

Nuffield Occasional Papers
Health Economics Series: Paper No. 6

Future Hospital Services in the NHS

One Size
Fits All?

Peter West

Introduction by
John Wyn Owen



The Nuffield Trust
FOR RESEARCH AND POLICY
STUDIES IN HEALTH SERVICES

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Fits All?

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INTRODUCTION

The government is once again undertaking a comprehensive health spending review. At the same time it has found funds to avoid a winter of emergency inpatient closures and lengthening waiting lists.

Sustainable financing of health care with appropriate mechanisms for individual community and national priority setting are important public policy objectives which have been under scrutiny over many years and must now be addressed with some urgency. The Trust has informed this debate in the past and will continue to do so.

These Occasional Papers offer the economists' contribution and should be of interest to policy-makers at the highest level as they strive to improve the effectiveness of the National Health Service, improve patient care and create the right incentives to reward efficient performance within inevitable financial constraints.

Paper 6 – Future Hospital Services in the NHS One Size Fits All? – by Peter West, examines the past medical and economic factors that have shaped the current role and facilities of hospitals and goes on to look at recent UK policy on the quantity and location of acute hospital beds and the impact of trends in health care on the hospitals of the future. There are various possibilities but the simple fact of the continued existence of an acute hospital service, even one that is located in fewer places, means that the acute hospital will always have priority in spending plans although this may not be the best investment for health gain.

West considers that the NHS may begin to develop a number of models of care outside hospital, such as large comprehensive outpatient centres where GPs combine general and some specialist practice, minor accident and emergency facilities and a range of diagnostic facilities.

At present, however, policy is driving the service rapidly towards fewer and fewer comprehensive District General Hospitals which make the best use of capacity close to technological services as the total number of beds falls. If this thrust, which is driven largely by short-term capital and longer term training issues, is to be challenged, there is need for better evidence on the quality of care, costs and feasibility of possible alternative models than is currently available.

John Wyn Owen
February 1998

FOREWORD

The application of economic analysis to health and health care has grown rapidly in recent decades. Alan Williams' conversion of Archie Cochrane to the virtues of the economic approach led the latter to conclude that:

“allocation of funds and facilities are nearly always based on the opinion of consultants but, more and more, requests for additional facilities will have to be based on detailed arguments with ‘hard evidence’ as to the gain to be expected from the patient’s angle and the cost. Few could possibly object to this.”*

During most of the subsequent twenty-five years many clinicians have ignored Cochrane's arguments whilst economists busily colonised the minds of those receptive to their arguments. More recently clinicians and policy makers have come to equate, erroneously of course, health economics with economic evaluation. Thus the architects of the Department of Health's R&D strategy have insisted that all clinical trials should have economic components and tended to ignore the broader framework of policy in which economic techniques can be used to inform policy choices by clinicians, managers and politicians.†

The purpose of this series of Occasional Papers on health economics is to demonstrate how this broad approach to the use of economic techniques in policy analysis can inform choices across a wide spectrum of issues which have challenged decision makers for decades. The authors do not offer ‘final solutions’ but demonstrate the complexity of their subjects and how economics can provide useful insights into the processes by which the performance of the NHS and other health care systems can be enhanced.

The papers in this series are stimulating and informative, offering readers unique insights into many aspects of health care policy which will continue to challenge decision makers in the next decade regardless of the form of government or the structure of health care finance and delivery.

Professor Alan Maynard
University of York

* Cochrane AL. *Effectiveness and Efficiency: random reflections on health services*. Nuffield Provincial Hospitals Trust, London, 1972.

† Maynard A and Chalmers I (eds). *Non-random Reflections on Health Services Research: on the 25th anniversary of Archie Cochrane's Effectiveness and Efficiency*. British Medical Journal Publishing, London, 1997.

PREFACE

This paper examines the past medical and economic factors that have shaped the current role and facilities of hospitals. It then goes on to examine recent UK policy on the quantity and location of acute hospital beds and the impact of trends in health care on the hospitals of the future. It concentrates on the position in the UK, where socialised medicine has dominated provision since the second world war. However, hospitals in all developed countries share similar, largely non-commercial foundations and many of the issues drawn out for the UK also apply in other health care funding systems.

In the opening sections of the paper, the broad history of hospitals in the UK and the impact of specialisation and the growth of cottage hospitals are examined. It is argued that the particular characteristics of hospitals in the past have conditioned, to a considerable degree, recent ideas on hospitals' operation and capacity. This is followed by a review of the current hospital capacity of the UK and its distribution. In the final sections of the paper, the technical and economic factors generating further pressures for change are examined and their implications for future hospital provision in the UK are drawn out.

THE HISTORY OF HOSPITALS IN BRITAIN: CAPACITY AND UTILISATION

Hospitals are institutions with ancient roots. St Bartholomew's Hospital in Rochester can trace its origin back to 1078 and St Bartholomew's in London to 1123. (For a detailed review of the history of the hospital see Granshaw and Porter¹ and Abel-Smith².) As such, they have their roots in charity and caring for the poor, linked to hostels for pilgrims,³ rather than the provision of technical treatments to the population at large. The Romans had hospitals for their troops, as part of their military machine, but, by medieval times the more than 1,000 hospitals in Britain^{1,4} were providing care for essentially charitable purposes.

Hospitals were established for several philanthropic reasons: to house lepers and other patients who might need care but were also seen as a threat to the rest of the community; to look after pilgrims on their way to holy shrines; and, initially in a minority of cases, to care for the poor and sick. Hospitals providing care for those who could not care for themselves were first founded by religious foundations, many of which suffered in the Reformation, but over time hospitals were increasingly opened as a form of conspicuous charity that united rich and poor in an appealing and often high-profile act of giving for the benefit of the community.⁵ Other models of charitable hospitals developed as a result of growing specialisation and the development of medicine in rural areas. In addition, rather less prestigious hospitals also developed, as an adjunct to the workhouse system which provided accommodation for the poor in return for their labour. Britain therefore has a history of four main types of hospital for the treatment of acute physical illnesses and chronic disease: poor law infirmaries; voluntary hospitals; specialist hospitals; cottage hospitals. (Hospitals for infectious diseases and asylums for psychiatric disorders also developed, often provided by local government, because of the

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negative connotations of these patient groups. These are not considered further in this paper.)

Poor Law Infirmaries

The Poor Law provided relief for the indigent and unemployed, in part through the operation of workhouses. Those seeking support would be expected to work for their limited welfare. Inevitably, a proportion of those unable to support themselves were also chronically or acutely ill and workhouses developed infirmaries to care for these people. These infirmaries are typically given little place in the history of hospital care because they were poor quality facilities and employed few if any doctors.² Since they did not offer the benefits of the voluntary hospitals to doctors, they would also be unlikely to get unpaid help from doctors on any significant scale. Over time, they were overshadowed by the growth of voluntary hospitals, which did not carry the stigma of the workhouse.

Voluntary Hospitals

Voluntary hospitals are particularly important in the history of British hospitals, because of their size and their key role in medical education and, therefore, in future medical practice. They developed in some cases from the long-standing religious foundations of the oldest hospitals but a large number of new ones were created in the 18th and 19th centuries. Their growth was the result of the growth of medical knowledge and of philanthropy. Being one of the governors of a hospital was a way of joining a group of like-minded, rich and philanthropic individuals. For those concerned to gain social prestige from giving to a hospital, the main characteristic needed was visibility. Thus, bricks and mortar play an important part in the history of hospitals, with church, private philanthropists and local government at

times competing to develop the most prestigious local hospital. But for all the prestige associated with hospital development, they were, until relatively recently, places where the risk of infection was high and clinical outcomes were poor. Until the development of anaesthetics in 1846 and antiseptic techniques in 1865, anyone with the financial means to get their health care outside hospital would have avoided hospitals, the ‘gateways to death’.⁶ Thus, even the prestigious voluntary hospitals served the poor while the rich were treated at home. This conditioned their operation and efficiency.

All hospitals in pre-20th century Britain, including voluntary hospitals, had one economic characteristic that reinforced the advantages of a distinct building with its plaque to the donors. Historically, at a time of limited transport and communication, community care for the poor and sick would potentially be highly inefficient. The majority of the time of personnel providing care of any kind would be dissipated in travel in the community. By bringing patients together in one place, where staff and limited facilities were based, the hospital achieved economies of concentration.

“The same contributions which if disposed of separately, and in a private Manner would barely be sufficient for the Relief of Forty or Fifty Persons, when collected together and providently Managed, will answer the Distress of three or four hundred.”

(Jacob, Nottingham General Hospital, (undated) quoted by Porter.⁵)

In addition, two key factors affected the relative efficiency of the voluntary hospitals in the 19th century.

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Doctors gave their time free to major hospitals, hence the name ‘voluntary hospitals’. Doctors’ incomes came from treating the rich at home with the skills they had practised on the poor in hospital, and from fees paid to them by medical students. A voluntary hospital post, with or without a stipend, was also a sign of skill and experience that would help to sell services to private patients. (This is still the case today. A post as a hospital consultant allows a doctor to enter the private practice market part-time. Those without consultant posts are unlikely to attract private patients.) Concentrating the sick poor in hospital gave the doctors more patients to practise upon, within the time committed to the hospital, and gave their students access to a pool of patients at any time. Community care was acceptable only for the rich who could be charged the opportunity cost of the time spent travelling. It was also important to ensure that only those who could not pay were admitted to hospital, since otherwise the incomes of doctors might suffer, if free care was provided to some who could afford it.

The income from teaching medical students also depended on a good supply of accessible patients. Students could less easily be taught in the homes of the rich, who might also resent being used as teaching material or to give the students practice. These factors led Abel-Smith to conclude that while hospitals had been founded in the 18th century for the welfare of the sick, many were founded in the 19th century to serve the needs of doctors and students,² a point of view which strikes many echoes in the current environment for hospital planning.

The key aspect of the voluntary status for the efficiency of the hospital is that as long as there were sufficient patients on whom teaching and practice could take place, their length of stay was immaterial. Doctors bore no costs from excessively long stays apart from the opportunity

cost of not being able to admit more interesting patients. Thus, the length of a patient's stay was a residual, balancing bed numbers with the need for clinical material. Given the right number of beds to provide the medical establishment with material, length of stay was clinically irrelevant. (Indeed, in examining historical material and medical texts, it is difficult to find any mention at all of the patient's stay in hospital or criteria for discharge.) Doctors could simply stop visiting the patients who were no longer of interest. The cost of keeping them in hospital was someone else's problem and might be dealt with in part by getting the fit patients to clean the wards.⁷

Very long stays in hospital became the norm in this system. This was reinforced by the governors of the voluntary hospitals, who had the right to refer patients with a note for admission to the beds they had funded with their donations. Many would expect their patients to stay the full term stipulated in their letter² which might be six to eight weeks – a stay specified not by the patient's doctor but by a layman. Some doctors endorsed the long stays because it allowed them to monitor the progress of disease and treatment over a long period, regardless of the therapeutic benefits of a stay in hospital. Mead, an early clinical pharmacologist at St Thomas's Hospital, went so far as to ask the hospital to remove its restriction on a maximum stay of four months, to allow some of his longer term cures to take effect and also to help the poor.⁷ To a degree, his patients are best seen as captive research subjects – imagine carrying out a follow-up study in an era without telephones or postal services and with low levels of literacy!

In this environment, there were few pressures for efficient use of beds. Admissions were typically restricted to one day a week. Emergencies might bypass this system but since they would have to survive the journey to hospital, this route was only rarely used.⁷ As a result,

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pressures on beds might occur only intermittently. A full hospital could also be said to meet the objectives of the philanthropists, by doing the most for the sick of the community that could be done. It would also give managers a reason to ask the philanthropists for more funds.

From time to time, the doctors themselves might have to press the governors to loosen their control on beds, if insufficient teaching material became available. As hospitals increasingly began to treat acute, rather than chronic, conditions the number of cases treated also became a significant statistic for marketing to potential donors.² But as long as the doctors had enough beds to admit the cases they wanted, discharge was of less concern and length of stay remained a residual item.

Long stays were potentially reinforced by the living conditions of the poor. For poor patients, the standard of housing was so basic that those involved in care did not see it as conducive to recovery, even when the facilities of the hospital itself were relatively limited.⁸ The home of the labouring man was seen as unsanitary and unsuitable for care and recuperation and the hospital was the preferred environment. But this potentially means that, although of a low overall standard, the hospital might actually offer poor patients a higher standard of accommodation than their own homes. (Those in the workhouse infirmaries probably lacked homes at all.) While a stay in hospital would mean loss of income, at least for those in employment, the quality of accommodation and food might be sufficient to make hospital more than bearable, compared to the alternative. Hence, the patient might be in no particular hurry to be discharged from a voluntary hospital if it offered a good standard of care. (I have personal experience of an elderly person in hospital who sought to extend their

stay by deliberate re-infection of wounds, presumably because of the economic and social benefits offered by a stay in hospital.)

In summary, voluntary hospitals created a set of conditions within which the decision to discharge was not a key clinical decision. Bed availability on a sufficient scale meant that doctors had enough material to practise and teach upon. As long as there was a supply of philanthropists keen to build their own hospitals, reducing length of stay to more efficient levels was not necessary. Since voluntary hospitals were the main arena for teaching medical students in the 19th century, their style of operation was also likely to become the norm as the students moved into practice themselves.

The modern hospital is consequently a development of a tradition in which there were no customers, only supplicant patients, and additional income was generated by appeals to trustees, not by market forces. Hospitals typically did not pay their medical staff and so there is a similarly strong tradition of independence of behaviour among medical staff that a commercial organisation would find unacceptable. While the focus on consumers, resource management, contracting for care and management of clinicians has changed the ethos of British hospitals in the last twenty years towards a more business-like style of management, particularly since the 1990 introduction of the purchaser-provider separation of DHAs and Trusts, strong residuals of the old culture remain.

Two other types of hospital developed in the 19th century, the specialist hospital and the cottage hospital. These are important because of their place in current and future hospital planning as alternative models of hospital care.

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Specialist Hospitals

Hospitals today look very different from those of even a hundred years ago. They are filled with specialised equipment and perform a bewildering array of different procedures. This is the result of the explosive growth of medical knowledge in the late nineteenth and twentieth centuries. Medicine is now an enormous subject with textbooks and journals devoted to specialisms which were once only a by-line in another, more general field. Technology has created new materials and implants to revolutionise surgery and new diagnostic techniques to investigate the patients' problems. Medicine has benefited from an equally wide range of pharmaceutical products though, compared to surgery and diagnostic equipment, their use is not generally or necessarily linked to the hospital itself.

