For Debate . . .

Impact of cuts in acute beds on services for patients

R BEECH, S CHALLAH, R H INGRAM

Abstract

The current redistribution of resources in the National Health Service will require a reduction in the number of acute beds in many district health authorities. The effect of such a reduction on services for patients was examined. Two hundred and two general medical admissions and 201 general surgical admissions to hospitals in West Lambeth District Health Authority were reviewed retrospectively. The elements considered were the severity of the patient's illness at admission, the scope for reducing the length of stay, the potential for other forms of care, and what types of patients would be denied access at different levels of reductions in the number of beds.

Given the assumptions a considerable potential for maintaining levels of service with fewer beds was identified. The finding was, however, that even if all of this potential was realised the cuts in the number of beds that are planned by districts that are losing resources would force real reductions in patient services. This suggests a "trade off." To increase services in districts that are gaining resources, real unmet need may have to be created in districts that are losing resources.

Introduction

The current subregional policy in the National Health Service entails transferring resources from districts where services are deemed to be relatively overprovided to fund developments in less privileged districts. Implementing this policy means reducing the numbers of beds in districts that are losing resources, which include not only the vocal London authorities but others outside London (table I).[1 2]

The impact of cuts in the number of acute beds for patients in the district health authorities that are losing resources has not been studied. One characteristic of such districts is their high rates of hospitalisation—that is, the number of cases treated per 1000 population. Is this because such districts set the threshold for admission to hospital so low that patients are needlessly admitted? If not, can services be maintained with fewer beds by providing other types of care and reducing the length of stay? Which patients will no longer be treated if services cannot be maintained? These questions face all authorities losing resources. Our study explored these issues in West Lambeth, an inner London teaching district. Although West Lambeth hopes to avoid cuts on the scale indicated in table I, it plans to reduce the number of beds in general medicine and general surgery (which together account for 40% of the district's workload of acute illness) by 27% and 25% respectively.[3]

TABLE I—*Planned reduction in the number of district acute beds, 1983-93*

Region and district	Percentage reduction in numbers of beds
South East Thames:	
Bromley	36
Camberwell	18
Greenwich	15-11
Lewisham and North Southwark	30
West Lambeth	35
North Western:	
West Lancashire	25
North Manchester	34
Central Manchester	25
South Manchester	20
Salford	19
Rochdale	25

Recent Department of Health and Social Security performance indicators[4] suggest that West Lambeth is efficient compared with national averages: cost per acute inpatient case was 4% below expected cost; lengths of stay in general medicine and general surgery, standardised for age and case mix, were respectively 2% above and 14% below expected. In addition, bed occupancy at the district's main acute hospital is roughly 90%, which rules out a reduction in turnover interval as a means of maintaining services with fewer beds.

Given these data how will services be affected by the planned reduction in the number of beds? This question was examined by studying the cases of individual patients admitted to acute beds. The elements considered in the study were severity of illness at time of admission, the scope for reducing the length of stay, the potential for other forms of care, and the types of patients who would be denied access at different levels of reduction in the number of beds. The cases were assessed independently by the two of us (RHI and SC).

Methods

Discharge summaries were reviewed for patients in a random sample of 202 general medical and 201 general surgical admissions that was stratified by which consultant looked after the patient. The period covered was one year from May 1985 to April 1986. Summaries were analysed in preference to complete case notes because they were more readily available. In addition, because the method might be used in National Health Service planning it had to be quick and repeatable. A pilot study had indicated that the findings were not substantially affected when complete case notes were analysed.

Admissions were assigned to categories (table II), which were based on the

Department of Community Medicine, United Medical and Dental Schools of Guy's and St Thomas's Hospitals, London SE1 7EH

R BEECH, MSC, research fellow in operational research
S CHALLAH, MSC, BM, lecturer in community medicine
R H INGRAM, MD, visiting professor

Correspondence to: Mr Beech.

TABLE II—*Description of categories of admission*

Category	Description	Example
Emergency	Possibility of imminent death or disability if not admitted	Acute myocardial infarction (medicine); perforated duodenal ulcer (surgery)
Urgent	Possibility of death, disability, or increased morbidity within hours to days if not admitted	Rule out acute myocardial infarction (medicine); suspicion of acute surgical abdomen (surgery)
Semiurgent	Within days to weeks problem will possibly become greater if not handled with admission	Investigate chronic gastrointestinal bleed with anaemia (medicine); gradually worsening intermittent claudication with peripheral vascular disease (surgery)
Elective	Lower probability of serious trouble within weeks	Colonoscopy with biopsy in an elderly infirm patient (medicine); cholecystectomy for gall stones (surgery)
Alternative	Admission to an acute inpatient bed could have been avoided by treating the patient in an alternative manner, but alternative does not represent a category of severity less than elective since many urgent and semiurgent problems can be handled on a day case basis	Day case procedures; outpatient investigations; nursing home care; rehabilitation facility

