lewisham College) I went to tutorials for three hours twice a week, at which theory was taught, and we engaged in teaching exercises assessed by our peers and tutors. There was, in addition, supervised teaching practice in the workplace. We were expected to plan, implement, and evaluate a short teaching programme. There was also a considerable amount of written work, with six written or practical assignments in the first term and a further 16 assignments in the rest of the course. Anyone interested in the content and level of the course may wish to refer to one or more of the texts listed below.^{3,5}

I would, however, sound a note of caution. It seems to me that the time, effort, initiative, and determination required to complete this course are equivalent to that needed to complete a research project. As Lowry points out in her article, teaching does not have the same status as research. The certificate has counted for little in my appointment interviews, and I was repeatedly told after failing the interview that my research record was weak. Until the status of teaching improves in the medical profession it seems unlikely that doctors in training will choose to make the efforts necessary to acquire teaching skills.

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- 1 Lowry S. Teaching the teachers. *BMJ* 1993;306:127-30. (9 January.)
- 2 *Floodlight. London's guide to part time day and evening classes*. London: Association of London Authorities, London Boroughs Association, 1992.
- 3 Curzon LB. *Teaching in further education*. 4th ed. London: Cassell, 1990.
- 4 Minton D. *Teaching skills in further and adult education*. London: Macmillan, 1991.
- 5 Newble D, Cannon R. *A handbook for medical teachers*. 2nd ed. Lancaster: MTP Press, 1987.

EDITOR,—Stella Lowry's article describing many ways of improving the preregistration year is thought provoking.¹ She mentions that Southmead Hospital is considering changing to a one year block contract as a means of empowering house officers and helping them to be recognised as an important part of the service provided. Some of the stimulus for this came from a survey of senior medical students, yet when 30 current house officers were consulted all but two said that, though they would be happy to have the opportunity to apply for both jobs at one hospital, they would not have applied for a one year block contract that restricted them to one hospital. The ability to gain experience in different hospitals was seen as an important part of the preregistration year, and one year block contracts could limit this.

We should be careful to avoid introducing change for change's sake and should carefully evaluate potential disadvantages as well as advantages. Southmead Hospital has an excellent induction and core curriculum educational programme, which could be coordinated regionally or nationally; it also organises regular trouble shooting meetings between lead consultants,

managers, and all levels of junior medical staff. These measures alone may be as effective a means of recognising house officers as an important part of the service provided as restricting them to one hospital site for their preregistration year.

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- 1 Lowry S. The preregistration year. *BMJ* 1993;306:196-8. (16 January.)

EDITOR,—Stella Lowry¹ underplays a striking finding of David Wilson's survey of 33 consultants in Yorkshire: he found that consultants generally did not see the preregistration year as an educational process.² This is remarkable as the universities have a statutory responsibility for this year and it is an integral part of medical education that is required before full registration with the GMC.

While I know many consultants who take supervision of preregistration house staff seriously, scheduling regular meetings and teaching sessions and using checklists to ensure that skills and techniques are mastered, it seems that these consultants are in the minority.

We are now entering the era of strict personal accountability, value for money, and survival of the fittest. In this atmosphere one assumes that consultants who fail to educate preregistration house officers will lose the privilege of having such a colleague.

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- 1 Lowry S. The preregistration year. *BMJ* 1993;306:196-8. (16 January.)
- 2 Wilson DH. Education and training of preregistration house officers: the consultants' viewpoint. *BMJ* 1993;306:194-6. (16 January.)

Monitoring theophylline treatment

EDITOR,—J K Aronson and colleagues fail to draw attention to metabolic abnormalities, especially hypokalaemia, and their importance in relation to theophylline toxicity.¹ Metabolic abnormalities accompanying theophylline toxicity include hypokalaemia,^{2,4} hyperglycaemia,^{3,5} hyperinsulinaemia,^{3,5} raised catecholamine concentrations,^{3,7} increased plasma free fatty acid concentrations,^{3,5} stimulation of gastric acid secretion,⁵ and probably hypophosphataemia³ and hypomagnesaemia.³ Among these hypokalaemia is the most consistent and important finding, and its magnitude correlates well with the concurrent serum theophylline concentration.³ Theophylline probably causes redistribution of potassium into cells at the expense of the extracellular pool, an effect reinforced by the increased catecholamine response and mediated by an increased intracellular 3,5-cAMP concentration, hyperinsulinism, and hyperglycaemia.^{3,8} The analogous hypokalaemia that may occur during treatment with β_2 adrenoceptor agonists has been explained in a similar manner.^{2,9,10}

In patients with airways obstruction hypokalaemia induced by theophylline is compounded by concurrent treatment with β_2 adrenoceptor agonists and corticosteroids and by hypoxia.²

Potential lethal cardiac arrhythmias and convulsions are recognised complications of both iatrogenic and self inflicted overdoses.^{3,4,7} Nausea, vomiting, and tachycardia are poor indicators of the severity of theophylline toxicity and do not always precede more serious cardiac and neurological effects.