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Regional trauma systems

The negative results from an evaluation do not tell the whole story

See p 1349

In 1988 the Royal College of Surgeons published recommendations designed to improve the management of patients with major injuries.[1] The Department of Health responded by supporting the development of a regional trauma service in North Staffordshire and commissioning an in depth analysis of its performance compared with the orthodox British model of care in two other centres in Lancashire and Humberside. Reviews were also undertaken of the cost effectiveness of helicopter ambulances and the role of minor injuries units. The college introduced courses in advanced trauma life support, and the Department of Health supported the extension of the major trauma outcome study, to provide comparative audit data on hospital performance.[2]

Although the analysis of the regional trauma service examined outcomes in 1990-3, the article by Nicholl and Turner in this issue provides the first opportunity for the general reader to review the data (p 1349).[3] Some will conclude that this delay is due either to publication bias against the negative results or to uncertainty about their validity when compared with the very positive earlier report from the Stoke clinicians.[4] Whatever the reason, the paper provides an opportunity to rekindle the debate on the organisation of trauma care in Britain eight years after accidents were included as a key area in the Health of the Nation strategy.

Nicholl and Turner state, "There was no reliable or consistent evidence that the developments [in North Staffordshire] improved the chance of survival from major trauma in the region," whereas the Stoke clinicians' reported an overall reduction in mortality from 38% to 27% in five years and a saving of 17 lives a year. The shorter timescale of Nicholl and Turner's study is unlikely to invalidate their results. Most of the service reconfiguration was completed within the study period, and subsequent referral patterns have not changed significantly. There are two other possible explanations for the discrepancies. Clinicians will claim that it is difficult to ensure that every confounding variable has been addressed when the injuries sustained by the study populations are so diverse. Statisticians will point to the limitations imposed by the relatively low incidence of death after injury when mortality is the main outcome measure.

Perhaps a more robust approach to evaluating trauma systems would be to concentrate on the process of care.[5] Measuring adherence to guidelines could be a surrogate measure of outcome if the guidelines had been shown to be based on accepted standards. The starting point must be the randomised controlled trial. This is slowly replacing anecdotal reports on trauma care, but most of the evidence is from overseas. For example, Bickel et al have shown that prehospital intravenous fluid therapy is associated with reduced survival rates in patients with penetrating trunk injuries in Houston.[6] This is supported by good experimental and clinical evidence that the currently recommended aggressive treatment of hypovolaemic shock with crystalloid or colloid is misplaced.[7] Those data will be reflected in the next version of the advanced trauma life support guidelines, to be published in 1998, which will advocate a cautious move towards hypotensive resuscitation and a renewed emphasis on early surgical assessment.

In 1995 Regel et al described how the integration of trauma services in Germany was associated with a reduction in mortality from 37% to 22% over 20 years.[8] Selective use of doctors in the prehospital phase, rapid evacuation by helicopter to a designated trauma centre, the early intervention of intensivists, the ability of senior surgeons to take patients quickly to the operating theatre, and the integration of well resourced rehabilitation services into the hospital environment are considered to be the essential features of this service. One weakness of their study was the failure to analyse the comparative effectiveness of each component of the system, though the authors do emphasise the importance of integration. This concept of the "chain of survival," so evident in the management of cardiac arrest, is not yet built in to the British response to major trauma.

Nevertheless, the British system has many good features, and it is reassuring to find recent clear evidence of the contribution of treatment to the significant reduction in deaths from trauma among under 25 year olds over the past eight years.[9] Equally, we should not be unduly influenced by unfavourable comparisons with North America. The cause, frequency, and demographics of trauma vary significantly between the two countries. Moreover, the popular British understanding of the American system may be inaccurate. It is, for example, generally assumed that American centres employ resident consultants throughout 24 hours, that centres are evenly distributed across the country, and that they treat large numbers of patients. However, the American College of Surgeons Committee on Trauma accepts that on site cover can be provided by a fourth year resident, who will usually have less experience than a fourth year

specialist registrar in Britain.[10] Many states do not have an integrated trauma system, and some small cities have more than one competing trauma centre.[11]

The infrastructure in Britain may be more consistent, but it needs enhancement and integration. The rigorous analysis by Nicholl and Turner provides some useful data about how this should—and should not—be done. However, their negative results must be taken in the context of a "shire county" comparison which may not be relevant to the larger metropolitan areas. Also, they emphasise that their report is limited to a review of mortality after major trauma and refer to their unpublished work on avoidable deaths from less severe injuries, the quality of life of survivors, and the cost of the service. These are important data which must be used alongside the results of further randomised controlled studies to construct a much needed evidence based system of trauma care in Britain. They should be published without further delay.

