TALKING POINT

Use of operating theatres

A BARR, R H MCNEILLY, SHEILA ROGERS

Adequate operating theatre facilities are essential for the efficient and effective work of any surgical department. National guidelines on the provision of theatres differ substantially from those proposed by the Medical Architectural Research Unit¹ following a survey of existing provision in acute hospitals in England. Irrespective of which, if either, of the two standards is correct, the present restraint on capital investment in the National Health Service means that any increase in surgical treatment over the next few years will have to be achieved, in most instances, through better use of available resources rather than the construction of new theatres. With this in mind, a survey of main operating theatres, excluding maternity and accident and emergency, was carried out in the Oxford Region to determine their use during daytime weekday hours and the extent to which these facilities met the needs of each health district.

Method

During the six-week period from 3 November to 12 December 1980 a special record of the use and staffing was compiled for each of the 86 main operating theatres in regular use in 20 acute hospitals in the Oxford Region. Most of these hospitals have general surgery, traumatic and orthopaedic surgery, gynaecology, and ear, nose, and throat surgery. Specialist paediatric surgery, cardiac surgery, surgery associated with renal dialysis and transplantation, surgery in patients with spinal cord injury, and neurosurgery are carried out only at a single hospital centre in the region. For purposes of the study a theatre session was defined as a morning or afternoon period during weekdays. Weekends and nights were excluded. Where two or more separate operating lists occurred in one period the duration of that session was taken as the sum of these. For an all-day session the time was divided equally between the morning and afternoon periods.

In addition to the special theatre record, a short questionnaire was sent to each of the 150 consultant surgeons in the Oxford Region. Of these, 148 replied in full while the remaining two responded by letter. A separate reply was requested for each hospital in which the consultant worked so that the 148 surgeons produced 193 replies.

Members of the Oxford RHA working party on theatre usage* considered that the duration of the operating session was paramount in reflecting the use of the theatre. While the number and types of operations are interesting, they are less direct measures of theatre occupancy. Thus the analysis, which is reported more fully elsewhere,² was largely designed to identify the characteristics associated with the duration of the session and, to this end, to identify cross-tabulations between the operating theatre survey and the consultant's questionnaire.

* Initial members of the working party were Mr J Chapman, consultant surgeon, Northampton General Hospital; Dr J Kerr, consultant anaesthetist, Nuffield Department of Anaesthetics, Oxford; Dr G Winyard, senior registrar in community medicine; Mr D Poole, divisional nursing officer, Churchill Hospital; and Dr B Mulligan, nursing officer (research), in addition to the three authors.

Oxford Regional Health Authority, Old Road, Headington, Oxford OX3 7LF

A BARR, MSc(ECON), PhD, regional information scientist
R H MCNEILLY, MD, FRCM, specialist in community medicine
SHEILA ROGERS, research assistant

Results

NUMBER AND TYPE OF SESSION

In total, 3657 operating lists were recorded occupying 3609 half-day sessions, which is equivalent to 122 operating lists per day for a population of 2.3 million. Of the total number of sessions, one-third were general surgery, 19% were traumatic and orthopaedic, 15% were gynaecology, and 11% were ear, nose, and throat surgery. Together, these four surgical specialties accounted for three-quarters of the total sessions.

Planned operations made up only 82% of all sessions, a further 5% were emergency-only cases, while the remainder (13%) included emergency cases in the planned lists. Overall, the 2913 sessions containing only planned operations lasted for an average of 182 minutes (standard deviation 71 minutes), whereas the 484 planned sessions with emergencies added lasted for 207 minutes (standard deviation 88 minutes). The relatively short period of use (average duration 87 minutes) combined with a high standard deviation (73 minutes) for the 166 emergency-only sessions highlights the substantial wastage of theatre time associated with this type of service.

SESSION DURATION

The duration of the operating session was calculated to be the time between the first patient being placed on to the operating table and the last patient on the list being removed. These two events had the merit of being common to all theatres and could be recorded unequivocally. It does, however, ignore time spent on preanaesthetic and postanaesthetic care, as well as the time taken to set up and clear the theatre, but, as these services vary between hospitals, it was decided to omit them from this preliminary study.