The result of the growth of each area of medicine has been the rise of the specialist, due to the breadth of knowledge required in each clinical area and the difficulty of being up-to-date and credible as a practitioner in more than one area. However, the development of specialists is not purely a technical and professional matter. Specialists have also developed for economic reasons. In the nineteenth century, some of these reasons were relatively naked. To make a good income, doctors needed a position with status that attracted paying private patients, such as a senior post in one of the voluntary hospitals. While their private patients would not be treated in the hospital, being the top man at such an institution made the doctor credible, as well as putting him in touch with the rich philanthropists who funded his hospital. But there were only so many major voluntary hospitals and so the young and competitive doctors might face a considerable wait before getting the right position. This situation was exacerbated by the

growth in medical education, which created many more qualified doctors but did not of itself expand the voluntary hospitals to match the aspirations of the emerging doctors. Attempts to buy a position might be a costly mistake if there was more than one candidate putting up money for the votes of the governors (see Granshaw⁹ for a detailed discussion of the rise of the specialist).

As an alternative route to the top, those who sought to rise rapidly in medicine in the 19th century might establish themselves, with few specialist credentials, in a new, specialist hospital, using its narrow caseload as material for a new, specialist textbook while they learnt on the job! By starting a new hospital, rather than waiting for ‘dead men’s shoes’ in positions of influence in the established voluntary hospitals, the new specialists could also raise their profile with the rich and philanthropic by offering them a chance to buy into the governorship of a new hospital without themselves waiting to be asked by boards of governors who might be of a different political or social persuasion. (Abel Smith² and Granshaw⁹ provide case studies of specific hospitals developed in this way.)

Doctors trying to steal a march on the rest of the profession by becoming self-made specialists were deeply resented, not least because they challenged the prevailing professional power structure and economic order. Granshaw⁹ provides an example of the ridicule heaped on new specialists by the British Medical Journal in 1860, using the joke specialism of ‘inverted eyelashes’:

“...in an incredibly short time, a goodly sprinkling of the aristocracy have been found to pledge themselves to serve suffering humanity and Mr —, in the matter of inverted eyelashes.”

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Of course, the motives of the specialist are not in doubt:

“...Mr —, who is determined that there shall be a building devoted to nothing but misplaced eyelashes and perhaps ... to himself.” (*BMJ*¹⁰)

Specialisation offered several economic advantages. One was rapid access to a group of philanthropic supporters who would provide an *entrée* into society and private patients. (Even today, individual doctors are known as ‘The Queen’s Gynaecologist’ or ‘The Queen’s Ophthalmologist’ and only recently I have had at least one doctor in London described to me as someone whose main career focus was precisely this label!) The other was the creation of a market niche that could give the new specialist a large share of a part of the market, with less competition until further specialists came forward. Specialisation offers this economic advantage if the consumer can be persuaded that the quality of care will be higher, due to the specialist’s greater understanding of the particular problem. In a complex service such as medicine, where technical quality is hard for consumers to judge, this may be particularly important as a way of differentiating providers, compared to other methods such as trial and error, which are used by consumers buying frequently used commodities such as food and clothes. There is a downside to the use of a specialist, that continuity of care is reduced by the need to see a different doctor for each different organ problem. This problem was overcome in Britain by the development of general practice to provide continuity of care and specialists to deal with complex organic disease. In the pre-NHS system of health care, the creation of generalist and specialist roles also offered scope for charging the patient more, where they can afford it, for two services rather than one – diagnosis of the need for a specialist and the specialist diagnosis itself – a form of supplier-induced demand. (Supplier-induced

demand can occur in the market for many technical goods and services. Because the supplier holds much more technical information than the consumer, the supplier can recommend more expensive goods and more extensive services which best meet the customer's requirements. In medicine, the perceived risk of ignoring medical advice may make consumers particularly likely to accept the advice of doctors as suppliers. This makes it possible for doctors to expand the demand for their services, potentially beyond the most appropriate clinical threshold, if they have the time to treat additional patients.)

The technical and economic causes of specialisation lead in a similar direction, the creation of smaller, specialist groups of providers who can then serve a narrower market without competition from generalists. This may raise standards but also increases the job security and income of the specialists. To protect both standards and incomes, specialists must also introduce credentials or other barriers to market entry, to ensure that their market is not rapidly eroded by more specialists still. Thus, over time, the specialists brought in their own examinations and, some, their own Royal Colleges. For example, Paediatricians in the UK have recently established their own Royal College in preference to membership of the Royal College of Physicians and plastic surgeons have tight restrictions on training posts so that entry to future positions, in a specialty with lucrative opportunities for private practice, is under tight control.

Cottage Hospitals

The cottage hospital movement developed in Britain around the 1860s. It appears to have had several causes. One was the growing ability of doctors to treat patients effectively, as a result of anaesthetics and antiseptic techniques. This left more doctors in rural areas concerned

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that their patients, particularly those on lower incomes, were being denied the care opportunities increasingly available. Patients in rural areas faced a long, and potentially unacceptable, journey to the major voluntary hospitals. The alternative was a shorter journey to the poor law infirmary at the workhouse. But this was not appropriate for those requiring a technical intervention rather than chronic care. The workhouse was unlikely to provide the facilities for (then) modern medicine or an environment in which progressive doctors would want to work. It was also associated with the stigma of poverty and so was very much a last resort for admission.¹¹

Consequently, rural doctors, equipped with increasing medical knowledge and the confidence in hospital as a place where effective medicine could be practised, needed new facilities close to themselves and their patients. The scale of such facilities would need to be in proportion to the local population and the number of donors. But the cottage hospitals in some cases also adopted a different style of funding deliberately. The founder of the cottage hospital movement, Edward Napper, introduced charges for patients, in part because of the lack of reliable philanthropy but also because of the perception that self-help was an important complement to charity. A free service also threatened the patient with the stigma of being a pauper.

The British Medical Journal was supportive of cottage hospitals at first, potentially because this development did not threaten established urban interests significantly but assisted rural doctors to expand their role and keep their hand in. The introduction of charges was also popular with the profession since it brought more money into hospital care. However, the BMJ grew increasingly concerned that by providing their time without charge, doctors working in cottage hospitals might yet be undermining the position of the profession.¹¹

The cottage hospital enjoyed one particular advantage, which the surviving members of this genre continue to enjoy. Their scale and location is such that they can be readily visible in a small community and user-friendly – the much-loved local hospital. Donations for specific items can be earmarked and the items clearly shown and labelled. In contrast, the scale of a major hospital makes this local and folksy relationship difficult. The scale of the hospital and the cost of major equipment also make it potentially harder to show a small group of donors what their fund-raising has produced. The result of the local association of cottage hospital and community is that some cottage hospitals are relatively well equipped, given the size of the population they serve, and at times better equipped in some departments than neighbouring, larger hospitals (see for example the hydrotherapy pool at Blandford Hospital). Large, relatively impersonal hospitals have lost this local sense of identification that cottage hospitals sustain.

In 1948, when the NHS began, almost twenty per cent of the hospitals nationalised in the UK were cottage hospitals.¹¹ But at the same time, the predominant model of hospital care was enshrined in the large local hospital, the focus of the hospital management committees that were to manage services at a local level. Over the last thirty years, this model has come to dominate both specialist and cottage hospitals. The latter survive in a variety of forms, as community hospitals. But many have been closed and others have seen a substantial change in their roles, with less and less acute medicine, and even less surgery, being provided within them. This is the result of the expanding role of the District General Hospital and its close links with the training of junior medical staff.

THE COMING OF THE DISTRICT GENERAL HOSPITAL

Since 1962, hospital planning in the UK has been based around, and largely dominated by, the concept of the District General Hospital.¹² This was planned to provide 600-800 beds for a population of around 100-150,000 people. (By comparison, more recent planning has looked at similar capacity for 300-500,000 people, e.g. S E Thames RHA¹³.) Prevailing bed norms were around 3.3 acute beds per 1,000 population, 0.45 maternity beds per 1,000 and about 1.4 geriatric beds per 1,000 (equivalent to 10 beds per 1,000 people over 65). With projections of future births, the overall norm was around 5 beds per 1,000 population. Two features of this model merit further scrutiny. The first is the claimed importance of a comprehensive, multi-specialty hospital. The second is the lack of rigorous evidence to support the projected hospital capacity for the country as a whole.

The Hospital Plan asserted that there had been a trend towards greater inter-dependence of the various branches of medicine. The advantages of a single location of a centralised service were claimed to outweigh the disadvantages of longer journeys for patients to the central site. Generation of better outcomes for a given cost as a result of providing a broader range of services in a single location – commonly termed ‘Economies of Scope’ – is an assumed result of concentrating a number of specialties in one place. But no evidence was quoted in the Hospital Plan and it is difficult to find it in the medical literature.

It is also difficult to find a clear justification for the concentration of some specialties at a DGH while others are provided at regional centres (e.g. cancer, neurosurgery, renal replacement). The simplest explanation is that doctors were seen as working within wider teams of professionals which had a (perceived) minimum viable size, for reasons of quality of care or perhaps cost. Even in 1962, a single handed consultant in a DGH in general surgery, for example, would

probably not have been able to provide a very satisfactory service in all aspects of general surgery. A larger team of doctors with supporting nursing and other staff was required for an effective service. If a district, defined as a given population, would produce sufficient caseload, at the thresholds for care operating in 1962, to keep at least one district-based team busy in a given specialty, then that specialty could be located in the DGH. If it would not, due to the relative rarity of e.g. cancer, major brain injury and kidney failure, then the specialty would be regionalised. Of course, these services for rare patients could have been split up and provided piecemeal but presumably that was seen as producing worse outcomes because each local specialist would see fewer cases and might develop less expertise than teams of the ideal size. More simply, a single neurosurgeon at each DGH could not be effectively on-call 24 hours a day so the disseminated model was not likely to prove effective. Overall, this leaves us with a notion of the DGH as a hospital containing teams of doctors who are kept busy by a district's caseload, which begs questions about the size of a district population and the minimum size of each clinical team.

In the recent past, the range of services to be located at a DGH has been defined more specifically as the range of specialties needed to provide a reasonably comprehensive set of services to treat and support the majority of patients presenting in the accident and emergency department. The Audit Commission¹⁴ notes guidance from the Royal College of Surgeons, the British Orthopaedic Association and the Clinical Standards Advisory Group, on the range of specialties required, or desirable, at a hospital with an accident and emergency department.

While the lists of required specialties vary for each set of recommendations, in part because of the different focus of one group,

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the orthopods, on skeletal trauma, the lists of local specialties seen as essential include:

- ◆ Anaesthetics
- ◆ Medicine
- ◆ General surgery
- ◆ Orthopaedic surgery
- ◆ Cardiology
- ◆ Geriatrics
- ◆ Gynaecology
- ◆ Psychiatry
- ◆ ITU
- ◆ Paediatrics
- ◆ Urology

This list provides us with a convenient blue-print for a DGH, as long as it has an A&E department. The acceptance of emergencies in turn becomes the defining characteristic of a DGH and hospitals without an A&E department are likely to have a much narrower range of specialties within them. Of course, if the range of specialties needed over time changes, e.g. urology was not a separate specialty when the Hospital Plan was drawn up in 1962, then the definition and location of the DGH may also need to change. (This issue is likely to play a significant part in the development of the DGH over the next ten years and is considered further in the discussion in subsequent sections.)

In spite of the predominance of the local DGH model, with a broad range of specialties on site, it should also be noted that private hospitals continue to offer care in a wide range of specialties but with much less comprehensive services on a site, with few beds and limited on-site medical cover for emergencies such as the sudden deterioration

of their patients. This model remains feasible because of the willingness of consultants to provide out-of-hours support to their private patients but the multi-specialty links within this model are likely to be limited. It is difficult to see how small hospitals in the private sector can be sustained if they really have significant clinical drawbacks, at least when the consultants are off-site. Yet they continue. The implication is that private hospitals, in spite of their lack of a critical mass in many specialties and their weak inter-specialty links, provide care which consultants regard as of an acceptable standard. Whatever the viability of this alternative style hospital in the private sector, it has not found favour in the NHS.

The DGH signalled the beginning of the end for specialist hospitals and for the surviving cottage hospitals. Specialisation was seen by those in general hospitals as cutting off individual areas of medicine from the benefits of the wider scientific advances of main-stream medicine (and also, potentially, of denying some markets to the generalists). Special hospitals were seen as unable to flourish if they did not share with other specialties in these advances (Select Committee on Metropolitan Hospitals 1890-3, quoted by Abel-Smith²) and the same argument was being put forward in the run-up to the Hospital Plan. For example, in 1961 the Lancet was calling for an end to small, specialised hospitals in an era where teamwork and reliance on the laboratory had taken the place of the single-handed clinician.⁹

With the advent of the DGH and in subsequent hospital planning, the critics of isolated specialist practice largely had their way. Even some of the prestigious London post-graduate hospitals, e.g. in urology, gastroenterology, have moved onto teaching and general hospital sites. (Some single site hospitals have survived, so far. In John Major's constituency, a single site former TB hospital, Papworth, continues as

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a major centre for UK heart transplantation and is to be redeveloped on site, rather than relocated at the regional teaching hospital. This may of course reflect political rather than health care priorities!)

The argument put forward to support integration of specialist hospitals with DGHs has not really changed since the 1960s and reflects the much earlier concern with separate development of specialist hospitals. Such hospitals are seen as potentially missing opportunities for multi-specialty collaboration and treatment. They lack the facilities and expertise to treat patients with multiple diseases and cannot support general emergency admissions. Their existence may also deplete the range of specialties at local DGHs, again weakening the comprehensive response to emergencies that such hospitals seek to provide.¹³

The perceived link between the range of on-site facilities and the quality of emergency care has also been used as one factor challenging the future role of the cottage hospital in the treatment of any kind of urgent clinical problem. The arrival of the DGH in 1962 signalled the run-down of the cottage hospitals, though the Hospital Plan contains some support for their retention in isolated areas and for outpatient services. The issue may be less contentious in that a small hospital without on-site medical staff can only provide a very limited service at night in cases of emergency, and duplication of complex facilities might not be cost-effective. In addition, as hospital stays are reduced to only the acute period of illness and recovery, potentially only patients at risk of needing a serious intervention will stay in hospital. On the other hand, if patients can travel for such an urgent service as neurosurgery, is other travel so harmful, in the event that the service needed cannot be made available on a cottage hospital site? In practice, the multi-specialty emergency service argument is difficult to sustain

from the published literature, with little clear evidence that such integration makes a difference to outcomes.¹⁵ For example, other methods of communication, apart from face to face contact, may overcome the problems of separate sites, by allowing doctors to develop treatment plans over the telephone between specialists in different disciplines.^{16,17}

To a degree the argument here is not about volume and service range and the quality of care for the many but merely the potential harm to a rare patient from being denied rapid access to a specialist opinion in some other branch of medicine and surgery. Much of the argument rests on the claims of potential benefit rather than evidence of actual benefit. However small the number of patients, the argument is that benefit for a few may occur. The counter argument is that a longer ambulance journey will also be harmful and that some patients will suffer due to concentration of services for emergencies in fewer DGHs. However, after reviewing the evidence, Harrison and Prentice¹⁷ conclude that the risk of a longer journey or transfer to hospital is not clearly demonstrated. They note a variety of confounding factors, including the possibility that the survival of patients with longer journeys to hospital may be affected by pre-hospital treatment. The planned introduction of paramedics able to offer more care than conventional ambulance personnel on the journey to a major accident department, a goal for the NHS by 1997, may also reduce the adverse consequences of centralisation of A&E. But this too raises concerns. For example, what if such staff were available in rural hospitals or could treat their patients inside such hospitals until more skilled medical staff arrived? Would this reduce or remove any quality drawbacks of small hospitals? The short answer is that we do not know.

