implications for hospitals. For example, patients may be admitted earlier than necessary before routine surgery to allow them to be used for teaching while they have physical signs. Extra investigations may be requested or more complicated and experimental procedures used so that students can learn about them. Although the NHS subsidises teaching hospitals through the SIFTR (Service Increments for Teaching and Research) payments for some of the additional costs of providing health care in a teaching setting, there was a worry that market pressures would make teaching hospitals unviable.

In practice, however, things are not as bad as had been feared.⁴ Medical schools are slowly recognising that they too are purchasers, controlling substantial sums of money in the form of SIFTR, and that they can negotiate contracts for the type of teaching that they require. A few medical schools, notably Leicester,¹⁰ are already using the placing of their teaching contracts to ensure that hospital managers take education seriously and provide time and resources for it to be done properly.

Conclusion

After years of stagnation medical education in Britain is changing. This is being driven not by educational theory but by the practical implications of technological and political changes. Medical educators must seize this opportunity and take full advantage of

these trends. By teaching in a wider range of settings and making more use of simulated situations we can allow students to explore aspects of medicine that are crucially important but difficult to cover in a traditional teaching hospital. We can ensure the best use of all resources by having more to choose from. Students can learn at a more controlled pace and in a more sheltered environment, which may be less stressful to them and to their patients. Changing attitudes to the funding of health care may be the first realistic opportunity that we have had to enforce high standards in medical education.

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London after Tomlinson

Undergraduate medical education

Lesley Rees, John Wass

This is the eleventh article in our series looking at the issues highlighted by the Tomlinson report into London's health care and medical research and education

Pressures from students and teachers, from professional bodies, and from changes in the way health care is delivered are all forcing a rethink of how medical students should be taught. These pressures may be more intense in London but are not confined to it. The recommendation the Tomlinson report advocates that has been generally welcomed is for more investment in primary care in London. General practitioners have much to teach medical schools about effective ways of learning, but incentives for teaching students in general practice are currently low, organising such teaching is difficult and needs resources, and resistance within traditional medical school hierarchies needs to be overcome. Likewise, students value learning within local communities, but the effort demanded of public health departments and community organisations is great at a time when they are under greater pressure than ever before. The arguments over research that favour concentration in four multifaculty schools are less clear cut for undergraduate education, where personal support for students is important. An immediate concern is that the effort demanded for reorganising along the lines suggested by Tomlinson will not leave medical schools much energy for innovating.

For many years it has been apparent that the teaching of medical students within the confines of specialist hospitals suffers from many defects.¹ The transfer of teaching to the community, where patients live and work, is seen to have many advantages and has been the subject of much recent debate.^{2,3}

At St Bartholomew's Hospital Medical College about

half of all medical students are destined for general practice, and in other schools the proportion is higher. Several events, including the Tomlinson report, have converged, making the pressure for more community based experience for medical students irresistible. The need for change will not be confined to medical colleges in London alone.

Pressure for change comes from patients, students, and teachers; from public and professional bodies; and particularly from developments in the way health care is delivered in the NHS.^{2,4} Before Tomlinson bed numbers in London and elsewhere had already declined. The length of inpatient stay had shortened and the number of patients seen as outpatients or as day cases had increased. Teaching requirements cannot dictate bed numbers, which must be tuned to patient need. Medical education must adapt and follow the patients, not vice versa. This means that traditional apprentice style teaching at the bedside will assume less importance and that learning in primary care, community based settings, outpatient clinics, and skills laboratories will increase.

Primary care

The Tomlinson report's major imperative is to improve primary care in the capital—the sole tenet that has received widespread acclaim. While welcoming Tomlinson's basic premise, the capital's general practitioners have repeatedly emphasised that improvements in primary care will be achieved only if sufficient resources are made available. This is required not only for practice premises but to foster a pleasant and

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The effort demanded by reorganisation in London may drain the energy required to innovate in teaching

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conductive environment for all patients and professionals alike. The same need applies to undergraduate teaching in general practice—a development first advocated 40 years ago by the College of General Practitioners.^{5,6}

Tomlinson did not address either the education and training required if general practitioners' roles are to be clinically extended or the resource implications of their participation as equal partners in undergraduate medical education. This partnership will require changes in attitude within the traditional hierarchical structures of some of our medical colleges. Within the City and East London Confederation for Medicine and Dentistry the joint department of general practice and primary care is increasingly involved in undergraduate education. Building bridges with all the general practitioners who teach our students has been painstakingly slow and difficult. Medical schools would do well to avail themselves of the expertise embedded in general practitioner vocational training schemes, which have fostered, used, and developed many of the desirable educational objectives and tools now thought necessary for educating the doctors of tomorrow. In many respects general practitioners are ahead of their hospital counterparts, for example, in developing their own teaching and communication skills.

