Service contribution and cost-effectiveness of specialist registrars in NHS trusts: a survey and costing analysis

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ABSTRACT

Since the introduction of the European Working Time Directive, specialist registrars arguably contribute less to clinical service. The purpose of this study was to broadly quantify the service contribution of specialist registrars across a range of specialties and their value to an NHS organisation. A questionnaire-based survey of the clinical activities of specialist registrars in a large NHS trust was undertaken. Simple costing analyses of this clinical activity were performed. Responses from 66 specialist registrars in 24 specialties showed an average of 51% overall clinical autonomy. Trainees attended an average of 2.7 outpatient clinics per week and spent 3.5 sessions a week doing ward work. Medical trainees took more referrals and attended more clinics. An analysis of costings suggested that surgical trainees might have generated around £700,000 income per year for the trust. Overall, specialist registrars make a substantial contribution to NHS clinical service and are cost-effective.

KEYWORDS: Training, service provision, cost-effectiveness, European Working Time Directive, productivity, clinical supervision

Introduction

With the adoption of the European Working Time Directive (EWTD) in the UK in 2003, there has been a broadening of the exposure of junior doctors (for example to include general practice and psychiatry) and changes to training structures. Furthermore, with the increasing complexity and subspecialisation of medicine and increase in consultant-delivered care, there is a perception that specialist registrars are not as skilled, autonomous or capable as they were in past generations. Consequently, some perceive a lesser contribution to patient care by specialist registrars during the course of their training.

When evaluating the validity of such perceptions, it is important to bear in mind the complex funding of specialist registrars. Typically, half of their salary is provided not by the employing trust, but externally via local deaneries and Health Education England. NHS trusts also receive a significant educational supplement (tariff) to support the delivery of training. Specialist registrars' basic salary is subsidised by the employing trust for service delivery undertaken outside of normal working hours, which is proportional to the frequency and intensity of the on-call commitments.

Specialist registrars are expected to be trained according to royal college curricula and receive formal teaching, feedback, assessments and appraisals, while also delivering patient care in various settings. They supervise doctors junior to them and answer to a supervising consultant. Trainees often complain that they do not receive sufficient formal training, and employing trusts complain that trainees do not deliver sufficient patient care. The real financial value of trainees is also contested because trainees might order more investigations, arrange more frequent outpatient follow-up and could be more prone to clinical error.

Lota and colleagues argued that, in cardiology, it would be more cost-effective to replace specialist registrars in outpatient clinics with additional consultants, and that specialist registrars would be better occupied in formal training activities.[1] They sought to demonstrate that the increased salary costs to an NHS trust of additional consultants would be eclipsed by the savings made on reduced follow-up appointments and unnecessary investigations.

The primary purpose of our study was to broadly quantify the service contribution made by specialist registrars in training posts in various specialties across a range of clinical activities – reflecting clinical activity undertaken both autonomously and under direct consultant supervision. By way of simple costing analyses, the scale of financial value this brings to the employing trust was also estimated.

Study design

The study was carried out at Imperial College Healthcare NHS Trust, which offers all major clinical services other than

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mental health, and is split across four sites. The trust provides training for almost all postgraduate clinical specialties, and significant teaching to undergraduate medical students. A questionnaire was designed to evaluate the entire spectrum of clinical activity of each specialist registrar surveyed over the course of their last working week – including outpatient clinics, ward activities, on-call activity and other speciality-specific tasks (eg tissue preparation in histopathology). The proportion of direct consultant supervision was recorded for each of these activities. The questionnaire was developed using a Delphi technique among the authors. It was piloted on a test sample of specialist registrars, and after assessment of the outcomes, it was modified for widespread use.

Specialist registrars were selected randomly from each speciality undertaking training within the trust, ensuring coverage of all locations and, when possible, including both senior and junior specialist registrars. Specialist registrars verbally consented to participation and all responses were anonymous. Ethical approval was not required for this survey. Questionnaires were completed through face-to-face or telephone interviews with doctors in postgraduate training by the authors (their peers).