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If it is difficult to demonstrate better outcomes from concentrated care of emergencies, it may be more difficult still to justify centralisation of many specialties providing elective care in the DGH. Just like the small private hospitals, small NHS hospitals may offer benefits in user-friendly care which patients value.¹⁷ In an emergency at night, the level of medical cover in a small hospital may be low but there may be other methods of responding, particularly if the casemix of small hospitals is carefully selected. Some hospitals now have nurse practitioners providing elements of medical care at night¹⁸ and this model could be extended to avoid the difficulties of isolated junior medical staff at small hospitals, though the impact on outcomes is unclear. Telemedicine including video links to major accident centres may also reduce the potential drawbacks of isolated small A&E departments with limited on-site skills and facilities.

It is also important not to overlook the wider financial issues affecting small hospitals. During the debate in the 1990s about safety and effectiveness, the size of specialist and cottage hospitals made them convenient targets for DHAs seeking financial savings, at a time when financial constraints have forced health authorities to look again at their capacity. Compared to the limited savings from shutting one ward of a DGH, shutting a whole site, albeit a small one, offers greater potential savings and the chance to sell some land to fund capital developments. Thus, even without evidence, the safety and quality arguments were appealing to DHAs. But with the increasing potential of telemedicine and the growing development of relatively low risk day surgery, it could be too early to write off the cottage or community hospital.

HOW MANY CASES, IN HOW MANY BEDS, ON HOW MANY SITES?

Three key issues for the future of hospitals in the NHS, given concern with the total cost of the service, are the amount of hospital care that will be provided, particularly for inpatients, the hospital capacity needed and the number of hospitals that will provide it. Surprisingly, it is only recently that an evidence-based approach has begun to be taken to these issues and the evidence itself is limited in some areas.

How Many Cases?

It is common in discussions of hospital planning to find clinical professionals arguing for additional facilities because of a perceived level of population need for hospital care. However, economists typically challenge this needs-based approach to hospital planning. Economists are uncomfortable with the concept of need since it carries with it overtones of moral imperatives. (See Williams¹⁹ for a classic analysis of need from an economic standpoint.) ‘Mrs Smith needs food’ or ‘Mr Smith needs hospital treatment’ sounds like something we ought to act upon, with one specific response to each need. The unhappiness of economists arises both from the moral imperative and the single defined response. Does Mrs Smith really need food or does she need a job or some home economics advice and support? Does Mr Smith need hospital treatment or some other form of therapy? Need leads naturally to a decision to meet it. Indeed, those who identify needs typically describe not a problem but their preferred solution. The economist prefers the concepts of demand and supply, the demand for additional goods and services and the cost of supplying them. Economists also stress the importance of looking at more than one way of meeting demand, in order to avoid ignoring potentially cost-effective solutions and to encourage a choice between alternatives that reflect individual preferences. For example, the poor need food but they may be more satisfied with the money to buy their own food

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than with some highly nutritious parcel of food delivered each week by a caring but inflexible government.

Hospital capacity is a supply response to a particular set of demands. Demands for hospital care in the UK currently come from clinicians, on behalf of their patients. While these reflect underlying health care problems, the supply of hospital capacity is also determined by past government spending decisions. A supply of hospital beds that is less than sufficient to meet the demand for hospitalisation generated by doctors is balanced by at least two kinds of rationing. Waiting lists control the speed at which patients with clinical problems receive treatment. But in addition, clinicians may vary their threshold for referral and discharge according to their perceptions of the waiting times, the clinical urgency of treatment and the potential outcomes from treatment. This balancing of supply and demand largely frustrates attempts to plan hospital facilities based on the 'right' level to meet the requirement for hospital care among the population. There is probably no 'right' threshold for hospital admission but only a threshold which prevents admissions of cases that can benefit less from hospital care than others that are presenting for admission. A hospital admission is also a way of managing the risk of short-term deterioration of a patient and almost any threshold of risk might be used, no matter how low, if beds are available. As a result, the effective level of hospital capacity cannot be fixed at some technical level linked to population health but depends on health service funding and related clinical behaviour. More funding and shorter waiting times, for example, might increase referrals, filling up the additional capacity created.

Hospital bed planning has, historically, worked backwards. An average level of current treatment (e.g. hospital admissions per head by age

and sex) is taken as the primary index of ‘need for hospitalisation’. This is then assessed in relation to trends in population and medical technology, e.g. efficient length of hospital stay. The resulting future bed capacity represents the number of beds needed to treat the future population at about the current treatment rates for each age and sex group, and at an efficient length of patient stay.

Unfortunately, the real world works the other way. The bed capacity is relatively easy to plan, since it is literally set in concrete at discrete moments in time and cannot easily be increased physically at short notice, beyond minor changes such as short term use of other accommodation. Changes in technology and greater efficiency in clinical practice then reduce lengths of stay and more patients are treated in the available beds. As a result, the rate of utilisation of beds per thousand population does not fall in line with increased efficiency. A part of the gain from technology and efficiency is used to lower treatment thresholds and waiting times. This extends the amount of care provided, often without any explicit planning. Empty beds just get filled with another case from the waiting list or a marginal admission from the emergency referrals. That is, if the NHS becomes more efficient, the ‘need’ that will get you treated may go down, rather than the available supply of beds. This may improve health but it may not, given the marginal nature of some of the admissions that may then occur.

It is common, particularly after the purchaser-provider separation of the NHS internal market, to find bed planning described as ‘old-speak’ with the emphasis now on the number of cases. Cases are indeed the appropriate focus for purchasers but if they specify the cost of treatment and mix of day cases and inpatients, they will effectively determine the level of local hospital capacity to a considerable degree.

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The number of hospital beds is also important because it is the basis on which staff are employed and services organised. It is inevitably one of the first numbers that a Trust manager is likely to calculate from a projected contract caseload and budget. For X orthopaedic cases per year, we will need Y orthopaedic beds, and Z nursing staff. But planning the number of beds based on current and projected caseloads remains a partial analysis if it fails to take account of the scope for falling thresholds for treatment. Thus, while considering the changes in projected bed capacity for the UK, we should bear in mind that one of the strongest factors driving the level of bed capacity is not ill health but the size of the NHS budget. Allowing faster than expected changes in technology to extend the number of patients treated beyond the norms used to plan means missing an opportunity to reduce NHS spending by closing beds faster. Alternatively, if the recent increases in emergency admissions, considered in more detail in a later section, reflect a genuine increase in sickness, fixing the number of beds will mean displacing a growing number of elective cases as emergency admissions grow and the threshold for elective admission is forced up by bed shortages. But given the difficulty of changing individual clinical decisions and of changing hospital capacity piecemeal, on a daily basis, bed planning is inevitable.

From Cases to Facilities – How Many Beds on How Many Sites?

Typically, projections of the number of beds required to provide the target level of hospital care imply substantial reductions in the number of beds. To a considerable degree, this reflects the fact that, in the past, the role of the hospital, and of an extended hospital stay in particular, was misunderstood. Hospital capacity is obviously driven by the number of cases and the length of their stay in hospital. The past operation of hospitals has been shown to have produced an

environment in which length of stay was a residual and not a key element in decision-making. Long stays, which, by modern standards seem unjustified, were the rule rather than the exception, when hospital medicine was developing rapidly in the 19th century. As a result of the factors shaping medical practice and medical education, long stays then became custom and practice. The Office of Health Economics²⁰ reports average lengths of stay in acute beds of 26 days for medical patients and 14 days for surgical patients in 1959, compared to seven and five days respectively by 1993. It is also possible to find specific examples of long stays for a given medical condition, e.g. in the 1940s, doctors were taught that a heart attack required six weeks in bed and three months off work.²¹

Medical patients and post-operative patients recovering from tissue damage from their surgery may gain little from a longer stay in hospital and early mobilisation is now recommended for e.g. acute myocardial infarction²² and hip replacement.²³ Immobility also brings the risks of pressure sores and blood clots and a longer stay increases the risk of hospital acquired infections.²⁴ There are many examples of conditions where a shorter stay has been found to be appropriate. Indeed, in some classic trials, Mather *et al*²⁵ and Rowley, Hampton and Mitchell²⁶ examined the use of home care for patients after heart attack and showed that, for some patient groups, admission to hospital itself did not appear to improve outcomes!

The explanation for the lack of clear outcomes from a longer stay is that, in practice, recuperation is determined predominantly by the patient's body and their medication, together with their nursing and therapy. A stay in hospital may be convenient and economic on staff time but in many cases it is not essential for recuperation. While it may appear strange to suggest that the hospital has little part in the curative

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process, the fact that the rich got their health care outside hospitals until the relatively recent past¹¹ shows that it was possible to cope without the hospital itself in the care process. Of course, hospitals now contain highly specialised units and facilities which have a key role in the diagnostic, surgical and post-operative support elements of care. But the majority of these complex, hospital-based technical services are focused on diagnosis and treatment in the first few days of active hospital care. Simply lying in a ward does not require specialised facilities and so prolonged stays in hospital have increasingly been challenged as inefficient. Yet, perhaps surprisingly, they were not challenged when the age of rational planning arrived with the 1962 Hospital Plan.

The Changing Planning Parameters

In the early 1960s, the hospital planning norms associated with relatively long lengths of stay continued to be endorsed. For example, Forsyth and Logan²⁷ reported the demand for hospital care in Barrow in Furness as one of a group of studies which were relied upon by the 1962 Hospital Plan. They commended Barrow for its short lengths of inpatient stay. But they reported uncritically what now appear to be relatively long hospital stays (Table 1), suggesting that even in the late 1960s, an inpatient stay was not being managed in the light of any evidence but was a residual, still based on custom and practice.

While it is clear that developments in surgical technique have changed some of the tissue damage done to patients in surgery, the lengths of stay found in Barrow also suggest that patients sat around recuperating in hospital when they could have recuperated at home, some at least in greater comfort. Patients kept close at hand for many days after active treatment were clearly highly accessible for staff, to provide either

TABLE 1: Length of stay by diagnosis/procedure, Barrow in Furness, 1958

Condition/Procedure	Length of Stay
Cholecystectomy	20+ days
Haemorrhoids removal	10 days
Fracture of the arm	4 days
Cataract surgery	10 days
Coronary thrombosis	30 days
Hypertension	27 days

Source: Forsyth and Logan²⁷

urgent or routine treatment, but were not likely to gain any health improvement from simply hanging around the hospital. The logical alternative is early discharge home and there has been increasing pressure to transfer the recuperative period of hospital stays to the community, reducing the total bed capacity needed for any specified caseload.

However, the NHS, before the 1990 Reforms at least, failed to provide clear incentives to shorter stays. A full hospital was an indictment of low levels of public expenditure, not of medical practice and hospital management and a waiting list for treatment could also be used to stimulate private practice. Health authorities had few if any incentives to increase the efficiency of their hospitals – see West²⁸ – and in practice the 1990 Reforms have themselves only achieved a part of their intended creation of competition, as a lever for greater efficiency, within the NHS.²⁹ Perhaps fortuitously, the NHS has avoided introducing any significant reimbursement to hospitals for the days spent in hospital by patients, through its use of capitation and

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activity-based funding. Payment for the actual days of care in e.g. Germany has led to a level of bed capacity that is about twice that of the UK.²⁰ But even without such payments in the NHS, there was still no incentive to discharge patients before the introduction of tighter contracts within the internal market, after 1990. Even in this environment, discharge remains a low priority activity. As a result, we can still observe the use of beds in hospital as a residual place for patients to stay between interventions, with little technical justification for or economic pressure on the length of a patient's stay.³⁰ Equally, while it is increasingly popular to recommend more care in the community, the economics of this transfer have not been researched with sufficient rigour to allow us to draw firm conclusions about its cost-effectiveness when active care, rather than redundant hospital stays, are involved.

Recent changes in medicine, NHS policy and funding have led to a falling number of hospital beds in the recent past. The norms of the 1962 Hospital Plan, e.g. 3.3 acute beds (excluding geriatrics, maternity, mental illness and mental handicap) per 1,000 population, can be contrasted with actual provision (Table 2).

TABLE 2: Acute hospital beds per 1,000 population

Year	Beds per 1,000 population
1960	3.6
1975	3.0
1985	2.9
1995	2.3 (estimated)

Source: Office of Health Economics²⁰

This reduction, by around one third over 35 years was associated with a larger reduction in length of patients' stay of about 50 per cent in medicine and surgery.²⁰ Overall, the NHS acute and general caseload has risen 43 per cent since 1974, for example, due largely to a reduction in length of stay of 60 per cent,³¹ giving increased activity while the number of beds fell. Together with the changes in the financial regime around new facilities, the increase in activity from fewer beds has led to a situation where, even if the NHS had more funds, it is not clear that NHS Trusts would plan significant expansion of beds. The prevailing culture is now one in which beds are not seen as the key resource. Capital charges have also made Trusts conscious of the opportunity cost of additional bricks and mortar. As a result, additional funding might be directed towards day surgery units, dedicated children's units or similar integrated care facilities rather than extra wards.

Changing Policy and Changing Practice – The Impact on Hospitals

Broader health policy and changing clinical practice have both contributed to the changes in bed capacity that have occurred in the recent past, and both have tended to support the trend to lower numbers of acute beds. However, in medicine, proposals to shift care to the community have been countered, to some extent, by growth in the demands for emergency medical admission to hospital.

Policy on Elderly Care

The policy impact is clearest in relation to care of the elderly. Increasingly, the NHS has moved away from continuing care of the elderly, which has become more of an individual responsibility (see Levitt, Wall and Appleby³² for a review of NHS policy on elderly care). While the bed capacity figures discussed in earlier sections relate to

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acute beds, we should not overlook the fact that large numbers of elderly people are treated in acute beds (i.e. beds not dedicated to long-stay or elderly cases *per se*), and elderly people occupy overall about half the beds in the NHS at any time. But with the change in policy, those requiring continuing care but not significant medical interventions are likely to be discharged from hospital relatively early, to a nursing home. Policy has also tended to reinforce the advantages of care in the community so that primary and community care are seen as the areas for development and for a wider role in health provision.

Changing Clinical Practice

Clinical practice has changed markedly in the recent past and this has had implications for both the number of hospital beds seen as appropriate for the NHS and the number of sites on which they are based. However, the individual clinical areas differ in their impact on hospital planning and, given the importance of clinical practice for hospital planning, they are considered further.

