Middle Articles

Work Study on Junior Anaesthetic Staff

D. A. NIGHTINGALE,*† B.A., M.B., B.CHIR., F.F.A.R.C.S., D.A.; T. H. TAYLOR,* M.B., B.S., F.F.A.R.C.S.

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A major revision of the duties of the junior anaesthetic staff of the London Hospital became necessary with the impending opening of an intensive care unit. As a first step it was essential to know how the existing staff spent their working time, and so an intensive work study was carried out for a period of 10 weeks.

We could find no published information about the actual working week of junior anaesthetists or other junior hospital staff. As this working week has never been established by contract (unlike that of part-time hospital consultants), we feel that the data presented in this study will be of general interest whenever staffing and terms and conditions of service of junior staff are discussed.

The training of junior anaesthetists in this hospital is largely by example from their senior colleagues, and because of this the consultants are nearly always accompanied by a junior for training purposes. Thus the total hours of work of the junior staff approximate in duration to the total work load of the department.

Details of the Hospital

Anaesthetic services are required in three hospitals—the main hospital, an annexe, and a maternity home.

The *Main Hospital*, situated in East London, has 703 beds, of which 325 are surgical. All types of surgery are undertaken, including thoracic surgery and neurosurgery. Anaesthetic cover is required for:

- Eight theatres on the main theatre floor (56 regular sessions per week).
- One dental outpatient "gas"-room staffed 11 sessions per week.
- In-patient x-ray department staffed 10 sessions per week.
- Minor outpatient theatre with regular anaesthetic attendance each session (11 per week) which can usually be combined with dental "gas"-room.
- An obstetric unit of 38 beds with 1,079 deliveries in 1964.
- Nine regular weekly sessions in special departments (two weekly E.C.T. clinics, three plaster-room sessions, one urological outpatient session, two cardiac catheter sessions, one anaesthetic outpatients).
- Occasional sessions in E.E.G. department, ophthalmic outpatients, radiotherapy department, urological x-ray.

During the period of this study members of the department assisted in the medical care of patients with respiratory and other problems in the general wards. The emergency services are maintained after normal working hours by a registrar (or senior house-officer) and house-officer resident and a senior house-officer (or registrar) available on call at home, with a senior registrar also on call at home.

The *Annexe* is situated at Brentwood, Essex, 21 miles (34 km.) from the main hospital. It has 182 beds, of which 167 are surgical. All types of surgery, with the exception of thoracic surgery, are carried out, but emergency admissions are confined to neurosurgery. Anaesthetic cover is required for: one twin theatre (both tables normally at work every session, except Saturday morning, when only one table is used); in-patient x-ray department, requiring anaesthesia for neurosurgical investigations; and an intensive care unit used mainly for acute neurosurgical cases. The emergency services are maintained by an anaesthetic registrar available on call at home, or resident if living too far away from the hospital. The off-duty time of this registrar is covered by the senior registrar on call at the main hospital.

The *Maternity Home* is situated at Hampstead, 7½ miles (12 km.) from the main hospital. It has 38 beds, with 921 deliveries in 1964. It is served by anaesthetists from the main hospital.

Thus the total number of regular sessions for which the anaesthetic department must provide staff is 107 per week; some sessions may be prolonged.

Staff

From the details given above it will be seen that the departmental rota requires five junior anaesthetists to be available after normal working hours to cover emergency duties in these hospitals. In addition, the consultant staff are available to assist with major anaesthetic problems, especially when the surgeons with whom they normally work are involved.

Anaesthetists available for this work are: (1) six part-time consultant anaesthetists with a total of 32 clinical sessions per week, four of which are at the annexe; (2) one full-time consultant anaesthetist who, in addition to three regular clinical sessions and a number of research sessions, is involved in the intensive care of patients with cardio-respiratory problems in the wards; and (3) 12 junior staff, consisting of two senior registrars, five registrars, three senior house-officers, and two house-officers (resident third house-officer appointments).

There is no formal geographical residence restriction for junior staff, but, clearly, to be of value for emergency duties the juniors on call must live within a reasonable time and distance of the hospitals covered.