Currently a general practitioner is paid £10 per session per student for teaching undergraduates. Money has recently been allocated by the Department of Health via regional health authorities to enable practices to develop their academic role. In the meantime, however, as Knox points out, the very nature of the Higher Education Funding Council's research selectivity exercise works to the disadvantage of academic general practice—whose research track record, while increasing in volume and quality, is still weak compared with research embedded in basic sciences. Knox hopes that this imbalance may be addressed by academic audit initiatives, when high quality teaching will hopefully be rewarded.^{6,7}

A recent pilot evaluation was undertaken at Barts of the joint teaching of gynaecology in general practice run jointly by the medical college and general practitioners. This proved highly successful and was enthusiastically received by the students (A Towle, personal communication). Indeed, if Osler's observation that "the most important essence of medical education lies in the communication of enthusiasm to the medical student," is true, then such enthusiasm is alive and well in many departments of general practice in the United Kingdom. Nevertheless, there are

worrying trends in inner London, such as the increasing proportion of practices with more than 2500 patients,⁸ which may mean that once the novelty has worn off enthusiasm for teaching will not be sustained.

A major shift of medical education from the teaching hospitals into primary care will need careful, active management. Transitional funding is essential if the rapid changes within the new NHS, both in primary care and in hospitals, are not to result both in a poorer quality of education for students already in the system and no assurance that the future for those entering will be significantly better.⁹ Most teachers will be running two curriculums, with the possibility of "burn out." No fine words or cosmetic patch ups will substitute for investment in infrastructure and personnel to achieve ordered and successful change.

Community based education

Community based education has developed around the world in academic climates in which the community is viewed as an equal partner in the development and delivery of health care; and this is now recognised as a desirable objective within the United Kingdom. Although several projects have been undertaken, there are few hard data, and scant evaluation. There is a real danger that some initiatives merely arise as a rapid response to internal and external pressures and are not part of any overall curriculum philosophy; in practice these may represent a change only in the venue of teaching but not a true reorientation.¹⁰ A coordinated approach to undergraduate medical education that includes teaching in the community must not perpetuate the divide between primary and secondary care but rather represent an integrated approach to care and education. The community, primary care, and hospitals each have their place. The roles and strengths of each must be defined in relation to an overall curriculum strategy.

The community based module of the City and East London Confederation was introduced in January 1991, in the second term of the five year course. Its success has led to additional community based activities in later phases of the curriculum. Its major achievement has been to forge closer links between our educational institutions, community organisations, and statutory bodies within east London.¹¹

The module was designed to create an opportunity for students to learn about a local community; social issues; inequality in relation to race, class, gender, sexuality, age, and disability; and service delivery and access to health care. It was intended to encourage students to develop a sensitive and empathic response to people's needs and circumstances and to allow them to place their medical and dental experience in an appropriate social, cultural, and environmental context. They undertook project work which introduced them to the basic techniques of gathering information in a community context.

Tutors were recruited from the medical colleges, dental school, departments of public health, and community organisations. Bringing together these organisations with complementary experiences and skills has generated creative programmes for the students. Tutors were given the freedom to interpret the modules' aims in the most appropriate way for their community and devise a programme for their student group with a particular theme providing a focus for local study. Themes have included: the elderly; parents and children; the Jewish community; housing; the family; mobility and transport; leisure and exercise; crime and health; isolation and loneliness; women; drug users; mental; education and employment; HIV and AIDS; homelessness; young people; learning difficulties; home working; single parent families; health advocacy.¹²

Extensive evaluation of this module showed that the experience was generally positive. Students enjoyed working in the community and spending time out of the academic environment as well as working in small groups. Learning about people, their living conditions, the ethnic and cultural diversity of the area, local issues, and information services provided by statutory and voluntary services proved popular. For many it raised their awareness of people's needs, cultural differences, and the causes and effects of health problems. Some felt that their communication skills had improved and the experience had made them more sympathetic. Tutors enjoyed working with students and seeing their enthusiasm develop, their perceptions change, their pre-conceptions challenged, and their insights deepen.

