Logic in Medicine

Logic in medicine: an economic perspective

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The Concise Oxford Dictionary defines logic as the science of thinking or a chain of reasoning or thought defensible on the grounds of consistency. Economics, at its best, is a logical way of analysing the costs and benefits of alternative ways of achieving competing objectives; it is the science of deciding how to allocate scarce means among competing ends.

Thomas Carlyle argued that economics was not a "gay science" but "the dismal science." Carlyle reached this conclusion because the basic assumptions of economics are scarcity and the ubiquitous necessity to make choices. In health care these factors require the allocators of resources to decide who will die and who will live in what degree of pain and discomfort.

Background

EXPENDITURE ON HEALTH CARE: INTERNATIONAL COMPARISONS

During the past 40 years expenditure on health care in all Western countries has expanded rapidly, and in all cases the role of the state in financing and providing health care has increased so that even in the "capitalist" United States over 40 cents of each dollar spent on health care is provided by the government.

Comparative data on international expenditure on health care is notoriously complex because of differing definitions of health care and fluctuating exchange rates. Table I and the figure give a general picture of comparative expenditure in 1982.² In that year the amount spent per person on health care in the United Kingdom was \$508. This amount was similar to that in Belgium but only 54% of the amount spent per person in France, 58% of that in Germany, and 36% of that in the United States.

The proportion of gross domestic product spent on health care is less than 6% in the United Kingdom, over 8% in Germany, over 9% in France, and over 10% in the United States. These countries are spending high proportions of very much higher gross domestic products on health care, and this is the result of countries tending, as they get richer, to spend more on health care. The final column of table I shows that in most countries (even relatively poor ones like the United Kingdom) if the gross domestic product grows by 1% expenditure on health care (at least in 1975-82) grows by more than 1%.

One conclusion that can be derived from these data is that expenditure on health care is low because the United Kingdom is relatively poor and the rate of economic growth in the United Kingdom has been slow. Only if the growth rate in the United Kingdom becomes faster and its expenditure on health care mirrors international patterns will expenditure rise to the level of affluent states like France and Germany.

TABLE I—Health care expenditure in selected Western countries²

	Expenditure per person in 1982 (\$)*	Percentage of gross domestic product spent on health care in 1982	Elasticity of health care expenditure†
Australia	828	7.6	1.0
Belgium	534	6.2	2.3
Canada	989	8.2	1.6
Denmark	746	6.8	1.8
France	931	9.3	2.6
Germany	874	8.2	0.8
Ireland	436	8.2	1.0
Italy	441	7.2	0.8
Japan	602	6.6	1.4
New Zealand	440	5.7	
The Netherlands	836	8.7	0.7
United Kingdom	508	5.9	1.2
United States	1388	10.6	1.4
Sweden	1168	9.7	3.9
Switzerland	1158	7.8	

*Measured at current rates of exchange.

†Change in health care expenditure associated with a 1% growth in gross domestic product at constant prices during 1975-82.

Comparative health care expenditure in selected Western countries, 1982. This graph shows that in a wide range of world economies a rich country (as judged by its gross domestic product in 1982 (\$) at current rates of exchange) spends not only more on health care in absolute terms but also a higher proportion of its gross domestic product on health care: $r=0.80$ ($p<0.001$). A similar graph exists for 1971.¹⁹

EXPENDITURE ON HEALTH CARE: DOMESTIC TRENDS

The comparatively low expenditure on health care in the United Kingdom has grown unevenly in recent years. Table II shows the pattern of expenditure on health care since the 1983 election³: all the data have been adjusted to take account of inflation and pay increases. Expenditure on hospital care has been virtually static: level in 1983-4, it marginally declined in 1984-5 and grew by less than 0.5% in 1985-6. The government argues that an additional 1.5% a year of "growth" money has been generated by "efficiency

savings"—that is, the recycling of funds from unproductive activities to more productive activities.

