mentioned in the present chart, another minor innovation compared with its predecessor.

We do not claim that the 1989 recommendations represent the permanent truth, but we do believe that they can all be justified by reasonable evidence. We also believe that uniformity in resuscitation guidelines has much to commend it. We hope that our guidelines will be widely endorsed.

Members of Resuscitation Council

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Basic life support working group

Chairman: A K Marsden. Coopted members: R F Furber, C James, C Moffatt, C C Molloy, D O'Brien, G Wynne.

Advanced life support working group

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For further information write to: Dr D A Zideman, Department of Anaesthetics, Royal Postgraduate Medical School, Hammer-smith Hospital, DuCane Road, London W12 0HS. A revised edition of ABC of Resuscitation, incorporating these revised guidelines, will be published in the autumn.

NHS Review

Improving clinical effectiveness in the NHS: an alternative to the white paper

Lois Quam

The government's argument in support of its white paper *Working for Patients*¹ has relied partly on the lack of any other articulated strategy for reform. No one can quarrel with the need to improve the efficiency or effectiveness of the NHS, but there are distinct alternative strategies for that reform. A clinical effectiveness reform is presented as a sounder and more plausible means for improving the NHS.

Fundamental assumptions of the white paper

The white paper is built on three fundamental assumptions. Firstly, it assumes that price in medical care effectively reflects value and that trading in internal markets would, therefore, increase efficiency despite the absence of supporting theoretical and empirical evidence.² Managers lack the information to purchase value for money because the data do not include measures of the effectiveness of care provided. Price based competition is inevitable because no existing quality measures compete with price in terms of coherency, comprehensiveness, and decision making power.

Secondly, the white paper assumes that patient throughput measures, such as performance indicators, effectively measure health care performance despite the absence of measures of patient outcome. These are pale surrogates for quality of care. The white paper contains a surfeit of input measures and a deficit of output measures.

Thirdly, the white paper truncates the definition of quality of care into one of patient choice. Other dimensions of care are neglected including the quality of patient outcomes; the extent to which the process of care adheres to the best known medical practice; and protection from substandard practitioners. Moreover, this focus on patient choice in the white paper is baffling because managers will steer patients to facilities with bulk purchase agreements. Money will precede patients rather than follow them.

These white paper assumptions are familiar to American doctors and managers. In 1981 the Reagan administration looked to the market to control costs and quality.³ Indeed, some of the same economic advisers participated in the development of both the American and the British competitive strategies.^{4,5}

Despite the competitive strategy's focus on cost containment medical care inflation in the United States is unrestrained, and the increase in the annual rate of medical care expenditure was higher in the 1980s than the 1970s. The rising costs of administration, which have contributed to increased health care costs in the 1980s, are incurred by the need to track complex financial transactions and regulate the market. These burgeoning costs in the competitive system have coincided with persistent concerns over the quality of care,⁶ low rates of patient satisfaction, and an increasing proportion of the population without health insurance.⁷

This failure to control costs and ensure quality has meant that the competitive strategy has lost many adherents in the United States at the same time as the government has introduced it in the United Kingdom. Because of the fear that price based competition has diminished quality of care in the United States, a new strategy aimed at measuring patient outcomes is being put forward by the medical profession,⁸ the federal government,⁹ and supporters of the competitive market approach.¹⁰

Alternative reform of the NHS

A reform of the NHS directed at improving the effectiveness and efficiency of clinical care is an alternative to the white paper.

. . . research in the United States shows the danger inherent in invalid performance indicators.

The assumptions of this clinical effectiveness reform are in fundamental disagreement with the white paper's proposals. Firstly, this reform assumes that value in medical care must include the quality of patient outcomes. Secondly, performance indicators in medicine are assumed effective only if they measure the process and outcomes in medical care. This argument is well known in industrial quality assurance.

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For example, improvements in productivity on an automotive assembly line depend greatly on understanding the process of work on the line, the desired outcomes, and the reasons for failed outcomes.

Research in the United States shows the danger inherent in invalid performance indicators. Institutions treating a wider mix of patients performed poorly to measures of expenditure or throughput because treatment of sicker patients is often more costly and lengthy. Another study found that analyses of variance in hospital referral and admission rates which failed to adjust for comorbidity were misinterpreted as differences in hospital quality.¹¹

... the white paper limits doctors' ability to use their clinical skill to improve efficiency because all performance measures are financial.