TABLE III—*Description of length of stay categories*

Category	Description
Zero	Inpatient admission could have been avoided by treating the patient in an alternative manner
No change	Inpatient length of stay was justified
A	Stay could have been reduced by three days or less
B	Stay could have been reduced by more than three days but less than or equal to seven days
C	Stay could have been reduced by more than seven days

TABLE IV—*Percentage of admissions by category*

Admission category	Percentage (No) of admissions			Percentage (No) of bed days		
	General medicine (n=202)	General surgery (n=201)	Overall	General medicine (n=2227)	General surgery (n=1793)	Overall
Emergency	23·8 (48)	20·4 (41)	22·1	21·1 (470)	27·1 (486)	23·7
Urgent	38·1 (77)	10·0 (20)	24·0	40·6 (904)	21·9 (393)	32·3
Semiurgent	19·3 (39)	16·4 (33)	17·9	27·4 (610)	26·5 (475)	27·0
Elective	13·4 (27)	28·3 (57)	20·8	8·8 (196)	17·2 (308)	12·6
Alternative	5·4 (11)	24·9 (50)	15·2	2·1 (47)	7·3 (131)	4·4

judgment of the observers, but suitability for day case surgery was assessed using the Royal College of Surgeons guidelines.[5] The purpose of the categories for inpatients was to generate a qualitative assessment of the types of patient that would be denied admission at different levels of reduction in the numbers of beds. The designation "alternative" was largely theoretical as the other forms of care that were suggested were either unavailable in West Lambeth or insufficient.

Each case was also assigned to a stay reduction category (table III). Two mechanisms for reducing length of stay were considered: (*i*) better management of stay, leading to a reduction in days at both the beginning and the end of a patient's stay provided that this was unlikely to affect outcome; (*ii*) transfer to a non-acute unit such as a nursing home or rehabilitation centre (regardless of whether such facilities were actually available in West Lambeth).

If the patient's home circumstances were not mentioned in the discharge summary it was assumed that these presented no barrier to reducing the length of stay or to day care. If no preoperative problems were mentioned a preoperative stay of more than one day was attributed to poor scheduling of theatre time, and, finally, unimpeded recovery was assumed unless postoperative complications were described. The estimates of the reduction in the length of stay and potential for day care were therefore optimistic. When reviewing admissions radical changes in either clinical practice or management were not assumed because such changes were not considered feasible in the short term. This point is discussed at the end of the paper.

The degree of initial concurrence between the two observers was assessed as follows. Firstly, for admission categories "alternative" indicated that an admission could have been avoided, whereas the other categories were on a continuum of admission from "elective" to "emergency" (table II). Agreement was defined as the use of the same or adjacent inpatient categories or when both observers used the "alternative" designation. Initial observer agreement for general medicine was 90% and for general surgery 92%.

For the length of stay categories "zero" indicated that inpatient admission could have been avoided. The other categories described "appropriate admissions" on a continuum of reduction in stay from "no change" to "C" (table III). Agreement was defined as both observers using the same or adjacent inpatient categories or both using the "zero" designation. Initial observer agreement for general medicine was 78% and for general surgery 80%.

The two observers met to discuss the differences. In all cases differences were resolved by the joint reanalysis of the discharge summaries. Initial differences were often due to the failure by one observer to note that a patient's age or place of residence made day surgery inappropriate, to note the patient's seemingly long preoperative stay, or to calculate the patient's stay correctly.

Results

The results are shown by admission category in table IV. The overall figure is weighted for the relative actual caseloads of general medicine and general surgery. The "alternative" category is the one of interest if the impact of closing off beds on the levels of services is being considered. Overall 15·2% (61) of patients admitted were thought to be treatable in another manner (24·9% (50 admissions) for general surgery). These "alternative" category cases, however, accounted for only 4·4% of overall bed days (7·3% (131 days) for general surgery). Table V shows what type of care was considered appropriate for each "alternative." Day surgery was the most promising of the forms of care as it would have reduced inpatient admissions by 12·2%, though overall these accounted for only 3·2% of bed days. Table VI shows the potential for reducing the length of stay of "appropriate" admissions. To achieve the high potential saving in bed days from the better management of patient stays, not only must clinical behaviour change but organisation, scheduling of theatres, and diagnosis and treatment must also be improved.

