reflects the availability of beds as well as the provisional diagnosis and severity of illness.

Our survey showed that most admitting medical officers were on a rota of one in three or better. As in the United States,¹ duty doctors cannot expect much time in bed when on call. We found that duty doctors had a better chance of getting more sleep in smaller hospitals.

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Audit in Person

Variations in hospital admissions and the appropriateness of care: American preoccupations?

John P Bunker

It is not just the explosion in costs that has catalysed preoccupation with the cost effectiveness of medical care in the United States. There is an equally important and growing recognition of the uncertain effectiveness of much of medical care itself, which has emerged directly from the now widely confirmed large and unexplained variations in rates of hospital admissions observed across local, regional, and national populations. Recognition that different segments of the population may receive appreciably different rates of a particular treatment is not new. Glover reported to the Royal College of Physicians in 1938 that rates of tonsillectomy varied as much as 20-fold among school districts in England and Wales.¹ Threefold and fourfold

variations in rates of operation among thirteen "small areas," roughly equivalent to counties, in Vermont.⁵ Vermont is a rural state with a largely homogeneous population and no discernible differences in morbidity to account for possible differences in medical need. Variations of equal magnitude in rates of operation were subsequently widely confirmed in other states and in other countries, including Great Britain.⁶ Variations in hospital admissions for medical diagnoses are even greater in the United States; on the basis of widely reported large variations in general practitioner referrals for consultant care,⁷ I judge that they are equally large in Britain. Coulter *et al* have now confirmed large variations in general medical admissions.^{7a}

Large variations in hospital admissions might be considered to have very different meanings in the United States and Great Britain. Variations in the United States might be reasonably assumed to include a good deal of overtreatment, and those in Britain, equally large but occurring at considerably lower absolute levels, to represent a good deal of undertreatment. Though these may be valid judgments, the fact that such variations occur in each country is strong evidence that the quality of medical care given by doctors in both is equally variable and uncertain. In the United States a large effort has been made to find the cause of the observed variations in medical practice. Only a small part of the variation has been attributed to variations in the prevalence of disease or to chance statistical variation. Rates of operation have been shown to vary directly with the number of surgeons and rates of admission with the number of beds available, but these explain only part of the effect. More important is the question of how medical decisions to treat similar conditions may vary so greatly among doctors. It is now widely acknowledged that this must mean that the scientific basis of the practice of medicine is inadequate; that the outcomes of treatment are, as a consequence, uncertain; and that, as a further result, doctors disagree among themselves in choosing treatment.⁸ There is also a growing body of evidence that doctors may not use existing scientific knowledge to full advantage.

Judging appropriateness of indications for procedures

The need for better data on the outcome of diagnostic and therapeutic technologies has been recognised for

... the scientific basis of the practice of medicine is inadequate.

differences in rates for other surgical procedures were observed in Liverpool, New England, and Uppsala by Pearson *et al* in 1968² and among 11 health planning regions in Kansas by Lewis in 1969.³

Magnitude of variation

I first became aware that there was a large public health problem a year later, when national data on operation rates in the United States became available and I could compare them with those published by the British Hospital In-Patient Enquiry.⁴ People in the United States at that time were twice as likely to undergo surgery as were those in Britain. Whether those in the United States were receiving too much surgery or those in Britain too little was indeterminable. People in the United States had not gained the benefit of living longer; indeed, life expectancy in Great Britain was slightly greater in 1970. Perhaps they were gaining an improvement in the quality of life, a goal to which much of medical and surgical care is devoted, but there were no data to determine this. Life expectancy in the United States is now slightly greater than in Britain, probably owing more to differences in smoking and other lifestyle factors than to medical care. It is still not possible to say whether the quality of life of the average person in the United States is better than that of one in Britain. The magnitude of the problem became painfully apparent in 1973 with the publication by Wennberg and Gittelsohn of large

Clinical Trials Centre,
King's College School of
Medicine and Dentistry,
Rayne Institute, London
SE5 9NU

John P Bunker, MD,

Correspondence to: 13 The
Green, Twickenham,
Middlesex TW2 5TU.