The annual leave entitlement amounts to 94 weeks—42 for consultants and 52 for juniors. In addition, statutory holidays for duty personnel amount to 30 days per year: Locumtenentes are not employed for holidays or sickness. Taking the national average as 12 days' sickness per person per year, this amounts to 228 days—that is, 33 weeks per year. In addition, study and examination leave are taken by all grades of staff. This means that at least 131 person-weeks are lost in the department per year—that is, on an average more than two people out of 19 are away from work throughout the entire year, and in

* Department of Anaesthetics, the London Hospital.

† Now Consultant Anaesthetist to the Alder Hey Children's Hospital, Liverpool 12.

practice, during holiday periods, up to five people may be away at the same time.

Collection of Data

The study was carried out over a 70-day period beginning on 1 April 1965. This included three statutory holidays, but not a particularly busy period for annual leave.

Each member of the junior staff was asked to complete a detailed work sheet every day. The response was excellent, and the forms were filled in accurately by the next day, eliminating any error due to the sheets being filled in from memory. Because a day-to-day check was kept on these forms a 100% response was obtained. In order to maintain the reliability of the survey the period of study was kept short; by the end of 10 weeks the routine filling in of work sheets became tedious, and to continue the study further would probably have led to inaccuracy. Because in an undergraduate-teaching hospital with a considerable waiting-list the work is spread relatively evenly over the whole year, the short period of this study should not lead to major inaccuracies in this respect.

During the study there were rotations of individuals to various jobs within the department, and some changes in personnel. Data were therefore not collected for individuals but with reference to the position occupied.

From the daily work sheets Table I was constructed. The times shown are simple averages of completed weeks worked, the number of weeks used being shown in column 7. Any week during which a person was absent for sickness, leave, or study leave, etc., was eliminated.

TABLE I.—Results. Averaged Totals for Completed Weeks (Time in Hours and Minutes)

	Time Spent in Hospital 1	Giving Anaesthetics 2	Ward Work 3	Other Work* 4	Resident Emergency Duty 5	On Call at Home 6	No. of Weeks Included 7
A	47-40	27-17	3-20	9-0	Nil	76-30	6
B	52-40	24-37	1-36	17-25	"	61-40	6
C	67-37	29-27	2-25	19-27	28	14-30	6
D†	59-40	39-38	1-50	3-32	0	81-20	7
E	64-50	29-25	3-25	19-05	28	28-25	6
F	61-44	31-42	0-40	17-27	24	7-50	6
G	57-57	32-05	0-56	18-18	24	17-20	7
H	81-08	37-56	1-35	23-16	42	10-10	8
I	71-22	30-43	2-25	26-03	32	12-00	6
J	72-24	35-15	1-10	16-25	24	12-10	6
K	129-15	37-17	3-20	85-20	119-45	Nil	7
L	132-0	37-19	2-56	86-02	118	"	5

A-B: Senior registrars. C-G: Registrars. H-J: Senior house-officers. K-L: Resident house-officers.

* This column shows the time necessarily spent in hospital either on resident emergency duty or retained for immediate call, although not actively employed. For senior registrars this column shows time spent in administrative duties and formal teaching (undergraduate and postgraduate) as well as emergency stand-by.

† This line shows data collected from the registrars who were seconded to the annexe and who were on call at home for every working week-day and some week-ends.

Although Table I can be used to give an overall impression of the average working week of any junior member of the department, because of the considerable number of weeks excluded in a short sampling period we felt that errors might have occurred. These errors could be substantial, because the working week varies according to the amount of resident emergency duty performed by the individuals in the weeks included in Table I.

In order to overcome these errors we derived an average working day for each member of the department. This was done by totalling columns 1-6 throughout the entire 10-week period and dividing these totals by the number of days actually worked (including "on call at home" days). These figures are given in Table II. The "total working time" is the sum of columns 2, 3, and 4—that is, giving anaesthetics, ward work, and other work.