A session lasting between two and a half to four hours was regarded as "normal" use, less than two and a half hours was considered to be "under use," and over four hours as "extended use." Table I shows the results for selected specialties. Less than half of the sessions fall into the "normal" category, while one-third are regarded as being "under use." Differences occur between the surgical specialties: the highest proportion of "under use" occurred in traumatic and orthopaedic surgery and dental surgery, while that of "extended use" was in plastic surgery and gynaecology. In every specialty the percentage of "under use" exceeded that of "extended use," the highest difference being found in dental surgery.

TABLE I—Number and duration of operating sessions for selected and all specialties

Surgical specialty	Total sessions* (= 100%)	Percentage sessions		
		≤2½ hours	2½-4 hours	≥4 hours
General surgery	1131	29.7	46.9	23.4
Traumatic and orthopaedic surgery	685	39.8	41.5	18.7
Gynaecology	550	32.0	41.5	26.5
ENT	376	26.1	59.0	14.9
Ophthalmology	171	27.5	60.2	12.3
Plastic surgery	167	31.1	41.9	27.0
Dental surgery	147	36.7	57.1	6.2
Urology	110	28.2	47.3	24.5
Other	234	39.3	39.3	21.4
Total	3571	32.5	46.6	20.9

* Excludes sessions where duration was unknown.

These facts clearly show that some scope exists for making greater use of the available resources. When comparisons are made between hospitals for planned operation sessions, the extent of variation for most specialties is equally as great in all hospitals as between the hospitals. In other words, the difference cannot be attributed to any one particular hospital or group of hospitals so any search for the underlying cause of the variation must take account of more than the hospital and type of session.

To explore the relation between the known variables we used regression analysis. Separate analyses were made for the morning and afternoon sessions of all the main specialties, taking the dependent variable as the duration of stay and the independent variables as hospital, grade of medical staff, number and grade of nursing staff, type of session, lateness of start (for morning sessions only), number of operations, and day of the week. Most regressions, however, were able to "explain" less than half the total variation in the dependent variable, indicating a poor predictive capacity and the possible absence of other important elements. While this means that conclusions from the analysis must be drawn cautiously, two firm aspects beyond dispute are:

(1) the duration of the operating session varies widely and, while the number of operations performed has some influence on the length of the session, it is not the only factor and in some specialties it is not an important component, and

(2) the comparatively large variations in the duration of the session unaccounted for suggests that other variables should be considered, such as the admission policy, bed allocation to individual consultants, and theatre schedules.

CANCELLED SESSIONS

The total possible number of sessions during the survey period was 5160 (six weeks $\times$ ten sessions per week $\times$ 86 theatres). Of these, 276 (5.3%) were cancelled for reasons that are set out in table II, the most common cause being the absence of patients for surgery (103 instances) due to the patient failing to come in, or being unfit for surgery, or the bed being required for an emergency admission. This, together with the second major cause—the unavailability of a surgeon (94 instances)—accounted for nearly three-quarters of the total cancellations.

The total number of operations performed during the survey period was 13 924—an average of four per half-day session. Though the proportion of cancelled lists is commendably low, 1000 additional patients might have undergone surgery during these unused sessions. The reduction in the number of cancellations may only increase the usage of theatres slightly but in conjunction with minor changes in other managerial areas could make a marked contribution to a fuller use of resources.

TABLE II—Reason for cancellation of theatre session

Reason	Specialty					Total
	General surgery	Traumatic and orthopaedic	Gynaecology	ENT	Other	
No patients:						
Reason unknown	17	18	11	2	11	59
No beds	10	25	7	1	1	44
No surgeon	20	29	20	16	9	94
No anaesthetist	3	—	—	—	—	3
No nurses	—	—	—	—	12	12
Patient unfit	1	—	1	—	8	10
All-day list						
finished early	10	—	1	—	13	24
Ward rounds	—	—	—	—	7	7
Other and not stated	5	4	5	4	5	23
Total	66	76	45	23	66	276

