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Suboptimal care of patients before admission to intensive care

Is caused by a failure to appreciate or apply the ABCs of life support

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During the past decade deficiencies in the quality of medical care have precipitated detailed scrutiny in the form of national confidential inquiries. These inquiries have examined perioperative deaths (NCEPOD), maternal deaths, and more recently, babies' deaths.[1–3] The 1993 NCEPOD report showed that two thirds of perioperative deaths occurred three or more days after surgery, usually from cardiorespiratory complications and in a ward environment. The riskiness of ward care is illustrated again this week in a different sort of confidential inquiry.

On p 0000 McQuillan and colleagues present the results of a confidential inquiry into the quality of care received by 100 patients admitted to intensive care (p 0000).[4] After conducting structured interviews with the referring and intensive care clinical teams, the investigators completed a questionnaire that focused on the recognition, investigation, monitoring, and management of each patient's airway, breathing, and circulation (ABCs). Two independent assessors (a nephrologist and an anaesthetist) evaluated the resulting questionnaires. Both agreed that 54 of the 100 patients received suboptimal care. Mortality in the intensive care unit for these patients was 48%, almost twice that of the 20 patients who they agreed had been managed well. In addition, two thirds of these 54 patients were admitted late to intensive care.

Although these findings have a disturbing familiarity, we need to ask whether they are representative of care across the United Kingdom. A recent report by McGloin et al from a London teaching hospital suggests that these deficiencies in care are not limited to the south coast of England.[5] Together these findings provide a strong case for undertaking a national confidential inquiry into events triggering admission to an intensive care unit.

Important resource implications arise from deficiencies in the quality of general ward care. Intensive care is a scarce resource that needs to be carefully meted out to those most in need.[6] However, we may have created an additional population of critically ill patients by failing to deliver the basic elements of ward care. Of the admissions reported by McQuillan et al as few as 4.5% and as many as 41% (depending on the individual assessors' judgments) could have been avoided had earlier care been properly provided.

The assessors categorised the deficiencies in care as failures of organisation, lack of knowledge, failure to appreciate clinical urgency, lack of supervision, and failure to seek advice.[4] With such a multiplicity of problems, where should we begin to seek a remedy? McQuillan et al venture possible solutions that relate to organisation and structure, clinical practice, and clinical guidelines.

Changing the process of care should reap the most rapid benefit. One option might be to increase the seniority of the doctors assessing and treating these patients. In Oxford the trauma surgeons now have 24 hour, resident, consultant cover which ensures all victims of major trauma are assessed and have their treatment planned by a consultant. The efficacy of this experiment has yet to be reported, but in the north west Midlands an increase in the proportion of trauma cases assessed by consultants from 28% to 70% had no effect on mortality and a questionable effect on morbidity.[7]

An alternative solution might be the formation of a medical emergency team along the lines suggested by Lee et al[8] and others.[9] This is a similar concept to the shock and trauma teams first described in the 1960s and 1970s,[10] and the idea has considerable merit. The medical emergency team has much in common with the cardiac arrest team, but the criteria for calling the team are widened to include patients with severe physiological or biochemical abnormalities or specific high risk conditions. Extending the role of the cardiac arrest team acknowledges the fact that cardiac arrests are commonly preceded by premonitory signs and symptoms.[11] It is more rational to prevent cardiac arrests than to treat them after they occur. However, an emergency team can help only if summoned, so referral should not be limited to medical staff. Doctors are not always adept at following guidelines[12] and experienced nurses and other paramedical professionals should be able to contact the team directly.

A medical emergency team can do much for the patient on the ward, but the more serious, less reversible problems may require admission to an intensive care unit or high dependency unit. High dependency units provide an environment where high risk patients can be cared for by appropriately trained medical and nursing staff [6] and has been shown to reduce cardiac arrests in hospital and improve outcome on intensive care units.[13]

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How can medical training be improved to facilitate the recognition of life threatening events? The medical emergency team must serve an educational as well as a troubleshooting role; otherwise there is a risk that ward based junior medical and nursing staff will become deskilled, potentially compounding rather than improving the situation. The high dependency unit can also provide a valuable educational role if medical and nursing staff regularly rotate through the unit. Finally, intensive care units themselves must adopt a hospital wide educational role. They can no longer function as isolated islands of expertise, but must become integrated into a continuum of hospital care. Intensive care should become part of the core curriculum for medical students and junior medical staff. The intercollegiate board for training in intensive care medicine, acting with the support of the royal colleges of medicine, surgery, and anaesthetics, have clarified the critical care training requirements for physicians, surgeons, and anaesthetists. Future generations of medical trainees will undertake intensive care training during their years as senior house officers and specialist registrars so that they will be better prepared to recognise patients at risk.

