

disease unconfirmed by laparotomy or necropsy was sufficiently long to make an erroneous diagnosis extremely unlikely. We conclude that our incidence of false negative and false positive diagnosis is unlikely to change, particularly as the four false negative diagnoses were all identified within six months of biopsy.

The potential clinical benefits of biopsy guided by ultrasound are well illustrated in this series. The addition of histological sampling to the ultrasound evaluation corrected the erroneous clinical diagnosis of malignancy in a tenth of patients as well as identifying the correct primary tissue in a further tenth. We thus considerably increased our diagnostic accuracy with major implications for treatment. In a further 26 patients, a quarter of this series, confirming metastatic malignancy removed the need for laparotomy. As the main objective in such patients is effective palliation, avoiding surgery with its morbidity and mortality is beneficial. The need or otherwise for surgery and other invasive investigations also has important implications for costs. Our study suggests that this technique will effect considerable savings because a firm diagnosis is obtained quickly. These financial benefits are enhanced because the technique does not require expensive equipment or additional staff.

The biopsy also allows pathologists to use additional microbiological or immunological stains. In one patient positive for HIV *Mycobacterium avium-intracellulare* was shown and the clinical diagnosis of lymphoma refuted. Few cytologists are confident in diagnosing lymphoma, and the sensitivity of fine needle aspiration biopsy in this condition has been reported to be as low as 40%.<sup>13</sup> The availability of a tissue specimen

from biopsy guided by ultrasound should facilitate an accurate pathological diagnosis in this difficult group of patients.

We conclude that biopsy guided by ultrasound as described here is a safe and reliable method of establishing the histological diagnosis of abdominal and retroperitoneal masses and influences clinical management considerably.

We thank consultant colleagues at this hospital who allowed us to study their patients. In particular, we thank Dr A M Jackson, consultant pathologist.

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## Junior doctors' on call activities: differences in workload and work patterns among grades

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### Abstract

**Objective**—To examine the workload and work patterns of junior doctors of all grades while on call.

**Design**—Pilot study of activity data self recorded by junior doctors, with the help of students during busy periods.

**Setting**—A general surgical firm and a general medical firm based at University Hospital, Nottingham.

**Subjects**—Four registrars, three senior house officers, and five preregistration house officers.

**Results**—Senior house officers and preregistration house officers spent nearly half of all their on call duty time working, but less than half of that time was spent in direct contact with patients. Registrars were on call more often than the house officers but spent less than one fifth of their on call duty time working, and almost two thirds of that time was spent in direct contact with patients.

**Conclusions**—Workload while on duty is excessive for both senior and preregistration house officers. Changes in some administrative procedures and employment of more non-medical staff during on call periods might reduce the time spent on non-clinical activities, thereby reducing the overall workload and allowing more time for patient contact.

### Introduction

Recent evidence indicates that some junior doctors

may be working in stressful conditions over long periods without sleep.<sup>1-3</sup> To identify when, where, and why junior doctors locally were working excessively the district general manager of the Nottingham Health Authority, supported by the then director of public health, commissioned this study.

### Subjects and methods

The study was confined initially to two acute specialty firms, one general surgical and one general medical, which together comprised 12 junior doctors. Both firms were based at University Hospital, Nottingham, a large teaching hospital of roughly 1400 beds. Data were collected only during on call periods—that is, outside the normal 9 am to 5 pm working week. The surgical firm was studied for 34 days and the medical firm for 27 days, and the study was conducted mainly in December 1989.

There was full cooperation of the participating doctors, who helped design the study. The collection of data relied mainly on self recording on detailed, pocket book size (11×15 cm) forms. Participants recorded in detail all activities, including work, leisure, and sleep. In addition, they completed a separate form about each bleeper call received. During periods when participants did not have time to record their own information because they were too busy students shadowed them, asking questions and recording answers.