Results

At the time of data collection, the hospital had in its employment 392 specialist registrars (ST3 level and above) in 36 different specialties. The total number of junior doctors within the trust, including non-training grades, was approximately 680. We invited 66 specialist registrars from 23 different specialties to participate, all of whom agreed, representing 17% of the total pool of training grade specialist registrars in the trust (Table 1). Overall, surgical specialties represented 26% of participants, medical specialties 38%, obstetrics and gynaecology 6%, and paediatrics 6%. 40 trainees (61%) were junior specialist registrars (ST5 and below); the remaining 26 (39%) were more senior (ST6 and above).

Overall, an average of 51% of the clinical activity of specialist registrars was done without the direct presence of a consultant. Specialist registrars received an average of 5.8 referrals a day (for patients not directly under their care), 58% of which they reviewed personally. They spent an average of one hour per day handling bleeps and phone calls. Regarding on-call activities, on average, a consultant was reported to be physically present during specialist registrar on-call shifts 18.5% of the time.

Specialist registrars reported attending an average of 2.7 outpatient clinics per week and seeing on average just under half the patients in the clinics. Trainees spent an average of 3.5 sessions a week doing ward work, 62% of which they did without direct consultant supervision. Surgical trainees spent an average of 3.6 sessions a week in the operating theatre and performed 54% of the operations independently. Anaesthetic specialist registrars were directly supervised by a consultant 56% of the time and performed the pre-operative assessment without direct consultant supervision in 87% of cases.

Medical versus surgical specialist registrars

Surgical specialist registrars reported considerably more direct consultant supervision of their clinical activity than did their medical counterparts (62% vs 35%, respectively), presumably reflecting the greater technical demands of the craft specialties and surgical training (Table 2). On average, medical specialist registrars spent longer handling phone calls and answering bleeps during a working day (70 minutes vs 45 minutes,) and accepted more referrals (65% vs 46%). They also personally clerked or reviewed more admissions (80% vs 68% for surgical trainees).

Medical specialist registrars performed approximately a third more clinics per week, but the percentage of total patients seen per clinic was broadly similar. They also reported far more ward-based activity than did surgical specialist registrars (8 and 1.5 sessions per week, respectively), largely explained by the operating commitments of surgical specialist registrars, although the two groups attend or lead a similar number of ward rounds per week. Surgical specialist registrars reported double the number of sick patient reviews per day than did medical specialist registrars (4 and 2, respectively), but spent less than half the time reviewing them (18 minutes and 38 minutes, respectively).

Table 1. Specialties represented in the survey and numbers of trainees interviewed

	n
Medical	**34**
Anaesthetics	4
Cardiology	2
Clinical pharmacology	2
Care of the elderly	3
Dermatology	1
Endocrinology	3
Paediatrics	4
Respiratory medicine	5
Chemical pathology	1
Gastroenterology	2
Haematology	1
Infectious diseases	2
Hepatology	1
Neurology	3
Surgical	**19**
Ear, nose and throat	2
General surgery	5
Obstetrics and gynaecology	4
Orthopaedics	6
Plastic surgery	2
Support services	**13**
Histopathology	3
Microbiology	3
Urology	2
Radiology	5

Table 2. Comparison of the workload of medical and surgical specialist registrars

	Medical	Surgical
Clinical activities overall		
Time worked without the direct presence of consultant, %	65	38*
Referrals per day, n	5.4	6
Referrals personally reviewed, %	61	59
Time spent handling bleeps or phone calls per day, mins	70	45
On-calls		
Average on-call referrals handled, n	12	7*
Consultant present during on-calls, %	13	23*
Referrals where immediate consultant advice was sought, %	20	25
Referrals accepted, %	65	46*
Accepted referrals personally clerked or reviewed, %	80	68
Outpatient clinics – all specialties		
Average clinics per week, n	2.3	3.2
Ward work		
Ward work performed independently, %	69	69
Ward rounds per week, n	4.5	5
Sick inpatient reviews per day, n	2	4
Average time spent reviewing a sick inpatient, mins	38	18*

*p<0.05.

