Royal College of Surgeons
ADVANCING SURGICAL CARE

Improving Surgical Training

Proposal for a pilot surgical training programme

Contents

Executive summary

The vision

We aim to create a surgical training system that produces competent, confident, self-motivated professionals who are able to provide the highest quality of care to patients in the NHS.

We aim to do this by:

- providing them with an appropriate balance between service and training;
- professionalising their trainers;
- introducing curricula that are truly competence-based within a learning environment that embeds and enhances simulation; and
- improving the experience of our trainees and ensuring the product at the end of training meets current and future patient needs.

The report

This report was commissioned by Health Education England (HEE) and aims to begin a debate within the profession about how surgical training might change. We have tried to be as inclusive in our approach as possible in the time available. A list of stakeholders and their views are set out in the report and in Appendices C and D. The recommendations that we make below represent a majority view, with some proposals being more contentious than others.

Feedback from stakeholders has led us to some initial conclusions around the current state of surgical training and around the potential changes that might improve it. We have turned these into a series of recommendations. Some of these will require additional research and development while many will need to be carefully piloted and evaluated before any further consideration about wider applicability across surgery and, potentially, medicine.

Many of the concerns we have heard have been recognised in previous high-profile reviews and yet still remain unresolved. Our primary focus is to look at ways in which we might rebalance service and training. One of the major challenges facing training today is a service which is over-reliant on a workforce of trainees, perceived by providers as ‘cheap’, often to the detriment of their training. We are keen to find alternative cost-effective solutions to support the service and we believe that, through collaboration with both HEE and NHS providers, we have an opportunity to address these issues and to provide a better quality of training for the next generation of surgical trainees.

The recommendations

Recommendation 1: To maximise training during daylight hours and to ensure that the time spent on call is of educational benefit, trainees on a full shift rota should have a minimum of 10 staff in that rota, including non-medical healthcare professionals.

Recommendation 2: Consideration should be given, where possible, to merging some tiers of out-of-hours surgical rotas in order to make the rota frequency less onerous and increase daytime learning opportunities.

Recommendation 3: A non-medical workforce should be developed to deliver surgical care by supporting junior surgeons and in some cases, by sharing on-call responsibilities.

Recommendation 4: Trainers should demonstrate their aptitude and qualifications to become educational supervisors through a programme of mandatory training.

Recommendation 5: Trainers should be supported by an adequate amount of time within the job plan to ensure that regular, weekly meetings occur with their trainees to manage, assess and support the trainee.

Recommendation 6: Trainees should have a consistent relationship with a trained educational supervisor and should have a separate and consistent relationship with a trained mentor.

Recommendation 7: Each period of training should be long enough to allow trainers and trainees to develop a mutually helpful relationship. This is likely to be a minimum of 12 months in a single institution.

Recommendation 8: All trainees should have the delegated support of a single team for each period of training.

Recommendation 9: Trainees should be allocated to those units that are able to provide high-quality surgical training with dedicated and supported trainers.

Recommendation 10: Trainee progression should be competence based rather than time based.

Recommendation 11: There should be pre-determined maximum and minimum times for the duration of training.

Recommendation 12: In each phase of training, there should be clear targets that determine whether the trainee is able to progress to the next phase. The targets will include knowledge, clinical skills, technical skills and professional capabilities.

Recommendation 13: The surgical curricula should be revised using a framework that includes the concept of entrustable professional activities.

Recommendation 14: Simulation should be embedded and enhanced within the surgical curricula and there should be sufficient resource to ensure availability for all trainees.

Recommendation 15: Each phase of training should be preceded by an educational induction where technical and non-technical skills are taught and developed in a simulated environment.

Recommendation 16: Any pilot of surgical training should have a run-through structure.

Recommendation 17: A methodology for an enhanced selection process for trainees entering surgical training should be developed.

Recommendation 18: An enhanced annual review of competence progression (ARCP) process for surgical training should be developed to support competence-based progression and to facilitate termination of training where trainees are not meeting the appropriate standards. This should include robust criteria that assess knowledge, skills and professional behaviours to determine the ability of a trainee to progress.

Recommendation 19: The certificate of completion of training (CCT) holder should be competent in the generality of the specialty and able to deal with at least 90% of the patients presenting in that specialty.

Recommendation 20: Where appropriate, the early years of surgical training should be broadened to accommodate training in areas that are relevant to that specialty.

Recommendation 21: The second year of the foundation programme should be themed for those wishing to enter surgical training and might usefully include areas such as critical care and emergency medicine.

Recommendation 22: A national surgical fellowship process should be developed that is regulated, quality assured and centrally commissioned with a clear indication of the nature of that training for trainees, employers and patients.

Recommendation 23: Funding for pre-CCT training should be used to deliver focused, high-quality, properly supervised training in accordance with the recommendations elsewhere in this report.

Recommendation 24: Funding should be provided to enable appropriate numbers of non-medically qualified staff to be trained to support the delivery of service and to enable the balance of service and training undertaken by surgical trainees to be redressed.

Recommendation 25: Funding should be provided to support the appointment of an appropriate and agreed number of post-CCT fellowships required as the result of changes to pre-CCT training.

Recommendation 26: Further modelling should be undertaken to better understand the costs of surgical training and the financial implications of new models of training.

The model

We have applied the principles outlined in the recommendations above to a pilot training model for general surgery. This will provide an opportunity to test the feasibility of the recommendations and whether they could be rolled out across surgical postgraduate training. It will be important to plan implementation of the recommendations well, with involvement of the various stakeholders, to ensure success.

Evidence from providers suggests that there is a need to train more surgeons to be competent to receive and treat the vast majority of acute general surgical emergencies in the district general hospital (DGH) setting, including those emergency conditions experienced by children and those which are urological in nature.

This will require the development of a new curriculum with appropriate assessments and selection (with the agreement of the regulator) and the availability of non-medically qualified but sufficiently trained members of the extended surgical team.

We believe that by applying the principles set out above, a general surgeon could be awarded a CCT:

- following an enhanced selection process at the end of foundation year two (FY2); and
- through completion of a competence-based run-through training programme that could be as short as six years.

We envisage piloting in a limited number of local education and training boards (LETBs), with evaluation concentrating on the early years where we see most benefit being achieved. Ongoing evaluation will be key to measuring the success of the recommendations, and if they should be adopted beyond the pilot stage.

Discussions are underway with other surgical specialties that may also wish to pilot alternate models of training.

Service and policy context

The landscape against which we are seeking to improve surgical training is one that sees the NHS challenged to provide significant medical, technological and scientific advances for an ageing population with multiple comorbidities. These challenges come at a time when the economic environment is more difficult than it has been for many years and also while the UK healthcare system is trying to embed recent organisational changes.

Further, since the Francis Inquiry[1] there has been an increased spotlight on patient safety, quality of care and professional behaviour. This is resulting in major changes to the way in which services are delivered and monitored, accompanied by an increasing focus on the way in which healthcare staff conduct themselves.

NHS England's *Five Year Forward View* is clear that action will be required on three fronts – demand, efficiency and funding – to sustain and improve the NHS.[2] A move towards ensuring a patient-centred approach to the planning and delivery of care, which is available seven days a week and delivered closer to home, has led to a debate about the way in which the NHS workforce delivers service and the role that individuals, both medical and non-medical, play within it. This includes the potential blurring of traditional professional boundaries, where this is safe and sensible and where it responds more appropriately to patient and service needs.

There is also a focus on new models of integrated care that will require a workforce with flexible skills able to work across different settings and traditional professional lines. New models will likely include multi-specialty community providers where diverse groups of healthcare professionals deliver integrated out-of-hospital care in one location; primary and acute care systems where general practice and hospital services are brought together; and redesigned urgent and emergency care models with far greater integration between A&E departments, GP out-of-hours services, urgent care centres, NHS 111 and ambulance services. The key will be centralising where appropriate while enabling meaningful local flexibility.

Within this context, there are increasing demands on the service, with ever-increasing numbers of older patients with multiple comorbidities seeking care for acute and chronic health problems presenting to both primary and secondary care. The pressures suffered by acute trusts across the UK during the winter of 2014/15 exemplified this.

For surgery, the progressive specialisation that has occurred over the past 40 years has provided benefits to patients by delivering surgeons who can undertake specialist procedures with great skill and expertise. However, this increasing specialisation has been counterbalanced by the difficulties in the delivery of the acute 'take'. Nowhere is this seen more starkly than in the case of general surgery, which has seen much change in the past ten years. Vascular surgeons, who were once part of the general surgical family, have become a separate specialty while breast surgeons and transplant surgeons have increasingly left the emergency surgical rota, creating additional pressures for those surgeons who staff these rotas.

Set against that, there is growing evidence in many areas of medicine that increasing specialisation, often in conjunction with service reconfiguration, can drive up standards of care and improve outcomes for patients.

1 Mid Staffordshire Foundation trust Public Enquiry. Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry. 2013. www.midstaffspublicinquiry.com/report.

2 NHS England. Five Year Forward View. 2014. http://www.england.nhs.uk/ourwork/futurenhs/5yfv-exec-sum/.

For surgery, this often means centralisation of complex cases, with some surgeons becoming progressively more specialised.

This increasing specialisation has sometimes been accompanied by the perception that the NHS places a lower value on those with a less specialised practice. This is clearly untrue, given the large numbers of patients who continue to be treated with good outcomes outside tertiary centres.

It is within this political, economic and service context that we seek to explore the potential ways in which surgical training can be enhanced, in order to deliver surgeons who can fulfil the needs of both the patient and the service and practise competently and professionally.

Current problems with surgical training

The current product of surgical training

The product of a UK training system should be equipped to undertake independent practice, in at least the generality of his or her specialty at the award of CCT. Although each surgical specialty currently sets out its requirements for the award of CCT with differing levels of detail, there is commonality between the surgical specialties in that they seek to describe the product of the training curriculum. For general surgery the description is:

> 'In order to gain the CCT in general surgery all trainees will gain knowledge, clinical and technical skills to the competency levels defined for ST8 in elective and emergency general surgery. They will all gain knowledge, clinical and technical skills to the competency levels defined for ST6 in gastrointestinal surgery (upper and lower). They will all gain knowledge, clinical and technical skills to the competency levels defined for ST4 in breast, transplant, vascular and endocrine surgery. In addition, knowledge, clinical and technical skills are defined for ST8 in the special interest components of general surgery.'[3]

This general surgery example illustrates that the current product of surgical training often perpetuates the view that surgeons need to be sub-specialists in their surgical specialty. As is well rehearsed in the *Shape of Training* review, this does not necessarily link with patient and service needs and may be influenced by other factors such as trainee interest.

Vignette 1: The 'breast issue'

The training of breast surgeons is an example of the product of surgical training not necessarily meeting patient or service needs. At present breast surgeons will undergo a general surgical training programme that will comprise two years of core and six years of specialist training, to a minimum of eight years. Many will spend longer than this. Much of the general surgical training programme revolves around the acquisition and maintenance of skills involved in the delivery of general surgery, including emergency general surgery. Increasingly, oncoplastic breast training is required at the end of training in order to produce a surgeon who can deliver high-quality care to patients with breast disease. However, on reaching CCT and becoming a consultant, the breast surgeon often leaves the acute general surgical rota, which effectively wastes much of the training that they have received over the previous eight years.

Problems with the current surgical training pathway

The current surgical training pathway for most trainees incorporates two years of foundation followed by competitive selection point into a two-year core surgical training programme. There is then a second competitive selection into specialty training, which continues for six years (five for urology and oral and maxillofacial surgery). There are exceptions to this broad principle with small numbers of trainees undertaking run-through training where the trainees selected into core training are entitled to progression through to CCT, providing that they meet the relevant targets along the training pathway (neurosurgery, academic surgical training, trauma and orthopaedic surgery [in Scotland], as well as a pilot in cardiothoracic surgery).

3 ISCP. General Surgery Curriculum. https://www.iscp.ac.uk/surgical/SpecialtySyllabus.aspx?enc=j4VfyFXq6Hwh0loAlHujtvi5dX26hnbw/8NqH1kHobI=

From the beginning of core surgical training, the minimum time that is required to deliver a surgical CCT holder, who is then eligible to apply for a consultant post, is eight years. In reality, however, it takes longer for many trainees. There are a number of reasons for this:

- The progression from core training to specialty training is often not immediate. The success rates for core trainees wishing to enter specialty training vary between the surgical specialties with ENT, urology and general surgery usually having the highest number of places taken by trainees straight out of core training (around 30–50%). In contrast this figure is around 5% for plastic surgery. This means that trainees often spend a period of time between core and specialty training in service or research posts.
- Trainees undertaking dedicated surgical research. A higher degree is often perceived as helpful in allowing trainees to progress from core to specialty training, while many 'teaching hospitals' prefer to appoint candidates with a higher postgraduate degree to consultant posts. While formal academic training is desirable for surgeons, it is debatable whether it is really necessary for surgeons other than those with academic aspirations.
- Time out of training for such things as parental leave may mean the CCT date is moved.
- Trainees have the right to apply to train Less Than Full Time if they have well-founded personal reasons for doing so. Their CCT date moves according to the proportion of hours they work.
- A final area where training can be prolonged is post-CCT where many trainees undertake 'fellowships'. The motivation for undertaking such training is varied. For some, the acquisition of additional skills required for a sub-specialist post is the driver. Some genuinely do not feel competent or confident for independent practice, while for others it is simply a reflection of the job market that additional experience is required before the 'trainee' will successfully obtain a consultant post. We are concerned that fellowship training is not regulated, is not centrally funded and is of variable quality.

Trainee dissatisfaction

The GMC *National Training survey 2014*[4] suggests that surgical trainees are the least satisfied trainees in the NHS today, and have been so for several years. It is true that satisfaction with surgical training has gradually improved since the inception of the GMC survey, but surgery still lags behind other specialties. In 2014, 77.1% of surgical trainees were satisfied with their training compared to medicine (78.4%), emergency medicine (81.6%), psychiatry (83.4%), ophthalmology (84.1%), radiology (83.8%), anaesthesia (85.6%) and general practice (88.6%).

Within surgery, the most dissatisfied trainees are the most junior. For foundation trainees, satisfaction was 72.1%, for core trainees 77.2% and for specialty trainees 85.5%. This suggests that there are problems in the early years of surgical training and there are a number of potential reasons for this, which we will expand on below.

Service versus training

In 2013 there were 58,469 doctors in training in the UK[5], each providing care to patients. The quality of care and the quality of training are inextricably linked and yet there is too often a

4 General Medical Council. National training survey 2014. www.gmc-uk.org/National_training_survey_2014_key_findings_report_1114.pdf_58504492.pdf.

5 General Medical Council. The State of Medical Education and Practice in the UK: 2014. http://www.gmc-uk.org/publications/25452.asp.

dependency on doctors in training to provide service, particularly at weekends.[6] While service and experience are an essential component of training, both the Collins report[7] and the Temple report[8] found that trainee doctors often felt expected to act beyond their competence and were poorly supervised. This is corroborated by the findings of the GMC's annual trainee survey and is not acceptable in terms of ensuring high standards of patient care and patient safety.