TABLE II.—Averaged Working Days (Hours and Minutes)

	No. of Days Worked	Time Spent in Hospital	Working Time				Emergency Duties	
			Total	Theatre Work	Ward Work	Other Work	Resident	On Call at Home
A	42	7-25	6-10	4-10 (0%)	0-30	1-30	Nil	12-10
B	52	8-10	6-40	3-40 (0%)	0-15	2-40	"	11-30
C	51	11-20	9-05	5-10 (36%)	0-25	3-25	4-40	3-30
D	52	10-00	7-25	6-35 (19%)	0-25	0-30	Nil	14-00
E	49	11-30	9-35	4-55 (15%)	0-40	4-00	5-55	4-05
F	47	10-35	8-20	5-30 (21%)	0-10	2-40	3-35	4-05
G	47	11-50	10-05	5-50 (16%)	0-15	4-10	5-05	3-10
H	54	13-20	11-30	6-35 (40%)	0-15	4-40	6-40	2-10
I	50	13-16	11-30	5-45 (28%)	0-25	5-20	6-45	1-40
J	47	11-35	8-15	5-45 (30%)	0-10	2-20	3-05	4-15
K	49	20-20	20-00	5-50 (54%)	0-30	13-40	19-00	Nil
L	40	19-10	18-50	5-40 (69%)	0-25	12-50	18-10	"

A-B: Senior registrars. C-G: Registrars (D is registrar at annexe). H-J: Senior house-officers. K-L: Resident house-officers.

The percentage figures in the column headed "Theatre Work" refer to the time during which the individual concerned was directly supervised by a senior colleague.

The ultimate picture that we wished the survey to show was the average working week for any grade of junior staff. We therefore performed on the data in Table II the following manipulations.

1. We derived a total for each column by multiplying the average shown by the number of days worked.

2. These totals were added together for each member of a given grade.

3. The resulting grand totals for that grade were then divided by the total number of days worked to give an average for an average individual in that grade.

4. The working week was determined for each grade. This was done by finding: (a) the number of "days available for work" per year, by subtracting from 365 the annual leave entitlement, statutory holidays, and 12 days' sick leave (this is the national average and also close to the rate at which time was lost for sickness during the study); (b) the number of days likely to be worked, by subtracting from the "days available for work" a number of days representing week-ends not on call or resident duty, the residue (called "days worked") being ordinary working week-days, plus duty week-ends. The number of days in an average working week is found by the expression:

$$\frac{\text{Days worked}}{\text{Days available for work}} \times 7$$

5. The average working day (3) multiplied by working week (4) gives the ultimate picture referred to above.

These results are shown in Table III.

TABLE III.—Averaged Working Days and Working Weeks (Hours and Minutes) for Each Grade

	Time Spent in Hospital	Working Time				Emergency Duties	
		Total	Theatre Work	Ward Work	Other	Resident	On Call at Home
A { Day Week	7-50 48-40	6-25 39-55	3-55 24-10	0-20 2-15	2-10 13-25	Nil	11-50 73-15
B { Day Week	11-25 64-40	8-50 50-10	5-35 31-50	0-20 2-05	2-55 16-30	3-50 21-35	5-50 31-20
C { Day Week	12-45 72-30	10-30 59-30	6-05 34-25	0-15 1-30	4-10 23-40	5-35 31-35	2-40 15-10
D { Day Week	19-50 109-10	19-30 107-20	5-45 31-45	0-30 2-30	13-15 73-05	18-35 102-30	Nil

A: Senior registrars Working week of 6-2 days
B: Registrars " " " 5-68 "
C: Senior house-officers " " " 5-68 "
D: Residents " " " 5-51 "

Discussion

Obviously the figures quoted in this paper are peculiar to one hospital, and to apply them generally could not be justified. None the less, this study is of value in showing how some trainee

anaesthetists at present spend their working time. In particular the following points appear to us to be important.

1. Anaesthetists are too often regarded as not actually working unless they are present in the theatre administering anaesthetics. In fact any time that an anaesthetist is kept in hospital to fulfil emergency commitments must be regarded as "working time." The difference in these times is shown by reference in Table III to "total working time" and to "theatre work time." In certain circumstances the "total working time" could be taken as equivalent to "time spent in hospital," though the latter is expanded by including meal-times, time spent at meetings, private study, etc.,

2. The increase in the figure for "total working time" over "theatre work time" is largely accounted for by time spent in hospital on emergency call, usually resident. Where it is necessary to maintain resident emergency personnel this time will inevitably form a part of the working week, and in departments smaller than ours the increase in the "total working time" due to time spent on resident emergency duty will be greater because of the lesser number of persons on the rota. (In this department the registrars and senior house-officers are on resident duty approximately one day in seven, in many departments the figure is more often one day in three.) The effect of resident duty on "total working time" is seen especially with the resident house-officers (and must apply to resident house-officers in any specialty).

