have no history of cysts; these patients should be referred to hospital. Mammography is the first investigation that should be performed in a woman in the age range affected by cysts because it provides useful diagnostic information in patients with a breast mass; roughly 1% of patients with a cyst have a breast cancer at the time that they present with the cyst, and this can be identified on mammography; prior needle aspiration increases the pain and discomfort associated with mammography; and fine needle aspiration performed before mammography may cause a haematoma, which mammographically may mimic a breast cancer.²

Results of mammography in series of 500 symptomatic patients

Mammographic diagnosis	Final pathological diagnosis	
	Malignant	Benign
Malignant	75	4
Suspicious	11	36
Benign or normal	14	360

Sensitivity (includes malignant and suspicious diagnoses) = $(75+11)/100=86\%$.
Specificity = $360/400=90\%$.
Positive predictive value of a malignant diagnosis = $75/(75+4)=95\%$.

James W T Chalmers and David Breen make several errors in their back calculation of the sensitivity, specificity, and positive predictive value of tests used to diagnose breast cancer.¹ The table presents results of mammography in a series of 500 patients; the results are classified as malignant, suggestive of malignancy, or benign or normal. The figures show how, with a prevalence of breast cancer in this group of 20%, it is possible to obtain a sensitivity of 86%, a specificity of 90%, and a positive predictive value of a malignant diagnosis of 95%. Chalmers and Breen calculate that, to obtain these results (which are the same as those set out in our article²), there had to be a prevalence of malignant disease of 69%. Their calculations are incorrect. In our view the results given for the accuracy of investigations of symptomatic breast disease³ should be attainable in units seeing appreciable numbers of patients with breast problems.

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Medical informatics

EDITOR,—We agree with Anthony Nowlan that “technological advance alone is not sufficient because much of the hard part is bound up with the way in which we practise medicine, and this cannot be addressed only by the medical profession.”¹ The conference “The heart of the matter,” organised jointly by the British Medical Informatics Society and the BMA last December, showed that there is a lot of interest in medical informatics, but discussion there emphasised the need to address the lack of education for both students and clinicians.

Other countries have taken a lead in tackling this at the national level by making substantial changes to medical education. For example, medical informatics has been included in the nationally regulated medical curriculum in Germany since 1980.² In the mid-1980s the Association of American Medical Colleges recommended that “medical schools should designate an academic unit for institutional leadership in the application of information science and computer technology to the general professional education of physicians and promote their effective use.”³

The changes to the undergraduate medical curriculum that are currently being planned in most medical schools in Britain offer an ideal opportunity to review the place of medical informatics in the curriculum and in universities. We believe that medical informatics should be integrated as a core part of a problem based approach to medical education and that each university with a medical undergraduate course needs a group, unit, or department of medical informatics in recognition of the future role of the discipline. This unit would not necessarily be located solely in the medical faculty but might also have roots in computing or information science.

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Memory of intraoperative events

EDITOR,—We were disappointed to read in J G Jones's editorial on memory of intraoperative events that Jones believes that the isolated forearm technique is “unsuitable for prolonged monitoring because of the risk of ischaemia in the isolated arm.”¹ We have described how prolonged monitoring is easily achieved simply by releasing the forearm cuff after 20 minutes and then reinflating it some minutes later if further muscle relaxation is required.^{2,3} This cycle of isolation of the forearm and release can then be maintained indefinitely. Using “train of four” nerve stimulation in more than 100 cases, we have found that although releasing the tourniquet after 20 minutes results in some reduction in muscle power, this is not sufficient seriously to impair the capacity for forearm responses. This technique assumes the use of a non-depolarising muscle relaxant such as atracurium or vecuronium in appropriate doses (the technique is not viable with pancuronium).

We are puzzled by the anaesthetic community's continued resistance to the more widespread use of the isolated forearm technique, despite Jones's description of the method as the gold standard against which other methods of detecting awareness need to be evaluated.⁴ This may have something to do with contemporary anaesthetic culture, in which simple clinical methods are overlooked in favour of high tech monitoring techniques. Even if a reliable monitoring device became commercially available in the near future (and this is unlikely) the cost of equipping every operating theatre in Britain with such a machine would be exorbitant. For example, at £5000 per machine (a conservative estimate) the total cost to the NHS would be

in the region of £20m—an unrealistic prospect in today's cost cutting, accountancy led service. This potential expense is in stark contrast to that of the isolated forearm technique, which uses equipment readily available in every operating theatre. With a relatively low but persistent incidence of awareness with postoperative recall, often associated with the threat of litigation, can anaesthetists afford to remain complacent about these matters?