Little will be gained from apportioning blame or resorting to recrimination for the failings that McQuillan et al have identified. Their findings need to be confirmed as part of a national confidential inquiry so that the full extent of the problem can be realised. Meanwhile, we should re-evaluate the process of care on our wards and the training we offer our junior medical staff.

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Hormone replacement therapy again

Risk-benefit relation differs between populations and individuals

Hormone replacement therapy is increasingly advocated not just for short term treatment of menopausal symptoms but as long term prophylactic therapy against heart disease, osteoporosis, even Alzheimer's disease—indeed, as the solution to many of the problems of ageing women.[1] Should universal hormone replacement therapy be recommended in asymptomatic healthy postmenopausal women?

Many clinicians now take it as established that postmenopausal hormone therapy protects against coronary heart disease in women. However, this is not based on data from randomised trials with coronary end points. Hemminki and McPherson attempted to see whether useful information on the incidence of cardiovascular diseases and cancer could be obtained from published clinical trials which studied other outcomes of postmenopausal hormone therapy.[2] Despite pooling data from all the small trials they found no convincing evidence one way or the other. Most striking is the tiny size and short duration of most of the trials, which clearly had inadequate power to examine clinical events. Even the largest, the Postmenopausal Estrogens and Progestins Intervention (PEPI) trial,[3] had fewer than 200 women in each treatment arm. Apart from the Nactigall study,[4] the median duration was not much more than one year. There was substantial uncertainty about definition and ascertainment of events, which were often reported as dropouts or asides and not as the primary focus of the trials. Given the variable quality of these trials and procedures, the small difference in numbers of events could easily have arisen from biases in ascertainment and reporting. Why then, are we so convinced of the cardioprotective effect of oestrogens?

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Observational prospective studies have generally shown that women taking postmenopausal exogenous oestrogens have a lower risk of coronary heart disease[5]: one meta-analysis of prospective studies suggested a relative risk of 0.56, or a 44% reduction in coronary risk.[6] However, the lower coronary risk in hormone users in observational studies may be largely explained by selection bias.[7] Women taking postmenopausal oestrogens, particularly in the United States, where most of the studies were conducted, tend to be healthier, with less baseline heart disease, thinner, of higher socioeconomic status, more health conscious, and have different lifestyles from women who do not take postmenopausal oestrogens. The effect of selection bias can be substantial: good compliers with placebo in trials have about 40% lower mortality than poor compliers.[8]

Nevertheless, oestrogen has biological actions that could plausibly explain cardioprotective effects.[9] The PEPI trial has clearly shown that exogenous oestrogen

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administration in women raises high density lipoprotein cholesterol, lowers low density lipoprotein cholesterol, and decreases fibrinogen concentrations. Other studies indicate that oestrogens can have antioxidant effects, lower homocysteine concentrations, act as calcium channel blockers, alter vascular reactivity, and, more variably, improve glucose tolerance. The demonstrable effect on lipids, which are the strongest coronary risk factors, and the consistent strong findings for coronary heart disease in observational studies indicate a real protective effect of oestrogens, though perhaps not as great as the halving of risk observed.

In contrast, the evidence for stroke is much more equivocal. Postmenopausal hormone therapy had no effect on blood pressure in the PEPI trial,[3] and observational studies indicate both increased as well as decreased stroke risks in hormone users.[5] Randomised trials designed to examine clinical end points such as the WISDOM study in Europe and the Women's Health Initiative in America will eventually provide more definitive answers about cardiovascular effects of postmenopausal hormone therapy but results will not be available for several years.

Nevertheless, hormone replacement therapy is also widely accepted to be protective for osteoporosis.[10–12] and possibly for Alzheimer's disease,[13] as well as for a variety of other menopause related conditions such as urinary symptoms and depression so why are there still reservations about universal prescription?