Expenditure on primary care in the National Health Service (NHS) is not cash limited but is open ended—that is, it depends on the number and behaviour of general practitioners and other contractors. The data in table II show that, except in 1985-6, real expenditure on primary care increased by over 2% each year in 1983-5. With the stock of general practitioners continuing to rise at about 1.8% a year this trend is likely to continue and cause anxiety to the controllers of public expenditure in Her Majesty's Treasury.

TABLE II—Recent expenditure changes (percentages) in NHS³ (all data adjusted for change in prices and pay rates)

	Hospital and community health service	Family practitioner services	Total NHS	Local authority social services
1983-4	0.0	2.0	0.9	3.3
1984-5	-0.1	2.8	1.4	1.5
1985-6	0.4	0.2	0.6	2.1

The cash limited budgets of local authority social services departments have grown unevenly since 1983. The growth in the real outlays of local authority social services (adjusting for inflation and pay changes) has never been less than 1.5%.

The increases in NHS (HCHS plus FPS) expenditure (hospital and community services and primary care) since 1983 has been modest yet important, particularly if efficiency savings of 1.5% a year are added in. The growth has been concentrated in the NHS primary care sector and local authority social services, and this may be appropriate, given the emphasis of policy on the development of high cost community care for priority groups such as the elderly, the mentally handicapped, and the mentally ill. At present the aggregate yearly budgets of the health care systems of England, Wales, Scotland, and Northern Ireland are over £20 000 million.

This level of expenditure, however, is inevitably inadequate for meeting all the competing demands for health care. Furthermore, the gap between provision and potential demand may be widening as the development of scientific knowledge and other factors increase the demands on scarce resources.

Sources of increased demand

Some of the sources of increased demand for care and cure provided by the NHS are as follows.

Demographic change—The "greying" of the population will result in there being more elderly people in the population and perhaps considerably increased levels of dependency, particularly for those aged 75 years and over. The estimated growth in hospital funding required to meet this demographic effect peaks in 1985-7 and requires at least a 1% real increase in funding, given the current patterns of expenditure. The pressure on expenditure from increased numbers of the elderly will fall for the next decade but will usually require 0.5% yearly increases in funding. With greater levels of dependency even this amount of funding may be inadequate.

Technological change—The effects of technological change on spending in the NHS, like the effects of elderly dependency, have been poorly researched. The Department of Health and Social Security asserts that the NHS requires a 0.5% increase in funding each year to finance technological advances. The scientific basis of this advocacy, however, which is apparently accepted by the Treasury, is absent: it is a crude estimate.

Community care—Since the 1970s successive governments have pursued a policy of developing community care for the elderly, the mentally ill, and the mentally handicapped. Initially it was thought that this policy would reduce costs, but now it is clear that it is very much more expensive—for example, the average annual cost of institutional care for a mentally ill person is £12 000, but care in the

community costs £16 000-£20 000. These higher costs are partly the result of providing care in small community units, where there are fewer economies of scale. Community care may also be of higher quality, though this aspect of provision has not been evaluated. The escalating cost of these programmes will drain resources from the sector dealing with acute illnesses, and it is pressures such as these that may lead to the "reinvention" of institutional care, though I hope this will not lead to the reinvention of the comparative neglect that such a policy seems to have produced in the recent past.

Acquired immune deficiency syndrome—The average cost of treating a patient who has the acquired immune deficiency syndrome (AIDS) once he enters the health care system is about £20 000. The average length of life is about 400 days, and the number of cases is rising rapidly. This epidemic will require considerable new resources if existing services are not to be rationed even more carefully.

Screening for breast cancer and cervical cytology screening—The evidence from Scandinavia indicates that breast screening for postmenopausal women will save lives. The Forrest committee has recommended introducing a selective breast screening programme. Evidence from research also shows that cervical cancer is a much greater problem than was thought five years ago. Consequently, there is a need not only to improve the levels of screening of women aged over 35 (particularly those in poorer socioeconomic groups) but also to extend screening to all women aged 20 and over. The effects on resources of introducing breast cancer screening and extending cytology screening are considerable.