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Emergency medical admissions: taking stock and planning for winter

We need more logic and more honesty

Emergency medical admissions have risen by 50% since 1984 and now account for almost half of all NHS admissions.[1] Through recurrent winter bed crises, disrupted elective admissions, growing waiting lists, and highly publicised interhospital transfers of seriously ill patients this continuing rise threatens the future of the NHS. Has anything changed since we last reviewed this problem?[2]

We now understand better the epidemiology of emergency medical admissions. Winter peaks principally reflect respiratory and cardiovascular illness.[3] Nevertheless, twofold variations exist between individual hospitals in both admission rates and increases in rates.[4] Whereas the proportion of the total population using inpatient hospital services has remained almost constant,[5] the number of patients readmitted four or more times in a five year period doubled between 1981 and 1994.

Age and deprivation take their toll. People aged over 65 account for only 15% of the Scottish population but 37% of emergency admissions.[1] This proportion may have grown because more elderly people live alone as family groups fragment, eroding informal support. Hospitals become "the carer of last resort." Socioeconomic deprivation operates across the board, from illness behaviour through to use of tertiary services. Deprivation increases emergency admissions, particularly for cardiovascular disease, self poisoning, and asthma. These, along with non-specific conditions, dominate the emergency admission workload.[1 4]

Up to half of those admitted as emergencies have not been referred by their general practitioners.[6] Accident and emergency departments therefore also act as gatekeepers. But rising expectations by patients and their families potentially erode the gatekeeper role of practitioners and hospital staff. Moreover, in accident and emergency departments junior doctors may practise defensively and lack confidence to resist an admission.

Primary care factors are clearly crucial, with considerable variations between individual practices—which are difficult to interpret in the absence of a "gold standard." An American randomised trial suggested that increased access to primary care was paradoxically associated with significantly higher admission rates.[7] More work is needed on the potential effects of the recently introduced out of hours care schemes and treatment centres.[8]

"Supply side" factors contribute powerfully. Hospital bed availability has effectively increased because lengths of stay have fallen faster than bed numbers. This may have contributed to the rise in 28 day readmission rate, which accounts for 14% of the increase in emergency admissions.[1] Some readmissions may be inevitable when practising explicit risk management. Increased readmissions and reduced admission thresholds might also contribute to the observed decrease in fatality rates.

Measuring the appropriateness of admissions remains difficult and contentious. Patients' and carers' views are rarely elicited. Professional staff consider that up to 40% of admissions may be avoidable but only if appropriate alternatives to hospital care both exist and are available.[9]

Although various planned and acute responses to excess emergency admissions have now been

described,[9] disappointingly few have been evaluated. Acute responses include closing or redesignating wards in the short term, redeploying staff, and boarding patients elsewhere in the hospital. Such crisis management potentially risks sensationalist media coverage.

Planned responses have addressed every stage in the admission process from initial referral to discharge. Patients may be deflected before admission, by easy access to "same day" rapid assessment outpatient clinics,[9] enabling senior clinicians to manage the referrals. Secondly, bed use may be improved: emergency admission units can triage patients to appropriate specialty wards, and consultants may be excused routine duties to handle acute admissions.[10] Such schemes can increase bed occupancy and reduce length of stay, boarding of patients in inappropriate wards, and transfers between wards or hospitals, but may cause deskilling and increase stress for staff.[10] Lastly, comes discharge planning, which should ideally start on the day of admission. Home visits immediately after hospital discharge may also reduce readmissions.[11]

Nevertheless, isolated changes have generally produced little effect, even when backed up with large cash injections. This is a complex closed system. Deflected patients tend to bounce back somewhere. The time has come for more logic, and more honesty.