The concerns are over possible adverse effects and the overall risk-benefit balance of long term therapy in healthy women. The observed cardioprotective effect of oestrogen appears to be related to current use and diminishes after stopping.[14] Thus, continued use is required for cardioprotection. While oestrogens undoubtedly increase bone density in women in trials, observational studies on fracture risk suggest that the protective effect is related to duration of use; as with cardiovascular disease, benefits appear to diminish rapidly after cessation (p 1858).[15] Weiss reported that women have to use oestrogens for at least five years before a protective effect on hip fractures is observed.[16] Unfortunately, oestrogen use increases the risk of both endometrial and breast cancer; the Nurses Health Study indicated a 30% increase in breast cancer risk in women using hormone replacement therapy who had taken it for five years or more.[17] The risk of endometrial cancer is substantially mitigated, though not wholly abolished, by addition of progestins,[18] but progestins do not appear to reduce, and may even increase, the risk of breast cancer.[17]

Various investigators have examined the risk-benefit balance of hormone replacement therapy. Roche et al have suggested that in British women there is an overall favourable balance.[19] Grady estimated the potential effects of hormone replacement therapy based on estimated event rates in various categories of American women.[20] She concluded that major benefits would be in women at high risk of coronary heart disease, whereas those at high risk of breast cancer, such as those with a family history, would be much less likely to benefit. These theoretical estimates are supported by a more recent analysis from the Nurses Health Study, which reported that current hormone users with coronary risk factors had the largest reduction in mortality, while women at low coronary risk had substantially less benefit. The survival benefit diminished with duration of use, largely due to an increase in breast cancer.[21]

However, risk-benefit estimates and hence clinical decisions cannot be universally generalised. Studies have been done largely on women in the United States and Britain who have high absolute rates of heart disease and osteoporotic fractures. Yet even in American women an estimated 2000 women would have to take oestrogen for one year to prevent one coronary event.[14] Women in countries such as Italy, Spain, or Japan, where coronary heart disease rates are substantially lower,[22 23] would have a completely different risk-benefit balance. Additionally, the long term observational studies have largely been on oral conjugated equine oestrogens, and the effects of other preparations and modes of administration cannot be assumed to be identical.

The short term clinical use of whatever hormone preparation is pragmatically found to be effective for relieving menopausal symptoms is relatively unproblematic. However, prescription of hormone replacement therapy in asymptomatic healthy women for prevention of heart disease or osteoporosis poses more of a dilemma, and the long term risk-benefit balance is crucial. The greatest benefits are likely to be in women at high risk of these conditions in comparison with their risk of breast cancer; these are likely to be older women. The potential benefits of long term prophylactic use in perimenopausal women are more debatable. And Barrett-Connor has pointed out the importance of each individual woman's choice based on risk pattern, fears, and quality of life.[24]

The idea of an anti-ageing pill in the form of oestrogen therapy is certainly attractive, but it is unlikely to be the solution to healthy ageing in women. The huge international variations and secular trends in chronic disease indicate that many of these conditions are potentially preventable and not due to the menopause per se. Japanese women, who have lowest endogenous oestrogen levels, also have greatest longevity, the lowest rates of coronary heart disease, and a low prevalence of menopausal symptoms.[25] We already have a good understanding of some of the existing dietary and other measures we can take to improve health.[26 27] The valuable clinical uses of oestrogens should not divert attention from identifying and acting on the major determinants of health in women.

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1998 European guidelines on resuscitation

Simplifications should make them easier to teach and implement

After a cardiac arrest the only interventions that have been proved to improve long term survival are basic life support and early defibrillation. They thus remain the focus of the most recent—and most internationally supported—set of guidelines on basic and advanced life support, published this week in the *BMJ* (pp 1863, 1870)[1 2] and *Resuscitation*.[3 4] The new guidelines contain changes which are a response to the educational needs and evolving technology of resuscitation rather than to any important changes in its science.

Collaboration between experts from several European countries resulted in publication of the first European Resuscitation Council guidelines in 1992.[5 6] In the same year the International Liaison Committee on Resuscitation was formed (with representation from North America, Europe, Southern Africa, Australia, and Latin America) with the aim of providing a consensus mechanism by which international science relevant to emergency cardiac care could be identified and reviewed. The advisory statements published by the international liaison committee in 1997[7] were introduced immediately into the United Kingdom by the Resuscitation Council (UK). The new European Resuscitation Council guidelines are derived from the advisory statements, with minor modifications to reflect experience in the United Kingdom.