At its heart, the problem is that we have an NHS that often depends upon trainees to deliver service, and this is not sustainable in the medium to long term. We set out the potential reasons for this below.

Rotas and shift working

The European Working Time Directive (EWTD) was implemented in the UK through the Working Time Regulations (WTR) in October 1998 and limits workers to an average 48-hour week over a 6-month period. It lays down minimum requirements in relation to working hours, rest periods and annual leave. Changes to junior doctors' working hours were introduced incrementally, reducing to 56 hours in 2006 and to 48 hours in 2009. In 2009, a small number of rotas were allowed to derogate from the EWTD for 24 months as a final step towards compliance with the 48-hour week.

Since its inception, the EWTD has been further interpreted through a number of court rulings, with two particular judgments playing important roles. One decision (SiMAP) affected the amount of time that doctors may spend on call[9] while the other decision (Jaegar) concerned the interpretation of when compensatory rest must be taken.[10] The SiMAP and Jaeger judgements have had a considerable impact on the NHS and have contributed to a lack of flexibility in the management of junior doctors' working time. In order to ensure compliance, many hospitals have moved away from an on-call to a full shift-working pattern and this is particularly true for core surgical and core medical trainees. It is also true for some of the surgical specialties, with general surgery trainees often on a full shift system.

The Temple report[7] concluded that high-quality training can be delivered in 48 hours a week, but not where trainees have a major role in the out-of-hours service, when they are poorly supervised or when they have limited access to learning opportunities.

Shift working has had a number of consequences for surgical training:

» The dissolution of the 'firm' structure with the work patterns of trainers and trainees not being matched. This has led to the loss of the traditional relationship between a trainee and the trainer.

6 NHS London. Adult Emergency Services: Acute medicine and emergency general surgery. Case for Change. Nuffield Trust for NHS London: 2011. http://www.londonhp.nhs.uk/wp-content/uploads/2011/09/AES-Case-for-change_September-2011.pdf.

7 Collins J. Foundation for excellence. An evaluation of the foundation programme. Medical Education England. http://hee.nhs.uk/wp-content/uploads/sites/321/2012/08/Foundation-for-excellence-report.pdf.

8 Temple J. Time for Training: a review of the impact of the European Working time Directive on the quality of training. Medical Education England; 2012. http://hee.nhs.uk/healtheducationengland/files/2012/08/Time-for-training-report.pdf.

9 Sindicato de Medicos de Asistencia Publica v Conselleria de Sanidad y Consumo de la Generalidad Valenciana. 2000. C-303/98

10 Landeshauptstadt Kiel v Jaegar. 2003. C-151/02

- A significant proportion of the time is spent on call, often at night, often with little support. This time can have beneficial value for training, but usually does not.
- The ability of the trainee to access elective training and educational opportunities in daylight hours is adversely affected owing to the need to provide emergency cover at night.
- The size of the rota has a direct effect upon the proportion of time that is spent on call at night. For instance, a full shift rota of six doctors can result in more than 40% of trainees' time being spent on call at night during a placement, while a rota with 10 doctors results in this percentage falling to 25%.
- The need to maintain the rota means that when there are unfilled posts, those remaining may have to fill in the gap on the rota or else the service is left uncovered.

Vignette 2: shifts, rotas and gaps

In the preparation for this report, one of the authors discussed the issue of rotas with a core trainee with whom he'd spent a weekend on call. She worked in a major teaching hospital, and was nominally on a 2-in-16 full-shift rota. Of the 16 posts, 5 were filled by true 'core trainees' and varying types of trust doctors or research fellows filled 6 posts. Five posts on the rotation were vacant, and have been for most of the six-month placement. The 11 remaining doctors were required to backfill in order to maintain the acute rota. As a result, in a 6-month post, that trainee had undertaken 18 days of elective daytime training.

Recent ruling in European Commission vs Ireland

A July 2015 case brought before the European Court of Justice (ECJ) may have an impact on the interpretation of the EWTD in relation to medical training hours.[11] The ECJ found that the European Commission had not proved that the following types of training time constituted working time:

a) Scheduled and protected time off-site attending training as required by the training programme.

b) On-site regular weekly/fortnightly scheduled educational and training activities including conferences, grand rounds, morbidity and mortality conferences.

This may set a precedent for other types of training where there is an employer/trainer separation and where, during that training, the doctor is not available to be on-site to deliver a service. The Department of Health and NHS Employers will no doubt review this judgment carefully.

Limited training opportunities

The annual JCST survey was introduced in 2012 to survey surgical trainees about aspects of surgical training that are not covered in the GMC survey. Currently around 75–80% of surgical trainees regularly complete the survey. Data from this survey and from the GMC survey serve to demonstrate some of the adverse effects that the over-reliance on junior doctors to deliver service is having upon training:

11 Judgment of the Court (Fourth Chamber) of 9 July 2015. European Commission v Ireland. Failure of a Member State to fulfil obligations - Directive 2003/88/EC - Organisation of working time - Organisation of working time of doctors in training. Case C-87/14.

- In 2013/14 the JCST survey showed that 27% of all core surgical trainees were regularly required to undertake routine clinical work that prevented the acquisition of new skills.
- In 2013/14 the JCST survey showed that 46% of trainees were unable to attend five elective supervised clinical sessions per week, which is the minimum that the JCST feels is necessary to enable the timely development of clinical, technical and professional competences.
- The GMC's *2015 national training survey* shows that almost 20% of core surgical trainees are not able to attend more than two-thirds of their teaching programme and over 20% of core surgical trainee posts do not offer significant training opportunities.[12]

These deficits will inevitably have a variety of causes, but the central problem is that the need for the service to deliver round-the-clock emergency care using junior doctors inherently compromises those doctors' training.

Limited surgical experience

Measuring surgical experience by counting logbook numbers is something that surgical trainees have done for more than 50 years, and there is no doubt that operative experience, as measured by these logbooks, has diminished progressively over that time. There are many drivers for that, not least the reduction in training hours and significant growth in trainee numbers that occurred between 1990 and 2010. Further, modern educational thinking has put an emphasis on the competency of performance over logbook numbers alone.

Surgery has gradually moved to a position where trainees need to demonstrate both competence and a degree of experience. The tools that we have to measure competence appear to be reasonably valid and reliable[13] and, with time, we will be able to determine the average numbers of a procedure that an average trainee needs to undertake to become competent.

However, analysis of logbook data illustrates the ever-decreasing surgical experience of surgical trainees in general and core trainees in particular. Logbook data in orthopaedics and general surgery shows how little operative surgical training there is in core. This triangulates with anecdotal evidence from trainers in all surgical specialties involved in delivering core surgical training.

The data in **Figure 1** show operative experience in appendicectomy for core trainees (from a total number of 2,032 core trainees). These data have been obtained from the surgical e-logbook and encompass data from UK core trainees who have completed core surgical training in the past three years. The numbers are low and are mirrored by data for other operations that junior surgical trainees might traditionally have expected to access.

Figure 1

	Mean	Minimum	Maximum
Assisting	6	0	49
Supervised – trainer scrubbed	6	0	61
Supervised – trainer unscrubbed	0	0	23
Performed	1	0	60

12 General Medical Council. *2015 national training survey*. 2015. http://www.gmc-uk.org/education/national_trainee_survey.asp

13 Marriott J, Purdie H, Crossley J, Beard JD. Evaluation of procedure-based assessment for assessing trainees' skills in the operating theatre. Br J Surg 2011; 98: 450–7.

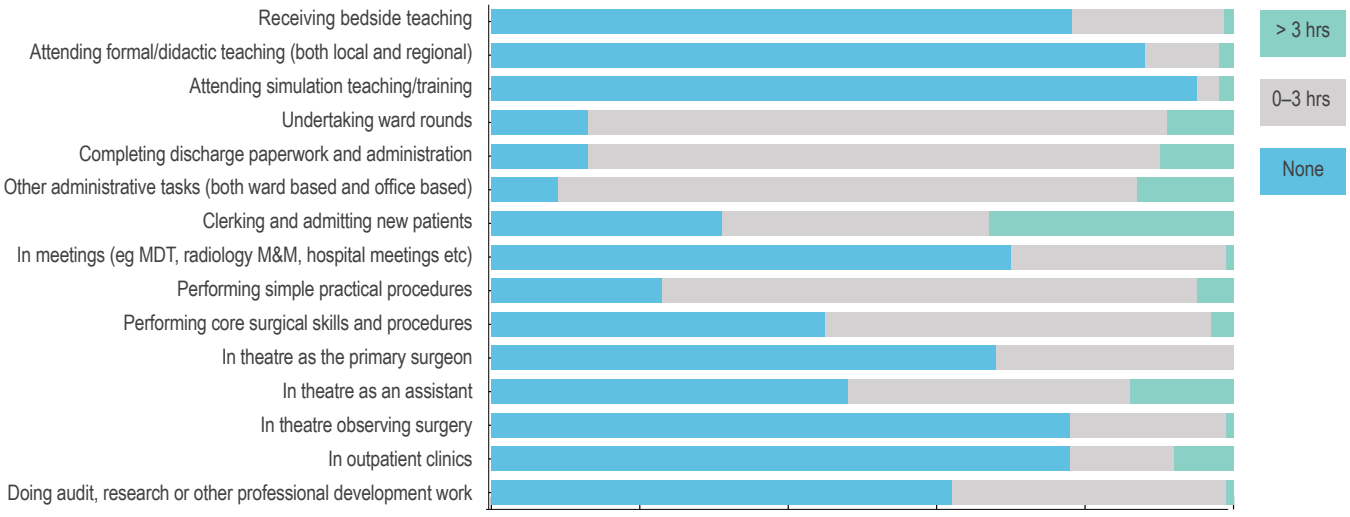
A recent study of urology trainee logbook data highlights that there is a concerning disparity between the operative experience expected by the JCST and that actually achieved by urology trainees[14] and this is true also of general surgical trainees.[15]

The RCS conducted an online survey of foundation, core surgical and ST3 trainees in July 2015 to provide an evidence base to guide work to improve the balance between service provision and education for junior doctors. A total of 989 responses were received including 147 from core surgical trainees, which we will focus on for the purposes of this report.

The survey data have given us an interesting view of how core surgical trainees spend their time. The trainees surveyed reported time spent in a variety of clinical activities on their last shift. In general, as can be seen in **Figure 2**, there is a lot of time spent on administrative tasks and patient clerking at the expense of time in the operating theatre, outpatient clinic and receiving direct teaching. Specifically, during their last working shift:

- Between 45% and 78% spent no time in theatre (either observing, assisting or as primary surgeon) or performing core surgical skills and procedures.
- Between 78% and 95% spent no time receiving any formal teaching (including bedside teaching, didactic teaching or simulation training)

Figure 2



Furthermore, in a separate question, 82% said that they had spent more than 40% of their time delivering service in that shift, with 47% spending more than 60% of their time in this way. While some service exposure undoubtedly has training value, 65% of core trainees surveyed felt that they did not have enough time for training in their current post.

14 R Robinson, KJ O'Flynn. Indicative operative numbers in urology training in the UK and Ireland. J Clin Urol 2015; 8: 188–195.

15 C Thomas et al. Does UK surgical training provide enough experience to meet today's training requirements? BMJ Careers, 11 May 2015. http://careers.bmj.com/careers/advice/Does_UK_surgical_training_provide_enough_experience_to_meet_today%E2%80%99s_training_requirements%3F.

Problems with the training process

Successful delivery of the current curriculum was always predicated on a number of practical requirements including the development of a professional faculty of clinical and educational supervisors, with clear role descriptions and with time to train. Further, there was a need for robust workplace based assessments together with a clear and objective Annual Review of Competence Progression (ARCP) process. To this we would add the need for a robust selection process into surgical training.

Uncoupled versus run-through training

The debate around uncoupled versus run-through training has raged in surgery for many years, with strong views expressed on both sides. Many would argue that run-through training provides continuity of training and is attractive to many trainees for personal reasons. Set against that are the arguments that we might not necessarily select the best trainees, that we would not allow for 'late developers' and that we cannot easily remove failing trainees from training because the ARCP process is too weak. For these reasons, surgery has generally persevered with 'de-coupled' training, using the second selection point as an opportunity to 'discontinue' the weaker trainees.

Selection into surgical training

National selection has been introduced into all the surgical specialties over the past eight years. The advantages are transparency, fairness and cost-effectiveness. However, there remain concerns that the process does not necessarily select the best trainees.

Even with national selection, the contact time at interview for the trainee remains relatively low, at least when compared with the selection processes used in other industries, and begs the question of how we should best select the next generation of surgeons.

As noted above, a run-through programme places even greater emphasis on the quality of the selection process and its ability to discriminate between candidates.

Progression through training and the ARCP process

Trainees progress at different speeds. Some are highly able and progress quickly, while others are less able, or receive less opportunity and progress more slowly. The current ARCP process struggles to deal with this variation while trainees resent an ARCP process that reflects a less than perfect outcome. As a consequence, in the current system, the numbers of surgical trainees who have progressed 'ahead of time' in the past few years are relatively small, as are the numbers of trainees who have been removed from surgical training as a consequence of failing to progress.

Can it truly be the case that all of our trainees are so similar that they achieve CCT at the same time? Or is this a quirk of the system? There is (limited) evidence that trainees achieve competence in surgical procedures at different rates and there are also oft-quoted comments from deanery advisors that without adequate documentation from trainers it is difficult to properly manage the under-performing trainee. We suggest that this situation could be improved if the trainers were properly trained and committed, if they had adequate time to train, and if there was more regular target setting and supervision. In many of these areas, these prerequisites are not achieved.

Educational and clinical supervision

The GMC pilot survey of trainers undertaken in 2014 highlights that there is room to improve the experience of trainers. Trainers surveyed noted that educational responsibilities are frequently given less priority than other commitments by senior managerial staff. Many trainers feel they are not provided with enough time for education and many are simply not able to use the time allocated for education due to other conflicting pressures. In addition, it seems that educational responsibilities are often overlooked in the appraisals process.[16]

Loss of the 'surgical team' and the trainer trainee relationship

The advent of the EWTD and the move to shift systems has not only affected the time that trainees can access elective sessions for training, but has also affected the environment in which they work. The traditional 'firm' structure has been lost, along with the loss of support that the structure provided and the mentorship that was available at all levels. Junior trainees in particular do not feel that they 'belong'. An example of this is the junior trainee mentioned above in **Vignette 2** who met her clinical supervisors so rarely that neither did they know her or her capabilities, nor did she know them or feel supported by them.

Summary

Surgical training currently provides high-quality CCT holders to staff the NHS, but it achieves this almost despite the environment in which trainees learn. There is an over-reliance on them to deliver service to the detriment of their training and the support and supervision that they receive is often lacking. As such they progress relatively slowly and achieve significant surgical experience relatively late in their surgical training.