A systems approach would suggest a comprehensive, integrated response coordinated across an entire community or region. This would include primary care as well as hospitals, social services as well as health services. Does Northern Ireland benefit from its unified budget? Would the rest of Britain? More openness implies involving the other stakeholders: social services, politicians, purchasers, primary care practitioners, patients, and the public. Consulted least, patients and the public probably hold the key. Greater honesty means recognising that we will get what we are prepared to pay for. Future debates will need to focus on the most contentious issue, prioritisation.

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Commissioning specialist services in the NHS

A national clearing house could pave the way

See p 1327

A white paper is expected in the next few weeks which will set out the UK government's vision for the NHS—possibly the most important document for the service since *Working for Patients* in 1989.[1] The government faces the tricky task of coming up with a formula which recognises the potential benefits of a purchaser-provider split—greater accountability and responsiveness to local needs—without the competition, fragmentation, and transaction costs of an internal market. The role of district health authorities and their performance since 1991 will be central in their considerations. Much attention has recently been paid to health authorities' capacity to commission specialised services, such as those for haemophilia[2] and cochlear implants,[3] which account for about £1.4bn (6%) of NHS expenditure. Before 1991 these services were funded centrally and managed at a regional level. Since then responsibility has largely been devolved to districts. Yet despite some transitional arrangements to ensure continuity, specialist providers have felt increasingly vulnerable. Is such concern justified?

An inquiry by the Audit Commission, published this week, finds few gains from this shift in responsibility.[4 5] This failure, it is suggested, results from the difficulties health authorities face in assessing the appropriateness of services which change rapidly; coping with the financial risk posed by low volume, high cost services (where one patient with haemophilia might exceptionally cost more than £500 000 to treat); specifying high cost services in separate contracts in the absence of adequate information; and making meaningful comparisons between hospitals. Given these challenges, the duplication of effort which occurs, with neighbouring authorities reviewing the effectiveness of the same new treatments, wastes precious skills and resources. In addition, authorities may arrive at different conclusions, resulting in inequities in access. Despite these problems, the Audit Commission concludes that health authorities remain the best placed organisations to commission specialised services because such services must be balanced against the need for other, less specialised services.[6]

So if responsibility should remain with health authorities, how can the system be made to work better? The Audit Commission's proposal is for greater central support combined with more effective local partnerships. The central support could be achieved through a national clearing house, built on existing NHS research and development work, to consolidate research evidence about those treatments which satisfy basic cost effectiveness criteria. A more systematic approach to the introduction of new technologies is also suggested, with central financial support being provided for new treatments while services are still being developed.

These recommendations are complemented by suggestions that health authorities should build partnerships locally with other districts and work with trusts both to share risk and to explicit criteria for prioritising patients and treatments. While many of the best practices identified by the Audit Commission came from large health authorities, it does not recommend structural changes but notes that many benefits can be realised by strengthening existing informal alliances between authorities. The report also identifies ways in which authorities can work more effectively with trusts, highlighting the role of public health as an important bridge to specialist clinicians and the value of sharing information with providers.

The report provides a timely and constructive contribution to the current debate about changes in the management of the NHS. But would the proposals work? A national clearing house would certainly complement the health technology assessment programme, but it would need to adopt a broader perspective than just the cost-effectiveness of technologies,[7] which has tended to be the focus of research activity so far. Even then, there is no guarantee that a national centre will be able to generate unambiguous guidance for health authorities because scientific evidence about new technologies is rarely clearcut. Much of the existing variation in local commissioning decisions reflects variation in interpretation of the same research evidence. There must, therefore, be some doubt whether local specialised providers will accept national guidance, particularly if a competitive market is replaced by the notion of contestability, dependent on a greater degree of collaboration and trust between purchasers and providers.[8]

The other principal suggestion, the encouragement of health authorities to become more active in commissioning through greater use of consortia and other methods of collaboration, is also welcome. In practice, the Audit Commission recognises this will require greater involvement by public health practitioners, and not just those with a medical background. This suggestion, however, coincides with calls for public health staff to shift their attention from personal health services to more traditional concerns such as housing and environmental hazards. In addition, more active commissioning will inevitably require more resources for health authorities at a time when the government is keen to reduce management costs. And improvements in the performance of health authorities are unlikely to be achieved until the current high turnover of staff can be halted. Commissioning specialised services is yet another example of the complex interplay of factors that have to be considered when pursuing organisational change.