Reforms in nurse training—The nursing profession is facing two problems. Firstly, it wishes to upgrade its training standards, making more nurses take degree courses. Secondly, owing to demographic trends and existing entry requirements the number of young people entering the profession will fall by up to one quarter in the next five years. More resources are therefore required to fund degree training and make up for the loss of student nurses on the ward and to increase the supply of nurses and carers (for example, by paying higher wages) to remedy the ravages of demography.

Reducing inequalities in primary health care and local authority social services—Considerable inequalities exist in the geographical distribution of the provision of local authority social services and primary care. The Social Services Select Committee examined the distribution of local authority social services provision and argued that these inequalities should be removed by the government.⁴ Birch and Maynard have shown that substantial inequalities exist in the primary care provided in England and that a policy of equality would shift resources and general practitioners from the south to the north.⁵ The paradox is that policies to equalise the distribution of health care resources (for example, the Resource Allocation Working Party in England and Scottish Health Authorities Revenue Equalisation in Scotland) have been directed at hospital resources alone. The inequalities in the provision of social services and primary care are substantial, and any attempt to reduce them may affect resources considerably.

Preventing illness and promoting health—Another area generating demand for new resources is health education and promotion. The problem of AIDS has led to the creation (from April 1987) of a new health authority which, in England, has taken over the role of the former Health Education Council and is concerned with preventing the spread of AIDS. At present about 100 000 people die prematurely because of their smoking habits,⁶ maybe as many as 40 000 people die prematurely because of their drinking (alcohol) habits,⁷ but fewer than 150 die prematurely as a result of their use of illicit drugs. The emphasis of existing policies on prevention seems to be unbalanced, but obviously the costs to governments of challenging powerful corporate interests are not inconsiderable in terms of financial support and votes. The subjects of illness prevention and health promotion are complex, but there are important opportunities to purchase considerable improvements in the length and quality of life at low cost, as is seen below (see table V).

There are, then, demands from many groups for additional funding. Such additional funding would enable the NHS to provide health care treatments and programmes that could generate appreciable improvements in the health of the population. These

programmes and other demands articulated throughout the Service cannot, however, be financed. The resources are not available to meet all the demands made by health care.

The nature of economic logic

SCARCITY

It is the ubiquitous nature of scarcity that is the starting point of economic analysis. Of course NHS funds could be augmented by switching defence funds to health care or switching private consumption on videos, junk food, and foreign holidays via taxation to provision for the NHS. Such switches, even if socially acceptable, would not abolish scarcity but merely alter its nature. Even the Americans, who are spending 2.7 times as much per person on health, ration care, particularly for those whose ability to pay for it is limited.

CRITERIA FOR CHOICE

Once scarcity is accepted the consequence is that there will always be medical interventions that, although productive in the sense that they enhance the quality and quantity of life, cannot be funded. Decisions have to be made about which types of health care will be provided. The debate must then be about the principles or criteria that will be used to choose which patients will get what care when.

OPPORTUNITY COSTS

Any choice results in an opportunity cost equal to the value of the alternative that is foregone. The opportunity cost of the Trident programme is fewer resources available for the NHS, videos, and roads. More health care for the priority groups means that fewer resources are available for patients who have acute illnesses. More diagnostic provision—for instance, the acquisition of a magnetic resonance imaging scanner—leaves less money available to fund other parts of the hospital system. There is no such thing as a free lunch: every choice results in an opportunity cost. In the case of the “free” lunch the opportunity cost is your time.