Nowhere is this seen more starkly than in core surgical training, and it is there that we believe most improvement can be achieved.

16 General Medical Council. National training survey: Key findings from the pilot survey of trainers. GMC: 2015. [As this pilot survey is refined and rolled out nationally, more detailed and sophisticated information will be available to better understand the training environment]

Options for improving surgical training

To improve surgical training we must try to address the problems outlined above. The experience of Modernising Medical Careers (MMC) suggests that a 'big bang' approach would be unwise, and that any changes should be piloted and evaluated. To this end, any pilot of a new system of surgical training should encompass the following principles:

1. Maximising training hours through a reduced service commitment

- By reducing commitments to shift working there will be more time spent learning and being trained during daylight hours. This will be achieved by rota redesign and by greater use of the extended surgical team.

2. 'Professional' trainers

- Those surgeons with the aptitude, skills and training should be supported to deliver high-quality training.
- This will require dedicated time in job plans for training together with trainers who have the aptitude, training and skills to deliver high-quality training ('professional trainers').
- Trainers should continue to be developed, selected into specific roles and regularly appraised for their educational practice.
- By enhancing the quality of trainers, we would envisage an enhanced trainer/trainee relationship with the return of what we would call a 'modern' apprenticeship.
- This will contribute to more robust assessment.

3. Refined process of training

- The process of trainee selection into surgical training will be enhanced with the aim of selecting those most suitable for training.
- The training programme will be truly competence based and will allow trainees to progress according to their ability and achievement.
- The introduction of run-through training, with robust assessment to ensure that trainees only progress when it is appropriate.
- There will be a modular approach to curriculum structure with the acquisition of entrustable professional activities (EPAs) providing a core structure for the curriculum. There is some evidence that modular training can be more focussed and is effectively 'immersion' training.
- There will be an enhanced role for simulation in the acquisition of both technical and non-technical skills.
- Those trainees with an intention of pursuing a surgical career will undertake placements in FY2 that are themed for a surgical career.

4. Refined product of surgical training

- The product of the training programme will be appropriate for service needs, which in surgery means that they should be able to deliver independent surgical care for both emergency and elective patients.
- The early years of training will, in some areas, be more broad based in order to develop transferable competencies while supporting a more broad-based practice at CCT.
- Specialist skills should be developed by nationally funded, quality-assured post-CCT fellowships.

These principles can be applied to a number of the surgical specialties. We will initially describe the changes that we wish to introduce in principle, with the proposed general surgery pilot training programme outlined in **Appendix A**.

1. Reduced service commitment

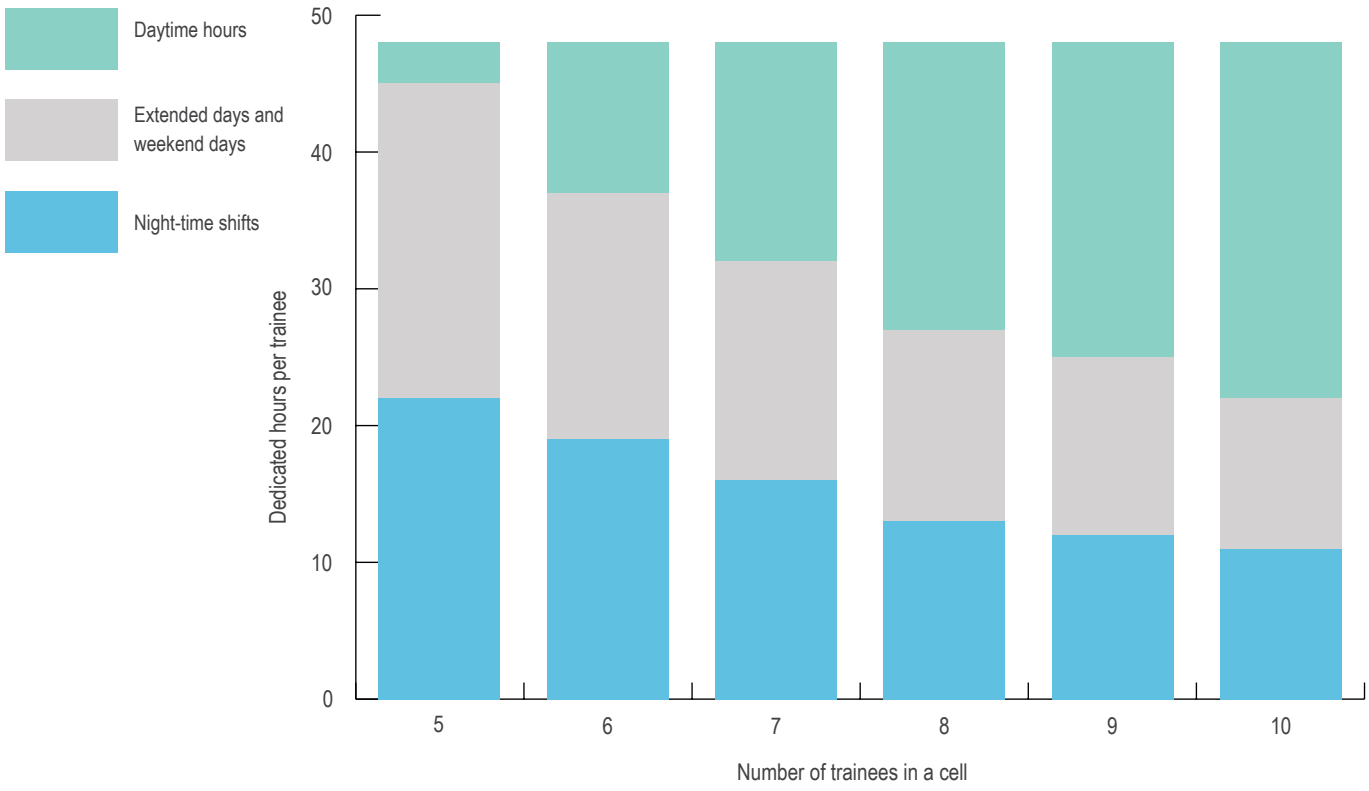
a. Rotas and shifts

The legal requirement for trusts to deliver training in 48 hours and to be Jaeger and SIMAP compliant has led to the widespread introduction of full-shift systems. Where trainees have such a significant on-call commitment, the time to train in daylight hours (where there are better training opportunities) is severely condensed.

The extent to which high-quality daylight training occurs depends directly upon the number of staff in the rota. The more there are, the more time that the trainee spends undertaking elective work during the daytime. This is shown graphically in **Figure 3**, where it is clear that the 'cell size' needs to be 10 staff or more for the daytime hours to be the majority of a trainee's working (and therefore training) time.[17]

Further, where there are gaps in the rota, the requirements to maintain the on-call service usually result in the remaining trainees being pulled from elective, daytime duties to deliver the emergency cover.

Figure 3



17 Numbers on a rota cell and the effect on junior doctors training Junior Doctor Advisory Team, Heath Education North West

The Royal College of Physicians report *Designing safer rotas for junior doctors in the 48-hour week,*[18] which has also considered these issues, states that a minimum cell of 10 staff is required for adequate training and service provision. We might argue that in order to take into account inevitable gaps in the rota as a result of planned and unplanned leave, a rota of 1:12 is more appropriate. This is based on a full-shift rota, with one doctor on a full shift at any one time. Specialties where a full shift system is not possible will need to consider other models of rota design.

Outline proposals from Professor Mike Gough contained in his document *Enhancing Surgical Training within the Confines of EWTD*[19] applied these principles to surgical training in order to increase the availability of trainees during daylight hours. This proposal is due to be piloted in the near future.

There is a balance to be reached. An appropriate amount of time spent undertaking emergency care, with good supervision, allows the development of competencies relevant to the care of the acutely ill patients. However an appropriate amount of time working under supervision in elective settings is required to develop core surgical skills without the added pressure of an emergency context.

Recommendation 1: To maximise training during daylight hours and to ensure that the time spent on-call is of educational benefit, trainees on a full shift rota should have a minimum of 10 staff in that rota, including non-medical healthcare professionals.

There may also be further adjustments to rota design. In some hospitals there is a triple tier of on-call surgical doctors: a foundation doctor to cover the wards, a core surgical trainee to support them, to assess acutely ill patients and (hopefully) to develop some clinical and technical skills in emergency surgery, and a third tier of a specialty trainee who will support the other tiers and who will be developing decision-making skills about emergency surgical patients. In general surgery this third tier is often also on a full shift rota, with all the adverse consequences outlined above.

There is some scope for merging some of these levels of on-call care, and this adjustment has already occurred in some units. The advantages include the need for fewer ‘slots’ with a resultant less onerous rota. Set against this, the work intensity and therefore the training opportunities might well increase, so some extra staff might be needed to support the doctors. We would suggest these individuals do not necessarily need to be medically qualified.

Recommendation 2: Consideration should be given, where possible, to merging some tiers of out-of-hours surgical rotas in order to make the rota frequency less onerous with consequential increases in daytime learning opportunities.

b. The extended surgical team

We believe that there is a need to radically re-think the surgical workforce and the roles within it. This includes an expansion in the roles of non-medically qualified healthcare professionals, with appropriate medical support to maintain quality, safety and efficiency.

18 Royal College of Physicians. Designing safer rotas for junior doctors in the 48-hour week. Prepared on behalf of a multidisciplinary working group by Horrocks N and Pounder R. London: RCP; 2006. https://www.rcplondon.ac.uk/sites/default/files/documents/designing_safer_rotasweb.pdf

19 Enhancing Surgical Training within the Confines of EWTD, M J Gough, 2015. [unpublished]

Advanced clinical practice roles are increasingly seen as the key to the delivery of healthcare services. The East Midlands Advanced Practice Framework[20] for example, provides a foundation for developing, reviewing and supporting advanced clinical practice roles in the East Midlands in response to a range of national and local workforce challenges, in areas such as surgery.

If we are to reduce the 'service' component of the junior doctor's work, then there needs to be an alternative and sustainable model of service delivery. We believe that such a model almost inevitably involves the use of advanced nurse practitioners (ANPs) or other non-medically qualified healthcare professionals not only to both support junior surgeons, **but also, where necessary, to staff acute on-call rotas.**

Vignette 3: Advanced nurse practitioners in the emergency department (ED), University Hospitals of Leicester NHS Trust

Leicester Royal Infirmary is one of the busiest EDs in the country. UHL recruited and developed experienced ED nurses as advanced nurse practitioners to perform at the same level as junior doctors, but without the changes in personnel every four to six months when the junior doctors rotate. The new role provides a stable group of staff with a consistent set of skills able to deliver care to patients who are seen by someone who is clinically competent and proficient, understands how the organisation works, can order tests and make referrals.

Again, explicitly, if there is the need for a 10 (or 12)-person acute rota, we envisage a rota made up of a mixture of medical and non-medical practitioners. The non-medical staff would be trained to assess acutely ill patients, begin to make sensible diagnostic decisions and initiate medical care of those patients. Clearly there will be a need for appropriate supervision and support, but we believe that this is a logical extension of the use of such practitioners in elective care settings, and increasingly in other specialties in out-of-hours care. This will create a new model of care: the 'extended surgical team'.

Non-medical practitioners are already being utilised across the country. ANPs have been used successfully in many hospitals including Barnsley Hospital NHS Foundation Trust.[21] According to an evaluation in 2013, the use of ANPs freed up junior doctors, which maximised their training opportunities. The ANPs provided continuity of care and became a highly skilled, more stable workforce. ANPs could also be used flexibly, with the development of training to support local needs.

20 Developing People for Health and Healthcare. East Midlands Advance Clinical Practice Framework. Health Education East Midlands. 2014. https://em.hee.nhs.uk/workforce/east-midlands-advanced-clinical-practice-framework/

21 McDonnell A et al. An evaluation of the implementation of Advanced Nurse Practitioner (ANP) roles in an acute hospital setting. Journal of Advanced Nursing 2015; 71: 789–99.

Vignette 4: Barnsley Hospital NHS Foundation Trust's use of ANPs

'Patient experience was thought to be enhanced through the timeliness of decision making, prescribing and the smoothing of the patient pathway through prompt ordering of investigations. For example on the Surgical Decisions Unit (SDU), the ANPs often took on the role of the admitting doctor, clerking the patients in and making an initial assessment, taking bloods, ordering investigations and prescribing initial analgesia, which not only reduced waiting times, but facilitated discharge for patients, because treatment decisions could then be made as soon as a senior doctor came to review them and triage them either for theatre, admission to the ward or discharge.'[21]

Vignette 5: Freeman Hospital, Newcastle

The cardiothoracic unit has used advanced nurse practitioners to staff the unit since approximately 2005. The change happened as a consequence of difficulties in filling rota gaps at senior house officer level. They currently use nurse practitioners to run both pre-assessment clinics and wards, providing 24-hour cover and these staff report to a resident registrar. This has enabled core surgical trainees to be freed up for training in theatre and the intensive care unit.

There are a number of candidate groups that could constitute an extended surgical team. Some are described below, with the pros and the cons of each group set out. We would expect that different models will likely develop regionally depending upon the availability of the workforce and local needs. However, the benefit of the East MIdlands Framework is that it defines 'advanced clinical practice', irrespective of title, sets a standard for entry and progression and outlines a career pathway, often missing when it comes to many roles for non-medically qualified practitioners.

Advanced nurse practitioners: From a nursing background, ANPs are trained to a nursing model and typically trained 'in house' with a relatively narrow area of practice. They can prescribe if they have undertaken the correct course and they offer the most immediate solution. However, within the context of limited nursing numbers to undertake 'nursing' roles and ongoing staff shortages[22], they might not be the best option.

Surgical care practitioners: From a nursing or operating department practitioner (ODP) background, they also typically train to the nursing model and have a relatively narrow area of practice. SCPs can also prescribe once they have completed the requisite course, and also often have surgical competences that offer support within the operating environment. However, there are limited numbers at present, and again they might drain the current nursing workforce.

Physician associates: From a biomedical background, and trained to the medical model. They provide a 'new' workforce, although there is as yet a limited career structure. Because of their training they are a flexible workforce, able to work in different hospitals or departments, but at present there are very limited numbers and they cannot prescribe. If they are to be the 'new' workforce, then any pilot will need to be delayed for two to three years until there are adequate numbers.

22 HSJ. Hospitals fail to hit staffing targets despite recruitment drive. 29 July 2015. www.hsj.co.uk/news/exclusive-hospitals-fail-to-hit-staffing-targets-despite-recruitment-drive/5088176.article

Recommendation 3: A non-medical workforce should be developed to deliver surgical care by supporting junior surgeons and in some cases, by sharing on-call responsibilities.