SURGERY

Technology over the past twenty years, particularly in surgery, has shortened hospital stay, largely by reducing the collateral damage to patients from their operation. Laparoscopic and minor access surgery and less invasive investigations have typically reduced the physical damage from which the patient must recover and made it possible for patients to return home much earlier. This provides some scope for reducing hospital capacity but the lower level of invasion of surgery may also change the threshold for surgery.³³ The costs of increased surgery could in turn offset some of the initial reductions in capacity made possible by less invasive laparoscopic surgery. Changes in anaesthetics have also influenced the growth of day surgery.³⁴ It is too early to know if the prediction of Cushieri³⁵ is accurate, that within ten years 70 per cent of surgical patients will be treated laparoscopically and, by implication, discharged after a short stay. The NHS appears proud that about 50 per cent of elective surgery patients are discharged on the day of treatment.³⁶ That still leaves half of elective cases and potentially some additional emergency patients who might become day cases in the future, as a result of the greater use of less invasive methods.

However, before beginning to project further large reductions in hospital beds from this change, we should not overlook the more stringent climate in the NHS now, compared to the past. Bed use is likely to be much more closely scrutinised by managers and purchasers than in the past and so the current length of stay of patients who could become suitable for day surgery might be quite short already. (Summary statistics for 1994-5 in Department of Health³⁷ indicate, not surprisingly, that less than about 20 per cent of patients having an eyelid procedure had an inpatient stay and their average stay was only 1.8 days. Equally, the same source shows considerable variation in the

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proportion of patients undergoing day surgery in different hospitals for specific procedures. This suggests that in some parts of the country there may be much greater scope for further hospital bed reductions without any reduction in activity.)

In addition, if growth in day surgery in the future occurs as a result of lowering of treatment thresholds and not transfer to day surgery of cases that meet the current, higher threshold, then no change in bed capacity will occur even with growing day surgery. More generally, Appleby³¹ notes that the trend in length of stay has been almost linear over the last twenty years and length of stay projected from this trend would soon reach zero. This alone suggests that the majority of gains from falling length of stay may have been achieved.

Changes in surgery in the recent past and in the future may also have implications for the distribution of hospital sites. Specialisation in surgery has increased over the last twenty years. For example, the work of the general surgeon of the past, who might also have undertaken some orthopaedic surgery, has been divided among general surgeons, urologists and vascular surgeons. Breast surgery has also been concentrated in fewer hands in some centres. Specialisation is not likely to fall and may rise further, reinforcing pressures for centralised inpatient units able to keep more teams of specialists busy from a larger catchment population. Specialist equipment, used during surgery itself (e.g. lasers) or post-operatively (e.g. ITU), together with specialist staffing, can probably only be provided effectively and economically in hospital centres. Therefore, most surgery is safe behind the hospital walls, at least when it involves significant surgery and an inpatient stay.

However, if hospitals do become fewer in number, there may be

growing pressure from purchasers to improve access to some services, e.g. for low risk day surgery cases. These could be treated in community hospitals or large health centres, closer to patients' homes and also operating at low costs with little if any overnight activity. It may or may not be cost-effective to separate day surgery from the major hospitals but any diversity of the market could lead to new entrants offering only day surgery. However, professional resistance to independent NHS surgical units in the UK appears strong, even though they exist in other countries and to some extent in the UK private sector, and guidance on day surgery tends to support close proximity to facilities and staff able to deal with complications. There are also advantages in having all the junior surgical staff and activities concentrated in one place for training and so that junior staff can look after inpatients out-of-hours.

Professional and educational concerns may therefore frustrate any proliferation of day surgery centres away from major hospital sites in the UK. Certainly there was little move to develop them after the NHS internal market was introduced and little purchaser enthusiasm for them. This may be because they require investment in additional sites with their own overheads when, for a similar marginal construction cost, the same facilities could be located on a major hospital campus. Since patients attend for day surgery relatively rarely, the main advantage of local access is to help to reduce the journey home, when discomfort may be increasing as the initial anaesthesia wears off. However, given limited budgets and pressure to increase day surgery and reduce the cost of hospital capacity, it seems unlikely that UK health care providers will invest heavily in additional day case centres outside major hospitals as a speculative move to win purchaser contracts.

SURGERY

Predicting the longer term future of surgery may be hazardous. Surgical technology is continuing to change and the trend of the last ten years seems likely to continue, as suggested by Cushieri.³⁵ Increasingly, laparoscopic techniques will be used, to reduce the damage to the surrounding tissue and make the average patient less reliant on a longer hospital stay. But, as Harrison and Prentice¹⁷ note, this may strengthen rather than weaken the integrated DGH. Laparoscopic surgery should not be seen as the same as day surgery or minor surgery and, as it advances, it is likely to move into ever more complex areas. In the event of something going wrong, patients undergoing the less invasive approach would still need rapid access to the more invasive facilities of the DGH.

In the longer term, we may see some surgeons replaced, or at least their roles changed. Research is under way on the introduction of robot surgeons for prostate surgery. These might reduce costs or improve quality but it seems unlikely that they will gain large scale public acceptance in the short term. It is also likely that skilled supervision will be needed in case of equipment failure. An alternative method of reducing the centralisation of surgery would be to introduce surgical technicians who could perform a limited range of procedures. This may occur if nurses or operating department technicians take over some minor surgery from surgeons and there are other examples within medicine, such as interventional dermatologists who carry out surgery on minor skin lesions and podiatrists who carry out foot surgery. Given suitable training and performance monitoring, this division of labour may be quite feasible in a range of medical and surgical procedures, e.g. endoscopy, and is likely to occur as other professions seek additional specialisation themselves. However, such moves will only be cost-reducing if lower cost staff substitute

effectively for higher cost staff, services are not duplicated and the resources previously used for the procedures are released. There is also likely to be pressure for senior staff supervision and centralisation of treatment, even when provided by less highly trained staff.

ACCIDENT AND EMERGENCY

Accident and emergency services are a further area of hospital care where, whatever the detailed evidence on outcomes, pressure to centralise services into fewer facilities in the NHS has increased in recent years.¹⁴ Much of the concern is with the inability of current services to meet standards for medical staffing, with only one quarter of units having the number of consultants recommended by their professional association.

One model would have A&E concentrated in major hospitals in future, perhaps served exclusively by ambulance, with some minor illness and injury facilities continuing to operate more broadly across the community. The major centres would provide support for a wide range of trauma and emergency surgery and could take control of much emergency medicine. While on the face of it, any substantial rationalisation will reduce public access, the impact may be less than expected. For example, the Audit Commission notes that over half of all accident and emergency departments are within ten miles of another accident and emergency department and one third, mainly in urban areas, within five miles. Small units in rural areas are seen as having a continuing role, to avoid reducing access too much, but seriously ill patients might then be transported directly to larger units. If half of the units which do not meet the Audit Commission suggested standard of 50,000 new attendances per year were to close, 31 accident and emergency units would disappear or be down-graded to e.g. minor injuries units. This could clearly have implications for the range of cases admitted to the host hospitals and their facilities, staffing and viability would inevitably be affected.

Potentially, the trend to more centralised and fewer major accident departments will continue. It is driven by the pressures for specialisation and a belief that e.g. trauma centres, offer higher quality

care. The research on the benefits of greater centralisation is not conclusive, as assessed by the Audit Commission, drawing on other consultative exercises in the NHS, but other factors may continue to drive the trend to centralisation, e.g. expectations by consultants working in accident departments that they will be part of a larger consultant team and not be expected to provide too high a level of out-of-hours cover. The number of well-qualified applicants for each post is likely to be small enough for their views to have a major influence over service patterns and smaller departments may struggle to recruit consultants if this view is widely held. Some hospitals have also found it difficult to recruit junior medical staff, e.g. because general surgeons are no longer required to have accident and emergency experience before specialising.

Local minor accident and emergency services may continue, in less acute hospitals or some other setting which may develop for local medical services as well. While restrictions on junior doctor training may make it difficult to staff these units with doctors in training, the conventional staff group dealing with emergencies, it may be possible to staff them with nurse practitioners and GPs. Support by video link to a major unit, with an on-call consultant adviser, could potentially offset problems for cases at the boundary between local and regional centre care guidelines who present to the local unit.

Within larger departments, GPs may also be increasingly employed to assess patients who would be more appropriately seen in primary care settings. This development could reduce the need for centralisation, at least when driven largely by the limited number of junior medical staff, since GPs could be highly effective and more experienced substitutes for hospital medical staff for this patient group.³⁸

ACCIDENT AND EMERGENCY

Lastly, whatever the future development of accident and emergency services, the lack of any clear assessment of the cost impact of centralisation should be noted. Again this is because of the absence of good evidence of economies of scale. Both the Audit Commission¹⁴ and the National Audit Office³⁹ note the difficulty of making accurate cost comparisons. Smaller units may be cheaper, particularly if they do not meet all the standards set for medical and other staff, but whether they are cheaper per attendance, and for given quality of care, is not demonstrable. For the present paper, it is important to note that yet again a key element of hospital planning is emerging with incomplete information on its consequences.

MATERNITY AND PAEDIATRICS

These two specialties have seen increasing emphasis on the de-medicalisation of services in recent years, at least to a degree. They are also areas of medicine where a great deal more explicit discussion and development of guidelines has taken place than in other fields such as surgery. In maternity, there has been a debate for many years over the appropriate place for delivery. While it is acknowledged broadly that a complicated delivery should take place in a general hospital with a range of on-call staff to treat the mother and child, routine delivery is increasingly seen as a natural event that may be managed without medical intervention. The debate can be seen most readily in government advice to the health service and its users. In the 1980s, 'Maternity Care in Action'⁴⁰⁻⁴² recommended that all births should take place in hospital. This was subsequently challenged by the House of Commons select committee in 1992 and by many individual women who have expressed a preference for a home birth.

Maternity highlights many of the key issues arising from risk management in health care. While it is undoubtedly the case that a normal birth may require no significant clinical intervention, the full scale of any difficulties, particularly for the newborn child, may only become clear when the child is born. That is, a normal birth cannot be defined with certainty until after the event. If complications are identified at birth, reassessment of risk and a transfer to a more intensive care facility may lead to worse outcomes. Hence, (it is argued) the hospital delivery, which already has access to a wide range of supporting services, is the safest. Critics of hospital delivery argue that because of the possibility of intervention, intervention may be more likely to take place, producing more adverse outcomes in hospital than might otherwise have occurred. Neither side in the argument is clearly supported by the evidence.

MATERNITY AND PAEDIATRICS

In a detailed review of the literature, Campbell and Macfarlane⁴³ conclude that there is ‘no evidence’ (or, more accurately, no evidence which meets rigorous standards of review) to support the claim that the safest policy is for all women to give birth in hospital, nor to support the closure of small maternity units. The lack of a clear conclusion from the available evidence, noted by Campbell and Macfarlane, reflects the lack of rigorous trials of alternative sites for delivery. Worse outcomes for home-births, where they are found, are partly due to unplanned home-births. Worse outcomes for consultant units may be due to the greater complexity of their casemix.

To a degree, the debate over childbirth has now side-stepped the site issues by focusing on other dimensions of care, including communication and routine monitoring. The most recent guidance to the NHS, ‘Changing Childbirth’⁴⁴ emphasises the importance of continuity so that women are attended in delivery by staff, particularly midwives, who have been involved in the monitoring of their care. While this may appear self-evidently preferable for women, the division of midwives into e.g. pre-natal, delivery and post-natal teams was common in hospitals so that women were handed from one set of carers to another during their pregnancy. At the same time, there has been a growing challenge to the routine monitoring of women in pregnancy and much of this is now carried out by midwives without doctors. While home-birth may still depend on the strength of the preference of an individual pregnant woman and her partner, and also on the support offered by the woman’s midwife, other methods have been used to ‘normalise’ delivery, particularly use of a very short stay in hospital for the act of delivery only. Once birth has occurred, all parties are better placed to reassess the need for complex supporting services. The short stay or ‘Domino’ approach was

endorsed by ‘Changing Childbirth’ as very attractive to women but the advisory group also noted that, with low perinatal mortality rates generally, it might prove impossible to carry out a trial to prove its advantages.

‘Changing Childbirth’ could not come down in favour of alternative models of hospital delivery since it had noted that the evidence was not conclusive. But the report endorsed a model of low technology care within a higher technology environment, through the provision of GP and midwife led units on the sites of general hospitals. This solves the problem of urgent access to additional services but means that low technology units will be as far from women’s homes as high technology units.

In practice, there has been a trend towards fewer, larger hospital maternity units and this has been supported by trends in paediatrics. Although clearly marked as ‘not policy documents’ several papers from the British Paediatric Association (now a Royal College in its own right) have pointed the way to fewer paediatric and maternity units so that the available junior medical staff can be deployed as effectively as possible. Hospitals with fewer than 2,000 births and 1,800 paediatric admissions per year are seen as potentially too small and the BPA anticipates savings from their closure (see BPA^{45,46} for details). In place of small inpatient units, hospitals not viable for inpatient services would provide a children’s community or day hospital service that would be able to provide some care for children brought to the accident and emergency department and on-going treatment and monitoring for children who in the past have been ward attenders, receiving day hospital care in inpatient units. This model would not readily support newborn babies needing complex care after birth and so elements of maternity services will necessarily be centralised along

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with inpatient paediatrics. As discussed later in this paper, because of the inter-relationships between specialties that extend beyond mother and child care, the future of paediatric inpatient services may have major implications for hospital planning in the NHS.

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Professional and economic pressures and trends are less clear in medicine than in surgery. Compared to the growing specialisation of surgery, medicine, through the Royal College of Physicians, has recently put great emphasis on the continued role of the generalist.⁴⁷ The technical interdependence of physical facilities and staff narrows the range of options for surgery. In medicine, patients who do not require life support in intensive care effectively heal themselves with the aid of prescribed drugs, the main therapeutic weapon of the physician. But if this is the case, the setting where their nursing care and recovery takes place may be immaterial, once the diagnosis has been made and treatment initiated. Hospital-based specialists may be most skilled at managing complex drug use but even elements of specialised drug use could be managed without admission to hospital and through community and telephone support, as well as outreach clinics.

The debate over the future of hospital medicine has been fuelled by the rapid growth in emergency medical admissions to hospitals, at a time when a greater role has been advocated for care in the community, within a wider primary care service. The health service has found itself with higher and higher numbers of medical admissions each year, particularly in winter, for reasons that are not fully clear. This has led to some challenges to the prevailing wisdom of continued reductions in bed capacity, for example from Edwards and Raftery⁴⁸ reviewing hospital beds for London.

