

# An emergency daytime theatre list: utilisation and impact on clinical practice

**A P Barlow** ChM FRCS  
*Surgical Registrar*

**M Wordsworth** MB ChB  
*House Officer*

**D A Wilkinson** MB ChB  
*Anaesthetic Registrar*

**I A Eyre-Brook** MD FRCS  
*Consultant Surgeon*

Departments of Surgery and Anaesthetics, Taunton and Somerset Hospital, Taunton

**Key words:** Emergency surgery; Theatre; Trainee supervision; Audit

A prospective study of all weekday emergency surgery performed in a district general hospital over an 18-month period was undertaken to assess the impact of a fully staffed, daytime operating theatre for emergency surgery on night-time operating and on consultant supervision of trainees. In the 12 months following the introduction of the emergency list there was a 46% reduction in the number of general surgical operations performed after midnight compared with the preceding 6 months. Despite the increase in daytime operating the degree of consultant participation was unchanged, with the majority of emergency procedures being performed by unsupervised junior surgeons and anaesthetists. Although the emergency theatre was available to all specialties and was used for 'scheduled' and occasional 'elective' cases when there were no emergencies, only 37% of total theatre time was used. Without a change in consultant workload and practice which permits their increased involvement in emergency surgery, a dedicated daytime emergency theatre may be a costly measure which fails to fulfil all CEPOD recommendations.

---

The Confidential Enquiry into Perioperative Deaths (CEPOD) identified deficiencies in the management of surgical patients admitted as emergencies (1). The report recommended both the increased supervision of surgical and anaesthetic trainees and the avoidance of unnecessary night-time operating. In order to achieve these objectives, the report suggested that districts review their

facilities for out-of-hours work and concentrate anaesthetic, surgical and nursing resources at a single location, with a fully staffed operating theatre available at all times. These recommendations were reinforced in the 1990 National CEPOD report (2).

In response to the CEPOD report, the surgical and anaesthetic departments of the Taunton and Somerset Hospital have provided a fully staffed operating theatre every weekday afternoon. We report the utilisation of this dedicated emergency operating list over a 12-month period. The extent to which this provision has increased consultant supervision and reduced night-time operating has been assessed by comparing surgical activity during these 12 months with that in the preceding 6 months when no such facilities were available.

## Methods

An afternoon operating session was provided for emergency general surgery, gynaecology, urology, ENT and oral surgery in the main theatre suite of Taunton and Somerset Hospital, a district general hospital serving a population of 300 000. This facility was created by cancelling one routine operating list every weekday afternoon. A general surgical registrar was released from other duties to staff this list, while surgeons from other specialties were made available as the need arose. All consultant surgeons continued with their existing afternoon commitments. The anaesthetic service was provided by the anaesthetist whose routine list had been cancelled to create the emergency list.

Data on the management of all non-elective surgery was collected prospectively for an 18-month period (April 1990 to September 1991). The initial 6-month period reflects activity before the emergency theatre was

---

### Present appointments:

A P Barlow, Senior Surgical Registrar, Bristol Royal Infirmary, Bristol

D A Wilkinson, Anaesthetic Registrar, Bristol Royal Infirmary, Bristol

Correspondence to: Mr I A Eyre-Brook, Taunton and Somerset Hospital, Taunton, Somerset TA1 5DA

available (*before*), when there were few opportunities for surgeons to operate on non-elective cases during weekdays between 0900 and 1730 without interrupting elective lists. Most non-elective operating was performed outside these hours, with all specialties, including orthopaedics, competing for theatre space. The 12-month period from October 1990 reflects activity after the emergency theatre became available (*after*).

Analysis has been confined to non-elective surgery performed between 0900 Monday and 0900 Saturday. Operations were classified as emergency, urgent, scheduled or elective using NCEPOD definitions (2). Operative workload was assessed in three ways: (1) the number of operations performed, (2) the time patients spent in the operating theatre, (3) the 'intermediate equivalent value' (IEQ) of the operations performed. The IEQ value of an operation is derived from the 1990 British United Provident Association classification (minor = 0.5 IEQ; intermediate = 1.0 IEQ; major = 1.75 IEQ; major plus = 2.2 IEQ; complex major = 4.0 IEQ) (3). Since surgical trainees frequently operate more slowly than their consultants, IEQs may reflect surgical workload more accurately than do operating times.