If members of the extended surgical team are to have a wider remit to their roles, the workforce will need to be developed to ensure that they are trained and in place to take on these positions. This in itself is a large piece of work that will need to be underway before a pilot training programme is launched. The non-medically qualified staff needed to support service delivery will need a clear scope of practice, a structured curriculum developed for their roles, (to provide reassurance to patients) and appropriate clinical support. We will need clarity on:

- whether there is a commitment to invest in the development of such a workforce;
- whether this workforce truly can replace doctors on an on-call rota;
- whether there are sufficient individuals from the right background who wish to undertake these roles;
- the extent to which this will deplete the nursing workforce and how this can be managed;
- the opportunities for career progression and a sustainable career pathway; and
- how training to appropriate levels of competency to fulfil extended roles will be funded.

c. Service years

An alternative model to developing the workforce of non-medically qualified staff to support the service, which was suggested and discussed during the development of this report, was to interleave training modules with employment periods devoted solely to service delivery. Once a trainee had achieved pre-prescribed levels of competence, ascertained through the ARCP process, they could be employed in a service role for one or two years at a time to enable them to embed their learning and develop work based skills and knowledge like any other professional employee. This would require partnerships between teaching hospitals where the training modules take place and district general hospitals in the locality where the service roles would be provided. It was proposed that such an approach may not take much longer than the current training programme if the training were condensed and concentrated and would clarify the difference between trainees and employees much more clearly. This model would effectively separate service from training.

Stakeholder engagement on this issue demonstrated little support and a very strong view that it would result in surgical training programmes that would be highly unattractive, likely to lengthen the period to CCT and, without clear mechanisms for stepping out and then back into training, would create a great deal of uncertainty among trainees and surgical aspirants. Concerns were also raised about the relative value to the service of a full-time member of staff who is only partially trained with limited areas of competency and whether it was possible to ensure that trainees in this position would not find themselves acting outside their areas of competency owing to a lack of appropriate supervision.

As a result of this feedback we recommend that a ‘service year(s)’ should not be included in any potential training pilot.

2. 'Professional' trainer

a. Mandatory faculty development

The Latin origin of the word 'doctor' (doceo) translates as 'I teach', but the majority of doctors, although expert in *what* they teach, have had little or no training in *how* to teach. Therefore the central responsibility of surgical trainers is the one for which they are often ill prepared. There is plenty of anecdotal evidence from trainees that there is huge variation in the quality of trainers, from exceptional to poor.

The quality of the trainer is an essential component if plans to enhance training are to be achieved. Research suggests that timely and regular feedback, expertly provided, can shorten the learning curves associated with new procedures.[23] Incorporating evidence-based training principles has the potential to produce excellent surgeons in a shorter time without compromising patient safety[24].

We fully support the GMC Standards for Trainers process that will come into full force in 2016 and local education and training boards (LETBs) across England are undertaking formal programmes of training for trainers in preparation for this change in regulation. The Joint Committee on Surgical Training (JCST) is working with the Faculty of Surgical Trainers of the Royal College of Surgeons of Edinburgh to develop an online portfolio that will support this process. However, there are fears that this may not prove to be a robust process and there is some concern as to whether the GMC's plans for the recognition and approval of trainers will be sufficiently granular to be able to differentiate.

There are many ways in which to develop surgical trainers including formal development activities, such as 'Training the Trainers' and more informal activities such as coaching and mentoring, belonging to a community of educators and role modelling. All these techniques rely on personal commitment and interest, institutional support and resources and the recognition of excellence in teaching and training.

We believe that continuing to rely on a voluntary approach will continue to lead to the inconsistencies in the quality of trainers that we see now. A mandatory programme of faculty development, embedded within practice, is essential if training is to become more efficient and of a more consistent, higher quality. Trainers should then be supported to plan, manage and focus training at the local level.

Recommendation 4: Trainers should demonstrate their aptitude and qualifications to become an educational supervisor, through a programme of mandatory training.

Recommendation 5: Trainers should be supported by an adequate amount of time within the job plan to ensure that regular, weekly meetings occur with their trainees to manage, assess and support the trainee.

If we can enhance the quality of the trainer, then there are potential benefits throughout the training system. Not only will the trainer / trainee relationship be enhanced, but the likelihood of

23 Grantcharov T, Schulze S, Kristiansen VB. The impact of objective assessment and structured feedback on improvement of laparoscopic performance in the operating room. Surg Endosc 2007; 21: 2,240–43.

24 Grantchorov TP, Reznick RK. Training tomorrow's surgeons: what are we looking for and how can we achieve it? ANZ J Surg 2009; 79: 104–107.

robust assessment will increase with the expectation that we can truly move from a time based system to a competence based system. However, there will also be 'softer' benefits including what one might call the development of a 'modern apprenticeship'.

b. A modern apprenticeship

Traditionally trainees learnt through apprenticeship systems that were less than comprehensive and were often highly idiosyncratic.

Nowadays, the curriculum sets out what to teach and how to do it in a much more systematic way. However, curricula are remote documents that need to be translated at a local level to reflect local opportunities. They should not interfere with the idea that as training opportunities arise, particularly at the boundaries of existing skills and competencies, these should be taken. This allows for a natural progression and local fluency based on multiple sources of good practice in a variety of professional and service settings. The evaluation of the Intercollegiate Surgical Curriculum Programme (ISCP) noted its efforts to deliver homogenous, systematic content and training management systems into a service that by its very nature is idiosyncratic, regionalised, heterogeneous and institutionalised around local practices and local ways of training.[25]

We need to reintroduce the positive aspects of apprenticeship by taking the trainee surgeon from a reasonably competent craftsman to a confident, comfortable, self-motivated individual. We need to do this within a shorter timeframe and within the confines of EWTD, by re-establishing the relationship between the trainer and trainee and bridging the gap between the theory of competency-based education and clinical practice at a local level.

The relationship between the trainer and the trainee should be one of mentorship, coaching and supervision. This will require longer placements than has often been the case, particularly in the early years of training, and will require careful and close educational support. There remains debate as to how long is ideal, but there is value in longitudinal placements of a minimum of 12 months in a single institution.

Recommendation 6: Trainees should have a consistent relationship with a trained educational supervisor and should have a separate and consistent relationship with a trained mentor.

Recommendation 7: Each period of training should be of an adequate time to allow trainers and trainee to develop a mutually helpful relationship. This is likely to be a minimum of 12 months in a single institution.

c. The surgical firm

The hallmark of a good professional is their ability to support the development of new members of their profession. The old surgical 'firm' structure encouraged the consultant trainer to invest time and effort into the emerging surgeon. It provided a sense of belonging that is often now absent, particularly in the early years of training.

The firm denoted a form of inter-generational cooperation and learning. It brought together novices who were being taught on the 'shop floor' not only by consultants, but also by nurses and more senior trainees, under the delegated authority of a consultant (the 'name over the

25 JCST and ISCP. ISCP Evaluation report. 2012. http://www.jcst.org/ISCP%20Evaluation%20/full_evaluation_report.

bed'). This consultant took responsibility for the quality of care and the quality of education and training delivered to those within the firm/team. In many ways, this was a forerunner of multidisciplinary team working!

What is important to note is that this type of apprenticeship model (in medicine and elsewhere) does not solely or primarily depend on explicit instruction. Rather, knowledge is also transmitted through informal learning that relies on time spent together (context, shared language and experiences, observation, implicit rather than direct communication) and through the formation of relationships of trust (that allows for mutual dependability and support). This in turn facilitates the transmission of how things are done in a particular context.[26] The key is that relationships must be allowed and encouraged to form. The current situation, where a consultant may not know their junior trainee's name because of shift patterns that have kept them apart, cannot continue if training is to become more effective, efficient and shorter.

We would wish to see trainees allocated to a team from the start of specialty surgical training. The team should comprise at least three consultants (to ensure a breadth of practice and ward against personality clashes), one of whom will act as assigned educational supervisor (AES) following mandatory training in this role. The educational supporting professional activities (SPAs) in the job plans of consultants within the team could be pooled to provide the AES with sufficient time to meet with the trainee on a weekly basis. This will enable the AES to plan the training timetable across the consultant-led activities within the team and to negotiate any modules, which need to take place in another specialty area such as critical care or the day-case unit. The team should also be multidisciplinary in nature, which will further encourage learning and team working.

Recommendation 8: All trainees should have the delegated support of a single team for each period of training.

d. 'Training trusts'

Trusts should be identified as 'training trusts' on the basis of the quality of the training that they provide, not their size.

Recommendations in this report around rota size may have implications for determining where training can take place. However, different rota models utilising different grades of staff might provide sustainable options for smaller units allowing designation of a 'training trust' to be based on the quality of the training and the trainers.

Suitable qualitative and quantitative measures need to be developed, which can be triangulated with the local knowledge of training programme directors and heads of school, to allow judgements to be made on the quality of the training being provided. Training placements must follow quality rather than service need.

Clearly this principle could result in some organisations not being allocated any trainees. This in itself should be a stimulus for that organisation to improve the training that it can deliver. However, there may be an unintended consequence that some institutions might choose not to deliver training and there could be a loss of good training opportunities currently available in smaller institutions.

26 Timm A. The demise of the firm – What is happening to apprenticeship learning? Report on a medical education research project conducted in 2009. University of Southampton; 2014. http://eprints.soton.ac.uk/372731/

Recommendation 9: Trainees should be allocated to those units that are able to provide high quality surgical training with dedicated and supported trainers.

3. A refined process of training

a. Competence, rather than time-based, curricula

The traditional time-based approach to surgical training relies on the assumption that surgical trainees learn at the same rate. There is clear evidence that this is not the case.[27]

There have been calls for competence-based education for many years. The ISCP is a competence-based curriculum that was developed in 2007. The term suggests that trainees complete training when they are competent rather than when they have passed through a prescribed number of years. A competence rather than time-based curriculum has the potential to dramatically accelerate the pace of procedural skills acquisition for some and, as a result, to shorten training.[28]

The Canadian (Reznick) model[28] used modules of training (which were often not service modules) that included accelerated periods of technical skills acquisition and were led by consultants who were committed to and skilled in delivering education. There was regular assessment with progression onto the next module when the competencies had been achieved. Full evaluation of this pilot process has not been published and it was noted that further study and consideration is needed, but could inform future implementation.

In a competence-based model the trainee could be said to be semi-supernumerary, embedded within a team and aiming, where possible, to maximise educational opportunities while minimising those service elements that provide little added value to the overall training of the surgeon. It also implies that the trainee can move onto the next stage when he or she has achieved their objectives. It may be challenging to directly translate this to the context of the NHS, but with close educational supervision and regular assessment, together with the setting of realistic targets, a more competence-based system should be possible. It would be the role of the trained AES in each team to manage this process at the local level.

Within this principle we would envisage that a minimum time for training and a maximum time for training should be determined in line with European and UK law and to ensure that failing trainees cannot continue to train 'forever' in order to achieve their competencies. These minimum and maximum times should be adjusted for less than full time trainees and for academic trainees.

Recommendation 10:Trainee progression should be competence based rather than time based.

Recommendation 11: There should be pre-determined maximum and minimum times for the duration of training.

27 Grantcharov T, Funch-Jensen P. Can everyone achieve proficiency with the laparoscopic technique? Learning curve patterns in technical skills acquisition. Am J Surg 2008; 197: 447–49.

28 Ferguson PC et al. Three-year experience with an innovative, modular competency-based curriculum for orthopaedic training. J Bone Joint Surg Am 2013; 95: e166.

Recommendation 12: In each phase of training, there should be clear targets that determine whether the trainee is able to progress onto the next phase. The targets will include knowledge, clinical skills, technical skills and professional capabilities.

b. Entrustable professional activities

Competency based curricula (along with most other types of curricula) often comprise long lists of educational objectives that can look like the index of a book. There is sometimes little connection between these objectives and what actually happens on the ground. The evaluation of ISCP has suggested that the introduction of workplace-based assessment has not been universally beneficial. There may be a tendency for the process to get in the way of the trainer / trainee relationship, for a tick-box culture to develop and for the process to focus on competence, when many would wish for excellence. Entrustable professional activities (EPAs) are one method of bridging this gap between the theory of competence-based training and the reality of clinical practice.

EPAs that are descriptors of work, requiring the possession of several competencies, provide a more holistic approach to the acquisition of proficiency.[29] Acquisition of EPAs are based upon the professional judgement of the educational supervisor, within a team structure, and are much more consistent across the service as they comprise the units of professional and medical practice, supporting national standards but reflecting some local variation. We see the use of EPAs as a development in competency-based training, in which a flexible length of training is possible and the educational outcomes become more important than training duration.

The use of EPAs will require the modification of existing curricula to underpin new models of training. This would be based upon which activities are central or critical to the practice of the specialty and require adequate skills, knowledge and attitudes that can be entrusted to a trainee once he or she is sufficiently competent. They need to be 'authentic tasks' and may encompass a large number of competencies. They are not an alternative to competency but a way of translating competency into clinical practice.[30]

Figure 4[31] Entrustment of professional activity

29 ten Cate O. Nuts and Bolts of Entrustable Professional Activities. J Grad Med Educ 2013; 5: 157–158

30 JRCPTB. A flexible curriculum for internal medicine – a proposal. JRCPTB; 2015. http://www.jrcptb.org.uk/documents/draft-new-curriculum-proposal-internal-medicine.

31 ten Cate O, Scheele F. Competency-based postgraduate training: can we bridge the gap between theory and clinical practice? Acad Med 2007; 82: 542–47.

Educational supervisors will sign off trainees as competent to undertake packages of work that will have significance to the service; in surgery these might be activities such as managing the acute take or managing in-patient surgical conditions, but they will have transferability across programmes and units.

In order to be in a position to implement this approach, the interaction between the trainer and trainee must be frequent, regular and based on an inherent knowledge and trust. This can only be achieved if the trainee spends a significant amount of time with the trainer and the trainer can observe and assess the trainee in action.

Recommendation 13: The surgical curricula should be revised using a framework that includes the concept of entrustable professional activities.

c. Simulation and Educational Induction

Simulation and simulated tasks have been used in medical, nursing and dental education for at least 50 years. In modern medicine it is possible to use simulation to develop clinical, technical and non-technical skills and behaviours and there is now a wealth of literature supporting the value of simulation in medical education.

Simulation in the context of surgical training means any reproduction or approximation of a real life event, process, or set of conditions or problems e.g. taking a history in clinic, performing a procedure or managing post-operative care. Trainees have the opportunity of learning in the same way as they would in the real situation but in a patient-safe environment. Simulation can be used in the development of both the individual and the team.

Drivers for simulation

There are several drivers for the introduction of simulation into the surgical curricula, the first one being patient safety. Medical errors can result in injury and even in death. Simulation (including human factors training) offers an important route to safer care for patients by allowing trainee surgeons to develop clinical and technical skills in simulated circumstances in a safe environment before undertaking them in supervised clinical practice. Simulation also allows the development of team working addressing human factors in a non-clinical setting.