The new basic life support guidelines emphasise the importance of immediately alerting the emergency medical services as soon as the rescuer has determined that the victim is unresponsive and not breathing ("phone first"), as the chances of successful defibrillation decline substantially with each minute's delay.[8] Children and victims unconscious as a result of trauma or drowning are an exception to this rule: they are more likely to have sustained a primary respiratory arrest and may benefit from one minute of basic life support before the rescuer leaves to seek help.

Lay people (and many health professionals) have difficulty in reliably identifying the presence of a carotid pulse.[9] Therefore, instead of relying on this sign as the sole criterion for starting chest compression, rescuers are now advised to look for "signs of a circulation." This includes response to the initial two ventilations (seeing movement), as well as checking the carotid pulse, all of which should take no more than 10 seconds. The rationale for lay rescuers performing a pulse check remains questionable, and there is strong argument for simplifying basic life support even further.[10] Although there is no convincing evidence in adults that any rate of chest compressions between 60 and 120/minute produces a better outcome than any other, infants and children benefit from higher rates, and, for uniformity, a standard rate of 100 compressions per minute has been agreed for all ages. Finally, following reports of problems with the recovery position introduced in the United Kingdom in 1997, a decision has been made to revert to the original position described in the 1992 guidelines.

The new universal algorithm for advanced life support bifurcates into two separate series of loops: managing ventricular fibrillation/ventricular tachycardia (VF/VT) and managing non-VF/VT rhythms. The guidelines emphasise the former as the vast majority of survivors come from this group. Simplifying the algorithm has ensured that it is equally applicable to first responders with access to automated external defibrillators, which are increasingly easy to operate and offer the best chance of reducing delay to first defibrillation. Indeed, the propagation of these devices is a development which brings defibrillation into the domain of basic life support.[11] Similarly, the guidelines also allow for the new generation of defibrillators using alternative waveforms and energies, which are acceptable if shown to be of equal or greater efficacy to those used currently. Pulse checks after a defibrillating shock

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are indicated only if the waveform changes to one compatible with a cardiac output.

The duration of each loop of the new algorithm is indicated in minutes rather than cycles of cardiopulmonary resuscitation, and, allowing for the delivery of three shocks in the VF/VT loop, each should last about 3 minutes. Although adrenaline (epinephrine) is indicated every 3 minutes, precise timing is often impracticable during resuscitation. Many will no doubt continue to count an appropriate number of cycles and give adrenaline with each loop.

Tracheal intubation remains the gold standard in airway management, but the laryngeal mask airway and Combitube, while having some limitations, are now recognised as acceptable alternatives.[12] Carbon dioxide delivery to the lungs is reduced considerably during cardiac arrest, and a tidal volume of 400-600 ml is probably adequate.[12] When a bag-valve-mask device is used this volume is less likely to cause gastric insufflation than the previous recommendation of 800-1200 ml.

Despite minimal clinical evidence supporting the use of any drugs (including adrenaline) during cardiopulmonary resuscitation, atropine 3 mg, given once for asystole on the first loop, is still advised. Antiarrhythmic drugs (for consideration after 2-4 loops) and buffer agents remain a low priority. When pacing is indicated, external cardiac percussion (fist pacing)[13] may generate an effective cardiac output while pacing equipment is obtained. For patients in either non-VF/VT rhythms or refractory ventricular fibrillation the algorithm suggests eight commonly overlooked but important and potentially reversible contributing factors.

The European Resuscitation Council's guidelines match the ideal of describing "appropriate care based on scientific evidence and broad consensus, leaving room for justifiable variations in practice."[14] Their publication represents just one link in the guideline chain: they must now be disseminated, implemented, evaluated, and reviewed. This task should be made easier by an underlying theme of the guidelines—simplification—to make them easier to teach, learn, and remember. Only in this way will we succeed in saving "hearts too young to die."

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Why all the fuss about genetically modified food?

Much depends on who benefits

Why are some consumers concerned about food from genetically modified plants? After all, we have been modifying crop plants for centuries by plant breeding. What is new is the recent development of biotechnology that makes it possible to move a single gene from one species to another to produce crops which do not rot so quickly or which are resistant to herbicides or to attacks from viruses, fungi, or insects.