Table 3. Comparison of the perceived workload of junior (ST3–5) versus senior (ST6–7) specialist registrars

	Junior specialist registrars	Senior specialist registrars
Clinical activities overall		
Overall time worked without direct consultant supervision, %	48	56*
On-calls		
Referrals where consultant advice was sought, %	22	18
Referrals accepted, %	59	62
Accepted referrals personally clerked or reviewed, %	75	75
Outpatient clinics – all specialties		
Proportion of specialist registrars doing outpatient clinics, %	68	96*
Average clinics per week, n	3.2	2.3
Patients seen where consultant advice is sought, %	41	33*
Patients discharged by specialist registrar, %	34	45*
Ward work		
Ward work performed without direct consultant supervision, %	67	71
Ward rounds per week, n	5	4.8
Trainee surgeons		
Sessions per week in theatre, n	3.2	4.1
Cases per session, n	4.4	4.3
Procedures performed independently, %	55	51
Cases where responder is scrubbed from the beginning to the end of the operation, %	96	97
Postoperative reviews led by trainee, %	50	53
Trainee anaesthetists		
Sessions per week in theatre, n	9.7	8.0
Cases per session, n	4	3
Cases in a list anaesthetised by responder, %	93	80
Time in a list where responder is directly supervised by consultant, %	68	20*

All figures are given as averages of all responders. *p < 0.05.

Junior versus senior specialist registrars

We did not detect a significant difference between senior and junior specialist registrars in workload or level of direct consultant supervision during on-calls and ward work commitments (Table 3). Senior specialist registrars, however, undertook more outpatient clinics and reported a higher discharge rate of patients seen (45% vs 34% for junior specialist registrars). This difference was presumably a reflection of their greater experience and confidence. Only minor differences were reported between senior and junior surgical specialist registrars with respect to theatre activity (including independent operating) and perioperative care (an analysis of any trend in the relative complexity of their allocated cases was beyond the scope of this survey). Junior anaesthetic specialist registrars reported anaesthetising a higher proportion of patients in a given list than did senior specialist registrars (93% and 80%, respectively), which could reflect the relative complexity of the cases allocated to them. But senior specialist registrars were much less likely to need direct consultant supervision to anaesthetise patients (20% compared with 68% for junior colleagues).

41% of specialist registrars reported that they attended teaching at least once a week for an hour or more, and 34% attended at least monthly. Attendance at managerial meetings was less common, but was still undertaken by 42% at least once a month; 89% attended clinical multidisciplinary meetings at least weekly.

Income generation of trainee activity: outpatient clinics

In 2012–13, NHS trusts were paid on average £200 for a first outpatient appointment and £100 for a follow-up appointment,

with some variation depending on the complexity of particular clinics. For example, for trauma and orthopaedics, the trust is paid £137 for an initial consultation and £83 for follow-up consultations. A typical fracture clinic seeing 50 patients could be run by two specialist registrars and a consultant. If we assume that the consultant sees 20 patients and the registrars see 15 patients each (our data suggest that trainees might see slightly more), and an even split of new and follow-up patients, then the work of two specialist registrars in that clinic will generate £3,300 income for the trust. Six fracture clinics in a week would generate £19,800. Over the course of a year, this amounts to just under £1 million or approximately £250,000 per orthopaedic trainee for fracture clinics alone. Some specialties see fewer patients per clinic but will raise a higher tariff. The data from this survey suggest that specialist registrars undertake, on average, three outpatient clinics per week and see approximately 10 patients, of whom a third are new, which might translate approximately to £3,000 income per week per specialist registrar just for outpatient work.

Income generation of trainee activity: theatres

The tariff paid to UK NHS trusts for completing surgical procedures varies from a few hundred pounds to several thousand, with an average figure of £2,500 (in 2013). Our data show that, on average, a surgical trainee operates on four patients in a half-day list, and 50% of these operations are independent of direct consultant presence. Surgical specialist registrars are therefore generating approximately £5,000 income per half-day session, which, for three operating sessions a week, equates to approximately £450,000 surgical income per trainee per annum (assuming 30 weeks of operating).

Conclusion

This survey of trainee work and productivity included 17% of the trust's total specialist registrar body, covering a very wide range of specialties. There have been concerns in the UK that since the introduction of the EWTD, trainees' experience of the practice of medicine has been reduced significantly. It has been estimated that presently trainees can expect to receive a total of approximately 6,000 hours of training on average compared with the 30,000 hours they would have received in 1993.[2] Despite this, our survey suggests that consultants remain sufficiently confident to afford their trainees considerable autonomy in their clinical practice.