The second driver is that there is evidence that simulation can shorten the learning curve in the development of both technical and non-technical skills and thereby can enhance learning. In the Dreyfus model of skill acquisition[32], task simulation will help the novice while contextualization will be helpful for the advanced beginner. In situ simulation and supervised clinical practice will help the progression from competent to proficient, while mission rehearsal will help the expert to become a master, and will also be valuable in the development of non-technical skills and team based proficiencies. The effects of European working time regulations have been addressed elsewhere in this report and widely publicised and debated. Whatever the actual effect upon the quality of training, what cannot be in doubt is that the opportunities for practical training experience have been diminished. In that context, the place of simulation as a means of acquiring, developing and improving technical and non-technical skills has much to commend it.

32 Dreyfus SE, Dreyfus HL. "A Five-Stage Model of the Mental Activities Involved in Directed Skill Acquisition". Operations Research Centre, UCL: 1980. http://www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA084551

The third is that simulation offers the opportunity for a trainee to acquire, develop and improve skills in a non-threatening environment. This is particularly true of technical skills, where the operating theatre, with the multiplicity of distractions that exist in that environment, may not be the best place for a trainee to focus upon the development of the technical aspects of a procedure.

Consequences of simulation

In respect of surgical training, the introduction of simulation into the curricula will neither affect the objectives of learning nor the technical or non-technical skills that are required during surgical training. What simulation offers, in certain parts of the syllabus, is a different learning method that will complement and augment clinical training.

The use of simulation in surgical training should be regarded as part of a blended approach to managing teaching and learning concurrent with supervised clinical practice. The use of simulation on its own cannot replace supervised clinical practice and experience or be used to authorise a doctor to practise unsupervised.

Methods of simulation

Examples include simulation within the workplace, training in skills laboratories, training on skills courses and virtual reality simulation. It is important to emphasise that simulation training need not necessarily be expensive. For instance, it can be used in the workplace as a means of enhancing and practising skills. Examples of this would include low-fidelity simulation such as bench models or video box trainers.

Training would start at the beginning of each placement with an educational induction including simulated models and clinical situations in the skills lab until a pre-defined level of proficiency is acquired. Only then would the trainee be able to progress to clinical situations on the ward and in the operating theatre.

Figure 5[33] Available types of simulation

Simulation	Advantages	Disadvantages	Best Use
Bench models	Cheap, portable, re-usable, minimal risk	Acceptance by trainees; low fidelity; basic tasks, not operations	Basic skills for novice learners, discrete skills
Cadavers	High fidelity, only 'true' anatomy simulator currently, can practice entire operations	Cost, availability, single use, compliance of tissue, infection risk	Advanced procedural knowledge, dissection, continuing medical education
Human performance simulators	Reusable, high fidelity, data capture, interactivity	Cost, maintenance, and downtime; limited 'technical' applications	Team training, crisis management
Virtual reality surgical simulators	Reusable, data capture, minimal setup time	Cost, maintenance, and downtime; acceptance by trainees; three dimensions not well simulated	Basic laparoscopic skills, endoscopic and transcutaneous procedural skills

33 Reznick RK, MacRae H. Teaching surgical skills – changes in the wind. N Engl J Med 2006; 355: 2,664–69.

Summary

Simulation is already included within the surgical curricula, although at present it is not a mandatory component of surgical training. However, it is available to a baseline level across core surgical training and will likely become mandatory in the near future. Similarly, human factors simulation is available across most training programmes. We would therefore seek to embed and enhance the role of simulation in surgical training. The rationale is clear and there is significant potential to make surgical training both safer for patients and potentially to accelerate the acquisition of competencies.

Recommendation 14: Simulation should be embedded and enhanced within the surgical curricula and there should be sufficient resource to ensure availability for all trainees.

Recommendation 15: Each phase of training should be preceded by an educational induction where technical and non-technical skills are taught and developed in a simulated environment.

d. Run-through training

As noted elsewhere in this report, the principle of run through training is contentious with strong arguments present on both sides. The principles outlined in MMC of increasing flexibility and providing a broad-based beginning to specialty training still apply today, and should be considered alongside the choice of a run-through versus uncoupled training programme.

The Tooke review of MMC recommended that uncoupled programmes should be reinstated in the majority of specialties owing to the perceived lack of flexibility to leave and re-enter training and to transfer between specialties. However it was the imposition of a 'one size fits all' process that caused such problems in 2007, rather than the idea of run-through in and of itself.[34]

Run-through training is considered to have the following benefits:

- It provides more certainty for trainees making it easier to plan within geographical areas.
- It helps to increase competition and fill rates at national selection. The competition ratios for those surgical specialties with run-through are greater than for core surgical training (neurosurgery rate is 1:6; cardiothoracic run-through pilot rate is 1:10 compared with 1:2 for core surgical training). This was the main reason that the Royal College of Emergency Medicine undertook a run-through pilot in 2014 – to encourage recruitment and reduce attrition.[35]
- It abolishes the perceived waste of trainees that complete core training, but who cannot gain entry to specialty training.
- Run-through programmes are attractive for Less Than Full Time (LTFT) trainees owing to the stability provided.
- Many trainees already seek to 'theme' their core training towards a particular specialty and many specialties require at least 12 months of core training to be spent in that specialty.

34 House of Commons Health Committee, Modernising Medical Careers, Third Report of Session 2007–2008, Volume I. London: The Stationery Office LImiteed; 2008. http://www.publications.parliament.uk/pa/cm200708/cmselect/cmhealth/25/25i.pdf.

35 Health Education Yorkshire and the Humber. Health Education Yorkshire and the Humber, Emergency Medicine Run Through Training Pilot: Arrangements for Offering Run Through Training to Existing Acute Care Common Stem (ACCS) Emergency Medicine (EM) and CT3 Emergency Medicine (EM) Trainees. 2014. http://www.rcem.ac.uk/CEM/document?ID=7604&subID=49.

Set against this, the three main arguments against run-through training are:

- Early selection occurs before trainees are certain what they want to do and to the exclusion of those 'late developers' who decide their career intention later in their careers.
- Run-through breeds complacency in trainees.
- Run-through means that it is difficult, within the context of an imperfect ARCP system, to deal with those trainees who do not meet appropriate standards.

We believe, on balance, that the positives outweigh the negatives and we believe the negatives can be further mitigated by:

- Good programme information at the recruitment stage.
- Enhanced recruitment and selection processes.
- Professional trainers who can support an enhanced ARCP process .

However, we do feel that further work is required in two specific areas if we are to make run through training work for surgery: enhanced selection into surgical training and an enhanced ARCP process to ensure that only those trainees who deserve to progress can do so. These are discussed further below.

Recommendation 16
Any pilot of surgical training should have a run-through structure.

e. Robust recruitment and selection

A run-through programme places even greater emphasis on the need for robust recruitment and selection processes. The processes need to be able to distinguish reliably between highly qualified candidates and to select individuals who can be trained to be highly competent surgeons with a reduced risk of in-programme attrition.

We have been struck by the differences between the current methods of recruitment into surgery and similar processes in sectors such as business and banking, where multi-stage processes are standard practice, and more time is spent seeking to be certain that the correct candidates are appointed. We show the vignette below not to suggest surgical selection should directly parallel selection of airline pilots but to demonstrate a different model from which we might usefully learn. Given the cost of training a surgeon and the nature of their work, we feel that an enhanced selection process is essential.

Vignette 6: Recruitment process for the Emirates Airline Group

Shortlisted candidates are invited to attend a four-day selection process. The programme is designed to provide candidates with an opportunity to experience Emirates. This allows candidates to identify and overcome any issues that pose an obstacle to joining the team as well as to ask questions about life as a professional pilot with Emirates. The two-stage selection programme generally follows a fixed format:

Day 1: Stage 1
- Welcome brief / simulator brief
- Simulator assessment (basic flying skills, flight deck management and airmanship)
- Advanced compass test (comprehensive skills and aptitude)

Candidates will be notified at the end of the day if they have been successful in this first step of the assessment.

Day 2: (Stage 1 continues)
- Psychometric testing
- HR brief (important information relating to terms, conditions and the process of joining Emirates)
- Guided tour of accommodation and facilities

Day 3: Stage 2
- Assessment centre exercises
- Panel interview
- Feedback from company psychologist on psychometric profile

Candidates will be notified at the end of the day if they have been successful during the last steps of the assessment.

Day 4:
All chosen candidates are required to complete a medical test

The detail of the selection process into a run-though programme in surgery will need to be developed. It will build upon the current selection centre model used by most of the surgical specialties and will need to include the following features:

- Multi-stage selection process
- Long-listing process against robust criteria
- Selection centre assessment involving multiple stations and assessors
- Examination of multiple competencies per assessment station
- Potential use of situational judgment tests for testing important non-academic attributes (such as empathy, integrity and resilience)[36]
- Recruitment based on those values expected of a professional
- External validation of the process by workplace psychology experts

Recommendation 17: A methodology for an enhanced selection process for trainees entering surgical training should be developed.

f. In-programme assessments and ARCPs

In a run-through programme that allows competence-based progression, in-training assessments and the ARCP process must have the ability to discriminate between those trainees who are progressing quickly, those who are progressing satisfactorily and those who are not. Some of these assessments will need to be summative, in a way that they are not always at present and will need to be based around the attainment of objective criteria in the areas of knowledge, skills and professional behaviours.

36 Patterson F et al. Evaluations of situational judgement tests to assess non-academic attributes in selection. Med Educ 2012: 46: 850–68.

There are a number of factors that we would wish to explore and investigate as part of a pilot:

- Frequent in-programme summative assessments linked to EPAs
- Competency benchmarks throughout the programme
- Increased externality at all ARCPs and assessments
- A presumption of non-compliance at ARCP and the need to provide evidence of attainment
- A more rigorous approach to reviewing the evidence at ARCP
- ARCPs to review performance of the trainer as well as the trainee, using objective data

We feel that the process of professionalising trainers will resolve many of these issues, but probably not all, and a formal piece of work is required to develop an enhanced ARCP that is compatible with employment regulations.

Recommendation 18: An enhanced ARCP process for surgical training should be developed to support competence-based progression and to facilitate termination of training where trainees are not meeting the appropriate standards. This should include robust criteria that assess knowledge, skills and professional behaviours to determine the ability of a trainee to progress.

4. Alterations to the product of training

a. Product that meets changing patient needs

As outlined in this report, the proposed move towards seven-day services, integrated care and new service delivery models will require a response from the surgical consultant population.

Our patients include a growing number of people with multiple co-morbidities, an ageing population, those who experience significant health inequalities and increasing patient expectations.

The *Shape of Training* review[37] has split opinion in the medical profession, but we cannot ignore the fact that a wide ranging stakeholder engagement exercise was undertaken which resulted in a key message that patients and the public need more doctors who are capable of providing general care in broad specialties across a range of different settings. This is supported by the response from the patient and lay representatives who engaged with us in the production of this report, set out in the stakeholder views section below. We can take the paternalistic view that we know best, or we can listen to the needs of our patients and try to change to meet what it is that they require of us.

We need to understand how this affects the way we deliver care in surgery and the training programmes we need to put in place. There is already a realisation in some surgical specialties that the core of the specialty should be more broad-based and that potentially only a relatively small number of trainees need to go on and develop sub-specialist skills.

37 Shape of Training. Securing the Future of Excellent Patient Care: Final report of the Independent Review Led by Professor David Greenaway. Shape of Training 2013.

Recommendation 19: The CCT holder should be competent in the generality of the specialty and able to deal with at least 90% of the patients presenting in that specialty.

b. Broad based early years training

It has been traditional in surgery to provide two to three years of early-years training in a 'rotation' of specialties prior to entering specialty training. Currently referred to as core and previously known as basic surgical training this used to include a much broader range of specialties – including emergency medicine and critical care – than is currently the case. Core surgical training is currently designed to allow the trainee to develop the basic and fundamental surgical skills common to all surgical specialties. While the content of core training varies from post to post many trainees seek to theme their training, having already decided what they want to do. They seek to rotate through relevant specialties and indeed the criteria for entry into specialty training usually mandate a minimum period (usually 12 months) in the specialty. In our view, there is potential value in formalising this approach such that trainees who enter a particular programme all rotate through a group of related specialties that would form the early years of a run-through programme in that specialty.

An example is the general surgery model that we propose in Appendix A. Exposure to paediatric surgery, urology, trauma and vascular surgery will enhance the breadth of skills that the resultant CCT holder will possess. However, while we feel that there is value in this broad-based training, the logistics of delivering training in these smaller areas is challenging and the practicalities will need further work.

Two areas where the majority of surgical trainees would also benefit from collective exposure are emergency medicine and critical care. Time practising in these areas would underpin training in many surgical and medical specialties and should be a mandatory element of the foundation programme for anyone wishing to go into a surgical specialty. Again, the practicalities of delivering training in these areas will need further discussion and investigation.

Recommendation 20: Where appropriate, the early years of surgical training should be broadened to accommodate training in areas that are relevant to that specialty.

Recommendation 21: The second year of the Foundation Programme should be themed for those wishing to enter surgical training and might usefully include areas such as critical care and emergency medicine.

c. Post-CCT training

As noted above, we do not expect that the current standard of a CCT will change under these proposals, however the content will. The CCT will be more explicit in terms of what is *not* included. These areas are important because they often encompass more specialised areas of surgery that require skill and expertise in order to deliver high-quality outcomes for patients.

Currently this training takes place either pre-CCT, where access to such training is available, or post-CCT, in fellowship posts. Current fellowship posts are of variable quality, are not usually quality assured, are not regulated, and are funded in an ad hoc way by trusts, industry or other sources. The challenge is to deliver specialised training in a way that resolves these issues.

The RCS runs a voluntary quality-assurance scheme for post-CCT fellowships across surgical specialties that relies on such posts meeting a robust set of standards as outlined below.

Vignette 7: Standards underlying the National Surgical Fellowship Scheme

The National Surgical Fellowship Scheme:

- identifies, assesses and approves fellowship posts (after due consideration of the future needs of the health service);
- provides a mechanism to maintain and raise standards and ensure uniformity of fellowship provision;
- maintains and publishes a central register of high-quality approved posts to assist trainees;
- assists providers in attracting high-calibre candidates;
- ensures the availability of targeted opportunities for surgeons to obtain super-specialty and multidisciplinary skills not easily available within specialty training programmes/regions;
- prevents indiscriminate proliferation of fellowship posts and aligns fellowship opportunities more closely to workforce needs; and
- ensures that the training of pre-CCT surgeons is not compromised by pre- or post-CCT fellowships.

We envisage a further series of post-CCT fellowships in sub-specialist areas of practice that will not lie within the CCT. In order to ensure that an appropriate number of sub-specialty fellowships are available in the right specialist areas we would support these being commissioned centrally by HEE based on LETB annual workforce plans, in consultation with the relevant specialist association. The 'lag time' of a fellowship is a maximum of two years and it should therefore be possible to match workforce requirements with fellowship programmes with more accuracy than has been the case when trying to match specialty national training numbers (NTNs) and the future needs of the service. This principle has been applied successfully for such areas as cleft lip surgery, using current interface fellowships.