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many years, but a national effort to respond to this need has only recently been implemented in the United States and given appropriate funds. A new agency for health care policy and research, with a budget for the current fiscal year of \$100m, was created by the United States Congress in December 1989. The agency is charged with the responsibility "to enhance the quality, appropriateness, and effectiveness of health care services... through the establishment of a broad base of scientific research and through the promotion of improvements in clinical practice and in the organization, financing, and delivery of health care services." Resolution of the uncertainty underlying variations in rates of hospital care was the major rationale for creating the agency.

**... Research on outcomes will
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clinical practice.**

The need to use existing data more effectively is also widely acknowledged: the effectiveness of medical care in general falls far short of the best of which medical care is capable. Considerable effort has been made, primarily in the United States, to lessen the gap between care as practised on average and care provided under optimal conditions. Quality assurance programmes, including medical audit, represent one such effort. Consensus conferences, implemented by the National Institutes of Health in 1977, represent another. These conferences convene "a carefully selected panel of persons thought to be without vested interest, to listen to the evidence presented... and to prepare a report on the topic under consideration, including recommendations."⁹ Panels of experts are now being used, in a somewhat similar manner as in the consensus conferences, to judge the "appropriateness" of the indications for various medical and surgical procedures,¹⁰ the results of which are being used, in turn, as a basis for granting or withholding payment for care. The potential for similar use of data on appropriateness of care in negotiations of NHS contracts is currently under review at the King's Fund Centre (D W Costain, personal communication).

Perhaps the most interesting response to the phenomenon of variation and to the underlying implied uncertainty has been the substantial amount of research by health policy analysts of the transfer of scientific data to clinical practice and of how medical decisions are made, together with a ground swell of self examination by the medical profession as a whole. The Institute of Medicine in Washington last year held two conferences on improving the translation of research findings into clinical practice, clearly the weakest link in the process of medical innovation. Adoption of new medical technology seems to have as much to do with medical leadership and precedent in a given place as with its demonstrated efficacy. Standards of practice for old procedures, as well as for new, set by "opinion leaders" of a medical community are thought to explain the phenomenon of variation. That each medical community may have quite different clinical policies or standards is attributed to the uncertainty surrounding much of medical practice. Variations in care should diminish as local standards are replaced by national standards. Consensus conferences represent an important step in the effort to establish such national standards but are limited by the adequacy of the scientific base they attempt to synthesise and by the bias of the "experts" convened. Research on outcomes,

or the "evaluative clinical sciences" as they are starting to be called in the United States, will continue to be the central necessary ingredient in the effort to improve clinical practice.

Common problems and solutions

The United States and Britain have a common medical goal based on a common problem, and despite the appreciable differences in how medical care is organised and paid for the solution is also a common one. The goal is improvement in the care of patients within existing economic constraints. The solution is a better scientific base readily accessible to clinicians in their practice of medicine.¹¹

Quality assurance programmes, medical audit, and, now, assessment of the appropriateness of care represent the major current efforts to improve care by attempting to eliminate care of poor quality. A good beginning, perhaps; a necessary first step, probably; but in the process of rooting out the "bad apples" we have largely neglected the need to measure and encourage good medical care.¹² It is important to bear in mind that in identifying poor quality care we cannot assume that the remainder is good; that identifying and minimising adverse drug reactions does not assure that when such reaction does not occur the drug is achieving the purpose for which it was prescribed; and that when we have eliminated those diagnostic and therapeutic procedures that are judged to be clearly inappropriate we still do not know how many of the residual "appropriate" and "equivocal" procedures are achieving their intended results.

"Not bad" medicine does not equal good medicine, and we have only begun to face the enormous task of measuring at a population level the positive impact of medical care, encompassing how much good medicine does overall and how much good it does procedure by procedure and condition by condition. This is the task to which the new agency in Washington is committed and for which Congress has appropriated what may seem like a large sum of money, but which will, in all likelihood, cost much more. And even this is only half the job, for to make the results of research on outcomes readily available to practising clinicians—a goal implicit in the British government's commitment to a nationwide information system as part of *Working for Patients*¹³—it will be necessary to invest equally large, and as yet unestimated, sums of money.

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