Several reasons for an increasing number of urgent medical admissions have been proposed, including the growing number of elderly people in the community, an increase in disease incidence rates, changing GP willingness to take on urgent care responsibilities, increased access to beds due to improved efficiency and simple

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inflation of consultant episodes due to inter-consultant referral (see Harrison⁴⁹ for a comprehensive list of reasons). The available evidence does not show conclusively which of these reasons is most important but the availability of additional bed days is clearly a contributory factor since if beds were not available, admission would not be possible. In considering the number of hospital beds, it is also important not to lose sight of the level of hospital capacity used by emergency admissions. Where they have a short stay, for assessment only, the beds required to care for them may be quite few in number. For example, there has been a rise in the number of patients admitted as emergencies due to overdoses of harmful substances. These may be managed only by observation in many cases, though the average length of stay for poisonings has remained relatively stable over the recent past and is well above a single day.²⁰

In some of the most detailed research on this topic, examining daily admissions and length of stay, Jones⁵⁰ has provided some support for the view that there has been a significant upward shift in respiratory disease, due to an increase in the size of the annual influenza epidemic. If further research supports this hypothesis, the NHS may need to reconsider its norms for bed planning. Alternatively, since the seasonal variation in admissions is already well known, hospitals may have to concentrate on particular activities that are not bed-intensive during the winter months, e.g. by carrying out more outpatient clinics and day surgery in winter than in summer. And whatever the final level of demand, we should not lose sight of the fact that the threshold for medical and surgical admissions is variable, not fixed, and could adjust to the future level of hospital beds, whether higher or lower, without any explicit decision to do so and with no clear assessment of the costs and benefits of falling hospital capacity at a time of rising demand.

Where the urgent admissions reflect the inadequate management of patients already known to the NHS, improvements in community management may offset the rise in admissions, though this will have a cost in the community. Kendrick,⁵¹ analysing data for Scotland over 15 years, has suggested that recurrent admissions may be substituting for chronic long-stay care in hospital and that the growth in the number of elderly people is less important. For example, comparing two periods of five years, Kendrick found that the number of patients with four or more admissions rose by 70 per cent and this growth accounted for about half the total rise in admissions. Clearly, if this group of patients had been in hospital continuously, they would have incurred only one admission and occupied the kind of long stay beds that the NHS has largely eliminated.

This finding may also be linked to the characteristics of nursing homes used by such patients now. While a hospital typically has nowhere else to send patients during a crisis, a nursing home has the hospital as an alternative when patients deteriorate. Nursing homes also have a financial incentive to manage difficult problems by transfer, rather than higher short-term staffing, and UK nursing homes are unlikely to have associated inpatient beds of the kind that can be found in e.g. Canadian long-term care facilities in major cities, (personal observations by the author of large residential and nursing home facilities in Toronto). Whatever the long-term outcome of these multiple admissions and the cost of enhanced nursing home care as an alternative to hospital care, the implications for hospital bed capacity of the continued growth in medical admissions cannot be readily ignored.

On the other side of the debate, proposing less reliance on hospitals, Vetter⁵² has suggested that for medical cases in particular, the place of

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the hospital within the overall pattern of care is far from clear. He argues, drawing on a wide range of evidence, that many types of patient can be managed effectively in the community, e.g. heart attacks, strokes, but that vested interests within medicine have prevented the real potential of home care being realised. For chronic disease management, a dimension of care considered in more detail later in this paper, Vetter particularly supports community care over hospital care.

As a result of the lack of unambiguous evidence on the role of hospital care for many medical cases, there is a lack of clear standards for admission and discharge. It is therefore almost inevitable that observers will find 'inappropriate' use of beds as the patients occupying any medical beds are the result of decisions by patients, their families, junior doctors and GPs, all of whom may have quite different standards of 'appropriate'. For example, Anderson *et al.*⁵³ found that only 40 per cent of patients met their criteria for being in hospital, though critics might argue that the use of hospital beds has changed sufficiently since 1988 to alter this finding. To take one common cause of admission, length of stay for patients with circulatory disease has fallen appreciably over the intervening years, from 20 days in 1989 to 11 days in 1995.²⁰

If rising numbers of patients continue to be admitted, because they and their families demand a response to a crisis and because a community-based response may be slow or costly to provide, where will 'urgent' medical patients be admitted in future? There are two possibilities. One is that all medical patients as well as surgical and trauma patients are admitted to major hospital centres only. This will have a high average cost per case, given the likely level of staffing and site overhead costs but such centres may be better able to investigate

patients and discharge immediately or after an overnight stay. However, they may also have a high-intensity and high-tech culture which is less suitable for e.g. elderly patients with a short-term crisis in a chronic illness, for which additional nursing support is the main requirement.

The alternatives to the major acute centre, implied by the proposed growth in the role of primary and community care, will be either additional care at home or another model of medical care, based in less intensive facilities and suitable for a less complex range of cases. This looks like the re-invention of the local cottage hospital or sub-acute community hospital. These models offer closer access for patients but none of them will necessarily have a lower marginal cost for suitable patients than an acute DGH admission. The marginal cost is the change in costs due to a change in activity, in this case the care of additional patients in a DGH, another kind of hospital or at home. The marginal cost can be quite different from the average cost. For example, if a given number of medical beds are kept staffed around the clock in case of demand for them, then the cost of using some of them for patients who are not very ill may be quite small. The staff costs would be incurred anyway, as would the overheads. Hospital costs are incurred in steps, linked to opening or closing of beds. The real extra cost of one patient is the cost of drugs and food provided, plus any extra record keeping or diagnostic tests and materials used and this may be quite low for some patients, even in a large DGH with a high average cost per case.

In other words, the cost of adding an extra 20 patients per day to the caseload of a very large hospital may actually be less than the cost of providing a low-technology care centre on another site with duplication of overhead costs. (If this seems perverse, think how

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cheaply a large school could absorb 20 extra children spread across the age range, compared to teaching these children in a separate local school or at home. The analogy is imperfect as patients are dealt with as individuals and not in groups of 20 or 30 but it illustrates how a large institution may absorb additional activity at low marginal cost.) Big institutions may have costs that only change with a big increase or decrease in activity, hence the argument that the marginal cost of care may be lower in large hospitals, for the kind of caseload that could be treated outside them in the future.

CHRONIC DISEASE AND THE SHIFT TO PRIMARY CARE MANAGEMENT

Developments in primary care may shift some elements of hospital caseload back to the community. Recent initiatives include the introduction of total fundholding and the possibilities opened up by the primary care White Papers put forward by the outgoing Conservative government in late 1996.

Total fundholding, if it extends as planned in spite of the change of government, is likely to have some impact on the management of acute episodes of illness in patients with a chronic disease. This group is at highest risk of periodic re-admission to hospital and known to total fundholders, who will have the resources to shift their care to existing or new community services, e.g. 24 hour on-call community nursing teams. If this service develops, it will shed further light on the relative costs of grouping patients in medical wards or coping with them through disseminated care, though perhaps with intermittent hospitalisation of the kind found by Kendrick.⁵¹

In addition, total fundholding will increase the incentive to manage patients to achieve greater stability and avoid deterioration requiring acute care. The development of disease management programmes spanning existing services may also have some effect on the frequency of acute events but it is difficult to predict the ultimate effect on the number of medical cases referred to hospital.

The White Papers on primary care^{54,55} introduce the possibility that other agencies may begin to provide chronic disease management, though legislation has limited this to the 'NHS family' and excluded the most direct forms of management of chronic diseases by new, commercial companies. New models of primary care may have the effect of finally countering poor standards of care in many areas due to inadequate GPs and facilities, poor standards of hospital care or simply

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poor communication. The continued protection of the low standards of care against the forces of effective competition from higher quality local providers is difficult to justify in the light of repeated concern that, particularly in inner city areas, primary care is failing to provide lower income families with appropriate care. Yet the internal market has barely touched the commissioning of general practice services by health authorities and the market for hospital services is far from a dynamic one, (see West²⁹ for a detailed review of the limited impact of the market).

With the kind of technology available now and in the near future, including decision support, unified patient records and protocols for chronic disease management, primary care staff could take more and more responsibility for disease management. Although separate from the hospital, this raises the question of the future shape of primary care facilities and the extent to which they begin to merge with the facilities of other providers, e.g. the local community hospital or a local integrated care centre (discussed further in later sections of this paper) that combines elements of traditional primary and secondary care. This can be viewed as either an opportunity or a threat to primary care as we know it. To the outside observer, general practice appears to have suffered a substantial loss of morale and difficulties in recruiting since the boom period when general practice was the majority choice of medical graduates. This may be, at least partially, because much of the clinical work of general practice is of low intellectual quality. Well trained medical graduates cannot all be expected to be satisfied with a large number of minor conditions to treat at a rate of one every six to eight minutes of their surgery time, however great the stimulus of the potentially serious hidden problem. Diverting work to nurses under protocol is increasingly done to share the work and shift some

elements of it that require less medical input. But getting rid of work raises the question of how to fill the time. Delegation down to nurses and referral up to specialists could leave GPs without a role!

The obvious move for GPs is to follow the hospital doctors down the specialist path. This happens to a degree already with some GPs choosing to have a partial specialism e.g. in ante-natal and maternity care for their practice or in a hospital service as a clinical assistant. Loss of local access to outpatient clinics at hospitals, due to centralisation of hospital services, may provide further opportunities for more specialisation by GPs in areas of chronic disease management, particularly for patients who wish to avoid the journey to hospital. GPs may also become involved in the initial secondary assessment of patients, e.g. by becoming sub-specialists who see all the local patients with mild chest pain, either before referral to the consultant clinics or after initial review of referral letters by a consultant. This development, associated with larger practices offering both generic and specialist primary care, may be reinforced by the impact of the White Papers and by total fundholding. However, the absence of an early indication of the speed and degree of change to be introduced to the NHS by the Labour government makes it difficult to know whether such radical changes will occur.

THE FUTURE OF HOSPITAL OUTPATIENT ASSESSMENT

Any development of GP roles in assessment and management of patients will have an impact on hospital outpatient services. Medical and surgical outpatient clinics impose few constraints on future hospital provision. Clinics essentially involve face to face meetings, with some physical examinations, between doctor and patient. In addition, patients may need to use some diagnostic or assessment equipment, directly or indirectly through laboratories. While expensive diagnostic equipment such as MRI scanners will continue to be concentrated, there is no reason why other elements of the process should not be increasingly disseminated into the community, if there is a demand for this. Some fundholders have introduced such clinics because of long waits or poor facilities, or simply to strengthen collaboration with hospital colleagues.

Consultants can see patients in GP clinics or other intermediate sites away from their regional hospital base and, in future, could conduct some consultations by telephone or the Internet, particularly where a physical examination is not called for. While video links are rare currently, it may be possible in future to link health centres and hospitals so that a more expert opinion can be obtained, perhaps by later review of captured electronic images rather than potentially costly direct access to a consultant opinion around the clock. Of course, if the only benefit is the avoidance of a journey by the patient, who attends a video clinic by appointment at the GP's surgery, then those funding health care may be reluctant to spend resources on telemedicine to save costs which they do not currently have to bear. The costs will also depend on whether the NHS moves rapidly towards a situation where every care provider has a linked personal computer, in which case the addition of cameras for patient observations, for personal use or second opinions, may be possible at a relatively low

cost. At this stage, the future of these and related telemedicine technologies is uncertain. (See, for example, Lewis and Boyd Moir⁵⁶ for an illustration of the range of issues that might become amenable to telemedicine applications.)

At the same time, while decentralised access to a consultant will improve access for patients, centralised access increases the scope for new outpatients to have a range of investigations and a consultant opinion in a single visit to hospital. Potentially, the simple consultant assessment without any additional diagnostic tests will be replaced by other approaches, such as initial assessment, testing and review and treatment planning, all on a single day's visit to hospital. GP and consultant joint management of patients and the use of outpatient clinics could also be improved by technology such as the development of expert systems which reflect the specialist consensus on treatment algorithms and the use of e-mail for rapid communication on areas of concern. Simpler technologies may also have a role. For example, there are experiments under way using instant photographs for dermatology cases. Patients do not need to travel to the hospital as their picture is reviewed by a dermatologist who may initiate treatment or request a visit for only a smaller group of patients.

Given patient-held computer records linking the patient to a specific disease management regime, a range of staff may be able to monitor and modify care using the expert system with either no referral to specialists or *ex post* specialist review of some or all treatment changes that result. With a suitably structured set of questions at first presentation, e.g. using a GP or nurse-administered standard questionnaire to obtain a patient history, there is no reason why this approach should not be adopted for a number of conditions where information is needed by the specialist but not face to face contact with

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patients. Use of personal computers with pre-packaged questionnaires would ease the administrative burden and could be open to direct use by patients. While this kind of development remains speculative, it seems likely that it will occur to some degree, reducing the need for large, centralised outpatient review clinics all grouped on one main hospital site.

DIAGNOSTIC TECHNOLOGY

Diagnostic technology is moving in several different directions, depending on the area considered (see again Lewis and Boyd Moir⁵⁶) and some elements have been noted already.

Developments in pathology have made decentralisation of laboratory work increasingly possible. However, large analysers may also offer the potential for achieving economies of scale – that is, lower average costs from the use of fewer, larger laboratories with large, efficient analysers and fewer overhead costs. The low cost, centralised service is particularly attractive for processing slower stream work testing outpatients and GP patients, where the distance to the laboratory is not of great importance. Such laboratories might take on a very large (e.g. regional rather than district) workload. However, since every DGH needs rapid access to some diagnostic tests for urgent assessment and inpatient review, it is also possible that the equipment to provide a wide range of tests rapidly might, with little extra equipment or staffing costs, provide at least a proportion of slow stream testing on every DGH site. Overall, the speed at which technology is changing in this field, e.g. the move from incubation to direct testing of bacterial DNA in Microbiology, makes it difficult to predict the scale of laboratory that is most likely to offer the most efficient service for emergencies and slower stream work.

In imaging, technology is also developing new approaches, following on from the Magnetic Resonance Imaging scanning developments. These typically involve a large investment in a piece of equipment which has limited capacity, e.g. positron and proton scanning in PET and SPECT. A decision will be needed for this equipment on its optimal use, either for the assessment of only a minority of patients or its place as a routine tool. Given the high cost of new imaging technologies, they are likely to penetrate slowly and be concentrated in

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regional centres initially. However, their high cost and the need to make optimal use of them will reinforce other pressures to centralise acute hospital services onto fewer sites, where access to complex imaging is available for inpatients. For some hospitals, a compromise might be to obtain access to a range of mobile imaging services so that patients would no longer have to travel to obtain investigations, e.g. in CAT and MRI scanning and in cardiology.

Outside hospital, we might expect to see some further dissemination of near patient testing in laboratory-based diagnostics. Small analysers are now available and although there is typically concern about quality control, some GPs are likely to be attracted to direct access to blood tests, for example. However, the experience of fundholding, where fundholders had more scope than other GPs to introduce such testing, suggests that it is not a priority, if they can get a fast service from the existing laboratories. For imaging, the equipment has such a high relative cost for purchase and staffing, and such a low utilisation rate in any single practice, that most technologies are not likely to be disseminated to general practice unless general practice begins to work in much larger facilities with more GPs and more secondary or intermediate care on-site. One exception may be ante-natal ultrasound, which has proved popular with expectant parents, whatever its outcome in pregnancy, and where larger practices involved in maternity care may invest in the necessary equipment. This would support moves to maintain routine ante-natal care in the community but would not have a direct effect on the scope and capacity of hospital services.