Currently, post-CCT fellowships are funded via a number of different routes, including locally by trusts, through industry partners, research funds and through other associations. Optimally, funding should come from HEE for post-CCT fellowships. However, a variety of funding sources could continue if there is a robust national commissioning process linked to workforce requirements and a mandatory quality assurance process led by the profession.

Whether these posts lead to a 'credential' depends upon the ongoing consultation on credentialing by the GMC, but we do feel that there is value in the public being able to identify those trainees who have successfully undertaken quality assured post-CCT training. The exact mechanism remains to be determined.

The details of how these posts are run and delivered is to be determined, but our initial thoughts are that:

» The fellowships should have a curriculum with assessment of competencies, although we do not envisage the need for an examination.
» There is a logic in having JCST /Special Advisory Committees (SACs) managing the post-CCT fellowships in the same way as they manage pre-CCT training.
» Access to post-CCT fellowship training should be through a national competitive selection process. The JCST and relevant SACs/SSAs should be involved in selection using a model similar to other national selection processes. This would allow more accurate and responsive workforce planning for a small number of skill gaps across the UK as well as ensuring equality of access and robust selection processes.
» We see access to post-CCT fellowships being available not only to those who have just completed CCT, but those consultants already in practice who wish to further develop their sub-specialty skills.

We have described a post CCT model, but an alternative would be to use the interface fellowship model, that already exists.

Vignette 8:

Interface fellowships are offered in the cross-specialty areas of cleft lip and palate surgery, hand surgery, head & neck surgical oncology, oncoplastic breast surgery, and reconstructive cosmetic surgery. Five training interface groups (TIGs), made up of representatives from the relevant specialty advisory committees and surgical specialty associations, oversee the fellowships. The TIGs set standards for training and national recruitment, and closely assess trainees' progress. For governance reasons, the interface fellowships are all undertaken within training, and certification dates are put back to accommodate them if necessary. The fellowships are considered to be the gold standard in their respective fields, and fellows receive high-quality focused training. Trainees are not expected to fulfil their unit's service needs during their interface fellowship.

Recommendation 22:
The national surgical fellowship process should be developed that is regulated, quality assured and centrally commissioned with a clear indication of the nature of that training for employers and for patients.

The cost of surgical training

The costings set out in Appendix E have been provided by the University Hospitals of Leicester NHS Trust (UHL)and are based on work to understand the real, annual costs of training a general surgical trainee based on current salary, on call, supervision and infrastructure requirements. In reaching these figures, a number of assumptions have been made and these are listed in Appendix E. For example, the costs of supervision have been assumed to change as the trainee becomes more senior.

As the figures show, the average annual cost of a trainee to the NHS is estimated at £198,000, averaged out over an eight-year general surgical training programme. Based on these assumptions, a full eight-year programme of training will cost the NHS £1.58m per trainee.

The (perhaps) surprising components of these costs are those incurred by the hosting institution reflecting the trainer time incurred in supervising a trainee. This is reflective of:

- the calibre of the individuals we train;
- the professional skills, expertise and knowledge they have already attained and will go on to develop;
- their value to the NHS, patients and society; and
- the investment required in terms of other staff time and infrastructure to develop them into confident, self-motivated individuals capable of providing the highest quality of care to patients.

This is a significant sum of money and it is likely that this figure, or one very similar to it, will apply across other surgical and many medical specialties. It is therefore essential that the NHS, and ultimately the taxpayer, receive value for money for its investment.

Furthermore, recent research has shown that on average, two years of core surgical training costs a trainee £10,240, including both mandatory and additional courses. There will be additional costs to the trainee for the other years of training.[1]

These costings can only be considered an estimate, with the assumptions being developed by surgical trainers at Leicester, and we feel that further work is required to test these assumptions. Further, the support and infrastructure costs may vary between LETBs. One example of this is the extent to which the LETB has already invested in simulation. We know that there is variation across the country and, given the prominent role of simulation in our proposals, different LETBs will have different levels of investment to make if our proposals are implemented.

Financial consequences of the changes that we have proposed

One of the basic tenets of this report is that the NHS currently relies on trainees to deliver service, to the detriment of their training, such that trainees are spending too much time undertaking service that is of little educational value. We can now see that they are doing so at great expense to the system. Trainees are not a 'cheap' option although trusts may consider them to be so because some of these costs are paid from other sources, such as HEE.

We acknowledge that trainees can learn from the time that they spend on-call while caring for acutely ill surgical patients *if* this is properly supervised. However, there is also a need for supervised training in daylight hours, especially in relation to the training opportunities in

1 Oakland K, Bola S; Financial burden of surgical training: http://careers.bmj.com/careers/advice/Financial_burden_of_surgical_training

outpatient clinics, in the operating theatres and on the wards. We have recommended that trainees be placed on a rota that comprises a minimum of 10 staff, some of whom might be non-medically qualified advanced practitioners. Such a proposal will inevitably have financial consequences, which we have attempted to model.

Set out below are two examples based upon real rotas in two separate large major teaching institutions, Leicester and Leeds. In both cases we have:

» costed the current rota for general surgery; and
» adjusted the rotas, in line with our proposals, and to the calculate the 'new' cost of delivering the general surgical service at junior doctor level.

University Hospitals Leicester

The finance team in UHL have calculated the staff costs of running the current general surgery rota. We have then 're-designed' the rotas using the following principles and recalculated delivery of the service:

» A 1-in-12 rota. The rationale being that even with occasional absences owing to sickness and vacancies, this will deliver an effective 1-in-10 rota for those working within it.
» We have removed the locum posts that are currently needed to fill the gaps in the rota.
» We have assumed that there are the same number of employed doctors, but have added non medical staff as the 'extras' to create the new rotas.
» We have assumed that advanced practitioners will be employed at Band 7.

Current costs of the general surgical rota in Leicester

UHL run four general surgical rotas on two sites, as described in detail below. In brief, they have two tiers of surgeons on call in both hospitals, with all trainees on a full shift system. As can be seen, there is a planned vacancy in the Leicester Royal Infirmary rota which is required to make the rota EWTD compliant, and which will require a locum to fill the post.

The second table shows a snapshot of the staff who were actually employed in September 2015, showing that there were additional vacancies that also require locums.

We have then gone on to identify the (total) annual salary costs required to run the rota assuming that the staffing levels in September were indicative of levels throughout a year.

The additional costs of training, discussed earlier, have not been included but the salary costs are as described in Appendix E. Locum costs have been calculated at an average of £119k per annum at the CT1/ST1–2 level and £142k per annum at the ST3+ level (based on costs provided by UHL). The total costs of running the rotas for a full 12 months, if we assume that September is a representative month, are therefore just under £3.5m.

COSTS OF CURRENT GENERAL SURGICAL ROTA AT LEICESTER				
Hospital site	**Trainee grades**	**Number of rota slots**	**Specialty of staff members (if available)**	**Average cost per substantive staff member (excluding any locum costs)**
Leicester General Hospital	F2 and CST1-2	8	2 HPB, 2 Lower GI, 3 Breast, 1 Transplant	£70,159
Leicester General Hospital	ST3+	10	4 HPB, 4 Lower GI, 2 Breast	£83,797
Leicester Royal Infirmary	F2 and CST1	7	2 Upper GI; 2 Lower GI; 2 Vascular; 1 vacant slot to make rota compliant	£68,381
Leicester Royal Infirmary	ST3+	12		£83,797

Trainee grade	**Total rota slots**	**Total rota slots filled**	**Total locums**	**Total cost**
CST/ST1-2	15	11	4	£1,233,893
ST3+	22	16	6	£2,195,491
	37	**27**	**10**	**£3,429,384**

Potential costs of the 'new' proposals

Set out below is an example of what the costs might be for running a 1-in-12 rota in Leicester using advanced practitioners, as outlined in model three in the 'Implications for Service' section. We have used a 1-in-12 rota assumption so that a 1-in-10 actually will actually be delivered after accounting for absences and vacancies. We have applied this model to UHL's lower grade rota tiers to understand what the cost difference might be. We have made the following assumptions in developing this example:

- We have assumed that the number of doctors will remain the same
- We have assumed the same working hours
- We have 'moved' core trainees to a more senior level where they are needed to achieve an appropriately staffed rota
- We have filled all the gaps in the junior rota with advanced nurse practitioners
- Advanced practitioners work a 37.5 hour week, while junior doctors work a 48-hour week. Therefore, we have assumed around four advanced practitioners for every three surgical trainees we have removed from the rota
- We are aware that rates of pay may vary for advanced practitioners and have made calculations based on the midpoint of the Band 7 pay scale

COSTS OF NEW PROPOSALS FOR GENERAL SURGICAL ROTA AT LEICESTER					
Hospital site	**Trainee grades**	**Number of rota slots**	**Specialty of staff members (if available)**	**Average cost per substantive staff member (excluding any locum costs)**	**Total cost per site**
Leicester General Hospital	F2; CST1–2; care practitioners	12	6 Core trainees	£70,159	£420,954
			8 Advanced practitioners	£43,835	£350,680
Leicester General Hospital	CT2 and ST3	12	10 ST3+	£83,797	£837,970
			2 core trainees	£70,159	£140,318
Leicester Royal Infirmary	F2; CST1; care practitioners	12	6 Core trainees	£68,381	£410,286
			8 Advanced practitioners	£43,835	£350,680
Leicester Royal Infirmary	ST3+	12	12 ST3+	£83,797	£1,005,564
Total					**£3,516,452**

This example, as described, results in salary costs that are greater than the current costs. However, there are ways in which the costs might be altered including:

- Replacing Trust doctors on the rota with care practitioners
- Reducing the rota size to 10
- Remunerating the care practitioners with a higher banding

The costs are indicative and do not include the costs of any additional senior supervision that may be required.

Leeds Teaching Hospitals Trust

This calculation is based on the Leeds Teaching Hospital Trust general surgical rotas using the Leicester financial costings, firstly to see whether the model can be applied more widely and also to ascertain the potential financial effects in a rota where there are large numbers of trust doctors and rota gaps. As can be seen the lower number of trainees within Leeds means that there is a greater reliance on non-training grades.

It is also then possible to calculate the costs when the trust doctors are replaced by advanced practitioners.

Current costs of the general surgical rota in Leeds

The general surgical rota in Leeds is based at St James University hospital and has four separate rotas. Two rotas are at core training level and two rotas are at ST3+ level. The acute surgical rota is the second busiest acute surgical service in the UK, hence the need for this number of junior doctors. All posts are full shift posts; there are a number of planned gaps, requiring locums, and a number of trust doctors both at core level and senior level.

The tables are written as in the Leicester example.

COSTS OF CURRENT GENERAL SURGICAL ROTA AT LEEDS				
Hospital site	**Trainee grades**	**Number of rota slots**	**Specialty of staff members (if available)**	**Average cost per substantive staff member (excluding any locum costs)**
St James University Hospital (RSO assessment)	F2, core, trust doctors	9	1 FY2, 4 core, 2 trust, 2 gaps	£70,159
St James University Hospital (RSO Theatre)	F2, core, trust doctors	9	4 core, 3 trust, 2 gaps	£70,159
St James University Hospital (SPR assessment)	ST3+	9	6 trainee, 2 trust, 1 gap	£83,797
St James University Hospital (SPR theatre)	ST3+	9	5 trainee, 3 trust, 1 gap	£83,797

Trainee grade	**Total rota slots**	**Total rota slots filled**	**Total locums**	**Total cost**
FY2 / CST	18	14		£982,226
ST3+	18	16		£1,340,752
Locum costs CST			4	£476,000
Locum costs ST3+			2	£282,000
Total				**£3,080,978**

Potential costs of the 'new' proposals

Set out below is an example of what the costs might be for running 1-in-12 rotas in Leeds using advanced clinical practitioners, as outlined in model three in the 'Implications for Service' section on page 45. The assumptions made are the same as for the Leicester model.

As can be seen, there is an increased cost under these proposals. However, if all the trust doctors on the junior rotas are replaced by advanced practitioners as in the second table below, some of these costs are ameliorated.

COSTS OF NEW PROPOSALS FOR GENERAL SURGICAL ROTA AT LEEDS					
Hospital site	**Trainee grades**	**Number of rota slots**	**Specialty of staff members (if available)**	**Average cost per substantive staff member (excluding any locum costs)**	**Total cost per site**
St James University Hospital	FY2 and CST and advanced practitioners	12	3 CST / trust doctors and 1 FY2	£70,159	£280,636
			11 advanced practitioners	£43,835	£482,185
St James University Hospital	FY2 and CST and advanced practitioners	12	3 CST / Trust doctors and 1 FY2	£70,159	£280,636
			11 advanced practitioners	£43,835	£482,185
St James University Hospital	CST and ST3+	12	9 ST3 / trust doctors+	£83,797	£754,173
			3 CST	£70,159	£210,477
St James University Hospital	CST and ST3+	12	9 ST3 / trust doctors+	£83,797	£754,173
			3 CST	£70,159	£210,477
Total					**£3,516,452**

COSTS OF NEW PROPOSALS FOR GENERAL SURGICAL ROTA AT LEEDS WITH JUNIOR TRUST DOCTORS REPLACED BY ADVANCED PRACTITIONERS					
Hospital site	**Trainee grades**	**Number of rota slots**	**Specialty of staff members (if available)**	**Average cost per substantive staff member (excluding any locum costs)**	**Total cost per site**
St James University Hospital	FY2 and CST and advanced practitioners	12	1 CST and 1 FY2	£70,159	£140,318
			13 advanced practitioners	£43,835	£569,855
St James University Hospital	FY2 and CST and advanced practitioners	12	1 CST and 1 FY2	£70,159	£140,318
			13 advanced practitioners	£43,835	£569,855
St James University Hospital	CST and ST3+	12	8 ST3 / trust doctors	£83,797	£670,376
			4 CST	£70,159	£280,636
St James University Hospital	CST and ST3+	12	8 ST3 / trust doctors	£83,797	£670,376
			4 CST	£70,159	£280,636
Total					**£3,322,370**

Potential financial benefits of the 'new' proposals

Initially, the cost of employing PAs, SCPs or ANPs within surgical teams will be an added cost. The NHS will only realise the benefit over time, and only if the trainees benefit as a result of the appointment of other grades.

The cost benefits accrue from two main sources. First, the current cost of locums to support rotas in both hospitals is significant. Replacing these costs with appropriately trained and supervised advanced practitioners can potentially save a considerable amount of money. Second, replacing trust doctors with advanced practitioners also saves money, even when it is assumed that four advanced practitioners are needed for every three trainees.

We believe that if a training system is introduced in line with our proposals, there is the very real possibility that surgical training time will be reduced. Competence-based training implies that some trainees will progress more quickly, and for every trainee who is able to shorten their training time by one year, there is the potential to save up to £198,000. Clearly this hypothesis needs to be tested, which is indeed one aspect of any pilot.

For some specialties this saving, if achieved, could be used to support the development of post-CCT fellowships, and this is expanded further below.