A comparison of trainee logbooks found that the proportion of theatre cases operated on independently by specialist registrars more than halved after the introduction of the EWTD.[3] By contrast, an analysis of anaesthetic trainee activity found no significant alteration in training time since the introduction of the EWTD.[4] Our survey suggests that surgical specialist registrars operate independently for over half of their theatre cases and are heavily relied upon for pre-operative and post-operative care. Anaesthetic specialist registrars demonstrated a similar degree of autonomy.

It is unclear whether more trainee autonomy is desirable or what level of autonomy is ideal. Increased operating times have been reported in cases involving trainees.[3,5] An analysis of 14,452 operations showed that the presence of specialist registrars in theatre not only lengthened operating time, but also ultimately lead to significant additional costs.[6] Marston and colleagues found evidence of poorer long-term outcomes for hip replacements performed by trainees than for those done by consultants.[7] By contrast, Moran and colleagues found no such difference in clinical or radiological outcomes.[8] Other larger studies showed no significant difference in mortality rate, cost, or length of hospital admission or intensive treatment unit stay for cases operated on by trainees rather than by consultants.[9] Some specialist registrar-led operating lists have been shown to be safe and financially viable.[10]

It has been argued that, compared with consultants, specialist registrars bring poor value for money to outpatient clinics because of the possibility of undertaking unnecessary investigations and more frequent follow-up.[11] Lota *et al* suggested that the number of consultants needed to replace registrars in outpatient clinics could be paid for threefold or fourfold with the savings made from the reduced follow-up appointments.[1] A separate income analysis of 1,000 surgical outpatient consultations concluded that trainees potentially provide good value to their hospitals because their income-generating activity should more than offset the cost of follow-up appointments.[12] Furthermore, follow-ups are now being restricted by both clinical commissioners and trusts, with strict criteria and protocols to manage ongoing patient care. An audit of 848 outpatient oncology consultations performed elsewhere showed no difference in consultation duration between consultants and specialist registrars.[13]

Our data show that, over the course of a year, each specialist registrar in an orthopaedic fracture clinic could generate approximately £250,000 of income for a trust. Clearly this amount will vary by specialty, but it represents a significant income stream for a hospital. In specialties with fewer clinics and patients, outpatient activity alone might still translate into approximately £3,000 income per week per specialist registrar. Similarly, given the numbers of operations performed independently by surgical trainees, surgical specialist registrars are generating approximately £450,000 surgical income per trainee per annum (assuming 30 weeks of operating).

Furthermore, our survey shows a substantial teaching contribution by trainee doctors, providing a considerable efficiency in terms of the educational tariff paid to trusts. In particular, this teaching activity contributes to the income generated for teaching medical students. It is of course worth remembering that teaching benefits both the teacher and learner. We have not been able to objectively examine the clinical work undertaken by specialist registrars and therefore cannot undertake a formal cost–benefit analysis comparing total income generated for the trust with expenses incurred in investigations (among others). However, assuming that the survey is broadly reflective of reality, the extent of clinical activity suggests that most trainees do not represent a net cost to a hospital. In a similar analysis of obstetrics and gynaecology outpatient consultations, Flanagan and colleagues found that year one residents (registrar equivalent) were a net cost to the institution, year two residents nearly break even, and year three residents became a net financial gain.[14]

Limitations

The main limitation of this study is that the data collection was based on specialist registrars' retrospective perception and

recall of workload, clinical activity and level of supervision. By doing the interviews in person, we believe this will have been at least partly overcome by ensuring that respondents thought carefully about their previous week – ie about specific clinics and theatre lists, rather than making arbitrary guesses. We were also concerned that respondents might tailor responses to a perceived agenda (for example, to demonstrate excessive work, or better or worse training supervision). We believe that the anonymised, peer-conducted nature of the interviews lessened this possibility. Our Delphi exercise before formal use of the survey also ensured the survey questions were used uniformly and as robustly as possible. We were unable to put a financial value on many activities undertaken, such as ward work, meetings, phone calls, counselling patients and families, or supervision and training of juniors and students.

Summary

Specialist registrars in training provide a significant service to NHS trusts. They generate income through direct clinical work, which is in general very likely to outweigh the costs of the trainees themselves. Specialist registrars still have substantial autonomy in admitting and discharging patients, both on-call and in the outpatient clinic setting, and they have a key role in daily ward work and leading ward rounds (in most cases autonomously). This survey provides an insight into specialist registrar productivity and cost-effectiveness, and data to help to better evaluate their roles and contributions. ■

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