

TALKING POINT

Strategic planning of acute beds by specialty

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Some of the problems facing the Health Service today have been exacerbated by inappropriate provision of beds. This paper describes a method used by one regional health authority to provide more relevant indications of likely requirements by specialty.

After the NHS reorganisation in 1974 planning activity became formalised, with the advent of systems for strategic and operational planning. There is little evidence, however, that the development of new methods for planning is receiving the same attention as the development of the systems themselves. While the existence of a suitable framework may help the planning process, little progress will be made in improving the Health Service unless the plans are appropriate for the problems.

Planning can be approached in two ways. The first is by in-depth studies of needs, treatment options, and outcomes, including cost benefit analyses. Such studies are essential for long-term development but at present are contributing little towards solving immediate practical problems in the distribution of resources.

Alternatively, we could assume that over the next 10 years health care patterns are unlikely to deviate grossly from current practices and recent trends and, by using routinely collected statistics, we could attempt to derive simple indicators or "norms" for future requirements. Unfortunately, though based on average current practices and performances and therefore intended as broad guidelines, such norms are often taken as exact measures and remain in common use long after becoming obsolete. Despite these and other limitations this pragmatic approach is better than waiting for perfection and it was used for this study.

We have concentrated on strategic planning for beds in the basic acute specialties and have excluded regional and national services. The norms for beds currently used by the Trent RHA were determined from national guidelines for total provision and were last revised about nine years ago. By restricting the scope of the work to updating these norms and creating an appropriate method for continuous monitoring we hope to have an immediate impact on medium-term developments in inpatient care. Operational planning at area and district level will require a different method, such as that described by Butts and Ashford,¹ which takes more account of local factors.

The purpose of the study was to enable the RHA to guide area health authorities on their bed requirements, to provide guidelines for capital planning, and to help assess strategic plans. Planning must be comprehensive and the inpatient work load analyses described will be used later to determine the implications for manpower and other services.

Method

The factors affecting bed requirements can be divided into two broad types. Firstly, there are those over which the hospital service has little or no control, such as size and structure of the catchment

population and the morbidity and expectations of that population. The second type depends on hospital clinical and organisational practices, such as length of stay, turnover, and policies about day treatment. Though as many significant factors as possible should be taken into account it is necessary not only to establish their relation to the number of beds required but also to have reliable information about each factor in the future. Thus the socioeconomic structure of the population, while a potentially important indicator of need, had to be excluded on the grounds that too little reliable evidence exists to quantify its effect. The considerable variations in demand according to age and sex were, however, taken into account.

When regional or national averages are used, projections based on past trends are likely to be more realistic than consensus medical opinion, even if this could be obtained. This is probably because changes over, say, the next 10 years often seem unacceptably dramatic and difficult to imagine under present conditions, even though equally dramatic changes have occurred recently. Existing demands and their projected trends as indicated by hospital activity statistics were therefore used as surrogates for need in establishing required future admission levels. Expressed demand is, of course, influenced by supply and therefore adjustments were made where demand had evidently been depressed by lack of facilities.

An analysis of existing and projected levels of the utilisation of beds then enabled us to determine the number of beds required. The factors affecting the use of beds in individual hospitals are subject to local variations, such as medical staff levels; but because we are concerned here with strategic planning and monitoring average values can appropriately be used. Data on the Trent Region (population 4.5 million) were used throughout the study in preference to national data since it is likely that the differences between the averages for this region and national averages will persist well into the future. Additionally, regional data are always more up to date and will permit continuous monitoring. The analyses described below were applied to seven groups of specialties—1976 being the base year (table I).

TABLE I—Comparison of Proposed Bed Requirements in 1988 with current norms Beds per 1000 population in Trent RHA

Specialty group	Proposed requirement	Current norms
Medical	0.88	0.79
ENT	0.06	0.12
General surgical .. .	0.69	0.66
Trauma and orthopaedic	0.55	0.44
Gynaecology .. .	0.24	0.25
Ophthalmology .. .	0.06	0.09
Paediatrics .. .	0.10	0.15
	2.58	2.50

Admission rates

Trends in demand rates (admissions plus change in waiting lists) were examined for seven years, 1970-6. Had national data been used this could have been done for each age and sex group from the Hospital Inpatient Enquiry (HIPE), but for a regional analysis data had to be taken from SH3.* Nevertheless, by using current age and sex admission rate data from Hospital Activity Analysis (HAA) some adjustment could be made to these trends to take account of changes in population structure during these years. Periods for which it is reasonable to project these trends depend on the length of time for which they have been consistent. The principal reason for the projection is to show the likely direction and pace of future changes in demand and it is not necessarily appropriate to project trends to

*Hospitals give details of bed and patient numbers to the DHSS on form SH3.