Supporting post-CCT fellowships

The work undertaken within general surgery and discussions that have begun with other surgical specialties will lead to greater clarity about what should sit within the CCT in future and what might lie outwith it. Elsewhere in this report, we set out reasons for supporting the expansion of properly regulated and quality assured post-CCT fellowships. If we are to develop more generalist CCT programmes, there must be assurance in the system that there are an appropriate number of centrally funded and centrally commissioned opportunities to develop the sub-specialty skills that our patients will need.

In some specialties we would wish to see financial realignment of funding streams which enables savings in pre-CCT training costs to fund centrally commissioned post-CCT fellowships in sub-specialty areas at levels agreed with the relevant surgical specialty association.

For example, if a specialty was to adopt these proposals, we might expect that most of the trainees would progress through training on average one year faster that they do at present. If that is achieved, then it would be possible for a quarter of them to undergo a two-year fellowship programme and to still save some money. Clearly this assumes that the cost of fellowship training is broadly similar to the cost of pre-CCT training, which is another assumption that needs to be tested.

Summary

The proposals that we have made are not significantly cheaper than current costs, and indeed in the models outlined above are slightly more expensive. However, we have been ‘generous’ in designing the rotas, and as a consequence we have perhaps over-estimated the costs. Further, we believe that if the proposals are introduced, there is the prospect of shortening training for many trainees, with consequential cost benefits. What we do feel, however, is that our assumptions and models need further work and further testing.

Recommendation 23: Funding for pre-CCT training should be used to deliver focused, high quality, properly supervised training in accordance with the recommendations elsewhere in this report.

Recommendation 24: Funding should be provided to enable appropriate numbers of non-medically qualified staff to be trained to support the delivery of service and to enable the balance of service and training undertaken by surgical trainees to be redressed.

Recommendation 25: Funding should be provided to support the appointment of an appropriate and agreed number of post-CCT fellowships required as the result of changes to pre-CCT training.

Recommendation 26: Further modelling should be undertaken to better understand the costs of surgical training and the financial implications of new models of training.

As noted above, it has not been easy to identify the costs set out above and in appendix E and we are extremely grateful to the Director of Medical Education, Dr Sue Carr, and the finance team at UHL for undertaking this work.

Implications of these proposals

While the majority of the recommendations in this report relate to improvements in the way in which surgeons are trained, many of the major *implications* are around the wider workforce and what an extended surgical team might look like in the future.

Our proposals will not work without a cohort of trained non-medical practitioners who are able to support the service. Such professionals will range from care practitioners or physician associates who may provide direct medical care, to enhanced administrative support for those increasing administrative tasks that underpin much of the daily life of the junior doctor.

Workforce implications

In simplistic terms, increased service pressures from an aging population with increasing co-morbidities along with a challenging financial environment have led to trusts' over-reliance on trainees to deliver service. This is not a sustainable or cost effective solution.

Many have already come to the conclusion that the answer to the practical challenges we face in delivering the service is to identify a new workforce to fill the ever-widening gap between expectation and resources. We quote within this report a small number of examples of where local trusts and LETBs are developing roles to support service and we believe that these roles can also support improvements in training. One significant implication of the recommendations set out in this report is not only the need to re-balance the work of the trainee but to re-balance the work of the surgical team and to include within it non-medically qualified practitioners who are appropriately trained to work across traditional boundaries, including working on acute rotas.

At this time, this workforce does not exist. We are assuming that there will be adequate funding to train them, that there will be adequate numbers seeking to undergo such training and that not only can they support, but that where necessary, they will be able to replace the medical workforce.

We are keen, however, that the development of an alternative workforce is undertaken in conjunction with the medical profession to ensure buy in and as part of a national framework to ensure consistent standards around entry, progression and practice.

Implications for patient care

Good training and good care often go hand in hand. Any changes we make to surgical training or the wider healthcare workforce need to ultimately improve the care we provide to patients. We have argued that inclusion of greater numbers of non-medically qualified practitioners will allow us to train surgeons more quickly and potentially to a higher standard. That has to be to the benefit of patient care.

Set against this, as we have suggested earlier, while there is ample evidence that a non-medical workforce can support medical care by doctors, there is much less evidence that a non-medical workforce can replace doctors in an on-call situation. We would need to be reassured that such a model would have no adverse effect on patient care.

Patients also need to understand the role of non-medically qualified members of the team and local clinical governance arrangements need to provide reassurance that the service is being delivered safely. A national framework around these roles would support this process and

would ensure that trained staff can move across sites, trusts and regions. What is reassuring is that there are examples around the country where ANPs are delivering patient care that is having a positive effect on patient experience.[38]

Implications for service delivery

The changes that we are proposing in the pilot will likely result in a change in the way that emergency care is delivered. Indeed, many stakeholders fed back that it was difficult to envisage significant changes to training in the absence of changes in the way that service is delivered.

Simplistically, we can describe at least four models for delivering a minimum 1:10 acute surgical rota. In reality, there is probably a continuum of models from one that depends purely on medical staff at one end of the spectrum, to one that is completely dependant on non-medical staff with enhanced medical supervision and with surgical trainees being almost supernumerary, at the other.

Model 1: To merge tiers and centralise services to provide a sufficient size cohort of surgical trainees on a full shift system to provide a minimum 1:10 acute surgical rota.

Indeed, it was suggested by some stakeholders that a rota size of 1:12 would actually be required to account for planned and unplanned leave. This model would probably require the reconfiguration of services with a much smaller number of trusts being able to deliver acute surgical care. With the numbers of surgical trainees reducing we do not see this as a sustainable model for the future.

Model 2: As model 1 but with a mix of trainees and other medically trained doctors comprising the rota.

Again, this would only be possible in those specialties where there are sufficient numbers of SAS or trust-grade doctors and may also require reconfiguration of the service in order to be achievable. The alternative is to use locums to continue to fill rota gaps where these are available with the incumbent problems around continuity, quality and cost. This model in many ways reflects the current situation, except that currently rotas are usually of less than 1:10. Many trusts are already finding it difficult to staff even these reduced rotas. We therefore do not think that this is a sustainable model for the future.

Model 3: As model 1 but with a mix of trainees and appropriately trained advanced clinical practitioners comprising the rota.

We think that this is the most likely solution for most units, subject to the caveats elsewhere in this report in relation to sufficient clinical supervision and patient safety assurances. The ratio between medical and non-medical practitioners is likely to vary from unit to unit and implementation of this model is unlikely to require or result in service reconfiguration.

Model 4: A surgical assessment unit (SAU) run by appropriately trained advanced clinical practitioners on a minimum 1:10 rota under the supervision of senior trainees/consultants, through which early years surgical trainees rotate.

38 Developing People for Health and Healthcare. *East Midlands Advance Clinical Practice Framework*. Health Education East Midlands. 2014.

As with model three, this is dependant on the availability of an appropriately trained non-medical workforce and would not necessarily require or lead to service reconfiguration. Early years trainees would rotate through the SAU for training purposes. The SAU would be staffed by a stable team of highly proficient staff capable of triaging and initiating care under appropriate supervision.

Models 3 and 4 would result in a reduced reliance on locums to fill gaps in rota with associated cost savings and more continuity of care.

Implications for service reconfiguration

The need for minimum numbers of staff to sustain a rota may have implications for determining which hospitals can deliver an emergency surgical service, with a potential reduction in units providing acute emergency care 24/7. There are other drivers for such changes at present, with the ongoing reorganisation of surgical care in Manchester being a case in point.

Vignette 9

The current proposals for 'Devo-Manc' will lead to a reduction in the number of units providing emergency general surgical care in Greater Manchester from ten down to four units. This will facilitate the centralisation of junior doctors into fewer units, with a consequential increase in the 'cell size' of a rota and an associated increased intensity of exposure to emergency surgery. It is further proposed that those surgeons who provide emergency care in the four acute units may deliver their elective service in other hospitals, and this pattern of work may also be a potential model for the surgical trainees.

Although there may be something to recommend such changes, especially in large conurbations, such reorganisation is not necessarily required. With the use of non-medical staff to be part of the rota, even small hospitals may be able to provide an emergency service, providing that there is enough senior support for an admitting service which is largely staffed by advanced clinical practitioners, as outlined above. So although the proposals in this report have the potential to drive service change, it is not a prerequisite. If implemented we believe there are several different models of surgical care that will be determined by local needs.

However consideration should be given to the level of service change planned or underway when decisions are made about the location(s) of any pilot.

Implications for medical schools

The introduction of run-through training will require better career advice for medical students and within the foundation programme such that those wishing to enter surgical training have a clear idea of their future career.

Implications for the foundation programme

We strongly recommend that for trainees who wish to pursue a career in surgery the second year of the foundation programme should be themed. This will require a reorganisation of the foundation programme.

Implications for the timing of a pilot

Any pilot will need to be considered, planned and carefully evaluated. There are a number of pieces of work that need to be undertaken before any pilot could commence, most notably curriculum re-write, identification of high quality training units, development of trainers, development of an enhanced selection process and an enhanced ARCP process.

Further, the need for non-medical practitioners to be trained and available to support the surgical service means that any longitudinal pilot could likely not begin before 2018 at the earliest.

Implementation of these proposals

It should be emphasised that the recommendations in this report only relate to a pilot training programme. We are not suggesting wholesale change to all surgical postgraduate training at this stage. Further, the development of any pilot will take careful planning and initiation, with ongoing evaluation once it has commenced. The support of the profession, employers, patients and government will also be key to its success.

We feel that there are several preliminary pieces of work that should be undertaken before any pilot actually commences including the following.

Further analysis and testing

Before a pilot commences, it will be necessary to further test the feasibility of a number of our recommendations:

- Testing and analysis of the use of extended surgical team including how this is currently working in practice across the NHS
- Rota design modelling
- Modelling and costing of the delivery of embedded simulation
- Modelling of how entrustable professional activities will work in practice
- Analysis of competence-based education systems
- Research into industry-based selection and assessment processes.

Development and initiation activities

In addition to the further analysis and research identified above, a number of activities will need to be undertaken before any pilot can commence. It will be necessary to dedicate adequate time to these activities if a pilot is to be a success:

- Support obtained from NHS England to principles of service changes (such as wider use of non-medical professionals)
- Further in-depth stakeholder engagement with the profession, employers and patients
- Investment in training for non-medical workforce to support junior doctors
- Revision of the surgical curricula for the purposes of the pilot using EPAs as a framework
- Development of the training faculty
- Development of an enhanced ARCP and in-programme assessment process
- Development of an enhanced recruitment and selection process
- Development of metrics that properly measure the quality of training in a trust
- Development of the monitoring and evaluation methodology for the pilot
- Engagement with postgraduate deans and identification of training pprogramme for the purposes of the pilot.

Owing to the long lead-in period, it is proposed to implement some of the recommendations outwith a full-scale pilot in order to maintain momentum. For example the following activities are already planned:

- The JCST will approach the GMC to embed simulation as a mandatory component of core surgical training
- Health Education Yorkshire and the Humber are commencing a pilot of modular training
- The RCS extended surgical team project will improve understanding of the extent to which a non medical workforce can support junior doctors to provide high-quality surgical care and training

Stakeholder views

The engagement process

The RCS has undertaken the following activities to gain stakeholder views on the proposals outlined in this report:

- Establishment of a stakeholder group comprising representatives from JCST, the general surgery SAC, the trauma and orthopaedics SAC, the urology SAC, surgical trainee organisations including Association of Surgeons in Training (ASiT) and British Orthopaedic Trainees' Association (BOTA), heads of school and patient representatives
- Circulation of this document to the stakeholder group representatives, representatives of the Royal Colleges of Surgeons of Edinburgh, Royal College of Physicians and Surgeons of Glasgow, representatives of the service and postgraduate deans
- Discussion and debate within the Council of The Royal College of Surgeons of England
- Presentation and discussion with the College's Patient Liaison Group
- Discussion with Health Education England regional lay representatives
- Discussion with trust representatives
- Publication of a blog outlining early thinking.

We consulted on the draft report, with feedback specifically sought on the principles outlined in this report as well as the proposed general surgical training programme.

Maximising training hours through a reduced service commitment

There is strong support for use of a non-medical professional workforce and an acknowledgement that such service changes will be required as we move towards a more consultant-led and -delivered service model.

Concerns were raised about the practicalities of a 10-staff rota design and whether this would be feasible for smaller units and smaller specialties. There were also concerns about where the non-medical workforce would come from, as there are already problems with nursing shortages. If this recommendation is to be implemented, much thought would be needed into how the training and development of the workforce will be structured and if they are to take on responsibilities traditionally undertaken by junior doctors. As mentioned above, this will take time and significant investment.

Concerns were also raised about the merging of rota tiers. There was concern that this would significantly increase the workload on consultants in terms of supervision. Trainees were concerned that such a proposal might also degrade training opportunities for higher surgical trainees if they merged rotas with core surgical trainees. To address these concerns further analysis is needed to model and test different rota designs, including how to ensure that the right trainees get the right educational opportunities. It was noted that proposals to merge rota tiers would complement previous initiatives such as the hospital at night initiative.

Many stakeholders also commented that training and service delivery are not mutually exclusive: high-quality teaching is often linked to high quality outcomes. However, the implications for the NHS of reduced service delivery by surgical trainees needs to be better understood.

‘Professional’ trainers

Stakeholders were, in the main, very supportive of these proposals and noted that this is central to delivering improvements in training. The following points were noted:

- There is a need to ensure that employers support the time needed to undertake an educational supervision role, especially if there is an increased service commitment on consultants as a corollary of these changes
- Mentorship, coaching and supervision continue beyond formal training and are an important part of being a consultant
- The criteria for identifying high-quality training units need to be developed
- A minority of stakeholders shared the view that there is already a regulated mechanism for ensuring trainers meet certain requirements, through quality assurance by LETBs.

Refined process for training

There were mixed views about the proposed elements to improving the process of training.

There is general support for a competence-based curriculum and it was noted that previous moves to this model were lost opportunities. Stakeholders were supportive of the use of EPAs and were interested to see how this would work in practice. It was noted however that competence-based progression might be challenging in the context of the NHS, because the practicalities of progressing a trainee are affected by the relative rigidity or any rotational training programme.

There was general support for the wider use of simulation as part of postgraduate surgical training. It was recognised that this would need significant investment and a logical place to start will be in the early years of specialty training. There is already appetite from the JCST to embed simulation as a mandatory component of core surgical training. However, the trainee organisations do have concerns about equity of access to simulation across the country, and emphasise that simulation training should be utilised as supplementary to enhance clinical training and not as a substitute for surgical exposure. They also raised concerns about the funding of simulation training.

There were mixed views in relation to the proposed run-through structure of the pilot. Several commented that run-through training has been a failed experiment in surgery and there isn’t an appetite to reinvestigate this approach for the reasons outlined in this report. However, others commented that run-through offers stability, particularly to female and LTFT trainees and could be successful provided there is an enhanced selection process with a robust assessment of progression.