MOVES TO MANAGED CARE – ANOTHER PRESSURE ON HOSPITAL BEDS?

Along with changes in the work of each area of medicine, there is a wider change to be seen in medicine, the growth of managed care and attempts to achieve greater consistency in the care provided to patients. Elements of this have been considered above in relation to chronic disease management but there are also lessons from the US experience of more tightly managed secondary care for hospital planning. Somewhat surprisingly, the privately funded health services in the US have been subject to ever more stringent and detailed cost control as those funding care, particularly employers, exercise their market power. Compared to other developed countries, the US has greater plurality of funding methods and a much higher level of overall spending on health care.²⁰ As a result of the high costs of providing health service access to employees and those dependant on the state, agencies funding health care have pushed for a variety of methods of controlling costs, often given the generic label ‘Managed Care’.

The financial pressures exerted through managed care and the associated growth of managed care models such as Health Maintenance Organisations have led to substantial reductions in hospital capacity, e.g. reductions of around 25 per cent in the areas of California with the greatest penetration of HMOs⁵⁷ in a period of ten years. Equally, this had a much smaller effect on costs than the simultaneous reductions in the intensity of services provided to patients. Average length of patient stays fell in these areas to 4.9 days, lower than recent NHS figures. However, considerable caution is needed when comparing data between the US and the UK as patients may be discharged to nursing homes rather than back to their own homes, in both countries but potentially at different rates, so that length of stay in hospital alone gives an incorrect estimate of the total package of care provided (see, for example, Ensberg *et al*⁵⁸ for an

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analysis of early discharge after hip fracture and links to nursing home care). Alternatively, because of higher spending, treatment thresholds may be lower and less sick patients may be being treated.

Much of the past reduction in length of patient stay has probably come from more rational discharge policies but this source of savings must eventually dry up. Alternative models of care, including day surgery, will change the costs of hospitals. However, the complex interaction of case-mix and cost per day of stay may mean that savings are not realised on the scale anticipated.⁵⁹ Very early discharge, relying on other modes of care, may also not generate the savings projected, given the costs of community care and transfer to nursing homes and the overall cost impact remains unclear (e.g. see Steiner and Vaughan⁶⁰ and Steiner⁶¹ for examples). Nonetheless, cost pressures generated by tax saving politicians are likely to continue to press hospitals to reduce their total capacity and, more generally, funding is driving hospital capacity more than is the ‘need’ for hospital care. But if hospital capacity is indeed to be reduced in the UK, the distribution of hospital sites and access to them will come increasingly to the fore in the argument on hospital services.

How Many Hospital Sites?

In the light of the potential changes in the delivery of medicine and the number of hospital beds, their distribution is the third element in planning, after the caseload and the bed numbers. As the NHS has moved towards a lower level of bed capacity, it has also moved to fewer inpatient hospital sites. For much of the last twenty years, this rationalisation of sites has been possible without the closure of major general hospitals, though some have closed in big cities. Typically, the cottage hospitals and their successors, community hospitals, as well as

single specialty hospitals and geriatric long-stay hospitals, have been the main casualties. Multi-site general hospitals have also moved to single sites, to achieve the preferred DGH model. Although improvements in patient care are frequently claimed in such rationalisations, the driving force for purchasers has more often been the chance to save the site operating costs of the hospitals closing. Since the health service has continued to treat more patients with fewer beds, this shift to fewer sites can be defended as not detrimental to the amount of patient care, even if access to services is reduced.

Closing hospitals means increased travel costs for patients and it is the risk, inconvenience and concern of patients that is usually put forward to support retention of local hospitals. The risk from longer journeys to hospital, noted earlier, is not well defined or conclusively established but there is no denying the inconvenience and travel costs. However, increasingly the NHS is having to face up to a level of bed capacity that is not compatible with the current distribution of hospitals and current standards for staffing and training. At the same time, mergers of health authorities have reduced the total number of health authorities considerably, making the one-to-one association of a DGH and a district, a feature of the 1962 Hospital Plan, compatible with many fewer DGH sites. This one-to-one association might have been expected to change as a result of the 1990 reform of the NHS and the introduction of the internal market. By and large, it did not.²⁹ The NHS therefore faces a choice between fewer sites and greater access for patients.

The impact of changes in medical practice on the future of the hospitals has already been noted. The future number of hospital sites will also be affected by other factors, including the quality of care and cost of larger and smaller general hospitals and the related degree to

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which some services are seen as exclusively the preserve of the DGH. In addition, the future work and training of junior medical staff is already exerting considerable influence over hospital planning, as noted for paediatrics, and is likely to do so in other specialties. These issues are examined in the following sections.

Is Bigger Better and is it Cheaper?

Economists have looked extensively for evidence that hospitals of different sizes with different numbers of cases of each type treated or different breadths of caseload, might be able to produce health care at lower cost or higher quality. Lower costs in a larger hospital are described as economies of scale and might be expected from reductions in overhead costs per case, such as management and facilities costs, when more cases are treated in a single, larger hospital. Better results might be expected because of the higher experience and regular exercise of skills in larger centres. However, although these effects are highly plausible, the available research suggests that larger hospitals are not less costly and do not necessarily produce better outcomes, though the quality of evidence on these issues makes the picture less clear, one way or the other.

A recent review¹⁵ concluded that much of the available research was of poor quality and that the best research shows no general relationship between hospital size and costs per case. Any reduction in costs with larger hospital size were found in this study to be exhausted below a size of 200 beds and some higher costs, that is, diseconomies of scale, appeared in some studies in hospitals of between 300 and 600 beds. This may reflect the greater difficulty and higher costs of managing larger hospitals or other factors such as grade drift, with large numbers of staff being more highly graded and more highly paid in a large hospital.

The same study also concluded that, although many researchers have found evidence that adverse outcomes occur less often when hospitals or individual clinicians treat a larger number of cases per year, these studies lack sufficient control of differences in casemix to be reliable. Where casemix adjustment is carried out, studies in e.g. outcomes from coronary artery bypass grafting, show less variation with volume. The added complication of using this research to justify fewer, larger hospitals is that the studies concerned typically compare hospitals with higher and lower caseloads. They do not show that increasing the caseload of a low volume hospital would lead to the same outcomes as those achieved by existing, larger centres.

Some specialties did show evidence of a link between volume and outcomes, e.g. cancer treatments, suggesting that there is some advantage in centralisation and no obvious gains from decentralisation to offset this, however small the advantage might be from centralisation. However, although quality of care might appear to be the paramount concern, in practice the key factors driving the number of acute hospital sites in the recent past have been the training needs of junior doctors and the number of junior doctors needed to staff an appropriate rota, as well as further sub-specialisation which has increased the catchment populations seen as appropriate for some specialties.

Perhaps because of the quality of evidence, the move to centralised services in fewer DGHs serving larger catchment populations has not occurred consistently throughout the NHS. There are still relatively small DGHs, in size and scope, predominantly in rural areas and smaller towns, which operate with a smaller range of specialties or a smaller number of consultants than is recommended by advisory groups for accident and emergency care or for surgery and medicine.

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Their survival is due in part to the reluctance of local purchasers to accept reduced access to services, particularly when the gains in quality of care are relatively unclear. However, the growing impact of rules and guidance for junior medical staffing and training may affect these hospitals in particular and the distribution of hospital services in general.

**Junior Medical Staffing and Training –
The Real Key to Hospital Planning?**

As noted by Abel-Smith² hospital development in the 19th century was as much to do with training of doctors as with treating the sick. This continues to be the case.¹⁷ The NHS is particularly reliant on doctors in training, below the grade of consultant, for much of the routine work by day and the majority of care at night and at week-ends.⁶² Unlike most of Europe, Britain has retained close, if not always coherent, control over the number of new doctors trained.⁶³ In the recent past, there has also been considerable pressure from the Royal Colleges, supported by Ministers, to reduce the working hours of junior doctors (see e.g. Mawhinney⁶⁴). The obvious way to do this would be to increase their number and this has happened to some extent. But with career development to consultant or GP controlled, more junior doctors would mean more disappointed doctors in the future, with no career path to follow. Given the high cost of training a doctor, the NHS has sought to avoid doctor unemployment. It is also clearly in the interests of the medical profession to maintain a shortage of skilled personnel and therefore a strong demand for their services.

Under the rules for junior doctor training, rotas of four or five junior staff become the minimum that can be operated by some specialties if they are to meet the needs of their patients and the requirements of the

Royal Colleges. Some specialty bodies also stipulate the minimum number of cases of any kind that must be treated on a hospital site if it is to provide suitable experience for doctors in training, e.g. in paediatrics. Given a fixed number of junior doctors in each medical specialty, any move to reduce their working hours and include more doctors on a rota must mean that the specialty operates from fewer inpatient centres. This means that each specialty must treat patients from a larger catchment area, whether in hospitals with the same range of specialties as current DGHs or in some other model.

The introduction of Trust status under the NHS Reforms might have been expected to slow down the centralisation of acute hospital services, at least where neighbouring hospitals were in different Trusts. (Where a Trust included both the local DGH and community hospitals, centralisation was more likely to become part of the Trust strategy to reduce overhead costs and meet the professional goals of clinical staff.) However, in practice, financial pressures have reinforced the professional guidance and health authorities have pushed forward a number of Trust mergers with the intention of reducing costs while also meeting the professional guidance on junior doctor staffing.

The process of centralisation for training needs and junior doctor hours has been compounded by the continued growth of specialisation, particularly in surgery in the recent past. Increasingly, it is seen as essential for high quality care that medical and surgical staff concentrate more and more on less and less. For example, the enquiry into deaths following surgery⁶⁵ recommends that only appropriately trained surgeons carry out operations. In itself this seems obvious but its consequence, noted by the authors, is that some District Health Authorities may have to consider relying on sub-regional units outside their boundaries for urology and vascular surgery. Specialisation in

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these two disciplines, out-growths of general surgery, will mean reduced local access to surgery for some cases. Accident and emergency has similarly become a specialty in its own right and a team of several consultants is the preferred model for continuity of cover. But again, the result is fewer comprehensive hospitals, if the definition of a comprehensive local DGH or the number of consultants does not change.

If we accept the professional guidance on junior doctor staffing within existing and new specialties, the moves to centralise acute care on fewer DGHs are likely to continue, at least to the point where all have appropriate – by professional clinical standards – teams of consultants and junior staff. If the current DGH remains the only model of hospital care, then reduced patient access is inevitable unless a radical alternative develops, namely a DGH without junior doctors. While experiments, and on-going practice, have developed, employing suitably trained nurse practitioners to provide some out-of-hours cover,¹⁸ it seems highly unlikely that the medical professional bodies would accept DGHs with no junior medical staff.

This does not mean that such hospitals could not function. If they could recruit a sufficiently large team of consultants, at a salary high enough to make out-of-hours work by consultants attractive, they might operate without junior staff. A related model, closer to some of those discussed later in this paper, would involve younger consultants working in DGHs in support of A&E while older consultants provided elective services in other hospitals, with reduced demands for on-call work. Indeed, I know of some hospitals that have given active consideration to this model. But it is not yet clear what it will cost to recruit a larger team of consultants to operate it.

The consultant-only DGH represents the simplest way of avoiding the pressure to centralise that results from junior doctor training requirements. If we put this model aside, we are left with two possibilities for hospital care:

- ◆ accept centralisation of more services to fewer hospital sites, with the associated additional patient travel;
- ◆ separate cases requiring the services of a DGH, as currently configured with emergency and elective care in a broad range of specialties, and those suitable for a less sophisticated hospital setting and provide more accessible, less acute care closer to patients' homes.

Inpatient care is likely to be more significantly affected by alternative models of hospital distribution. For outpatient care, there may not always be a need for a consultation to take place on a hospital site, particularly a DGH, and the frequency of travel is very much larger, increasing the potential advantages of local outpatient centres. These would also need to serve a sufficiently large community to make cost-effective use of the available capacity. However, the future of inpatient care is likely to dominate the hospital planning debate and discussion here concentrates upon it.

Fewer Sites for 'District' Specialties?

The issue of concentrating some or all acute specialties on fewer sites raises again the question of what a DGH comprises. Potentially, it provides a range of services likely to be needed relatively frequently by its catchment population for urgent acute and elective medicine and surgery. However, this brings us back to the link between the District and the DGH. Some services such as cancer and neurosurgery have

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never been available in every DGH. Local DGH specialties were typically those whose clinical teams could be kept busy by the local caseload. Pressure for larger clinical teams overall and sub-specialisation mean that some teams of clinicians can only be kept busy by serving a larger catchment population.

One way of meeting this pressure for centralisation would be to reduce the range of specialties at each DGH so that more services are provided from regional or sub-regional centres. One DGH might lose urology, for example, while gaining vascular surgery for a wider catchment area. This model can be found where a DGH is actually serving a district population from several inherited sites. However, the pressure to maintain a ‘comprehensive’ range of specialties in a DGH has typically seen this model as one to be eliminated through investment in a single site DGH. A wide range of specialties is typically seen as essential to support an accident and emergency department in a DGH. While fewer sites for some specialties is a practical solution to the location of acute services, the more common situation is for the current DGH to be seen as providing an appropriate breadth of services, particularly for emergencies. Dilution of the range of specialties in a DGH is usually ruled out but it may well be as feasible as the alternatives.

Alternatives to the current DGH

Development of the second model of hospital services – having more hospitals providing elements of acute care, more widely dispersed than DGHs – raises further issues. These include the definition of the casemix for such hospitals and their requisite size and location. It is also important not to ignore potential costs and benefits beyond the simple reduction in patient (and visitor) journeys.

Who are the patients who do not need to be treated in a DGH?

Potentially, they are those patients who are not likely to deteriorate rapidly, suffer life-threatening events or have multi-specialty care prescribed for them. Clearly such a group of patients could be treated outside a comprehensive DGH. But before we become too enthusiastic about the prospects of a new model of hospital, it is important to remember that we have spent much of the last ten years trying to encourage early discharge from hospital and restrict a hospital stay only to those who need it. The transfer of recuperation to the community has meant that the number of patients who need hospital care, but no on-site access to any of the services usually found in a DGH, may in practice be quite small. If they do not need complex hospital care or access to it, why are they in hospital and not in the community or in nursing homes?

The Elective Resource Centre

SE Thames RHA¹³ proposed a different kind of hospital, termed the Elective Resource Centre. (In practice, the model can be found within multi-site DGHs but it is usually being phased out where possible.) The expert group identified research showing that elective surgical cases in particular were highly efficient and predictable in their use of beds and care for this caseload could be more readily planned and managed in isolation from unplanned emergencies. Emergencies disrupt bed use and planned admissions, from time to time, because of the fluctuations in their daily numbers.