ECONOMIC EFFICIENCY

Choices have to be informed by information about the costs and benefits of each alternative. Such information enables the decision maker to identify the most efficient option. The pursuit of efficient practices is not merely about reducing costs; if it were, the most “efficient” procedure would be to do nothing, as that pushes costs to zero. Efficiency is defined as the minimum cost of producing a given outcome or the maximisation of outcomes from a given budget. Thus the achievement of economic efficiency requires the minimisation of costs and the maximisation of outcomes (or benefits).

INEFFICIENCY IS UNETHICAL

The consequence of scarcity is that choices have to be made, and efficient choices seem to be the most desirable: they maximise benefits (improvements in health) from a given budget. If doctors do not evaluate their practices and strive for this goal their practices may be inefficient. Inefficiency means that costs are not minimised and benefits are not maximised: in other words, there is waste of scarce resources. Waste, or inefficiency, means that potential patients (in the queue for care) are deprived of health care from which they could benefit. Inefficiency in one hospital department may mean that resources are not available for orthopaedics and that patients are left in avoidable disability and distress.

Inefficiency is unethical. If patients are not to be deprived of care from which they could benefit doctors must make evaluation and efficiency the priorities that dominate their practices.

IDENTIFYING EFFICIENCY: THEORY AND THE MARGIN

When making decisions on allocation we need information about costs and benefits (outcomes). Before considering how to identify and measure these variables, however, it is necessary to decide what data are actually needed for decision making.

The managers, administrators, and clinicians of a health care system typically generate data in terms of totals and averages (arithmetic means). The first rule for achieving economic efficiency with such data is:

(1) (a) if total costs exceed total benefits do not invest in the procedure;

(b) if total benefits exceed total costs do invest in the procedure.

This does not, however, tell us what amount to invest if rule 1(b) is met. The advice of the economist is that the decision on the level of investment should be decided by using data about the margin. The margin is the increment added to either costs or outcomes by a small (one unit) change in the level of activity. Thus the decision maker needs data on the marginal cost of producing one more (or one fewer) hernia repair and the marginal benefit to the state of health of one more or one fewer of such a procedure. From these data the second rule may be derived to decide the efficient level of investment in an activity:

(2) (a) if marginal cost exceeds marginal benefit reduce investment;

(b) if marginal benefit exceeds marginal cost increase investment;

(c) when marginal cost equals marginal benefit stop investing and maintain that efficient level of output.

The logic of these rules is quite simple. Rule 2 (a) indicates that if, as a result of increasing activity by one unit (the margin), the value of opportunity costs (foregone alternatives) exceeds the benefits of the procedure investment could be made more productively elsewhere and the level of activity should be reduced. On the other hand, if the benefits (in terms of the incremental effects on the state of health) exceed the costs of one more operation investment in that procedure should increase. The efficient level of activity is where costs and benefits are equal at the margin.

IDENTIFYING EFFICIENCY: USING THE MARGIN IN DECISION MAKING

Are such theoretical rules of any use in determining the level and nature of the allocation of resources in the NHS, or is the logic of theory useless in practice? There are inevitable problems in applying such rules, but their power and usefulness in informing decision making can be shown by a simple example.

In the late 1960s data from trials in the United States identified the cost and outcome (in terms of identifying cancers) of the use of the guaiac stool test as a screening device to identify cancer of the colon. Table III shows these data.⁸ The policy debate surrounding these data was what level of guaiac testing to adopt as efficient practice. Carrying out more tests increased costs but also reduced false negative results in cancer detection. Table III shows that the average cost per cancer detected rose from \$1175 to \$2451, and the opinion was that doing six stool guaiac tests was “good practice.”

Simple manipulation of these data using the concept of the margin shows nicely how useful economic logic can be. In table IV the second column shows the increase in the number of cancers found from each additional (marginal) test. The next column shows

TABLE III—Test results and costs of stool guaiac tests⁸

No of tests	No of cancers found	No of cancers missed (false negatives)	Total cost of diagnosis (\$)	Average cost per cancer (\$)
1	65-946	5-99500	77 511	1 175
2	71-442	0-49960	107 690	1 507
3	71-900	0-04160	130 199	1 811
4	71-938	0-00350	148 116	2 059
5	71-941	0-00030	163 141	2 268
6	71-942	0-00003	176 331	2 451

how costs increased with marginal increases in testing. The final column shows that the cost of identifying a marginal (one more) case of cancer rose from \$1175 with one test to \$47m with six tests.