Over the past 20 years we have learnt how to isolate genes from any living organism, introduce the new gene into another organism, and get it to work there. The DNA is isolated and treated with restriction enzymes, which break the DNA down into large fragments about the size of a gene or bigger. These fragments are then forced into strains of bacteria or viruses so that, on average, each bacterium or virus contains one piece of DNA. Growth of the mixture amplifies every piece present, the mixture is plated out, and the bacteria or viruses are then grown up from single colonies. Each colony is then screened for the presence of the particular gene. That is the hardest part, but the result will be a bacterium or virus with the sought after gene.

Growing that bacterial clone then gives milligram amounts of the gene, which can be sequenced and trimmed, with special DNA signals added to it, before it is inserted into the DNA of a bacterium, plant, or animal. Because the genetic code is universal, the gene will work in the new host provided that the right signals have been attached, and in this way we can make human interferon, insulin, or growth hormone in bacteria. In exactly the same way we can now modify plants and animals.[1 2]

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Genetically modified foods have been entering British supermarkets over the past year. The public has accepted some without hesitation—for example, "vegetarian cheese" and the paste made from genetically modified tomatoes. But others, notably the flour from genetically modified soya beans, have caused controversy. Why? Both the tomato and the cheese offered consumers some advantage: cheese that was acceptable to vegetarians and better tasting tomato puree and sauce. Crucially, the consumer could choose between the conventional and the new product for they were side by side on the shelves. In contrast, flour from genetically modified soya beans offers no obvious advantage to the consumer, but rather to the producer. Since soya derivatives occur in 60% of processed food products, it can't be avoided, and the consumer has no choice. There has been a chorus of protests from consumer groups.[3]

Genetically modified soya was made by introducing the gene from a soil bacterium so that the plant became resistant to the herbicide glyphosate. Monsanto, the producer of the modified soya, claims that a smaller amount of a safer herbicide is used and that the yield is higher. Herbicide resistant soya has real advantages for the farmer, and this new crop, which accounted for 2% of the US crop in 1996, amounted to 15% in 1997 and is predicted to be 40% in 1998.

Modified soya is now entering Britain, but retailers cannot offer a choice between a modified and an unmodified product, because genetically modified soya is not kept separate through the production chain in the United States, the major supplier. US farmers are unwilling to segregate the two crops since there is little demand for segregation there and the costs are considerable. The US government considers that attempts to ban the import of soya breach World Trade Organisation agreements, for such products can be excluded only if they are unsafe.

So how do we know if they are safe? Before any genetically modified food can be used in Britain, it needs government approval, and ministers take the advice of the Advisory Committee on Novel Foods and Processes, which I chaired for nine years. This committee, which includes a consumer representative and an ethical adviser, considered this new product to be as safe as conventional soya, and so advised the minister.

So if it's safe, what are the problems? Firstly, consumers are concerned about the environmental impact of these new crops. Are we going to release something we will wish we hadn't? Secondly, there are concerns about some of the antibiotic resistant genes present in some genetically modified plants. But the consumers' biggest concern is about risk, especially in the light of the bovine spongiform encephalopathy epidemic: scientists, and the regulatory processes, are no longer automatically trusted. Risks are assessed differently in medicine and food. We accept quite high risks when we are seriously ill but will not tolerate much risk at all with food.

So what are we to do? Firstly, explain as carefully as possible what is happening and why. Secondly, open up the regulatory process: nothing must be hidden. Thirdly, if possible, offer a choice between the new and the traditional product. Fourthly, label these new foods as helpfully as possible. Finally, it is proving difficult to get agreement in Europe, and Europe may easily fall behind with this new technology, not because of safety or environmental problems, but because of lack of agreement in the European Union.

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Planning the United Kingdom's medical workforce

On present assumptions UK medical school intake needs to increase

Without an appropriate workforce, health service delivery will fail. The function of medical workforce planning is to ensure, so far as possible, that the right numbers of doctors, in the right specialties and grades, are in the right places. Traditionally national policy in the United Kingdom has been to provide an adequate supply of doctors while avoiding overproduction and unemployment. The policy has also been to train enough doctors for self sufficiency without reliance on net immigration. The main mechanisms for achieving these policies have been through fixing quotas for the number of places in medical schools and through a variety of mechanisms to control the number of NHS medical posts in each grade, specialty, and location.