Most importantly, community organisations have valued student involvement. For example, information gathered by one group is likely to lead to the establishment of day care services for elderly Jewish people in Stepney; another group critically examined chiropody services in City and Hackney, generating recommendations that the community health council wants to embrace; students investigating community services for diabetics made a presentation to general practitioners in Newham; information from an occupational health audit in general practitioners' surgeries in Tower Hamlets will be used by local voluntary organisations; students working with a mental health project prepared a "survivor's guide for the users of mental health services in Tower Hamlets."

Although most tutors enjoyed working with the students, many found the time and effort more than they had expected. Their sustained commitment as tutors at a time of increasing pressure on public health departments and cuts in grants to voluntary organisations has major implications for the module's long term viability. Furthermore, the community module is unwelcome to some staff who teach basic medical sciences and who are anxious about further overcrowding in the curriculum.

It was only possible for the City and East London Confederation to finance this community experience with an "enterprise in higher education," grant which was used to pay community tutors, and a King's Fund grant, which supported the community module coordinator and his part time secretary. When this money ran out funding was taken up by the three constituent colleges of the confederation, but future funding has yet to be identified. We are aware that we should have identified the resources at the outset to introduce and sustain it and to provide adequate evaluation and feedback.¹¹

Self directed learning and clinical skills teaching

Traditional education for doctors and nurses relies heavily on teaching factual information and does not foster independent learning or critical or logical reasoning. Continuing education, however, relies increasingly on self motivation and self discipline and the ability to study independently of formal structure and direction. As such the move to self directed learning involves the provision of new facilities, new education techniques, new learning materials, and new assessment procedures.¹² Furthermore, with fewer "general" medical and surgical patients at some teaching centres, the learning of communication, clinical, and practical skills also needs to become more focused.

Indeed, this was the motive for setting up our first clinical skills and self directed learning centre, jointly with our College of Nursing and Midwifery, which is currently being built at Smithfield. A growing range of complex and invasive techniques in medicine need to be learnt in a "safe" environment. In a clinical skills

laboratory modern information and technological systems, patient simulators, and action mannequins are used to teach communication and diagnostic skills. Comprehensive audiotaped based critiques of an interview done by a medical student and a review of the history, examination, and communication skills and of social, psychological, and ethical aspects of the patient's problem can be assessed by clinicians, social scientists, ethicists, and indeed the patients themselves.

Ethics can also be taught in this environment using interacting lecture techniques and videobased illustrative clinical material. The confederation has just held its first university based examination in ethics and law using such a foundation course.¹⁴

Outpatient teaching—As inpatients are less available for teaching so too we have looked at teaching in outpatient clinics, the subject of a recent study at Barts (A Towle, personal communication). To be effective such teaching requires meticulous planning and organisation and may be especially difficult in busy clinics with a finite number of staff. Not only does it require dedicated teachers and staff involvement, but also clinics designed in such a way to be suitable for teaching with minimal disruption and inconvenience to patients.

Research has been the traditional element of "self directed learning" for undergraduates, with over half of Barts students currently undertaking an intercalated BSc or a BMedSci in their "clinical" years. Protecting these activities, as well as adequate elective time, is vital since these young people are the seed corn of the future of clinical medical research.^{15 16} Ideally all medical students should have this opportunity, if resources could be identified, a matter of continued debate within London University.

Assessment

Assessment drives learning, and fundamental changes in ways of learning necessitate changes in methods of assessment,^{17 18} which need to become more reliable. One way of achieving this is the objective structured clinical examination. This assessment is becoming more widely used, and evidence suggests that it is more "accurate, wide-ranging, and fair" and assesses not only factual knowledge but other competencies, including communication and practical skills.¹³ Although it takes much effort to set up for the first time, it is definitely perceived as fairer by the participating students.

Tomlinson's recommendations for London's medical colleges

The proposal in the Tomlinson Report to reduce the number of medical students in the capital by 150 will have severe financial implications and clinical consequences. A reduction of this size is equivalent to closing a large London medical school with the loss of clinical, teaching, research, and support staff amounting to probably 1000 people. The severance costs alone will be £5m. The loss of research income will be a minimum of £10m a year. The loss of service increment for teaching and research (SIFTR) will be as high as £20m per annum.