Early intervention in this cancer saves lives, but is it worth spending \$47m to save one more life? All these data are in 1968 prices, and with or without adjustment for inflation the cost of this screening activity when it includes six tests seems to be high. Without using the concept of the margin, however, this cost is not identified, and inefficient decisions may be made.

TABLE IV—Marginal results and costs for subsequent stool guaiac tests^a

No of tests	Increase in No of cancers found	Increase in total costs (\$)	Marginal cost per cancer found (\$)
1	65.94600	77 511	1 175
2	5.49600	30 179	5 491
3	0.45800	22 509	49 146
4	0.03800	17 917	471 500
5	0.00372	15 025	4 038 978
6	0.00028	13 190	47 107 143

IDENTIFYING EFFICIENCY: MEASURING COSTS AND BENEFITS

In this example the measurement of cost refers only to the guaiac procedure, and the measurement of outcome is the number of cancers identified. Both of these measures, though useful, are crude.

In evaluating a procedure the full costs have to be identified. What is the cost of treating a case of head and neck cancer? To cost just the hospital surgery is incomplete. The costs of this need to be added to the costs of hospital diagnosis, referral costs in primary care and postoperative care, and the non-NHS costs—that is, the costs associated with local authority social services, the care provided by voluntary agencies (for example, hospices), and the costs to the patient and the household in which he normally lives. The objective of the costing is to identify the effect on resources of the relevant episode of illness.

The problems associated with costing a procedure, though not inconsiderable, are fewer than those arising from evaluating the outcome. The guaiac case takes as a measure of benefit the identification of a case of cancer of the colon. Indeed, it is commonplace throughout medical evaluation to use intermediate outcome measures and indicators such as survival. The outcome of a health care intervention, however, is not merely survival but the quality of that survival: General Franco, the Spanish dictator, was kept alive by technology for the last 80 days of his life, the quality of which, as he was mostly unconscious, was very low.

In the late 1970s the United States Office of Technology Assessment introduced the concept of the QALY—that is, the quality adjusted life year.⁹ For example, one year of full quality life would be free from disability and distress. This was a measure of outcome that combined measuring the additional life years associated with a procedure with their quality. The measurement of the quality of life is crude and may be as inaccurate as the measurement of the quantity of life (survival). The virtue of such measures, however, is that they are explicit, and consequently the debate about the allocation of resources is about objective problems such as the measurement of quality of life and cost rather than subjective and about the political power of doctors competing for resources.

The methods used to estimate the cost of quality adjusted life years are detailed elsewhere.^{10 11} Tables V and VI set out some results. The data in table V are the result of work by Williams,^{10 12} who has applied the pioneering work of Rosser and Kind¹³ to a variety of treatments in the United Kingdom. Table VI summarises data from North America and draws on the work of Torrance at McMaster University.¹⁴

These results are inevitably controversial. For instance, the North American data indicate that intensive neonatal care for low birthweight children (500-999 g) is an expensive way to produce a

QALY, though it is less expensive than hospital dialysis and continuous ambulatory peritoneal dialysis treatment for patients who have end stage renal failure.

From Williams's estimates some very clear priorities are established for the allocation of (especially marginal) NHS resources. If a district had £1m growth money and only the options listed in table V to spend this money on, its managers would recognise that it could produce 5988 QALYs from advice by general practitioners to stop smoking, 1333 QALYs from hip replacements, and 71 QALYs from hospital dialysis. Clearly, a health authority wishing to maximise QALYs (improvements in health) would invest its £1m in advice by general practitioners to stop smoking.