Several factors tend to increase the demand for health care and for doctors. Population size and structure, notably its ageing, is reasonably straightforward to estimate. Advances in medical knowledge and technology are less predictable. They increase the scope for treatment and increase specialisation, which, in turn, tends to increase the range and number of specialists. Hitherto, technological advances in medicine have generally increased, rather than reduced, costs and the need for medical staff. Public expectations to meet needs and improve quality of care, fuelled by professional aspirations, media interest, and political promises, will continue to rise. Large waiting lists and long waiting times persist. Reductions in bed numbers, shortening lengths of hospital stay, and increases in throughput enhance the efficiency with which capital stock is used but require an intense pace of medical work. Shorter working hours for junior doctors, European legislation on working time, and consequential increases in pressures on consultants' time also all compellingly suggest expansion of the medical workforce. Expansion will be needed, too, because of

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the increasing proportion of women in medicine and because of needs for part time and flexible working.

As well as these general trends, the Calman reforms of postgraduate medical training and recent white papers on the NHS create a further set of requirements. The former will lead to an increase in the proportion of care which is provided by consultants, but more time will be needed for training in a shorter training period, from both the junior doctors being trained and the senior doctors who train them.[1] Patient care will gain, but medical time will be needed, to implement the measures in the white papers to assure effectiveness and improve quality[2] and to increase involvement in audit, continuing medical education, and professional development. The changes in management arrangements, in particular involvement of general practitioners in commissioning through primary care groups, will consume doctors' time. Reductions in time spent on direct patient care will increase the need for more doctors.

Are there any countervailing pressures that might work against the apparent need to increase the number of medical students the UK trains? Improvements in the health of the population to the point where medical needs actually reduce sound plausible but there is no evidence of this happening. One possibility is the transference of tasks from doctors to non-medical staff. Another is to reduce wastage of medical students through medical school and of trained doctors after qualification.

Decisions on the number of medical students needed to produce tomorrow's doctors are bedevilled by the long lead time between entry to medical school and attainment of specialist qualifications, the impossibility of forecasting the shape of clinical services many years ahead, and uncertainty about the career pathways doctors will take after qualification. The Medical Workforce Standing Advisory Committee advises the Secretary of State for Health on planning the medical workforce. In its third report, published late last year, which covers evidence on the issues described above, the committee recommends an increase in UK medical school intake of about 1000 a year (a 20% increase) to meet increasing demands and reduce reliance on overseas trained doctors.[3] The government's response is expected shortly. The report observes that the percentage of doctors in the United Kingdom who were trained overseas has increased, comments that the gap between demand and home supply will grow further unless measures are taken to avoid this, and continues to favour self sufficiency in training the doctors we need

The report also discusses the need to minimise wastage of students in training and doctors after qualification. It worked on the assumption of a loss of 10% of students from medicine during medical school.[3] The true figure may be a little higher,[4] or a little lower,[5] and we need more precise information. A case also exists for implementing routine "exit interviews" with medical students who change course or quit higher education to determine why we lose them. In the first 10 years or so after qualification a further 15-20% of doctors are lost to the NHS.[6] These comprise, in particular, doctors who practice abroad and married women doctors who, often temporarily, are not in paid employment for domestic reasons. The possible impact of an increase in early retirement is another important supply factor. Intentions and plans for early retirement need more study than they have received.

Are there alternatives to expanding medical student intake? In a recent paper Maynard and Walker argue that more consideration should be given to the role of financial incentives, and other incentives relating to conditions of service (such as part time contracts), in retaining doctors in the workforce, reducing emigration, and reducing the wish to retire early.[7] They also challenge the principle of national self sufficiency, pointing to the free movement of labour within the European Union and the fact that several European countries produce substantially more doctors than they employ. Few would favour reliance on poaching doctors trained in or for the developing world. But for the United Kingdom in Europe there is a question to answer. In future should the aim be for UK or European self sufficiency? On the present assumption that we should not depend on doctors trained overseas, and given profound changes in doctors' hours and work patterns, the workforce committee is right to conclude that a substantial increase in the annual medical student intake runs no serious risk that the United Kingdom would train too many doctors.