**Results**

The non-elective operative workload was similar throughout the study period. During the 6 months before the introduction of the emergency list (*before*) 547 operations were performed with a value of 669 IEQs. In the 12 months after the emergency list became available (*after*) 1087 operations were performed with a value of 1332 IEQs.

**Use of the emergency list**

Figure 1 shows the total weekday emergency surgical activity for each specialty and the proportion of this

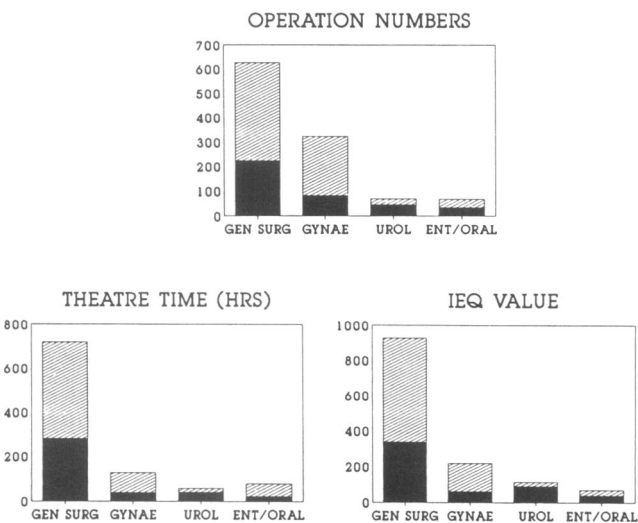


Figure 1. Weekday emergency workload, expressed as number of operations, theatre time and IEQs for each specialty. The proportion of the total workload performed on the daytime emergency list is shown by the solid section of each bar.

Table I. Non-elective operative workload for all specialties after the introduction of the emergency list

Time of day	No. of operations	IEQ value
0900-1400	14	23
Emergency list	386	526
1730-2200	348	378
2200-2400	181	211
2400-0900	158	194

workload performed on the emergency list during the 12 month period *after*. General surgeons performed the majority of all emergency operations (58%), comprising 70% of all IEQs and 73% of utilised emergency theatre time. The majority of emergency operating was performed outside of the normal working day (0900-1730), with only 36% of operations performed on the emergency list (Table I).

Although all specialties made use of the emergency list, the theatre session was completely unused on 50 occasions and the list was incompletely filled on many other occasions. Thus, only 37% of the total available theatre time was utilised. Of general surgical cases performed on the emergency list 5 (2%) were classified 'emergency', 137 (61%) 'urgent', 70 (31%) 'scheduled' and 13 (6%) 'elective'.

**Impact of emergency list on late-night operating**

The introduction of the emergency list was associated with a 33% reduction in the number of operations performed after midnight. The reduction in general surgical late-night operating was even more dramatic (46%), from 86 operations in the 6 months *before* to 93 operations during the 12 months *after* (Fig. 2). Table II lists the type of general surgical operations performed

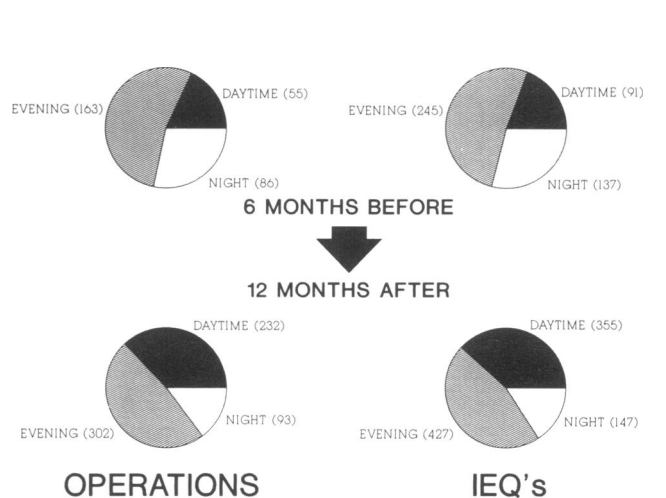


Figure 2. Comparison of the time (D = 0900-1730; E = 1730-2400; N = 2400-0900) general surgical non-elective operations were performed 6 months before and 12 months after introduction of the emergency list. Number of operations and IEQ values are given in parentheses.