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Lumbar puncture needn't be a headache

Use blunt needles and no bed rest

Lumbar puncture is an investigation that patients often fear. Headache afterwards is the commonest complication, occurring in over 30% of patients when a 20 G bevelled needle is used.[1] The headache is typically occipital and related to posture. It can be severe in up to a third of patients, rendering the individual immobile. Characteristically, the headache starts 24-48 hours after lumbar puncture and usually lasts one to two days but may be more prolonged. The headache is related to low cerebrospinal fluid pressure resulting from spinal fluid leaking through the hole cut in the dura by bevelled spinal needles.[2 3] Traditionally, manoeuvres such as bed rest and posture have been used to prevent headache. Despite the popularity of bed rest, evidence of its effectiveness is weak, and British clinicians are ignoring the most effective means of preventing headache after lumbar puncture.

Two randomised controlled trials have considered bed rest, comparing four[4] and six[5] hours' bed rest with immediate mobilisation, only one using blinded assessors.[5] Neither study found any difference in the rate of headache, or in the rate of disabling headache.[5] Bed rest is thus not of proven benefit.

Lumbar puncture is most commonly performed in administering spinal anaesthesia and in diagnosing neurological disease. In anaesthetics much effort has gone into reducing the incidence of headache after lumbar puncture. Finer bore spinal needles have been used in an attempt to reduce the volume of the cerebrospinal fluid leak[2 3] and have succeeded in

reducing the incidence of headache to around 14% with a 25 G needle and just over 2% with a 27 G needle.[6] In addition "blunt" needles (pencil point and bullet tipped) have been found to separate rather than cut dural fibres, thereby further reducing the rate of leakage.[7] Using such needles with bores of 25 G or smaller reduces the incidence of headache to around 1%.[3]

In diagnostic neurology many of the traditional investigations necessitating lumbar puncture such as myelography, where the incidence of headache is higher,[2] have been superseded by newer techniques. Nevertheless, lumbar puncture to allow examination of the cerebrospinal fluid remains an important investigation. The requirements of diagnostic lumbar puncture differ from those in anaesthetics: spinal fluid must be removed and the pressure measured. Thus very fine needles cannot be used. Needles smaller than 22 G take longer than six minutes to collect 2 ml of fluid.[6] A similar period is required to measure pressure, and even then the measurement may be inaccurate.[6] In practice therefore a 22 G needle is the smallest size that can be used for diagnostic lumbar puncture.

Blunt needles have recently been shown to reduce the incidence of headache after diagnostic lumbar puncture in neurological practice in double blind controlled randomised trials.[8 9] A 22 G blunt needle gave rise to an incidence of headache of only 5%,[8 9] similar to the incidence quoted in anaesthetic series for this type of needle.[6]

This evidence has not yet changed practice in British neurological and medical units, where a 20 G needle remains the standard and bed rest is routine.[10 11] The incidence of headache could be reduced sixfold (30% to 5%) if clinicians switched to 22 G blunt spinal needles. The newer needles are more expensive, but theoretical calculations indicate that the higher cost of the needles is more than offset by the potential saving from treating fewer patients with severe post-lumbar puncture headache.[10] In the light of this evidence neurological and medical units should review which lumbar puncture needles they use and consider limiting the use of bed rest.

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UK government fails its first test on public health

The government should reaffirm its commitment to a total ban on tobacco sponsorship

As we went to press Tessa Jowell, Britain's minister for public health, was preparing to appear before the Commons European legislation select committee. Her difficult brief was to explain why the government had reneged on its promise to ban tobacco advertising by exempting Formula One motor racing.[1] Given that such an exemption jeopardises the best chance yet of getting European health ministers to agree to ban tobacco advertising throughout the European Union, she may find the going tough.