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the full extent of the 10-year strategic planning period. If large changes are indicated a shorter span may be preferable, with monitoring of the changes that actually occur. But in this study 10-year projections to 1986 were made and are considered to be realistic.

To determine whether demand was being artificially depressed in the surgical specialties by current lack of resources demand rates in the clinical centres in the region were considered in relation to waiting times before admission. In all specialties, except ENT surgery, this showed that in places with long average waiting times demand rates would be likely to increase if waiting times were appreciably reduced. The required amount of adjustment to the demand rate therefore depended on the average waiting time chosen; but there is no agreed optimum and so we used the waiting time that needed to be achieved if no patients were to wait more than one year, a current Department of Health and Social Security standard. While we are not suggesting that this DHSS minimum standard should necessarily be regarded as acceptable we used it in this study since in the major specialties it is unlikely to be achieved in the Trent Region during the strategic planning period. The result was to enhance demand rates by up to 13% above the regional averages according to specialty. [A detailed description of the method used for these adjustments to waiting time can be obtained on application to the authors (BWR).]

In some specialties we also had to allow additional capacity to remove large backlogs in the waiting lists, which would not be dealt with by facilities planned to meet only new demand. Further adjustments to demand rates were therefore made to allow these lists to be reduced to the DHSS standard within five years of applying the new norms for beds. For medical specialties without waiting lists districts with abnormally low demand rates likely to have been caused by inadequate provision were excluded from the calculation of demand rates. This gave increases of up to 7% above regional averages. The final results from the demand calculations were estimated rates for each specialty for 1986.

Lengths of stay

Trends in average lengths of stay over the past eight years in each specialty group from SH3 data were adjusted for population structure changes and, as for demand rates, were quite consistent over the data period. They were projected forward by testing alternative assumptions about the trend curves and selecting the most appropriate for each specialty.

Bed usage rates

The percentage changes forecast in admission rates and average lengths of stay were assumed to apply equally to each age and sex group of the population and were applied to the current rates of bed use in each of 12 population groups as determined from an analysis of HAA data.

Bed requirements

To translate rates of bed use into numbers of beds required we then had to postulate appropriate occupancy levels. For each specialty group this was done by considering the percentage occupancy over the past few years, the projected length of stay, and the implied turnover interval. These three factors are related and so, for a given length of stay, the occupancy must be chosen such that the turnover interval is neither too short—one that would be impossible to achieve in practice—nor too long—which would represent an inefficient use of beds. We could have selected one turnover interval for all specialties and from this calculated the occupancy for each specialty by using the appropriate length of stay. There are, however, many unquantifiable differences among specialties showing that different turnover intervals may be appropriate and so we decided to pay due attention to these differences.

Results

The results consist of a table giving the estimated number of beds required per 1000 population for strategic planning for each of the seven groups of specialties and for each of 12 age and sex groups; table II shows the figures for orthopaedic surgery. The bed require-

ments per 1000 total population will depend on the age and sex structure of that population and table I compares the proposed new norms, when applied to the estimated population for 1988 in the Trent Region, with the current planning norms. It seems that orthopaedics and the adult medical specialties will require more beds than the current norms would provide, while for ENT, ophthalmology, and paediatrics the current norms are over-generous.

TABLE II—Strategic planning bed requirements per 1000 population in traumatic and orthopaedic surgery in Trent RHA

Age group	Men	Women
0-4	0.28	0.20
5-14	0.31	0.22
15-44	0.50	0.18
45-64	0.47	0.45
65-74	0.69	1.19
75+	1.59	3.36

Discussion

Much has been written about the dynamics of supply and demand in the hospital service and the relation between available beds, clinical practice, and admission rates.^{2,3} General practitioners' referral habits are also relevant.⁴ Reviewing American published work, Forsyth and Logan remarked that "at any particular time the appropriate number of beds is the number in existence."⁵ Feldstein was unable to calculate any level of provision at which the demand for beds would be satisfied.² Undoubtedly a constraint on beds could be used deliberately to modify clinical practice and patients' expectations; but there are still no agreed standards for "good practice," efficiency in the use of resources, or level of service to which the public is entitled that could be safely used for estimating the number of beds required.