In medicine, the potential patients in an Elective Resource Centre include patients with a chronic disease, who require nursing care for a short-term acute episode with a relatively well-defined range of severity and outcome, and medical patients undergoing systematic monitoring and assessment. The medical group might also include

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patients who for one reason or another were not candidates for more complex interventions, on grounds of prognosis, and patients requiring only rehabilitation. Surgical workload might include low risk cases with little need for multi-specialty care and a range of post-operative problems that could be managed by, for example, nurse practitioners.

If the medical staff can be recruited to operate an Elective Resource Centre and ways found of rotating junior staff in training through such facilities, it appears to be a feasible model. Alternatively, nurse-led care may be an acceptable model, at least for medical cases but perhaps also for post-operative care and discharge management. Models of nurse-led medical wards have been developed recently in some centres (see, Griffiths⁶⁶ for an example). The Elective Resource Centre therefore has the apparent benefit of improving local access and offers scope for planned and orderly treatment of non-emergency patients. Quality of care could be an issue if such hospitals were to become isolated from the mainstream of hospital medicine but recognition of this risk should make it possible to arrange audit and rotations of staff to offset it. But what of the costs of hospital care?

While elective care in a DGH may suffer when admissions are cancelled to admit emergencies, this has the advantage of smoothing out the total caseload at any time to fit a limited number of hospital beds. If elective cases are taken to another site and treated at a planned rate, one of the consequences is likely to be lower average utilisation of the DGH. In other words, by limiting the capacity of DGHs and cancelling routine surgery from time to time, the NHS is able to cope with a fluctuating caseload within a smaller number of beds. If the DGH has to retain the capacity and supporting staff for the maximum number of emergencies that might occur, it is likely to be over-staffed

for much of the time. In consequence, the Elective Resource Centre may increase the total cost of all hospital care while reducing travel costs and delay for patients. (An example from maternity illustrates the potential costs of segregating the caseload. Hundley *et al.*⁶⁷ found that the marginal cost of caring for low-risk mothers alongside high risk mothers on a maternity unit was small and that the creation of a separate, midwife-led unit catering for low-risk mothers could easily add to total costs.)

Before leaving the Elective Resource Centre model, we might also note another potential drawback. It is easy to assume that such centres would provide care closer to patients' homes. This could be true if sufficient centres are built. However, this number of centres may not be optimal to make effective use of facilities. For example, I have visited a hospital in southern England which housed a hip replacement unit, with surgical and rehabilitative facilities for ten patients per week. This appeared to the casual observer to provide efficient care at an appropriate scale. While it may be that larger or smaller units would be more efficient, it is likely that there will be lower and upper limits to the efficient scale and a point at which average cost per case begins to rise with smaller or larger numbers. This in turn means that the caseload to allow such elective units to operate efficiently may not be the same as the caseload that would be generated by its local community. Cases may have to be drawn from a wider catchment area if the unit is to operate efficiently. More generally, the most efficient size for an Elective Resource Centre treating a range of cases may not be the size that matches the demand for elective care from only a small local community. A similar argument may apply to different specialties but with a different efficient scale resulting. In other words, the efficient size for an elective unit might require quite different

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catchment populations for each condition treated. Indeed, it is possible that dedicated elective units, treating a relatively large number of only one type of case, might be highly efficient. Such units exist for e.g. hernia repair in the private sector. In the NHS, national or regional centres could be established treating, if not all routine cases of, for example, hip replacement, at least those that have waited for more than some stipulated time on local waiting lists. If the difficulties due to training doctors are resolved or simply side-stepped in this model, it could offer highly efficient care but some distance from patients' homes. That is, the trade-off between what is efficient for the NHS and convenient and less costly for patients might be resolved in a different way, with each Elective Resource Centre serving a relatively large population.

Small local centres with dedicated capacity to treat a broad casemix could also suffer from the drawback that some patients might wait longer in a local queue than in a centralised DGH queue. (Banks and post offices have gone over to single queue systems precisely to resolve this logistical problem.) Of course, a common waiting list could be developed but if patients had to travel to a different neighbourhood Elective Resource Centre for treatment, the advantages of better access would be lost. (I have encountered examples around the NHS where small hospitals have operated in precisely this way, with surgeons drawing their caseload from across the district, not from the hospital's neighbourhood, in order to make the best use of the theatre capacity and respond to waiting list pressures.) Similarly, where two hospitals are obliged to merge to meet the training and professional criteria for a DGH, turning one of the two sites into an Elective Resource Centre could be an appealing way of avoiding new building. This may achieve lower overall costs for the NHS, including the costs of capital, but it

will also worsen access for patients if acute and elective patients regularly travel in opposite directions.

To summarise, once the caseload of an acute hospital is sub-divided into different categories with different needs, the less acute caseload may be suitable for treatment in a different kind of facility. However, the optimal size of that facility for each specialty using it may not make for a particularly local hospital. A large number of small local hospitals could, of course, be developed with very much part-time consultant attendance, much like the old cottage hospitals.

The Community Hospital Alternative – Is Small also Beautiful?

The SE Thames¹³ study and other research (e.g. Rawlinson, Kelly and Whittlestone⁶⁸) have identified models for hospital care in which community hospitals play a greater role. Clearly, these offer the advantages of local care, if they only treat local patients. But the relative efficiency of this model may be even lower than for resource centres because the total local hospital capacity is split into a larger number of units, each of which will have limited flexibility in the face of peaks in demand.

For local community hospitals, the potential caseload is likely to be less acute than for Elective Resource Centres, e.g. day surgical cases and medical cases needing short term nursing and limited investigation. Again the capital and revenue costs of this model need careful consideration. For example, a day case unit with one theatre and some medical facilities might treat ten to twenty cases per day if fully utilised. This implies a caseload of between 2,500 and 5,000 cases per year. But this caseload would meet the day case demands of about 50-100,000 people (based on rates of treatment per head of population drawn from Department of Health³⁷). This is a relatively large

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population compared to the size of town where many community hospitals can be found. If the facility is to be used efficiently, it may have to serve a relatively large catchment area, particularly if a proportion of day surgery cases are seen as not suitable for community hospital care due to a non-negligible risk of needing inpatient admission. Such patients would be potentially suitable only for surgery at the DGH. Of course, it is possible that the NHS over-rates efficiency, as measured by utilisation, and that a community hospital day surgery facility could be relatively efficient if staffed and run for only a part of the week. But this remains one of the many issues requiring further empirical research before we can draw a satisfactory conclusion.

One such issue is the staffing of community hospitals and the relative roles of hospital medical staff, GPs and nurse practitioners. Given the less acute nature of the intended caseload, the need for on-site medical staff may be quite limited. GPs may be sufficiently skilled, or able to be trained, to provide the required level of care on-call. Alternatively, elements of medical care might be managed by nurses with only consultant or GP advice on request. The cost-effectiveness of alternative staffing has not been tested with sufficient rigour to draw conclusions on the right mix of staff, though it should be noted that some of the evidence suggests that the cost difference between different types of hospital may be limited (e.g. see Coast *et al*⁶⁹ and further discussion later in this paper).

The Local Integrated Care Centre

It is relatively easy to develop rather cosy models of community hospitals serving the local population and offering a low technology, user-friendly model of care. Indeed, this may be a fair reflection of their services and not mere nostalgia. There is also scope for such

models to develop further by integrating general practice and elements of local hospital care which have, in most parts of the country, become strongly separated. This model is termed here the Integrated Care Centre.

DGHs are currently more and more like universities, with many departments and large campuses, relatively isolated from general practice. The separation of primary care facilities from almost any kind of hospital facilities is probably based more on the need for access on foot to primary care, in the past, and the separate contractor status of GPs, not on the degree of synergy between primary and secondary care.

In contrast to ever more complex and larger campus hospitals, general practice typically remains in facilities which are closer in scale to the nursery school, accessible on foot but often with local parking problems. The premises usually contain a waiting area with several consulting rooms and one or two treatment rooms. One variant on the community hospital model would be its development into an integrated facility with a large number of GP practices wholly or partly on the site. Indeed the hospital could become one large group practice facility for the neighbourhood. It might offer access to a large group of GPs, some of whom would have a special interest and carry out first level outpatient diagnosis for a range of patients. (Models of specialisation in general practice are currently developing and have a long history in maternity, where GPs can opt for more or less involvement.)

Alternative models may be more convenient for the majority, in an era of high car ownership, and transport might be provided for those unable to make their own way. It is clearly a weak defence of the current

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pattern of general practice premises to say that the poor, sick and the frail can get there under their own, limited, steam! It also looks rather like a form of shroud waving to argue that hospitals or GP premises must be disseminated widely, when they are intermittently used, while at the same time policy-makers allow greater and greater centralisation of, for example, food retail premises. Surely the poor, old and frail need their nutrition protected by better transport and access arrangements as much or more than their less frequent access to health care.

Potentially, integrated facilities could be developed to house a large nucleus of general practices, (say up to 20 GPs), hospital facilities including limited A&E units open during the day, and the rump of services such as outpatients when these require little in the way of specialist equipment. Such hospitals might accommodate a limited caseload in acute medicine and minor day surgery. The service would be heavily dependent on nurse practitioners and GPs with support from a major regional hospital provided via video and computer links and some on-site consultant clinics. The comprehensive health centre with associated medical beds may therefore be a feasible model to link these two strands of medical care. Within it, GPs might also develop some special interests and undertake, for example, initial assessment of patients referred by their own GPs in cardiology, dermatology, rheumatology. History may have a lesson for us here as traditionally outpatients and general practice competed for the same patients, those seeking care for the first time for their problem.

The future shape of the hospital service, using one or several of the models discussed here, will depend both on the cost and quality implications of the different types of care. These issues are considered in the next two sections, drawing on the clinical and staffing factors already discussed.

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The various models of hospitals leave us with several potential permutations for inpatient care:

- ◆ all services centralised in the DGH;
- ◆ partial centralisation with supporting Elective Resource Centres;
- ◆ partial centralisation with Community Hospitals and Integrated Care Centres (with or without larger Elective Resource Centres).

Each model could also include a substantial element of home care for less acute cases.

The choice between these models will depend on a range of quality and cost factors. The available evidence does not show convincingly that quality is necessarily better in a centralised DGH-only model, particularly when we are only concerned with the less acute caseload suitable for other types of hospital care. The main advantage of this model is that it gives efficient use of junior doctor time and maximises (nominally at least) opportunities for training. Critics have argued that training alone cannot be the deciding factor and that the training of junior staff must fit around the model of care and not *vice versa*.¹⁷ But even if the training difficulties with decentralised models can be overcome, we should not lose sight of the cost impact of alternative models and their wider feasibility.

Clearly, locally available care, whether in a smaller local DGH, a community hospital or at home, will cut travel costs for patients and their immediate families. (Extended families and friends may live further from the patient and so their travel costs could be lower if DGHs were concentrated in larger urban centres.) Travel costs that

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result from hospital centralisation can be readily assessed and the arithmetic is basically straightforward. A day case patient should always be accompanied and most inpatients are likely to receive visitors, some getting a large number of visits. We can then assume that both a day case and a day in hospital generate two return journeys, on average, at a cost of (say) £0.40 per mile and (say) £5.00 per hour, based on average gross earnings of £7.00 per hour.⁷⁰ Each day in a hospital 40 miles further from a patient's community would then generate time and travel costs of around £84 per patient day or about £700,000 per year for the patients occupying one ward. (It should also be noted that the journey to a hospital will comprise only a part of the total cost of the episode. If, as seems plausible, patients do not expect to make much effective use of their time on the day of admission and discharge, then the costs of time used here may overstate their loss. However, visitors are much more likely to use their time productively, for work or leisure, and will face an opportunity cost – that is, the loss of a valued opportunity to spend their time in work or leisure, even if no money costs are involved – as a result of a longer journey to hospital.)

Estimated travel costs at plausible rates per patient suggest that it might be worth incurring some additional expenditure on local services to offset travel and time costs for patients and visitors. The NHS might respond to these costs more readily if it was obliged to meet them when services were relocated.

The financial and economic balance to be struck, for patients who continue to need some care, is between the costs of hospital and home care for any given outcome. Both hospital and home care incur the direct costs of treatment. In addition, for long stays with little care, the hospital incurs a variety of overhead costs due to operating a larger total number of beds, for example, site services.

Home care may be cheaper, depending on the size of the hospital overheads. For example, Hollingworth *et al*⁷¹ report savings of over £700 per case for patients discharged early to a hospital at home scheme after hip fracture. This assessment took account of the diminishing nursing inputs to patients towards the end of their hospital stay and did not use average cost per day. Direct care costs differed by only about £100 and the source of this difference is not described in detail. Insofar as it reflects additional and potentially inefficient care provided in hospital, it may overstate the difference in optimum costs between hospital and home. It may also overstate them if some care tasks were transferred to informal carers. A much greater element of the cost difference, £330 per patient, is due to the higher hotel costs of keeping patients longer in hospital. Together with the overhead costs of the hospital, this makes up the majority of the cost difference, indicating that it is not on care tasks that the greatest savings will be made but on hospital capacity and hotel services. Such costs could be reduced by reduced hospital stays or simply transferred to patients (e.g. the cost of meals).

Coast *et al*⁶⁹ also provide an estimate of the reduction in direct costs due to patients being admitted to a GP hospital bed rather than a DGH bed. The saving is just under £100 per case for the same length of stay, including the required adjustment for GP travel. Taken with costs to patients and visitors for time and travel, the figures suggest that if the NHS was obliged to meet patient and visitor travel costs, it might well be cost-effective to incur some additional overheads by operating more hospital sites. On the other hand, if these local sites cannot operate efficiently for reasons already noted, then providing more local services might increase total costs.

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Care at home is an appealing model and has been promoted extensively in the recent past as an alternative to hospital care for those with less acute illnesses. A number of experimental projects have shifted more complex care activities from hospital to home. (For a review of such initiatives, see Marks⁷².) At the same time, the research on home care does not always support the widely held belief that it is cheaper than hospital care. Marks reviewed a range of studies, some of which show apparently higher costs for home care either because of the relative inefficiency of home care or the difference in care regimes between the norm in hospital and a more carefully planned model of care at home. Others show substantial savings but these are often the result of early and effective planning of discharge home, compared to the norm of a relatively long and under-managed hospital stay. Tight management of the length of a patient's stay in hospital may well be as cost-effective as any home care package. More generally, although there are some examples of well controlled trials, much of the research on home care lacks a rigorous research methodology and is often based on *ad-hoc* interventions that took place with only limited control groups, if any. (There is also a tendency for those carrying out the intervention to evaluate it, introducing an inevitable element of bias.)

It is also important not to lose sight of the potential inefficiencies that affect community care, particularly the substantial amount of staff time spent travelling (see e.g. Dunnell and Dobbs⁷³ and Audit Commission⁷⁴ on nurse travel). This can amount to as much as 25 per cent of district nurse working time. Coast *et al*⁶⁹ have also noted that community hospital care, and by implication home care, may involve appreciable additional journeys for GPs at a higher cost per hour than for patients.