Table II. General surgical operations performed between 2400 and 0900

Operation type	Number
Appendicectomy	37
Strangulated hernia	10
Extra-abdominal abscess	10
Colonic resection	6
Orchidopexy (torsion)	4
Laparotomy (peritonitis)	4
Repair ruptured AAA	3
Laparotomy (perforated ulcer)	3
Limb revascularisation	3
Small bowel obstruction	3
Return to theatre (bleeding)	3
Laparotomy (GI bleeding)	2
Cholecystectomy	2
Abdominal trauma	1
Circumcision	1
Amputation toe	1

between 2400 and 0900 after the introduction of the emergency list.

**Impact of emergency list on surgical and anaesthetic supervision**

Figures 3 and 4 display the levels of direct consultant involvement in all non-elective weekday general surgery before and after the introduction of the emergency list. The availability of the emergency list did not increase overall consultant surgical involvement (14% before, 13% after) or overall consultant anaesthetic involvement (13% before, 19% after). Consultant surgical involvement was more common with the more complex general surgical operations, and was universal in those designated CMO (8 before, 23 after). Consultant anaesthetic involvement was more common with the higher-risk patients (ASA 1

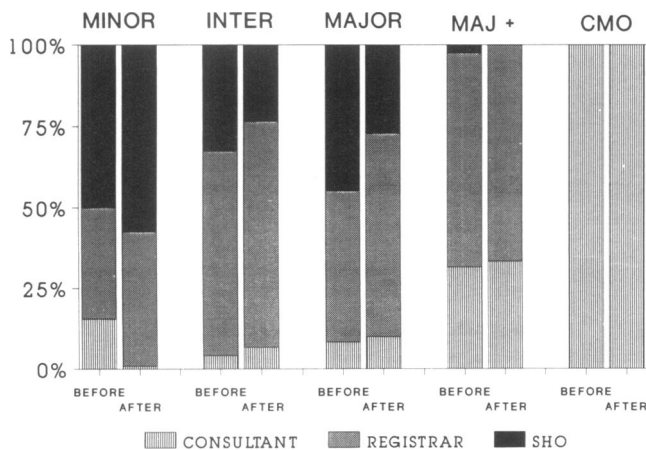


Figure 3. Comparison of the grade of most senior surgeon involved with all non-elective operations performed in the 6 months before and the 12 months after introduction of the emergency list.

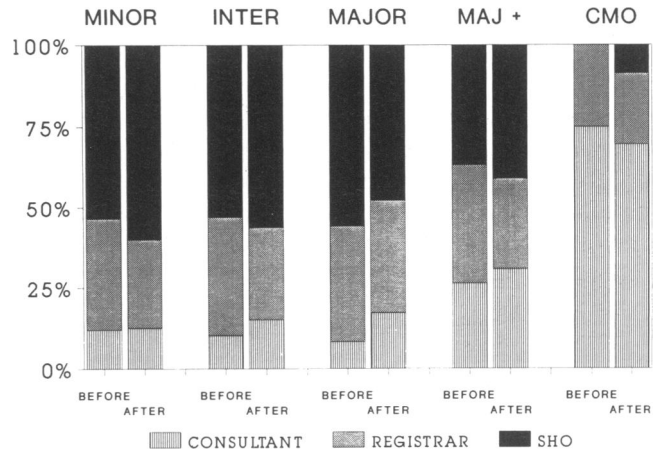


Figure 4. Comparison of the grade of most senior anaesthetist involved with all non-elective operations performed in the 6 months before and the 12 months after introduction of the emergency list.

and 2 = 15%; ASA 3, 4 and 5 = 27%). Consultant involvement was lowest at night (surgical 9%; anaesthetic 4%) and greatest during the emergency list (surgical 18%; anaesthetic 34%).

**Discussion**

A daytime emergency list is an effective means of reducing night-time operating. In Taunton our incidence of general surgical night-time operating before the emergency list became available was similar to that reported in Plymouth (4). After the emergency theatre became available late-night operating fell from 22% to 15%, with a reduction in general surgery from 28% to 15%. Yet unnecessary operating still occurred (Table II).