TABLE V—*Type of care required by alternative cases*

Alternative care	Percentage (No) of admissions			Percentage (No) of bed days		
	General medicine (n=202)	General surgery (n=201)	Overall	General medicine (n=2227)	General surgery (n=1793)	Overall
Day surgery	1·0 (2)	23·4 (47)	12·2	0·1 (2)	7·0 (125)	3·2
Outpatients	2·5 (5)	0·5 (1)	1·5	1·0 (23)	0·1 (2)	0·6
General practitioner care	1·5 (3)	0·0 (0)	0·8	0·5 (11)	0·0 (0)	0·3
Hospice	0·0 (0)	1·0 (2)	0·5	0·0 (0)	0·2 (4)	0·1
Nursing home	0·4 (1)	0·0 (0)	0·2	0·5 (11)	0·0 (0)	0·2
Total	5·4 (11)	24·9 (50)	15·2	2·1 (47)	7·3 (131)	4·4

Discussion

To assess the implications of a 27% reduction in beds in general medicine and a 25% reduction in beds in general surgery on services for patients several assumptions were made: (*i*) the

TABLE VI—*Potential for reducing lengths of stay and actions required to achieve this*

Action required	Percentage (No) of total bed days saved: General medicine (n=2227)	General surgery (n=1793)	Overall
Better management of stay coupled with improved organisation of ancillary services	13·5 (301)	9·5 (170·5)	11·7
Discharge to rehabilitation beds	7·1 (158)	2·8 (50·5)	5·2
Discharge to nursing home	2·8 (63)	1·7 (31)	2·3
Discharge to hospice	0·7 (15·5)	0·0 (0)	0·4
Outpatient care	0·0 (0)	0·3 (5·5)	0·1
Psychiatric care	0·0 (0)	0·5 (9)	0·2
Total	24·1 (537·5)	14·8 (266·5)	19·9

demand for care and the practice of general practitioners would not change; (*ii*) bed occupancy could not be increased; and (*iii*) the scope for new investment in nursing home beds or rehabilitation beds by a district with falling resources was limited. Hence better management of a patient's stay, with improved organisation of ancillary services and greater use of outpatient departments were regarded as the main ways of reducing length of stay. If services for patients had to be reduced it was assumed that this would be in order of decreasing severity.

Table VII summarises the implications of a reduction in the number of beds. Points on a continuum in terms of reductions in beds are indicated. The maximum point in each column represents the planned reduction in numbers of beds. The minimum point indicates the current position, with the number of general medical beds already reduced by 11% and general surgical beds by 12%. (The survey was based on a period before this reduction.) There are two interim points on the continuum to show the gradual diminution in services. Policy options are indicated for minimising the impact of these reductions in the number of beds on the levels of services.

The results suggest that in both specialties better management of a patient's stay and improved organisation of ancillary services would lead to reductions in length of stay. If this potential was fully realised the reduction in general medical beds that has occurred could have been accommodated without adverse effects on levels of services. Realising this potential and making increased use of outpatient, day, and general practitioner care would allow further cuts in numbers of beds, but an overall cut of more than 15% could be accommodated only by cutting the number of elective cases. If the maximum planned reduction in numbers of beds is implemented no elective cases could be treated, and there would be some reduction in semiurgent admissions. In general surgery the point has already been reached where cuts in services can be avoided only if the potential for reductions in length of stay is realised and the use of day case surgery increased. If the Royal College of Surgeons guidelines for day care are followed and investment in facilities is made there is the potential to cut the number of beds by roughly 17%. From then on there would have to be cuts in the number of elective cases. The maximum planned reduction in beds of 25% causes, in bed days, a 75% cut in admissions for elective surgery. Note that this finding cannot be derived directly from the information given in tables IV and VII because some elective bed days would be saved by the better management of the patients' stay.

The cuts in elective admissions resulting from the planned reduction in the number of beds would lead to arbitrary decisions about whom to admit. Given the existence of waiting lists rationing already exists, but as the numbers of beds are reduced the need for rationing would increase. The implication of an elective admission to general medicine is different from that in surgery. Failure to perform an endoscopic sphincterotomy or sclerotherapy for oesophageal varices is likely to lead to a more severe, urgent, and even dangerous condition. Thus the term "elective" refers only to timing. It might be argued logically that deferring indefinitely the elective repair of an asymptomatic, reducible inguinal hernia is more acceptable than delaying the excisional biopsy of a breast nodule; yet if the hernia strangulated within the interval and the breast nodule turned out to be benign fibrocystic disease the wrong choice would appear to have been made. Similarly, it might be argued that the results from an urgent gastric resection for carcinoma are predictably so poor in the long run that an elective cholecystectomy for gall stones and recurrent cholecystitis is a better investment. In making the argument the chance, albeit a small one, of cure after a resection is forfeited. It is doubtful whether the profession or the society it serves is willing or able to deal with such questions.