This clinical effectiveness reform argues for the development of an applied research agency in the NHS supported by a clinical database and NHS clinical and general managers directed to enact policy changes based on research results. This reform has three key components.

Firstly, a substantial increase in funding for research and epidemiology to support a research agenda which informs key clinical and general management decisions is necessary. In particular, clinical management decisions for illnesses about which there is uncertainty over the efficacy of treatment should be studied. Addressing these areas has the greatest potential for improving the effectiveness and efficiency of the NHS. Secondly, statistically sound methods for analysing and monitoring the clinical practice of the NHS must be developed. A major database to collect information on patient demography, diagnoses, clinical findings, and treatments should be established. Thirdly, the attention of managers must be directed to applying and integrating research results. This would remove the hit and miss approach that often dominates the dissemination of important findings from research.

There is a precedence in Canada, the United Kingdom, and Scandinavia for using health care databases to monitor quality of care and recommend management applications.^{12 13} Using this computerised database routine monitoring systems may be developed to improve clinical practice in the NHS by:

- Monitoring the introduction and standardisation of diagnostic methods and treatment modalities based on the results of randomised clinical trials to encourage the dissemination of state of the art medical practice
- Monitoring selected adverse clinical events, such as postsurgical complications or readmission rates, and analysis of clusters of adverse events to determine management practice changes which may reduce the incidence rate
- Detecting severely substandard performance by a doctor or hospital through monitoring of clusters of adverse events or single occurrences of a serious mishap
- Monitoring access to care by detecting the occurrence of late stage disease at presentation for inpatient care, such as advanced breast or cervical cancer
- Developing valid and reliable measures of patient outcomes, including physiological measures, and functional health status measures, such as ability to work and care for one's family, and patient satisfaction; measures that would constitute output measures for the NHS.

Such a process of routine statistical monitoring to focus intensive review offers great potential for improving the quality of patient care. Statistical thresholds to indicate further analysis using medical audit may be automated.¹⁴ This strategy allows the computerised database to show where further intensive review by medical audit is likely to be most fruitful. Highly trained clinicians can then work most efficiently to investigate problems and focus on solving problems.

Applications using the APACHE II system developed at George Washington University in the United States exemplify the strength of this reform. The APACHE system weighs the severity of patient illness in intensive care wards. Weights are assigned to objective clinical findings, such as the Glasgow coma score and blood pressure, to obtain a severity of illness score. The score increases with the likelihood of organ failure and death.¹⁵

Based on measurement of the severity of illness in patients within an intensive care unit, APACHE derives an expected mortality rate. The actual mortality rate is then compared with the expected rate. In a review of 13 intensive care units in the United States Dr William Knaus and his colleagues at George Washington found that one hospital performed statistically significantly better than expected and one hospital performed significantly worse than expected. Both outcomes could be traced to clinical management processes.¹⁶ In the NHS, unlike the United States, the clinical management practices found to improve care in the intensive care units can be applied by management across the service.

To a doctor or another health professional this approach is a clinically relevant method for rationalising medical care in the NHS. This method produces valid indicators to help clinical management. In contrast the white paper limits doctors' ability to use their clinical skill to improve efficiency because all performance measures are financial.

Improving efficiency as a byproduct of improving clinical effectiveness

The government's perception that the well known variation in treatment rates between districts indicated inefficiency in the NHS was an important impetus for the white paper. This variation, however, persists in widely divergent medical care systems, a finding that suggests that uncertainty in medical practice is the underlying cause rather than the presence or lack of market incentives.¹⁷ Indeed, the magnitude of variation is roughly equal in the United States and the United Kingdom. This evidence suggests that internal market reform will not meet the government's objective of reducing variations between regions. The clinical effectiveness reform is more likely to succeed because it addresses clinical uncertainty.