3. It will be noted that at present little time is spent in the general wards, and this is largely for intensive care purposes. The theatre commitments of the junior staff keep this time to a minimum, and more time could usefully be spent on pre- and post-operative ward rounds.

4. Each member of the junior staff is on call at home for a varying number of hours per week: indeed, emergency work at the annexe is largely covered by this means. The effectiveness of the emergency cover depends upon the junior staff being able to find suitable accommodation for themselves and their families within a reasonable distance of the places covered—that is, in North-east London for this department. At present only three people (apart from the house-officers) have accommodation in the area, and the main reason for the other junior staff living further away is the high cost of suitable accommodation in the London area. The distance that most of the junior staff live away from the hospital not only limits their usefulness for emergency cover but adds up to three hours' travelling time to their normally busy working day. In fact time spent in transit has not been considered in the study except when it involves travelling between hospitals during the course of a working day. The greatest improvement in the effective use of medical manpower in this department would be the provision of adequate married quarters and residential accommodation near the main hospital.

5. The effect of holidays, sick leave, etc., on the working week is shown most clearly in the case of the senior registrars, for with them 26 "on call" week-ends must be fitted into 305 "days available for work"; this is why the "average working week" is as long as 6.2 days and why the hours worked per day appear to be short.

6. At the Conference on Anaesthetic Staffing held in Sheffield in April 1964 suggestions were put forward by Dr. W. J. Patterson regarding the composition of an "ideal working week" for the different grades of junior staff. For the purpose of making comparisons our house-officers probably should be classed as "senior house-officers" and the senior house-officers and registrars grouped together as "registrars." Patterson's recommendations for senior house-officers in their first six months of training included eight theatre sessions per week, all supervised, this representing a total of 28 hours in theatre (allowing three and a half hours per session). As can be seen from Table III, our residents exceed this, and, further, are under direct supervision for only 60% of the time. It is

difficult to evaluate time spent on emergency work on a sessional basis, but we feel that there is little reasonable doubt that our residents do more than the equivalent of one session. With regard to the registrars, the discrepancy in time spent in theatres becomes greater. Patterson suggests six sessions (21 hours), half of which should be supervised, plus two emergency sessions; our registrars average 33 hours per week (including emergencies), of which approximately 25% are directly supervised. We do not approach his recommended two sessions for ward work and one for study. The senior registrars' working week is closer to his ideal as regards theatre work (six sessions), but routine administration takes up a lot of time at the expense of formal teaching and research.

7. Under the present system of training of anaesthetists in this hospital an increase in the number of clinical consultant sessions should improve the standard of this training by providing for more supervision, but would be unlikely to affect significantly the total hours of work of the junior staff. A change in the balance between time spent in theatre and time spent in the wards and in formal tuition can be achieved only by employing more junior staff, for the total amount of theatre work must remain the same.

Summary

An accurate work study was carried out over a 10-week period among the 12 junior staff of a busy London teaching hospital anaesthetic department serving 923 beds in three hospitals. The results obtained are presented and analysed on the basis of a derived "average working week," which varied in duration from 5.5 days for the resident house-officers up to 6.2 days for the senior registrars. The senior registrars were in direct contact with the patients for 26 of the 40 hours per week necessarily spent in the hospital to fulfil routine and emergency commitments. The equivalent figures for the other grades are: registrars 34 and 50 hours respectively; senior house-officers 36 and 60 hours; house-officers 34 and 107 hours. In addition to this time spent in the hospital the senior registrars were on call at home for a further 73 hours per week, the registrars for a further 31 hours, and the senior house-officers for 15 hours. The house-officers were resident, and their period of 107 hours in the hospital per week is effectively all duty time. In the discussion consideration was given to the effect of resident duty on the length of the working week, bearing in mind that in many hospitals the duty rota requires residence on one night in two or three, not one night in seven, as at this hospital. In addition, comments are made on the siting of residential accommodation, and the composition of the "ideal" working week of a trainee anaesthetist.

We wish to thank the consultant anaesthetists of the London Hospital, especially Drs. Parry Brown and B. R. J. Simpson, who were the originators of this study, for their help in the preparation of this paper, and our colleagues for recording so carefully the data on which it is based. We would also like to thank the House Governor for his valuable comments and Mrs. Ena Hornsby for secretarial assistance.

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