TABLE VII—*Policy options for managing a reduction in general medicine beds and general surgery beds*

Percentage cut in numbers of beds	Policy option	Percentage of beds saved by this option	Shortfall	Further option
	General medicine			
11	Better management of stay, coupled with improved organisation of ancillary services	13·5	0	None required
15	As for 11% reduction plus increased use of outpatient, day, and general practitioner care	15·1	0	None required
20	As for 15% reduction	15·1	4·9	Severe reduction in elective caseload
27	As for 15% reduction plus no elective cases treated	21·2	5·8	Reductions in semiurgent caseload
	General surgery			
12	Better management of stay coupled with improved organisation of ancillary services. Increased use of outpatient and day case care	16·9	0	None required
15	As for 12% reduction	16·9	0	None required
20	As for 12% reduction	16·9	3·4	Reductions in elective caseload
25	As for 12% reduction	16·9	9·4	Severe reductions in elective caseload

The implications of moving a district towards a position where it treats few elective admissions are far reaching because these cases generate elasticity in the use of beds. Pressure on beds is usually met by reducing elective treatment, and as the numbers of beds are reduced it is not clear how sudden rises in demand such as occurred in the winter of 1985-6 will be handled. Furthermore, there may be cost implications of bypassing the opportunity to treat a patient "electively" and waiting until the patient's condition becomes semiurgent before allowing admission. One option would be for districts such as West Lambeth to refuse treatment to non-residents. The proximity and small size of urban districts cause large flows across boundaries. For example, in the North Western Regional Health Authority residents account for less than 80% of the workload in 14 of its 19 districts and less than 70% in eight districts.[2] In London the magnitude of the flows is much greater. In West Lambeth roughly 70% of the patients treated are non-residents. A policy to stop flows between districts makes little sense and would be difficult, if not impossible, to implement. Current funding arrangements also mean that it would be economically disadvantageous for districts that are losing resources, as they receive credit for inflows.[6]

It may be argued that redistribution of resources will result in a

decrease in demand for the services provided in districts losing resources by patients from districts gaining resources. This is because in future they will be able to receive treatment in their local district. The impact of such an effect was explored by assuming that in future no one living outside the London area who did not fall into either the "emergency" or "urgent" category would be admitted in West Lambeth (emergency and urgent patients were assumed to be commuters). Added to policies for reductions in length of stay and alternative care such a development would save only a further 8·7% of bed days. The implication is that although there are large flows across boundaries most of these occur between London districts.

Any method based on judgment and using potentially incomplete information has limitations. Daily clinical practice, however, depends on individual judgment based on whatever information is available, and thus the method used here reflects professional practice. The statistical limitations are easier to estimate; confidence intervals have been calculated. It was estimated that increased use of outpatient departments and the better management of a patient's stay, coupled with improved organisation of ancillary services, could save 11·8% of bed days (95% confidence limits 9·3% and 14·4%). The estimate of the number of days saved by the increased use of day, outpatient, and general practitioner care is 4·1% (95% confidence limits 3·0% and 5·1%). Combining these policies of alternative care and reduced length of stay would save an estimated 15·9% of bed days (95% confidence limits 13·3% and 18·5%). Even the most optimistic estimate would not prevent reductions in levels of services despite it generating appreciable potential for reductions in beds.

If West Lambeth is typical reductions in the number of beds on the scale planned by health authorities who are losing resources are likely to lead to real reductions in levels of services. Tampering with the assumptions made would only affect the point at which these reductions are deemed to occur, not the overall finding. The results are optimistic for two reasons. Day case surgery accounted for most of the inpatient days that could be saved by treating patients in another way. The estimates were based on guidelines laid down by the Royal College of Surgeons. Consultants have criticised these guidelines on two grounds. Firstly, that day surgery is too aggressive for some of the conditions, and secondly, that day cases are unsuitable for training medical students. Should these criticisms block the development of day case facilities then real cuts in services could occur sooner than this study indicates. A second reason for regarding the results as optimistic is that the assumption made about home circumstances in the absence of information is unlikely to have been valid in all cases.