CONSULTANTS' OPINIONS

Each consultant was asked if the number of operating sessions allocated to him was sufficient and whether he was able to make full use of them. The results are summarised in table III. Two

TABLE III—Consultants' assessment and use of theatre sessions

Specialty	Total questionnaires (n = 100%)	Percentage		
		Allocation sufficient		Allocation insufficient
		Able to use	Unable to use	
General surgery	56	57	14	29
Traumatic and orthopaedic surgery	45	33	16	51
Gynaecology	32	19	37	44
ENT	16	44	6	50
Ophthalmology	16	69	0	31
Plastic surgery	8	25	0	75
Dental surgery	16	50	31	19
Other*	4	25	25	50
Total	193	42.5	17.5	40

* Neurosurgery, cardiac surgery, spinal injuries.

out of every five consultants were completely satisfied but the others thought that they had either insufficient operating time or were unable to use their allocated sessions fully. Most of the plastic surgeons would like additional sessions, as would about half of the consultants in traumatic and orthopaedic surgery and ear, nose, and throat surgery. Only 29% of general surgeons wished to increase the number of lists undertaken, though a further 14% were unable to use their present allocation at times. When the percentages of "unable to use" and "allocation insufficient" are combined the highest level of dissatisfaction occurred in gynaecology (81%). Where the number of scheduled sessions was considered insufficient the reasons given, in order of importance, were: shortage of theatre nurses, theatres, anaesthetists, anaesthetic or recovery rooms, and junior surgical staff. The reasons given for being unable to use fully an adequate allocation of theatre time included insufficient available beds and theatre nurses or both, and patient cancellations. Sometimes these subjective assessments conflict with the survey data.

Discussion

Though too much importance should not be attached to a single survey of six weeks' duration, some tentative conclusions may be drawn. There is a relatively high level of dissatisfaction among consultant surgeons with their present allocation of theatre sessions in this NHS region; this contrasts sharply with the comparatively modest daytime, weekday use of theatres in most hospitals and most surgical specialties. The location of theatres, and the time unused theatre sessions are available, may not always coincide with the consultants' needs, but, in view of the present chronic shortage of facilities, consideration should be given to what better use may be made of the existing spare capacity. The position is probably aggravated by the lower rate of bed provision in the region. In 1980 hospital beds for all medical conditions amounted to 5.82 per 1000 population in the Oxford Region compared with 7.66 for England, while for all types of surgery the rates were 1.21 and 1.60 respectively. While maldistribution and shortage of facilities exist, it seems unlikely that these are the only causes for the apparent failure to meet surgical demands.

Consultants develop special clinical interests within the same specialty and adopt different work patterns and treatment regimens.³ This may result in a variation in demand for theatre time, not only between surgeons but also for the individual surgeon from one week to the next. All of this points to the need for greater flexibility in the use of the theatre facilities. Possibly the weekly schedule is no longer the best way of allocating theatre time. One designed on a variable time interval may satisfy part, if not all, of the demand for extra theatre time by consultants and increase the theatre use. It is now generally accepted that an improved occupancy is achieved when the beds of several consultants in a specialty are pooled rather than each individual having a specific allocation; a similar degree of

continued on page 1061

Consultants support expansion in three major specialties

The BMA reports that hospital consultants in three major specialties have overwhelmingly backed the Central Committee for Hospital Medical Services' plans for controlled expansion

At its first meeting of the session the CCHMS re-elected Mr David Bolt as its chairman.

in their numbers within a new career structure to provide better services to patients (22 May, p 1575). At the CCHMS meeting on 30 September members were given the result of the ballot of consultants in general medicine, general surgery, and obstetrics and gynaecology by their chairman, Mr David Bolt. Of those voting, 85% were in favour—1224 for and only 214 against out of a total of valid returns of 1438—52.7% of those eligible to vote.

The CCHMS proposals, says the BMA, offer a way of correcting the imbalance in career opportunities, the aim

being a realistic and achievable expansion of the consultant establishment rather than an across-the-board increase. The committee concluded that over-simplified solutions such as simply doubling the numbers would not provide the correct answer. The proposals also include the rearrangement of the training of junior hospital doctors to give them a wider range of options for specialisation before making their final choice.