The government's only honourable exit from this debacle is to admit that it goofed (as the prime minister has begun to do—though so far only over presentational matters) and attend next month's meeting of European health ministers determined to support a total ban on tobacco advertising. If Ms Jowell continues to support the unsupportable line that she has advanced both in parliament[2] and in print[3] then she has no place as a minister for public health. If, as her friends maintain, she has only been following her government's orders, then the government would do better to close her ministry than to bring it into such disrepute. For Britain to lose its minister for public health so soon would be a tragedy, but what's the point of a minister who says all the right things but is over-ruled when the going gets tough? We want a minister for public health who can really advance the health of the public, which is often politically difficult.

The success of any such ministry is bound to be judged by its actions on smoking—Britain's main public health problem, now rising after 25 years' steady decline.[4] Tobacco companies need to replace the 120 000 smokers who die of their habit each year. As smoking habits are relatively fixed by the late teenage years, the tobacco industry must hook potential smokers before this, and the industry has found sponsoring sport is an effective way of reaching this vulnerable population. Several studies have shown that the young are influenced by tobacco sponsorship of sporting events,[5 6] and last week's *Lancet* reported a particularly relevant one showing that boys in their early teenage years who watched motor racing on television were nearly twice as likely to become smokers as those who did not.[7]

The government's main justification for exempting Formula One has been that British jobs would be lost as the ban would force motor racing overseas. However, commentators qualified to assess these claims have judged them "threadbare."[8 9] The risk of overseas migration of Formula One racing has also featured in public health justifications for the exemption, best summarised in Ms Jowell's statement to the House of Commons that "exempting Formula One is to ensure that there is less tobacco advertising not more."[2] The reasoning behind this is that in exchange for an exemption from the ban Formula One organisers would agree voluntary controls on tobacco promotion; without such an exemption, Formula One might decamp to countries that lack controls on advertsing. Televised events might therefore be beamed back to Europe containing even more advertising than now. But this rests on several questionable assumptions—for example, that the tobacco industry sticks to voluntary agreements and that countries have no ways to influence what their populations see on television. In any case, even if the exemption is granted now, nothing can keep Formula One racing in Britain if its organisers want to take it elsewhere in future.

Nobody believes the government's stated reasons for its proposed exemption—because they don't withstand serious scrutiny. In this climate of disbelief, the darker motives alleged for its actions—that it made the decision because senior figures in Formula One racing donated substantial sums to the Labour party—become more credible. And with these allegations, regardless of their truth, comes a fall in the government's standing. Louder and more insistent claims of doing nothing improper are falling on deaf ears. To redeem itself, this government needs to reaffirm its commitment to a total ban on tobacco advertising in time for next month's meeting of health ministers.

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Climate change: decision time in Kyoto

Doctors must lead from the front in the fight against global warning

Mankind faces a crucial test in Kyoto next month, and we look set to fail. The test will come at the third meeting of governments trying to commit to reducing their emissions of greenhouse gases to counter global warming. Virtually all scientists agree that global warming is happening, and most think that the consequences will be dire. Some small island states will disappear, food shortages in Africa will be worsened, and vector borne diseases will spread.[1 2] To counter the problem those in the rich world must reduce their energy consumption, and doctors can lead from the front—just as we did when we came to understand the evidence of the harmful effects of smoking.

But this time it's harder. The rich, particularly the Americans, have hugely higher energy consumption than the poor, and the energy consumption of some of the poor will have to increase for them to move out of absolute poverty. If the rich cannot reduce their energy consumption appreciably then nothing will happen to reduce emissions of greenhouse gases. It is hard for political leaders to agree to make the reductions because many vested interests oppose reductions, because we find it hard to make short term sacrifices for long term benefit, and because many people do not grasp the scale of the problem (some in Britain are attracted by "southern England becoming like Provence"). But doctors can understand. And we can change the world by speaking up and acting—together and individually—internationally, nationally, and locally and by changing our own lifestyles. Because that is what it means. We must use our cars less or not at all, insulate our houses, forego air conditioning, and make a hundred minor changes in our lives. None of this will be easy because we are addicted to energy, individually and as communities and nations. But if we can't find a way to change then our descendants will pay an awful price.

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