Jones also states that “the psychological consequences of conscious awareness with explicit memory of pain are not known.” Although a definitive follow up study of a sizeable cohort has yet to be published, there are numerous reports of small groups and single cases. When appreciable psychological distress is evident it inevitably falls within the parameters of post-traumatic stress disorder, being characterised by symptoms of excessive autonomic arousal (including panic, anxiety, and fear), intrusive re-experiencing of the original trauma (for example, flashbacks and nightmares), and avoidance (for example, the development of phobic disorder and attempts to avoid reminders of the trauma). These disturbances commonly last for years rather than months. What certainly is unknown is the psychological effect of intraoperative awareness and pain without explicit postoperative recall. Many people assume that this has no consequence, but this has yet to be proved. There are anecdotal suggestions that such experiences may have serious and enduring psychological sequelae.⁵

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Preventing suicide

EDITOR,—Andrew Warsop is to be congratulated for having the courage to put his head above the parapets in the challenging debate about the rights of individuals and the duty of doctors with regard to suicide.¹ This debate, however, does not belong to the medical profession alone. For over 40 years the Samaritans has offered emotional support to those for whom life may have become too much to bear. The question about the rights of individuals to self determination continues to be a constant source of debate. One of the fundamental principles that governs the way in which the Samaritans works states, “A caller does not lose the freedom to make his own decisions, including the decision to take his own life, and is free to break contact at any time.”

Principles, however, are one thing (as guidelines, codes of ethics, etc may be), but practice presents the stark reality of decisions that need to be made and assumptions that have to be taken. For example, who can possibly tell (within the time available for a decision to be made) that a person who is unconscious, having apparently taken an overdose, really does want to die? Death is irreversible, whereas someone who is resuscitated will

continue to have the right and opportunity to make a subsequent attempt at suicide.

We do not suggest that any method of interpreting principles that may be relevant in a volunteer based organisation would be transferable to the clinical domain, but we believe that when in doubt we should err on the side of life. Each situation will be different and will need careful and sensitive assessment (in so far as time and the circumstances permit). Nobody, however, can escape from the fact that death is for ever.

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1 Warsop A. Preventing suicide. *BMJ* 1994;309:1304. (12 November.)

Generic inhalers for asthma

Patients titrate dose against response

EDITOR.—In West Sussex prescribing of inhaled drugs for asthma has changed dramatically during the past four years. Between 1992-3 and 1993-4 alone, prescriptions for corticosteroids, measured in defined daily doses, rose by 31%, while those for bronchodilators fell by 18%. The ratio of defined daily doses of corticosteroids to bronchodilators rose from 0.44 to 0.70. This increase was achieved as a result of a determined effort and superb teamwork by every practice in the county but would not have been possible if changes to generic preparations had not been implemented at the same time.

The proportion of bronchodilators prescribed generically increased from 13.1% in October 1992 to 30% in September 1994 and that of corticosteroids from 4.5% to 24.2% in the same period. No problems resulting from these changes have been reported. It would be surprising if problems were reported because in the treatment of asthma the patient is taught to titrate the dose against his or her own response so minor differences in bioequivalence, if they exist, would be unimportant. The complaint by Mike Pearson and colleagues about the changes to generic inhalers for asthma¹ is particularly puzzling as it is well known that because of the reciprocal arrangements between the manufacturing companies many inhalers prescribed and dispensed with the brand name have in fact been produced by a manufacturer of generic inhalers.

It is essential that doctors prescribe the least expensive effective preparation available if resources are to be redistributed to maximise the benefit to patients.

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1 Pearson M, Lewis R, Watson J, Ayres J, Ibbotson G, Ryan D, *et al.* Generic inhalers for asthma. *BMJ* 1994;309:1440. (26 November.)

Money saved could be spent on patient education

EDITOR.—Mike Pearson and colleagues question the campaign to promote generic prescribing of inhalers for asthma.¹ I wish to draw attention to the cost implications of the continued use of branded products in Lancashire, where 1.4 million people are served by 284 practices.