Even after six years of the internal market, we still lack many integrated contracts for episodic or continuing care provided by multiple

agencies in hospital and the community. Without these, we cannot tell how far earlier discharge has reduced the total cost per case of patients discharged earlier. We lack particularly a specification of care tasks in the hospital and the community, on which to base cost comparisons. Transfer of inpatients to day cases may reduce total hospital capacity and overheads and simply eliminate unnecessary nursing care provided in hospital. Similarly, where patients can cope easily at home with little formal or informal care, their continued presence in a hospital bed is inefficient. But, for example, surgical cases discharged early to rehabilitation in the community, community care may only be cheaper if less is done for patients at home than in hospital, since significant nursing inputs at home will incur the extra cost of staff travel and care tasks shifted to family carers will impose costs on them instead of on the health service. We largely lack the evidence to know whether a higher level of care in hospital or a lower level of care in the community is more efficient when assessed on both costs to all parties and outcomes achieved.

It should also be noted that even where home care can be shown to be a cost-effective alternative, it may not be accepted by patients and families. This may be because effective home care cannot be provided at short notice, whereas the hospital door is usually open around the clock and hospital admission is likely to be more reassuring for the family of the patient. For example, home care, however high in standard, may fail to give families the peace of mind that additional skilled help is immediately available, should it be needed, particularly if family members do not live locally and cannot look in on their relatives at home. Once a crisis has passed, transition to home care is much easier. But many patients and families continue to behave as if hospital is the only acceptable mode of care for a medical crisis and

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may have a low threshold for contact with the hospital when they perceive a medical crisis. This response is probably fuelled by constant media attention on claimed miracle cures, in television programmes based on fact and fiction.

GPs may also be reluctant to take on the extra work of home care, given their resistance to home visits, unless additional payments are involved. Small practices in particular may also simply have logistical problems in responding to the demand for home care. Griffiths *et al.*⁷⁵ show a link between urgent asthma referrals/admissions and practice size, (though other factors may affect the perceived performance of small practices, e.g. the types of patients who stay on their lists). Junior hospital doctors may feel that admission to hospital is the safest option and the one which leaves them least exposed, in the event of an error in the diagnosis or treatment of the emergency patients. Thus, while of limited therapeutic value in some cases and potentially no more effective than home care in others, hospital admission continues to be a solution to the problems perceived by patients, families and doctors.

In favour of care outside hospitals, hospitals may themselves be inefficiently expensive because of the costs of maintaining capacity on-site. That is, if a hospital accommodates substantial numbers of patients who could be cared for elsewhere, it may be operating on a larger site than necessary and incurring some additional site-related costs at the margin which, though fixed in the short run, could be changed in the longer run. In addition, hospital care of any kind may lead to patients receiving more care than they require, e.g. a patient in a DGH may receive additional investigations, simply because they are in hospital. They may also acquire infections or other problems which again raise costs. Overall, the net difference in costs between hospital and home care will depend on the balance between inefficiencies due

to travel and due to hospitalisation and the overhead costs of maintaining higher or lower levels of hospital capacity.

Elective Resource Centres and community hospitals fall somewhere within the range between home care and DGH. Both offer some potential for saving overheads at the DGH by reducing the capacity needed there. However, this is achieved only at the cost of additional overheads and some duplication of facilities at the extra, less acute, sites. Assuming space is available at a DGH site to admit less acute cases, the site overhead costs of extra local hospital sites may make the less acute hospital models appear expensive to health authorities. Certainly release of site assets has been a factor in the run-down of non-DGH hospitals. For the Elective Resource Centre, the degree of duplication of diagnostic and other facilities will also affect total costs. If the local demand for different facilities is easily partitioned, e.g. requiring two machines, one of which can meet the DGH demand and the second the Elective Resource Centre demand, then there may be no significant duplication. Alternatively, if equipment is used only intermittently and there is spare capacity at the DGH, duplication at the Elective Resource Centre will increase total costs. However, this problem may be overcome for some services by providing mobile facilities, e.g. MRI and cardiological investigation.

Overall, it is not clear how far the alternative models offer real savings for the NHS. Some models may lead to an increase in total hospital capacity, less efficient use of DGHs during lulls in emergency demand and higher costs. It is not clear how high these costs might be, compared to the savings from reductions in inefficient extra treatments at the DGH. The literature on alternative models of hospitals does not provide a basis for assessing these costs.

FUTURE HOSPITAL PROVISION – WHAT MIX AT WHAT PRICE?**What is Worth Providing?**

As noted earlier, it is easy to become romantic about community hospitals and other models of care away from the high tech DGH. Even the outgoing Minister of Health was becoming enthusiastic in 1996, following a relatively uncontroversial report setting out the basis for defining the role of community hospitals in the future,⁷⁶ though perhaps with an eye to the impending election and some rural marginal seats. But what can be provided in practice? Paradoxically, we might find that the most appropriate place for the alternative models of hospital care is not the rural areas where they have often operated in the past but in urban areas. Research on the role of community hospitals in urban areas is on-going.⁷⁷ Urban areas have the advantage that they have a large enough population to justify sufficient hospital capacity to be spread between different types of provider. For example, if we accept that for financial as well as clinical reasons, the NHS is moving to a level of hospital capacity of around two beds per thousand population, an urban centre of 500,000 people would have about 1,000 hospital beds. These could be arranged in a number of ways to offer different models of care relatively close to each other. Of course, here the justification for different models is not patient travel, which may be much less in urban areas and possibly increased by centralisation of less acute care in some sites. Typically, different service models have been seen as a way of making the best use of the available buildings, in the absence of capital to develop the major DGH.

In rural areas, the journey to a more centralised DGH may be greater than in the past. But it may be naïve to assume that other models of care can predominate. A community of 40,000 – a market town for example – would be funded by the NHS for acute care requiring the use of about 80 acute hospital beds. A proportion of these would need

to be in the nearest DGH for serious emergency cases and complex surgical cases, leaving potentially small numbers of beds for a local community hospital or within a larger, and perhaps more distant, Elective Resource Centre. While it is difficult to assess the exact threshold for patients needing care in a community hospital, it seems unlikely that as many as 50 per cent of inpatients would fall into this category, given the moves to shorten length of stay in DGHs to the acute part of the episode only. If 25 per cent of local inpatient care needs could be met from a community hospital, giving it 20 beds, we might have an appealing, low-tech model of care. But a community of 40,000 will generate about 8,500 cases per year³⁷ or 170 cases a week. Unless the caseload is carefully managed, there is a real danger that fluctuations in demand will rapidly leave the local community hospital unable to cope. (Consider the inefficiencies that would occur if each hospital ward in a DGH could only admit patients from a particular town. This would impose a great loss of flexibility, similar to that which would occur with fragmented hospital capacity in community hospitals in rural areas.)

It is also important not to overlook the relative rarity of a hospital admission. In an era where more and more shopping is undertaken by car, where many children are driven substantial distances to school every day and where access to a car in the extended family is high, a journey to hospital for inpatient care every few years is not a substantial cost burden. Of course, not everyone has access to a car but in rural areas, the areas most affected by hospital centralisation, a car is almost an essential for daily living and most people have access to some transport. The number of non-emergency inpatients that would need hospital transport to a more distant DGH is also small, compared to the number of patients already moved by ambulance to outpatient

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and day hospital facilities and the cost of transporting the extra inpatients would not be prohibitive, particularly as they would require little in the way of support for the journey.⁷⁸ The greater cost of travel falls on visitors (and on more frequent outpatient attenders). However, while their costs are of equal relevance to an economist prepared to consider all costs wherever they fall, it is hard to see a financially challenged NHS agreeing to fund all visitors' costs and withdrawing funds from direct patient care to do so.

Although based on limited data, the pressure for concentrating hospital care, in fewer centralised general hospitals, is considerable. To counter it, the case for alternative models of care needs to be strong. It is possible that in urban areas particularly, where the local catchment population will generate large numbers of cases of each type and level of dependency, a case for alternative types of hospital could be made, not least because such sites are often a part of a 'centralised' DGH forced to occupy several sites as an interim measure. Community hospitals in urban areas could avoid the logistic problems of small numbers that are always likely in rural areas and elective surgical hospitals might operate efficiently, given the large total local caseload and the scope for separating risk groups within it. Currently, we lack the range and quality of data necessary to build a strong case for such models of hospital care, and also for alternatives involving more care at home. While outpatient and chronic disease care seem likely to be transferred increasingly to primary care, even here the full impact on costs and outcomes is not known. For patients assessed as benefiting from hospital care, the relative costs and benefits of community hospitals and DGHs serving large communities are simply not clear.

What do the Commissioners Want?

Although the Labour government has pledged to remove much of the internal market created by the NHS Reforms, they are likely to retain the separation of commissioning from providing of services. A form of District Health Authority, with advice from local commissioning teams led by GPs, is the expected model. What are they likely to buy from the array of services that could be provided?

DHAs in the recent past have driven much of the concentration of services into fewer sites and the dominant model of the DGH for acute care has been strengthened. This is partly due to financial factors. Faced with continuing pressure on budgets and the necessity of a local acute hospital, smaller, less acute hospitals are the easiest hospitals to close. This releases savings on site overheads and running costs that can fund additional activity in the DGH. Some health authorities have been innovative in purchasing new models of home care and community services but few if any have embarked on a strategy for more small hospitals. Where this has been done, e.g. in Medway, the strategy is based on urban community hospitals with a large catchment population and also on providing some services in towns with a much loved local hospital that is to close. Even in Medway, the strategy consolidates the central role of the DGH within local acute services.

GP fundholders may be more likely to support local small hospitals, since they may work in them and they are well placed to appreciate the value placed on them by patients. Some fundholders joined the scheme largely to protect services, rather than to change them⁷⁹ so we might expect to see fundholders keep their contracts with such hospitals. However, there are several counter-pressures, aside from the potential threat to fundholding from the Labour government. The first is that

FUTURE HOSPITAL PROVISION – WHAT MIX AT WHAT PRICE?

fundholders have incentives to develop their own services and facilities on site, potentially withdrawing some services from the local small hospital. They also face the strong professional stance of the consultants that, for acute care, the centralised DGH model is more appropriate. Lastly, there may be opposition from local GPs who do not use the local small hospital. Fundholders may also be too small as purchasers to support a community hospital if the DHA is less supportive and fundholders face the risk of having to bear an increasing share of the overhead costs of the hospital. As a result, fundholders may not always support their local hospital and future commissioning groups of GPs may similarly not always do so. Equally, if commissioning groups feel empowered but, unlike fundholders, do not feel tightly tied to a budget, they may press for the retention of community hospitals as an additional service. But given the probability that the medical staffing of community hospitals will fall on GPs, they may be less enthusiastic about local small hospitals than their patients would like.

Commissioners of all kinds may develop further the various models of community care as an alternative to developing hospital services. But the simple fact of the continued existence of an acute hospital service, even if that is located in fewer places, means that the acute hospital will always have priority in spending plans. This may not necessarily be the best investment for health gain but acute hospital services are likely to continue to be the source of greatest cost pressure, due to clinical innovations, and to absorb a large share of the commissioners' funds.

A PLAUSIBLE FUTURE?

In my view, if primary care begins to become more heterogeneous, as a result of the flexibility first proposed in the Conservative Government's White Paper, 'Choice and Opportunity',⁵⁴ the NHS may begin to develop a number of models of care outside hospital. These could include large, comprehensive outpatient centres, where GPs combine general and some specialist practice, minor A&E facilities and a range of diagnostic facilities, available directly or intermittently. Some topping up of NHS contributions might occur and diversity might lead to a gap between the services in rich and poor neighbourhoods. But it seems less likely that these will expand to provide inpatient care on any scale, given the limited efficiency of such models in rural areas and the style of general practice in urban areas. GPs are increasingly moving away from a 24 hour contract and even in market towns some do not wish to join the clinical teams of local hospitals, because of the additional time commitments.

In urban areas we will find smaller, leaner DGHs with short stays, large numbers of day cases and a comprehensive range of specialties supporting a comprehensive A&E service. We may also find some Elective Resource Centres and community hospitals in urban areas, where the overall bed capacity can make these models workable. But the advantages of such services, aside from the avoidance of expansion of the DGH site, will need careful assessment. At present, policy is driving us rapidly towards fewer and fewer comprehensive DGHs, which make the best use of capacity close to technological services as the total number of beds falls. If we are to challenge this thrust, which is driven substantially by short-term capital and longer term training issues, we will need better evidence on the quality of care, costs and feasibility of the alternative models than we currently possess.

My own view, based on a large number of local hospital planning studies, is that for a rare, acute, hospital inpatient episode, well-

A PLAUSIBLE FUTURE?

informed individuals may prefer to minimise risks (or the perceived risks) by being treated in a DGH almost regardless of how small the risk of an adverse event might be. Even within the NHS, patients travel very long distances, from time to time, in order to get more rapid treatment. The benefit of a shorter journey to hospital, once every five years on average, seems small, below £50 for a journey of an extra 40 miles to hospital, and the effective cost in cash may be even smaller, with assistance from hospital transport in cases of serious hardship. It may be cost-effective to increase the number of sites where some elements of acute care are provided, given the reduced travel costs, and it may be that outcome is not affected. But I am left wondering why I would want to consider bearing any extra risk, when my condition deteriorated, that I would not have access to a comprehensive set of facilities and skills. The savings from less travel are small and relatively infrequent.

More generally, the practical problems of obtaining efficient utilisation of less acute hospitals may mean that they are always more costly than simple cost per case estimates would suggest. This still leaves a role for non-DGH models of care, e.g. for terminal patients, and the nursing home sector provides a very large amount of this kind of care. The case for yet more models of care, offering better access but not much else, remains, for me, unconvincing.

Overall, it seems too early to report the demise of the centralised, comprehensive DGH, (as defined by the recommended breadth of services supporting accident and emergency departments) whatever the drawbacks for patient access from fewer hospital sites. But one thing is relatively clear. Patients in the future will increasingly come to resemble the patient in a recent cartoon, whose doctor is saying to him:

“You have something extremely rare – a hospital bed!”

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Hospitals are institutions with ancient roots and this thoughtful paper about the evolution of the UK hospital system charts its history before confronting the issue of its future.

The hospital bed stock has declined rapidly in the recent past and hospital closures affect patient access and use. How many hospital beds are needed and where should they be located? What are the future roles of the centralised District General Hospitals and smaller cottage hospital units?

Dr West argues that the lengths of stay in hospital will decline: in comparison to the USA, UK lengths of stay remain high even though they have declined sharply in recent years. Also day care will expand and more procedures will be done in the community. All these trends need careful evaluation and management, especially the trade-off between local care with rapid access to emergency procedures (e.g. after a heart attack) as opposed to travel to more specialised units where outcomes may be better but travel time might be fatal. The author concludes with reference to a recent cartoon in which the doctor is saying to the patient: “You have something extremely rare – a hospital bed!”