Some would reject such measures as generating unsatisfactory criteria to determine the allocation of resources.¹⁵ But are cost-QALY criteria any more unsatisfactory than existing measures, which are ad hoc, incoherent, and inconsistent? Some health authorities think not and are using this approach to help in decisions about allocating resources.¹¹

The implications of economics for the NHS

Economic analysis offers an explicit framework for appraising decisions about the use of scarce resources. It obliges decision makers to define objectives, assumed to be efficiency or the maximisation of improvements in health (QALYs), from a finite £20 billion NHS budget but to incorporate distributional (equity) issues as desired.⁵ Furthermore, it requires careful evaluation of the full (opportunity) costs of competing treatments and the identification and measurement (even if crudely) of outcomes (QALYs).

Identifying efficient practices, however, does not mean that the behaviour of doctors will be efficient: you can lead a horse to water but you cannot make it drink. To ensure that the behaviour of the hospital clinician and general practitioner is consistent with the findings of evaluative research practitioners may have to be

TABLE V—Data on cost per quality adjusted life year (QALY) United Kingdom, 1983-4^{10 12}

	Cost per QALY (£)
Hip replacement	750
Pacemaker implantation for arterioventricular heart block	700
Valve replacement for aortic stenosis	900
Coronary artery bypass grafts for:	
Severe angina with left main vessel disease	1 040
Severe angina with three vessel disease	1 270
Moderate angina with left main vessel disease	1 330
Severe angina with two vessel disease	2 280
Moderate angina with three vessel disease	2 400
Mild angina with left main vessel disease	2 520
Action by general practitioner:	
Advice to stop smoking	167
Control of hypertension	1 700
Control of total serum cholesterol	1 700
Kidney transplant	3 200
Heart transplant	5 000
Hospital haemodialysis	14 000

TABLE VI—Estimates of cost per quality adjusted life year (QALY) North America, 1983¹⁴

	Cost per QALY (\$)
Coronary artery bypass graft for left main coronary artery disease	4 200
Neonatal intensive care (1000-1499 g)	4 500
Thyroxine (thyroid screening)	6 300
Treatment for severe hypertension in men aged > 40 years (diastolic pressure 105 mm Hg)	19 100
Treatment for mild hypertension (94-105 mm Hg)	19 100
Oestrogen treatment for postmenopausal symptoms in women without previous hysterectomy	27 000
Neonatal intensive care (500-999 g)	31 800
Coronary artery bypass graft for single vessel disease, moderately severe	36 300
School tuberculin testing programme	43 700
Continuous ambulatory peritoneal dialysis	47 100
Hospital dialysis	54 000

"persuaded" with cash incentives and non-financial rules. For instance, general practitioners could be persuaded to take a greater interest in the higher incidence of cervical cancer in poor women if they were paid not just for each cervical cytology test but for identifying positive results. Non-financial regulations could include setting performance norms, rigorous peer review, and short term renewable contracts of employment for doctors.

It is inevitable that the NHS employment market will become more uncertain because policy makers require greater responsiveness from providers and greater flexibility in the provision of services. The role of the profession and its practitioners will be challenged, and the role of the consumer will be increasingly to question decisions and demand the evaluative (cost-QALY) information on which they are based. Adam Smith posed a dilemma nicely when he wrote in 1776:

The pretence that corporations are necessary for the better government of the trade is without foundation. The real and effectual discipline which is exercised over the workman, is not that of his corporation, but that of his customers. It is the fear of losing their employment which restrains his frauds and corrects his negligence.

In addition to the increased pressure for evaluating treatments and incentives the application of economics to health care will create the need for better medical education. At present most medical schools offer little in the way of systematic teaching of economics to young doctors.¹⁶ Similarly, there is all too little systematic teaching of economics at postgraduate level and during careers. Knowledge of economics is required for two reasons: firstly, to "immunise" doctors against the results of bad economic analysis, and, secondly, to enable doctors to participate in comprehensive, collaborative trials of the costs and benefits of treatments and programmes.