The table shows the number of beclomethasone 50, 100, 200, and 250 µg inhalers and salbutamol 100 µg inhalers prescribed in Lancashire in the six months to September 1994. Altogether 53% of prescriptions for salbutamol inhalers were

Number and cost of prescriptions for salbutamol and beclomethasone inhalers and potential savings in six months to September 1994, Lancashire Family Health Services Authority

	No	Cost (£)
<i>Salbutamol inhalers 100 µg</i>		
Branded	99 649	227 530
Generic	89 949	125 555
Both	189 598	353 085
Potential saving		102 501
<i>Beclomethasone inhalers 50, 100, 200, and 250 µg</i>		
Branded	56 192	806 291
Generic	18 163	177 032
Both	74 355	983 323
Potential saving		132 050

for branded products. A shift to 100% generic prescribing would have produced a saving of £102 501 on spending of £353 085. Altogether 76% of prescriptions for beclomethasone inhalers were for branded products, representing a potential saving of £132 050 on spending of £983 323.

Overspends on prescribing by general practitioners are to be paid for from local health authority budgets. Commissioners of care must therefore consider whether such extra costs can be justified by demonstrable clinical benefit. I know of no evidence that practices that use generic products provide less effective care for patients with asthma than those that use branded products. Compliance with the totality of effective care in asthma² is likely to be enhanced more by spending money on patient educators than on expensive delivery systems.

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*Part of the author's responsibility is to advise on prescribing and encourage the use of generic medicines.

Report on Australian surgeons

EDITOR.—Simon Chapman's glowing account of the Baume inquiry into Australia's surgical workforce is tinged with his political views.¹ Professor Baume's central conclusion—that the cause of surgical waiting lists in Australia is a shortage of surgeons, which in turn is due to excessive control over surgical training by the Royal Australasian College of Surgeons—has been rejected not only by the college but also by the Australian Medical Association and the specialist surgical societies. His suggestion that, if numbers of surgeons cannot be increased rapidly, incompletely trained people should be allowed to substitute for surgeons is widely regarded as being silly.

The Baume report has been criticised not only for inaccuracies (for example, overestimating the population of Australia in 2001 by three million) but also because it ignores facts, preferring instead views based on Professor Baume's "suspicion" or anonymous submissions by disgruntled groups or individuals. Surgeons presented Professor Baume with evidence that cutbacks in public hospitals related to the budget were the cause of long waiting lists and indicated that, if they were allowed to work to full capacity, their waiting lists would disappear rapidly. This evidence was largely ignored in the conclusions of the report.

Professor Baume's conclusion that hospital bottlenecks in Australia are due to a shortage of surgeons, who, he said, are reluctant to work in public hospitals, is an untruth that has left

surgeons gasping. In general surgery there are virtually no unfilled consultant vacancies in urban Australia, where waiting lists are longest. When such a vacancy was advertised recently at Westmead Hospital (a teaching hospital of the university in which Chapman works) almost 100 people applied.

Chapman says that Professor Baume drew attention to the "fantastic incomes" of surgeons. This phrase does not appear in the report, and the fantasy is therefore Chapman's. Fantasy, however, is an appropriate word, as Professor Baume pointed out that the quoted figures for doctors' incomes may be inaccurate and that the amounts represent gross income, from which practice expenses (ranging from 50% to 90%) need to be deducted. Australian surgeons' net incomes are, in fact, modest compared with those of other professional groups.

Chapman, a colleague of Professor Baume, describes him as "a creative egg cracker in medico-political cake baking." This assessment of Professor Baume is not shared universally by Australian doctors. The late Professor Fred Hollows, who encountered Professor Baume when the latter was minister for aboriginal affairs, was extremely critical of him,² and many Australian surgeons support his view.

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Treatment of low back pain

EDITOR.—Kwame McKenzie's news item about the Clinical Standards Advisory Group's report on the treatment of low back pain omits to state that general practitioners should have direct access to osteopaths as well as to chiropractors and physiotherapists.¹ Osteopaths should be part of the forthcoming and much needed "revolution."

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1 McKenzie K. Back treatment needs revolution, says report. *BMJ* 1994;309:1602. (17 December.)

Primary care and general practice

EDITOR.—In their editorial on the primary health care team Pauline Pearson and Kevin Jones fail to ask one fundamental question: does "primary care" exist? Increasingly, primary care is used as a synonym for general practice. For an example of this, one need look no further than Kathryn L. Evans's review of sinusitis, in which she writes that "most uncomplicated acute sinusitis is managed in Britain in primary care."² This is one of hundreds of examples that appear in journals every week and are heard in common speech. This use is misleading.

Many people in primary care professions have no direct or regular links with general practice and yet offer community based health interventions with open access. These people include opticians, dentists, chiropodists, shop pharmacists, osteopaths, school nurses, and child guidance professionals. As Pearson and Jones point out, other primary care workers who do work with general practitioners, such as district nurses and health