The plan for the three specialties covers five years, after which it will be reviewed. Increases in the number of consultant posts will be on the basis of requests from the profession in each district, and the CCHMS has already had bids for 525 new consultant posts, which shows the widespread support from consultants for expansion. Under the plan the numbers of senior registrars are to be related to likely consultant vacancies; in turn, registrar posts will be related to anticipated senior registrar vacancies with 10-15% wastage allowed for.

The registrar posts are to be regarded as the first phase of higher training and to take place usually in DGHs. It is intended that general professional training in these specialties should be at SHO level, at the end of which a further qualification will have been obtained. The training would include one year spent in general training in one or more specialties other than the one it was originally intended to follow. One of these might be general practice.

Special arrangements are to be made to accommodate the

needs of overseas doctors in the career structure. Those who plan simply to train and then return home will be given access to posts controlled by regions covering work comparable to SHO, registrar, and senior registrar. If seeking a career in the UK they will be guided to the career posts in the manner already set out.

Control of the whole exercise will be in the hands of the profession working through the Central Manpower Committee and its regional counterparts. Now that the plan has been approved it will be put before the Joint Consultants Committee, the Hospital Junior Staff Committee, and the General Medical Services Committee. Meanwhile the subcommittees of the CCHMS will be discussing the details of the ballot result.

A report on the CCHMS meeting will appear in a future issue. Scrutator comments at p 1057.

How many surgeons should we train?

The Royal College of Surgeons put forward its answer to this question last May in its *Second Report on Surgical Manpower and the Career Structure*. At a rare press conference last week the president, Sir Alan Parks, together with Professor G Slaney and Mr Denis Williams restated these views. They agreed with the Short Report that the imbalance between registrars in training and available consultant posts must be redressed and that the financial and personal loss embodied in an experienced surgical registrar with no definitive job prospects was unacceptable. They did not agree that the number of consultant posts in general surgery should be doubled, or that all patients received better care when treated by consultants. They proposed an increase in the number of consultant posts of 25-30% over the next 10 years. The registrar bulge would be tackled in two ways. Firstly, some registrar posts could be redesignated as SHO posts so that their holders could remain pleuripotential. The reduced number of registrar posts would then be filled by those committed and able to undertake higher professional training; their ultimate consultant status would be virtually guaranteed. Secondly, training registrar posts could be used more judiciously for overseas graduates, who would acquire skills and then return to their country of origin. Decreasing night cover and fewer hospitals where emergency surgery could be performed were seen as inevitable sequelae of a reduced junior workforce. In essence, the college clearly considers that the nature of the consultant post should stay the same, and its representatives thought that the present phase would continue to be painful until the ratio of consultants to juniors approached 1:1.

Talking Point—continued from page 1060

flexibility introduced into the operating theatre schedules may increase the use of theatre time.

We do not know how far these results are typical of all acute hospitals, but there is no reason to believe that they are unrepresentative. If this is so the medical and theatre nursing staff need to review urgently the entire surgical organisation in each health district and implement any changes necessary to achieve a greater level of efficiency. Such a review should be co-ordinated regionally and nationally so as to facilitate the exchange of relevant management information on the widest possible basis. Given adequate support, careful planning, and perceptive analysis, it should be possible to benefit patients by reducing the waiting time for treatment and to ease some of the frustrations felt by hospital staff about the shortcomings of operating facilities.

Requests for reprints should be sent to A Barr.

The survey of consultants was carried out by Dr G Winyard. We thank Mrs E Lawrence for typing and secretarial services.

References

- 1 Rawlinson C, Kelly J, Coakley A. *An evaluation of the provision and utilisation of operating theatre suites*. No W74/SD/385A. London: DHSS, 1981.
- 2 Oxford Regional Health Authority. *Use of operating theatres*. Oxford: Oxford RHA, 1982.
- 3 McPherson K. Opting to operate. *Times Health Supplement* 1982 March 12: 12.

(Accepted 21 September 1982)