Many health authorities that are facing real reductions in revenue see day case surgery as a means of reducing costs while maintaining levels of services. An interesting result from this study is that according to the Royal College of Surgeons guidelines 23·4% of inpatient admissions for general surgery might have been treated as day cases (table V). Roughly 16% of all general surgery operations in West Lambeth are done on a day basis (assuming all admissions have an average of one operation). Expanding the service along the Royal College of Surgeons guidelines would lead to 35·3% of general surgery operations being done on a day case basis. This finding is similar to Burn's.[7] An expansion in day case surgery, however, would liberate only 7% of general surgery bed days, or roughly a third of one ward. Hence closure of a ward would not be possible and savings in staff doubtful. This leaves the small savings on "hotel" costs. Investment would be needed to expand the day case facility, and extra patients with their associated costs would be likely to use the vacated inpatient beds. The impact of a move towards day case care in general surgery could therefore result in increased total spending rather than a reduction.

Conclusions

This study explored the scope for increases in efficiency in a district that is losing resources. On one hand, because the Royal College of Surgeons guidelines on day case surgery were followed, the assumptions of the paper go beyond what many would consider acceptable. On the other hand, other more radical changes were not considered even though there might have been documentary evidence to support such changes. For example, there is evidence that patients suffering from acute myocardial infarction are better cared for in their own home,[8] but this change in clinical practice has not been widely adopted and was not assumed in the analysis. There is also evidence that the use of industrial engineering techniques in hospitals in the United States has brought about appreciable reductions in lengths of stay,[9] but such methods are largely foreign to the NHS and again were not considered in the case study. The results therefore strike a balance between conservatism and radicalism in their response to bed reductions.

If evidence based on one district health authority, whose situation is not uncommon, is accepted the proposed cuts in the numbers of beds caused by redistribution imply rationing decisions that many—not only clinicians—will find unacceptable. Given the purpose of redistribution—namely, to improve services in "underprovided" district health authorities—the ethical claims for this process are compelling. In a period of low growth it appears that "overprovided" district health authorities will have to consider the radical management and clinical reforms described above if they are to avoid reductions in levels of services. If these reforms are brought about the long term effect of reductions in the number of beds on levels of services may be avoided. Such reforms will take time to develop and implement. So in the short term redistribution implies the following "trade off": unmet need is likely to be created in districts that are losing resources to improve services elsewhere.

We thank the participating consultants at St Thomas's Hospital for their cooperation with this study: in particular Dr R P H Thompson and Mr B Jackson for allowing us to pilot the project, and Mr R G Bevan, senior lecturer in health economics, department of community medicine, for advice.

References

1 South East Thames Regional Health Authority. *Regional strategic plan 1985-1994*. Bexley: South East Thames Regional Health Authority, 1985. (Consultative draft.)
2 North Western Regional Health Authority. *Regional strategic plan 1983-1993*. Manchester: North Western Regional Health Authority, 1985.
3 West Lambeth District Health Authority. *Strategic plan 1985/6-1993/4*. London: West Lambeth District Health Authority, 1985.
4 Department of Health and Social Security. *1984/85 performance indicators for the NHS*. London: DHSS, 1985.
5 Commission on the Provision of Surgical Services. *Guidelines for day case surgery*. London: Royal College of Surgeons of England, 1985.
6 Bevan G, Brazier J. Equity and efficiency: clarifying confusion for English acute hospitals. *Financial Accountability and Management* 1985;1:173-89.
7 Burn JMB. Responsible use of resources: day surgery. *Br Med J* 1983;286:492-3.
8 Mather HG, Pearson NG, Read KLQ, *et al*. Acute myocardial infarction: home and hospital treatment. *Br Med J* 1971;iii:334-8.
9 Enthoven A. *Reflections on the management of the NHS*. London: Nuffield Provincial Hospitals Trust, 1985.

(Accepted 18 December 1986)

What hazards, if any, are there for someone who eats commercially raised mushrooms three or four times a day?

The consumption of mushrooms does not appear to be linked very strongly with food intolerance.[1] All fungi, however, contain a range of non-protein-nitrogenous substances including purines, amines, and amino acids, and excessive consumption could possibly produce reactions in people sensitive to these substances. The case in question does relate to a level of consumption of mushrooms that is unusual. Excessive consumption of any food would exacerbate the effects of minor components and usually alters the overall balance of the diet as a whole, which could result in nutritional imbalance.—D A T SOUTHGATE, head, nutrition and food quality research, AFRC Institute of Food Research, Norwich.

1 Royal College of Physicians and British Nutrition Foundation. Food intolerance and food aversion. *J R Coll Physicians Lond* 1984;18:3-41.