In addition, the University of London will lose a student resource allocation of £4.5m per annum. The losers will not be just academic medicine but primarily the patients, for whom there will be a more diluted level of clinical care in the capital—which is a pity, particularly as the cost of educating a medical student in London is in fact no higher than the average cost for the United Kingdom. Tomlinson deemed the education to be of high calibre.

The Tomlinson report recommends the incorporation of all medical colleges into multifaculty institutions

without giving any academic evaluation of its desirability. It is arguable that the quality of research in medical colleges will be improved by the closer juxtaposition of clinicians and basic scientists in multifaculty colleges with excellence in biological sciences. None the less, there is a counter argument that it is more appropriate for basic sciences to be embedded in a clinical environment to foster excellence in clinically orientated research.¹⁹ These arguments oscillate in fashionable swings and we do not propose to debate this issue here.

There are, however, few data to support the thesis that undergraduate medical education is more effective when conducted within a multifaculty environment. Indeed, the resulting medical colleges within the capital would be extraordinarily large, with some medical student intakes approaching 350. The General Medical Council's proposals for undergraduate education strongly recommend a reduction in the factual overload often generated within basic science faculties.³ But there is evidence that it is difficult to achieve both a reduction in facts and horizontal and vertical integration within basic science departments. Our own experience within the City and East London Confederation confirms this. The GMC stated that clinical medical schools which had not already lost their basic science faculties should fight to retain them.

Furthermore, medical education is essentially different from other types of undergraduate education. The medical course is longer, there are fewer holidays, and school leavers face an unparalleled gamut of emotional experiences. Students face decay and death at a time when most others of the same age will be spared. There is need for a strong personalised component to support this process, which may be much more difficult to achieve in large medical schools. Such personal support cannot be humanely achieved in an organisation where teachers do not know the names of the learners. Indeed, when the Tomlinson report was published London University students spoke out in defence of the diversity of medical education within the university (for which it is famed) and strongly in favour of retaining some smaller institutions.

If the Tomlinson proposal was grounded in the belief that such mergers would produce economies of scale there "is in fact little evidence to suggest that economies of scale exist," in institutions that have merged.²⁰

Our personal prediction would be that in 10-20 years the debate will focus on how to unscramble these large schools, bringing ourselves into line with those in the United States, where intakes of 100 to 150 students are deemed desirable.

Thus, the potential for increasing excellence in medical research are in some ways at odds with our understanding of the educational experience required to prepare the doctor for the challenges of the next century. Furthermore, staff support and development will be essential both for those primarily employed by universities and NHS clinicians involved in teaching. Teaching must be rewarded, and this may be aided by the requirements of academic audits of teaching.⁷ Again we can learn lessons from primary care, where the development of teaching skills predates the recent discussions about undergraduate medical education by many years.

Costs

Tomlinson requires major investment to achieve improved primary care. Pump priming and continued investment will also be needed for research and development and the new modes of teaching. The funds will be required for new staff with a remit for managing curriculum change and overlap as well as for staff development programmes. Some colleges already

require newly appointed staff to participate in more effective teaching programmes, but staff development must go further. Staff in medical colleges have too few opportunities to meet and develop ideas together, an essential prerequisite for developing and sustaining a curriculum. The focus of such activity should properly be in academic medical education departments. Facilities for modernising teaching are also essential, and clinical skills laboratories are expensive to establish. Community based teaching does not come cheap, and resources are needed for the organisational aspects of these programmes. In one of three major foundation programmes in the United States US\$47.5m is being spent on developing seven new community based teaching centres.

The future

An immediate concern is that medical colleges involved in a fight for survival or in a major institutional reorganisation will not have the time or energy to innovate. Other pressures which may hinder or help change, including the unravelling of the service increment for teaching and research, have not been discussed in this article. Furthermore, the pressure to acquire more and more management and accounting skills in the new NHS²¹ will result in ever greater pressures on staff, who may find teaching and research ever more squeezed. If curriculum development is to be a priority medical college staff will need to be designated as having responsibility for managing change, given protected time and recognition for their responsibilities, and rewarded for their achievement.

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Correction

Alternative allergy and the General Medical Council

We regret two errors in this paper by Professor A B Kay (9 January, p 122). Dr Keith Mumby was not found guilty of serious professional misconduct in 1982. In addition, although Dr Mumby was found guilty of serious professional misconduct in relation to two charges in July 1992, he was not found guilty of failing to give adequate medical attention to a patient he had injected. We apologise unreservedly to Dr Mumby for these errors.