Clinical practice may have been leading the availability of beds to some extent rather than following it. Though there was financial growth from 1969 to 1975, the level of beds available in England fell from 3.6 to 3.4 per 1000,⁶ showing that options other than maintaining existing levels were chosen for the expansion that took place in the service. Furthermore, though beds have been readily available in the Trent Region in recent years in paediatrics, ophthalmology, and ENT, the average lengths of stay have continued to fall.

Our results represent our present best estimate of the future requirements for beds at the average regional level, though unforeseen changes in clinical practice could substantially alter the shape of the trends that have been extrapolated. We do not claim to be precise in our estimates but suggest that the results show important changes in present and future needs between one specialty and another. For instance, in several specialties in this region the existing provision lies between the present norm and the predicted value for 1988. Thus continuing to plan according to the existing norm would be to act in a direction opposite to the one apparently required and, for example, medical beds would be reduced when they should be increased. Below RHA level the norms should be used as guidelines only, since each area or district will have specific local circumstances that may affect their acute bed requirements. Apart from general questions of morbidity, the levels of both local authority services and of geriatric beds will have important consequences for the acute sector. In addition, present policy recommends that up to half the geriatric beds should be located in the district general hospital, and if there is to be a reintegration of geriatrics and general medicine this ought effectively to increase the number of beds available for acute medical conditions at all ages.

If medical practice and innovation are to determine resources rather than vice versa their effects should be recognised early and used in the planning process. The method described

enables this to be done, and the requirements for beds can be readily monitored year by year. We do not intend that annual monitoring should be followed by continual adjustments to bed allocations, but early warning would be provided of major changes in clinical practice leading to further inquiry about their significance. If this had been done sooner for orthopaedic surgery—with recognition of the increasing work load related to the elderly in general and joint replacements in particular—the present waiting lists might have been smaller.

IMPORTANCE OF FLEXIBILITY

If we are to make the best use of available resources an essential principle of hospital provision in future must be the flexible use of beds. Modern ward design allows for this, though in older hospitals bed allocations among specialties and between sectors will often have to be rounded off to suit ward sizes. As children's requirements for beds will depend directly on the numbers of children, which can vary substantially from year to year, special care will be needed in planning for them.

The overall projected requirement for the region of 2.58 beds per 1000 population is close to the present norm of 2.50. Furthermore, the whole of the increase can be attributed to the increased age of the population in 1988. The existing provision is 2.54. At the outset it was not known where the study would lead and the predicted requirement might have been considerably different from the existing norm. If it had been less there would have been no problem but an appreciable increase would have called for policy decisions about priority, either between the acute sector and others or perhaps between specialties within the acute sector. Such decisions may need to be taken as a consequence of further developments in, say, joint replacements and coronary artery surgery. Population projections to the decade beyond 1988 suggest a levelling off in numbers of people over 65 and 75, so at present further pressure does not seem likely to come from purely demographic changes. Though the effect of the elderly population on this region as a whole does not seem great in the acute specialties, it will cause considerable variations in the total requirements for acute beds

among AHAs from below 2.5 to over 2.7. For a long time we have accepted that the provision of geriatric beds should be based on the proportion of the elderly in the population but this is a new idea for the acute specialties. Adjustments would also be required in capital planning assessments.

The apparent overall stability in the requirements for acute beds for the next 10 years shown by our study should not be allowed to conceal the considerable predicted increase in work load through these beds. Increases in admission rates, from 12% for ophthalmology to 60% for orthopaedic surgery and paediatrics, have been forecast in all specialties except ENT. The limiting factors in such expansion may well be shortages of medical and nursing staff and finance rather than beds.

How far does the conformity of our calculated overall future requirement with the present provision of beds in the region depend on the constraints already imposed by the existing provision? In view of our economic expectations perhaps the continued presence of those subtle brakes on demand is essential if the Health Service is not to be overwhelmed.

If so, the current obsession with publicising the extent of unexpressed demand will be disastrous if successful and a terrible waste of effort if not. Perhaps the final arbiter has to be the level of public tolerance.

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Further withdrawal of pay-beds

Despite the present Government's intention to legislate shortly to restore the power to authorise pay-beds in NHS hospitals where there is a demand for them, the Secretary of State is legally bound to implement proposals for the withdrawal of pay-beds until the Health Services Board is abolished. The latest set of proposals—the seventh (HMSO, 70p)—have to be implemented by 1 January 1980.

The effect of the withdrawals will be as follows:

	Current pay-beds	Proposed reduction	Pay-beds after 31 12 79
England	2559	157	2402
Scotland	114	19	95
Wales	39	3	36
Total	2712	179	2433