This clinical effectiveness reform improves the efficiency of the NHS by improving practice. Evidence in the United States suggests that variations in practice are reduced when clinically relevant data are fed back to doctors.¹⁸ Moreover, the prevention of poor quality practice is both clinically effective and economically efficient.¹⁷

Incompatible reforms

This clinical effectiveness approach and the white paper are incompatible avenues of reform. The white paper lacks a strategy to improve clinical practice in the NHS or a means to ensure that the incentives of competition to lower costs will not harm quality of care. The government's commitment of £4m to medical audit in 1989-90 is not sufficient to fulfil this

role. The white paper investment in computerising financial tracking systems renders unlikely the investment in the computerisation necessary to improve clinical effectiveness; the curtailment of the resource management initiative illustrates this. The increase in administrative costs incumbent on the adoption of internal markets will further detract expenditure from clinical management improvements and existing patient care. An increase in medical malpractice claims is another cost of a privatised health service.²⁰

The white paper eliminates several strengths of the NHS which make a clinical effectiveness reform likely to succeed. Firstly, management decisions are disaggregated in the NHS by the introduction of internal markets. A manager's ability to undertake investment for improvements, which do not have a short term market advantage, is diminished. A self governing hospital would be penalised in the internal market because of the capital investment needed to develop clinical information systems. The hospital would price its services out of the market. Secondly, this clinical effectiveness reform is dependent, as is all scientific investigations, on the open sharing of clinical data and research results. In a competitive system this openness evaporates as health authorities must seek to sell their services by promoting their institutions and obscuring problems. Thirdly, the incentive for doctors to coordinate patient care to ensure best outcomes is diminished by internal markets. The white paper encourages doctors to take a piecemeal approach because only specific services, not care for an entire episode of illness, are bought and sold.

This clinical effectiveness reform builds on the existing strengths of the NHS and a strong British tradition in epidemiology; it compares well with the white paper; its assumptions are well founded; and its approach is scientifically sound.²¹

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ANY QUESTIONS

Is there any evidence that early retirement reduces morbidity or lengthens life?

It is not possible to organise randomised controlled trials to study the effects of early as opposed to late retirement, and many of the studies that have been done on the effects of retirement are epidemiologically flawed—for example, early retirement is often a result rather than a cause of ill health.

The research that has been done on retirement, however, suggests that the effects of retirement on health are more likely to be beneficial than harmful. This is contrary to the popularly held belief that retirement is a major blow. The main adverse effects of retirement are the drop in income and the loss of friendships established at work, but for those with occupational pension schemes the drop in income is not nearly so severe and may make no noticeable impact on lifestyle. Retirement often coincides with the end of mortgage payments, converting retired people with occupational pensions into a relatively wealthy group. Retirement also brings a change in lifestyle but for many people this is beneficial to health, reducing the stress of commuting and allowing the opportunity for outdoor activities.

If early retirement is a result of redundancy with a sense of rejection and worthlessness for a life's work there may be adverse effects. But if retirement is a change in career from full time employment to full time personal life, perhaps supplemented by part time employment and supported by an occupational pension, the general effects of retirement seem to be beneficial and thus the earlier that retirement starts the better. —J A MUIR GRAY, *community physician, Oxford*

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What are the hazards of timber preservatives used in the home?

Timber preservatives are used to protect a valuable finite resource from fungal decay and attack by woodboring insects. Many such substances have also been extensively used in agriculture, medicine, and forestry. The hazards are similar, but the particular risks associated with domestic wood treatment are concerned with the potential exposure of children, the old and infirm, and domestic pets.

All wood preservatives must be approved for use in the United Kingdom, a stringent process that entails strict regulation of the formulation, personal protection requirements, and conditions of use.¹ Those intended for use in the home may be approved only for professional use or for do it yourself purposes. Although there are many approved chemicals, recent public concern has focused on three: γ benzene hexachloride (γ -BHC; Lindane), pentachlorophenol (PCP), and tributyltin oxide (TBTO). These chemicals may be acutely toxic to those who work with them.^{2,3} It has been alleged that chronic exposure to Lindane may give rise to aplastic anaemia and other blood disorders and that dioxin impurities in PCP (strictly controlled to extremely low levels in the United Kingdom) may be harmful under similar conditions of exposure. There is no evidence to substantiate these views, or that the casual exposure of householders poses a serious risk to health. Many cases of wood preservative poisoning seem to consist of transient symptoms such as headache, sore eyes, and irritation of the respiratory tract attributable to exposure to solvents (mainly white spirit) rather than to the active ingredients. —A SCOTT, *senior employment medical adviser, Nottingham*

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