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TABLE I—Workload of junior doctors on call

	Mean time on call per person weekly (h)	% Of all time on call spent working	Total No of bleeper calls recorded	No of bleeper calls resulting in attendance	Mean time spent on each attendance resulting from bleeper call (min)	% Of all duties in which junior doctor slept $\leq 3$ h	% Of all duties in which there were $\geq 3$ interruptions to sleep
Registrar (n=4)	60.7	19.5	60	38	79.2	6.4	0
Senior house officer (n=3)	30.2	43.8	188	72	37.0	21.0	10.5
Preregistration house officer (n=5)	48.0	42.8	456	219	35.6	15.7	17.6

TABLE II—Patterns of work of junior doctors on call. Figures are percentages of total time recorded as work while on call

	Registrars (n=4)	Senior house officers (n=3)	Preregistration house officers (n=5)
Communication	14	28	33
Waiting and administration	6	15	12
Patient contact	64	49	47
Other	16	8	8
Total	100	100	100

### Results and discussion

Of the 2493 hours of on call duty during the study, information was recorded for 2145 (86%). Table I shows the workload of the three grades of participants while on call. Time on call was taken from the rotas. All other figures were based on data recorded by the participants.

Table II shows the patterns of work and refers only to time spent in work related activities. From the records kept by participants time spent working while on call was allocated to one of four categories. "Patient contact" summed all the time spent in direct patient care, including examining, reviewing, or clerking a patient; performing any procedure; and ward rounds. "Communication" was defined as time spent reading or writing records, liaising with colleagues, or speaking to relatives. "Waiting and administration" included time spent using the telephone; waiting on the ward for results, drugs, or patients; waiting for theatre or searching for results; or tasks which the researchers regarded as ineffective use of doctors' time. "Other" included travel, personal study, and unspecified work.

Registrars were on call for a greater number of hours a week than other grades but spent less time working. They spent a high proportion of their working time in direct patient care which required their special skills. Registrars were contacted by bleeper less frequently than other grades but when so summoned were more likely to spend a longer time with the patient. It is questionable whether a reduction in rotas in this grade would lead to less stress or greater job satisfaction, and it might lead to a reduction in the educational potential for the doctor and continuity of care for the patient. It is of concern, however, that about once a month registrars had inadequate sleep and yet were expected to carry a full clinical workload the following day.

Senior house officers were on call less often than other grades but had a heavier workload with little sleep and frequent interruptions. Although there were only three participating senior house officers, there were substantial differences in work patterns between the specialties. The one surgical senior house officer spent 43% of time working on call in theatre and received less than a third of the number of bleeper calls of a medical senior house officer. Despite a heavy clinical responsibility, the two medical senior house officers spent over half of their working time on non-clinical duties. Interestingly, the medical senior house officers reported spending 12% of their working time on call on the telephone. In contrast, the surgical

senior house officer and preregistration house officers reported that only 3% and 5% of their time, respectively, was spent on the phone. The medical senior house officers also reported spending 19% of their working time on call writing records and forms whereas the surgical senior house officer spent less than 5%. A reduction in rotas would not solve the problems for this grade, which seem to lie with the workload while on call and the type of work undertaken.

Preregistration house officers spent the most time working while on call of any grade. As the bleeper was for the most part the only form of communication preregistration house officers, like senior house officers, frequently received bleeper calls, which often interrupted urgent work or sleep for trivial reasons. Less than half of the preregistration house officer's time worked on call was spent in direct contact with patients. Writing records and forms took up a fifth of all working time on call. A reduction in rotas would help in this grade to reduce the hours worked a week. The educational value of the work done while on call may be reduced by a large part of the time being spent in clerical tasks or by the doctor being too tired or too busy to learn from the experience.

### Conclusion

The evidence from this small study carried out in a particularly busy period confirms that house officers continue to have a very heavy workload while on call.<sup>1-3</sup> This workload could be reduced and job satisfaction improved by relieving house officers of some of their non-clinical responsibilities by employing more non-medical staff during the on call period. If use of beepers was restricted to emergencies with the institution of a non-urgent messaging system the number of interruptions to work and rest, and thus the workload, could be reduced considerably.

The study has generated a great deal of information of considerable interest locally, only a small portion of which is reported here. As a result consultants have met to examine some current practices. In addition, the preregistration committee of the University of Nottingham is setting up a working party to look in more detail at the results relating to preregistration house officers.

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