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Making self regulation credible

Through benchmarking, peer review, appraisal—and management

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Professional self regulation has so far been vested in the General Medical Council, which has done much recently to modernise its way of working. The new performance procedures go a long way to plug a major gap in its ability to deal with cases which, though serious, may not be best dealt with by erasure or suspension from the medical register. Each problem dealt with by the GMC, however, represents an issue

which has not been adequately addressed locally, and it is locally that major changes are needed if self regulation is to be credible.

Firstly, outcome data for individual treatments are needed to allow doctors to compare their own results with those of colleagues throughout the NHS performing the same procedures. Such benchmarking has been found useful in cardiothoracic surgery[1 2] and lends itself to specialties which produce definite and measurable outcomes and complications but could in principle be adapted to all specialties. Individual doctors' results need to be corrected for case difficulty and comorbidity—which is difficult.

For cardiothoracic surgery Keogh et al have described some of the problems of risk stratification, including the necessity for good data collection.[3] It is an even more daunting prospect to extend such systems to specialties like general surgery, where surgeons undertake a wide variety of procedures and where outcomes other than mortality need to be investigated. An alternative would be to compare unadjusted results with the range of outcomes obtained by most doctors performing that procedure. This would allow individual doctors—and their hospital's audit process—to determine when results fell short of what could be expected throughout the NHS. When the adverse result was an excess mortality, the doctor, together with the medical or clinical director, might decide to stop performing the procedure until corrective action could be taken. This approach would allow doctors and the public to know that a particular hospital performed an operation satisfactorily compared with similar institutions, but would avoid the disadvantages of league tables, which might lead to high risk patients being denied treatment if doctors felt that their position in the league table might be jeopardised. The Joint Consultants' Committee and the Academy of Medical Royal Colleges are currently developing indicators based on everyday clinical practice. Outcomes of some procedures might be capable of being extracted from data already collected and held by specialist societies. In any event resources must be made available for outcome data to be collected as a matter of urgency.

Similarly, for the national service frameworks for cancer, coronary heart disease, and mental health—and others as they are developed—there need to be a small number of indicators which hospitals can use to monitor their adherence to the national framework. Such results could be published and would reassure patients that the whole process of care measured up to what had been determined nationally.

Secondly, a process of appraisal for consultants is being developed which is designed to enhance their professional role and protect patients.[4] For this to succeed the clinical work of individual consultants needs to be reviewed in the context of the clinical service provided by their department. It is difficult for clinical work to be appraised by lay managers or doctors from a different specialty. Appraisal must therefore be rooted in peer review, and with increasing subspecialisation genuine peer review will increasingly need to come from outside the hospital—in any event the assessor must be independent and therefore external. The assessor must have sufficient information to comment on individual performance, staffing, bed numbers, equipment, and so on. This type of peer review will provide a formal opportunity at agreed regular intervals (annually or biannually) for senior doctors to discuss issues relating to their individual performance, the facilities provided by the hospital, and their professional and career development. The process should also be valuable to trusts, not only in the interests of good human resources policies but also as part of their responsibilities under clinical governance.

This type of peer review has been pioneered by the British Thoracic Society[5] and has been found helpful by thoracic physicians across the NHS—not least because it helps clinicians make a case for better staffing or equipment when support comes from an external assessment. To extend peer review to all specialties, even quinquennially in the first instance, would require a national initiative and financial support. In some circumstances such a scheme could be developed into formal accreditation, as has happened with clinical pathology accreditation.

The work of individual doctors and the performance of the department in which they work are clearly interdependent. Responsibility for the performance of the department, particularly organisational aspects, lies with the clinical director, in conjunction with the trust's management. The annual review of consultants' job plans has been a contractual requirement for several years and is the proper mechanism for reviewing all aspects of a consultant's work programme and service development plans. Though different, the processes of job plan review and appraisal by peer review are closely interlinked, and neither process should be undertaken without the other. Ideally, they should take place together.

Thirdly, we must grasp the nettle of behaviour problems. Whatever the advice of the GMC,[6] it is difficult for doctors who have no managerial relationship with a colleague to take action over that colleague's conduct. Medical and clinical directors do, however, have a responsibility for the behavioural problems of doctors working with them and must act to resolve them. Clear methods need to be developed, and training is required to help medical managers deal with these issues.

Ministers have supported the concept of self regulation—for the time being. We have to show that it can be delivered within a short timescale, and patients need to know that they will be safe when hospital treatment is necessary.

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