The immediate response to such a proposal is that the medical school curriculum is already full, and so it is. But what is the opportunity cost of not teaching economics, and what is the value at the margin of teaching economics vis à vis other inputs in medical education? For most doctors some economic knowledge may be of more use during their lifetime than esoteric aspects of surgery and medicine that become redundant after successfully completing examinations.

Economic analysis, like medicine, is scientific, but, like medicine, the margins of error may be considerable (for example, estimates of premature mortality related to alcohol range from an estimate derived from official sources of fewer than 8000¹⁷ to 25 000¹⁸ to 40 000⁷ a year). Like doctors, economists are working to reduce the margins of error in an attempt to improve the allocation of scarce resources among competing demanders. A major virtue of economic analysis is that it is an explicit framework that is logical—that is, defensible on the grounds of consistency. Its social perspective inevitably challenges the individual perspective of the doctor, but such challenges are not a threat to the medical profession; rather, they are an incentive to improve understanding and, by careful evaluation, improve the quality and quantity of care available for patients.

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MULTICULTURAL MEDICINE

A cautionary tale—It all started because I could no longer contain her anguish. Part of me rationalised the admission: a fresh look at her symptoms and a review of the medication might ease the burden of erosive rheumatoid arthritis, Parkinson's disease, and searing indigestion caused by her anti-inflammatory drugs. But quietly inside myself I asked her God to take her; there was nothing more that we could do. He did just this a few days later when an undiagnosed diverticulum perforated, and she rapidly developed a fulminating faecal peritonitis which was totally unrelated to her years of joint pains. Cross legged she had rocked quietly in the ward for 24 hours telling of her abdominal pains, but she spoke in Urdu, and wrapped in shawls she was unheeded by the busy nurses and harassed doctors. At this stage she pleaded with her daughter to take her home to the doctor she trusted, or at least to bring that doctor to her in the ward, but the daughter was in awe of the system and did neither. As her grip on life loosened modern medicine took over. She was resuscitated to a "surgically acceptable level," and after the laparotomy she died.

The next day neither the coroner's officer nor the coroner felt able to bend the rules (but was resuscitation not bending other rules?). A necropsy was done and the body released too late to catch a flight that would take her eventually to her village in far away Pakistan. So the grieving was extended. During the preparation for burial her daughter washed her body and lovingly lifted her into the coffin. My job was to try to comfort them and to explain things. Why had it taken so long to realise she was dying, why had she been resuscitated and mutilated, and why after death did the official

insist on a necropsy? I thought that this family and my gentle patient had tolerated enough, and I beseeched the coroner to waive the necropsy. He listened patiently enough but then told me that "these people" will expect exceptions to be made "all the time," and the necropsy was to go ahead the following day. When the body was returned to the family for ceremonial washing it was badly stitched with the usual large scar from neck to pelvis, and it was bedraggled, with matted hair and blood and an obvious scalp incision. "Where did they put her brain?" they asked. I thought I knew, as they knew, and I didn't have to lie to these wise sorrowing people. After days of sorrowing and waiting for the next flight and agonising about breaking the news to the relatives in Pakistan, I thought events were settling down, and then the daughter brought me the necropsy report. She asked for an explanation about the part which read "because of Parkinson's disease, the brain has been retained for further study."

She was my age, was born a Muslim in a remote village in Pakistan, bore her first child when she was 15, and for the past 15 years we have communicated without sharing a language, but we shared more important things. I feel that I have let her down, but the betrayal is much wider than that. Our medical system and culture have failed her and are still failing the disadvantaged. Ironically, her disadvantage would be regarded as advantageous in a less materialistic world. She was gentle, self effacing, and believed devoutly that her God would provide, which I suppose He did, but not without having to contend with our system first.—ZOE KENYON, general practitioner, Charlton, London.