A recent consensus study suggested that 80% of operations performed after midnight could be delayed (5). While some cases of appendicitis need surgery without delay, most will wait. Unfortunately, these patients when admitted late in the evening would have had to wait up to 15 h if only an afternoon list was available, a delay which might often be considered inappropriate. The CEPOD report recommended that an emergency theatre be available throughout the day, as such a provision would avoid many of these unnecessary operations at night. An all day list would be fully justified if it were used by all specialties, including orthopaedics and ophthalmology. However, as in many district hospitals these specialties operate in a separate theatre suite, a single all day emergency list serving all specialties has not been instituted. With only 37% of our emergency afternoon theatre list time utilised we are not prepared to initiate an all day list. Cases such as appendicitis admitted late in the evening could be operated on between 0730 and 0900, but such timing is understandably unattractive to those who have already been working much of the night. If fresh staff were made available at this time by adjusting roster times, a significant further reduction in unnecessary nocturnal operating could be

achieved. If the emergency list were available in the morning rather than the afternoon delay could be avoided, but the fresh surgical and anaesthetic staff would have less time to assess patients before the start of the emergency list at 0900 unless roster times changed. Since this study, some morning emergency lists have been employed without changing the roster times. These morning lists have now been abandoned as the lists rarely started on time and could not run on without disrupting elective afternoon lists.

It is disappointing that we failed to show an increased level of consultant involvement in emergency surgery to match the increased daytime emergency operating, although we did not record a consultant's involvement with preoperative decisions nor the occasions when he gave verbal advice. It is probable that such consultant involvement was more frequently available during the daytime list. However, our levels of supervision differed little from those reported by Flook and Crumplin from Wrexham (6). An increase in consultant input is unlikely unless the consultant's existing clinical commitments are reduced. Paradoxically, for the surgeon it proves more difficult to achieve adequate consultant supervision during the daytime when the consultant is committed to outpatients or other clinical activities than in the evening when such commitments have ceased. Similarly, the consultant anaesthetist may be occupied with an elective list if the operating session cancelled to make an emergency list was a 'registrar' list anaesthetised by a junior. Only when the emergency operating session becomes a 'fixed commitment' in the consultant contract will high levels of consultant supervision be achieved for daytime emergency surgery.

The provision of a daytime emergency list may reduce the problem of delay in getting emergency cases to theatre. In Wyatt's study, 75% of surgical admissions occurred between 0900 and 2100 (4). The most common reason for delay was the late starting of the evening emergency operating provision caused by overrunning of afternoon elective lists. An afternoon emergency list prevents the 'stacking' of surgical cases admitted during the day. However, an alternative to the daytime list might be a fully staffed second emergency operating theatre in the evenings. This would coincide with the period of greatest demand for theatre and might prove equally effective at avoiding night-time operating. Unless

consultant surgeons are freed from existing commitments so as to adequately supervise the daytime emergency list, the 'second evening operating session' might prove a more effective mechanism to achieve the dual goals of increased consultant input and avoidance of nocturnal operating.

Whatever solution is chosen in each hospital, it is clear that both the public and the profession are demanding that emergency surgery is given a greater share of resources and expertise. Recent workload studies have indicated that 3.5 IEQs should be achieved in a standard half-day general surgical operating list (7). Thus, if our emergency list had been dedicated to elective surgery a further 875 inguinal hernia repairs, or their equivalent, might have been performed. Emergency surgery must have a high priority but further studies are necessary to ascertain the most efficient mechanism for providing this emergency care.

## References

- 1 Buck N, Devlin HB, Lunn JN. Report of the Confidential Enquiry into Perioperative Deaths. London: Nuffield Provincial Hospitals Trust and The King Edward's Hospital Fund for London, 1987.
- 2 Campling EA, Devlin HB, Hoile RW, Lunn JN. Report of the National Confidential Enquiry into Perioperative Deaths 1990. NCEPOD, London, 1992.
- 3 Jones SM, Collins CD. Case load or workload? Complexity scoring of operative procedures as a means of workload analysis. *Br Med J* 1990; **301**: 324-5.
- 4 Wyatt MG, Houghton PWJ, Brodribb AJM. Theatre delay for emergency general surgical patients: a cause for concern? *Ann R Coll Surg Engl* 1990; **72**: 236-8.
- 5 McKee M, Priest P, Ginzler M, Black N. Which general surgical operations must be done at night? *Ann R Coll Surg Engl* 1991; **73**: 295-302.
- 6 Flook DJ, Crumplin MKH. The efficiency of management of emergency surgery in a district general hospital—a prospective study. *Ann R Coll Surg Engl* 1990; **72**: 27-31.
- 7 Collins CD. Recommended values for use in surgical audit and surgical workload analysis. *Ann R Coll Surg Engl (Suppl)* 1991; **73**: 94.

Received 11 January 1993