There was widespread support for an enhanced recruitment process and for robust in-programme assessment, with implementation of these recommendations being a caveat for those stakeholders who supported a run-through training structure. It was recognised that there would be a need to ensure that the in-programme assessment process provides the right support for trainees who are not meeting competencies.

Refined product of training

Almost all stakeholders were supportive of the premise that postgraduate surgical training needs to meet future patient and service needs. Workforce planning will be vital to ensure we produce the correct number of trained surgeons for the future. Some noted however that the RCS's focus should be on producing surgeons of the highest calibre and experience that we can.

There were mixed views about the need for generalists compared to specialists. It was noted by some that sub-specialisation is more of a problem in medicine than surgery and that managing the emergency environment requires an experienced specialist surgeon. Among those supportive of a more broad-based curriculum, it was noted that there needs to be career advice and support in place to help trainees understand what a career as a more generalist surgeon will entail, and mechanisms in place to incentivise such a career.

There were also several comments that emphasised that the broad base of early training, while desirable, might be difficult to deliver. For example the ability of any general surgical trainee to gain skills in paediatric surgery might be adversely affected by the absence of general surgical consultant trainers with these competencies.

Stakeholders were supportive of centrally commissioned, regulated and quality assured post-CCT fellowships. There was some disagreement about what level of specialisation such a fellowship would involve, with trainee organisations advocating that these should be for advanced techniques or areas of practice confined to niche sub-specialist interest and not for curriculum areas or levels of competency that are currently achieved within a surgical training programme. It was noted that the training interface group (TIG) fellowship is an excellent model to follow.

Proposed general surgical training programme

There is stakeholder support for the proposed pilot in general surgery. There is particular support as this training model would give general, urological and paediatric surgical trainees the ability to initially triage and manage a broad range of emergency surgical cases. Many commented that the scope of the model is logical but there is a need to ensure that jobs will exist for the resultant CCT holders.

Patient and lay representative views

The patient and lay representatives that we engaged were supportive of the generalist approach and considered that specialisation sometimes happens too early in a doctor's career. There is support for a more holistic approach to training where trainees can see end-to-end care, and training of doctors with a broader set of skills who can treat a wider range of patients.

There was support for the principle of run-through training although it was commented that the key factors to support run-through (including robust selection processes, appropriate in-programme gateways and high quality career support for trainees) are not currently in place.

There was support for the use of the wider surgical team to support acute rotas, although there were concerns about the practicalities of how this would work, including whether there would be a commitment to develop this workforce from NHS England, and HEE.

Although there was support in principle for designated training trusts, it was noted that there could be unintended consequences if all trusts focussed on becoming training trusts.

The lay representatives noted that it is important to pick and train trainers carefully, as this would be critical to a successful apprenticeship model. The quality assurance of trainers would be a significant factor, as there is no such credible process to do so currently.

Appendix A: Proposed pilot curriculum for general surgery

The nature of emergency general surgery

Annually, in England, there are approximately 600,000 emergency admissions under the care of general surgeons. Of this group, just over half present with abdominal pain.[39] The most common major procedure in these patients is some form of laparotomy, to deal with an intestinal problem.

Vignette 10: The general surgical procedures most commonly undertaken on patients presenting to emergency departments[40]

1. Emergency excision of abnormal appendix
2. Cholecystectomy
3. Drainage of lesion of skin
4. Drainage of perianal abscess
5. Primary repair of inguinal hernia using insert of prosthetic material
6. Unspecified diagnostic endoscopic examination of peritoneum
7. Laparotomy for the acute abdomen
8. Laparotomy for trauma
9. Rectosigmoidectomy and closure of rectal stump and exteriorisation of bowel

Recent data suggest that the outcomes of patients undergoing laparotomy are variable across the UK and often are not as good as they should be.[41] There are a number of reasons for this, which is the subject of ongoing work by the RCS and various NHS organisations.

One of the key challenges facing the service is the staffing of acute rotas with surgeons who have the expertise and skills to provide excellent outcomes for patients. When general surgery was truly a 'general' specialty, a general surgeon could and did deal with the whole range of acute problems. However, as the specialty has become more subspecialised, this has become more difficult. Add to this the loss of the vascular surgeons who have become a separate specialty, together with the increasing tendency for breast surgeons, who train as general surgeons, to come off the acute rota almost immediately upon becoming a consultant, and it is easy to see why there can be difficulties in managing an appropriately staffed general surgical rota.

This had led to providers such as the Royal Derby Hospital piloting an emergency surgery ambulatory care model,[42] and the model for delivering emergency general surgical services recently piloted in Southampton.[43] These models and others like them will become ev-

39 RCS and ASGBI. *Commissioning guide: Emergency general surgery (acute abdominal pain).* 2014. www.asgbi.org.uk/download.cfm?docid=532C6007-31BB-4659-A5B166A9947F4CFB

40 Data obtained from York Teaching Hospital NHS Foundation Trust. For the period Apr 14 to Mar 15 there were 3,392 patients admitted via ED to General Surgeons; of which 870 ended up having a theatre based procedure (25.6%).

41 NELA project team. *First patient report of the National Emergency Laparotomy Audit.* London : RCoA; 2015. http://www.nela.org.uk/.

42 Tierney GM *et al.* Pilot Study of a new paradigm in the management of surgical emergencies using emergency surgery ambulatory care, *Ann R Coll Surg Engl (Suppl)* 2014; **96**: 198–201.

43 University Hospital Southampton. £4.3 million day unit to transform care for surgery patients. http://www.uhs.nhs.uk/AboutTheTrust/Newsandpublications/UHSjournal/UHSjournalissue8/43milliondayunittotransformcareforsurgerypatients.aspx

er-more-popular as they provide safe, effective, efficient, consultant-led care. However, they are reliant on the availability of surgeons who are competent to deal with the vast majority of the acute general surgical take and we are seeing increasing numbers of posts advertised for consultant emergency general surgeons, with many of the applicants for these posts coming from other parts of Europe to fulfil a need that our training programme currently fails to meet.

There is therefore a strong and demonstrable service need to train more surgeons who are competent to deal with the acute surgical emergency patient and we propose this pilot as a means of addressing that issue as well as the principles outlined in this document.

The scope of emergency general surgery

The concept of specialisation within abdominal surgery is largely anatomically based, with divisions that include upper gastrointestinal (GI) surgery (including oesophageal and gastric and hepatobiliary surgery) and lower gastrointestinal surgery. This works well for defined pathological conditions and associated treatment in the elective setting and has resulted in significant improvements in patient safety and outcomes for treatment.

From an emergency viewpoint, however, these anatomical divisions are often unhelpful as the spread of conditions presenting as emergencies crosses anatomical and specialty boundaries. Recent data suggest that lower GI conditions account for 44%, general GI cases account for 42% (half of which relate to the small bowel) and upper GI cases account for 12% (over half of which are perforated peptic ulcers). True ‘specialist’ upper GI conditions are very rare. More detailed data is shown in **Figure 6**.

Figure 6

Commonest reasons for emergency laparotomy	Commonest conditions and operations in emergency surgery
Perforated viscus	Assessment of abdominal pain and sepsis in adults and children
Small bowel obstruction	Peritonitis (including in children)
Large bowel obstruction	Small and large bowel obstruction
Intra-abdominal haemorrhage	Perianal conditions
Intra-abdominal sepsis	Superficial abscess drainage
	Complications of groin hernia in adults and children
	Torsion of the testis
	Pancreatitis
	Complications of abdominal surgery
	High-dependency unit and ward management of medical complications of surgery
	Initial management of some common emergency urological conditions
	Appendicectomy (including children)
	Laparoscopic cholecystectomy (but not exploration of CBD)
	Oversew of perforated peptic ulcer
	Freeing of adhesions
	Small bowel resection
	Right hemicolectomy
	Left hemicolectomy
	Hartmann's procedure
	Formation of ileostomy / colostomy
	Abscess drainage

Concerns have been raised for some time about the management of emergency surgery at the interface of the general, urological and paediatric surgical specialties.[44] Certainly in many smaller district general hospitals, a number of issues exist regarding the management of such patients who present acutely including:

- Inadequate numbers of trainees to deliver an on-call system for urology
- Surgeons who do not feel competent to deal surgically with 'minor' emergency conditions in children such as torsion of the testis or paediatric appendicectomy.

This problem has become particularly acute of late and providers have sought the profession's help to provide solutions that are not wholly reliant on local protocols and work-arounds.

44 ASGBI, BAUS and BAPS. Interface document (Emergency surgery in children), presented to RCSEng Council meeting, 9 July 2015.

Proposed pilot curriculum for a general surgeon

The product of training

We propose a curriculum for the training of a general surgeon that will produce CCT holders who will have the necessary competencies to take up a post in a district general hospital and who are able to receive an unselected emergency take and deal with 90% of the totality of general surgery, including elective abdominal surgery.

The training programme will include formal, substantial exposure to emergency urology, emergency general surgery of children and trauma. Appropriate vascular competencies will be included.

Broadly speaking, areas outwith the scope of practice would include complex hepatobiliary, oesophageal and gastric resection mainly for cancer and rectal resections below the pelvic brim, which would require a surgeon with more sub-specialist skills. Training in breast surgery would also lie outside the pilot curriculum.

The process of training

The principles outlined in the document above would underpin the process of training for these surgeons.

The duration of training

The curriculum would be a run-through, competence-based programme with a minimum duration of six years and a maximum duration of eight years. Adjustments for those undertaking less-than-full-time training, academic training or those who require leave from training would be as they are for current trainees.

Content of the training programme

The programme would have three phases:

- In the early phase there would be a modular curriculum based on progression determined by the spectrum of workplace-based assessments (WBAs) with competency forming the spine of the programme. The early phase modules will allow entry into more than one surgical specialty (with appropriate modification of person specifications), providing the opportunity to develop a common surgical stem for emergency general surgery, urology and paediatrics in the first instance and possibly expanding to other specialties as appropriate.
- The early phase would be designed to rapidly develop a strong base of knowledge, skills and attitudes required for the emergency general surgeon. The base is broad and designed so that trainees in non-general surgical specialties might access surgery modules if required, with outcomes demonstrated by WBAs and EPAs. Trainees will also access modules from other curricula.
- The early phase would be supported by an enhanced programme of simulation in both technical and non-technical skills.
- Exit from this early phase would be benchmarked at the current ST3 selection level as a minimum.
- In later phases of training there would be exposure to specific attachments in elective upper GI surgery and colorectal surgery and emergency surgery, with attachments arranged in a

modular fashion. Breast surgery will **not** be a component of the programme while there will be mandatory exposure to the management of major trauma and inclusion of appropriate vascular competencies.

- The curriculum will be mainly comprised of essential modules but there will be the opportunity to include a module that will begin to allow the development of some specialist skills to enhance safe delivery of a comprehensive service. Local programme scope and the availability of selected modules would be made available as part of information to candidates at national selection to help in ranking of posts available.
- Progression will be competence based and modules can be achieved in a flexible way dependant on local arrangements.
- Assessment will include tests of knowledge (MRCS and FRCS), which will be blueprinted to the syllabus, and will include assessment in the workplace. A robust assessment framework will be used to determine and manage progression of the trainee and current approaches will be enhanced with EPAs.
- Trainees will be eligible for a CCT in general surgery once competent in all essential modules and once all assessments have been successfully completed.

Figure 7: A schematic representation of the proposed general surgery training pathway

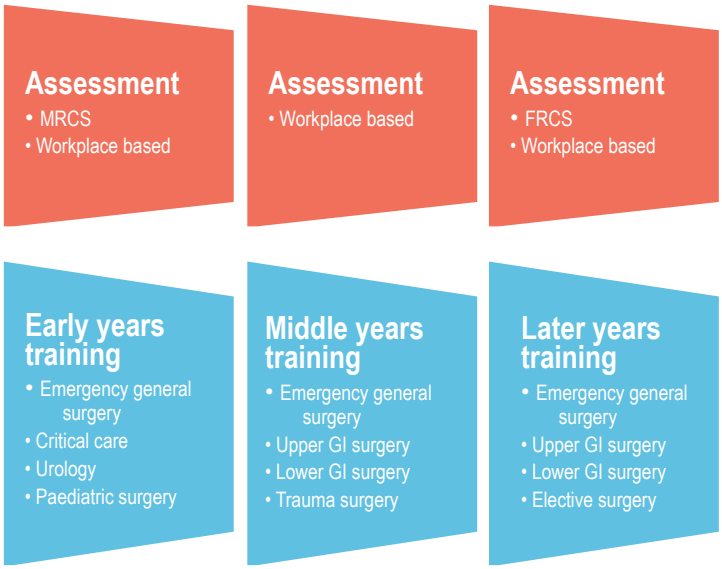


Figure 8: A potential outcome-based curriculum

Entrustable professional activity	Relevant competencies
1. Management of outpatient clinic	To include: » Patient as the central focus of care » Knowledge of common surgical conditions, underlying causes, presentations and comorbidities » History taking » Patient evaluation » Communication skills » Breaking bad news » Decision-making » Presenting a diagnosis and treatment plan
2. Running the ward round	To include: » Patient as central focus of care » Knowledge of common surgical conditions, underlying causes, presentations and comorbidities » Communication skills » Presenting a diagnosis and treatment plan » Leadership
3. Running the operating list	To include: » Knowledge of surgical conditions, underlying causes and comorbidities » Personal behaviour » Surgical skills » Decision-making » Time management » Team working and patient safety » Leadership
4. Management of the on-call	To include: » Knowledge of common emergency surgical conditions, underlying causes and presentations » History taking » Patient evaluation » Communication skills » Decision-making » Clinical/surgical skills » Resuscitation skills » Team working and patient safety
5. Management of the trauma on-call	To include: » Knowledge of common surgical conditions, underlying causes and presentations » History taking » Patient evaluation » Communication skills » Decision-making » Clinical/surgical skills » Resuscitation skills » Team working and patient safety

6. Management of the MDT including effective discharge planning	To include: » Knowledge of surgical conditions, underlying causes and comorbidities » Clinical reasoning » Decision-making » Personal behaviour » Team working and patient safety » Communication with colleagues and cooperation » Time management » Leadership
7. Management of effective improvements in patient care	To include: » Quality improvement including audit, evidence and guidelines » Principles of quality and safety improvement » Prioritisation of patient safety in surgical practice » Patient as the central focus of care
8. Carrying out research and managing data appropriately	To include: » Ability to understand principles of research and academic writing » Ability to carry out critical appraisal of the literature » Understanding of public health epidemiology and global health patterns
9. Acting as clinical supervisor	To include: » Able to supervise less experienced trainees » Able to act as a clinical supervisor to the standard required by the GMC
10. Managing and working successfully within the NHS	To include: » Leadership » Personal behaviour » Management, NHS structure, the independent sector and the communities they serve » Evidence and guidelines » Valid consent » Complaints and medical errors » Communication with colleagues and cooperation » Infection control » Principles of quality, safety improvement » Legislation

EPA levels: Graded supervision

Level 1: Observations of the activity – no execution

Level 2: Acting with direct supervision

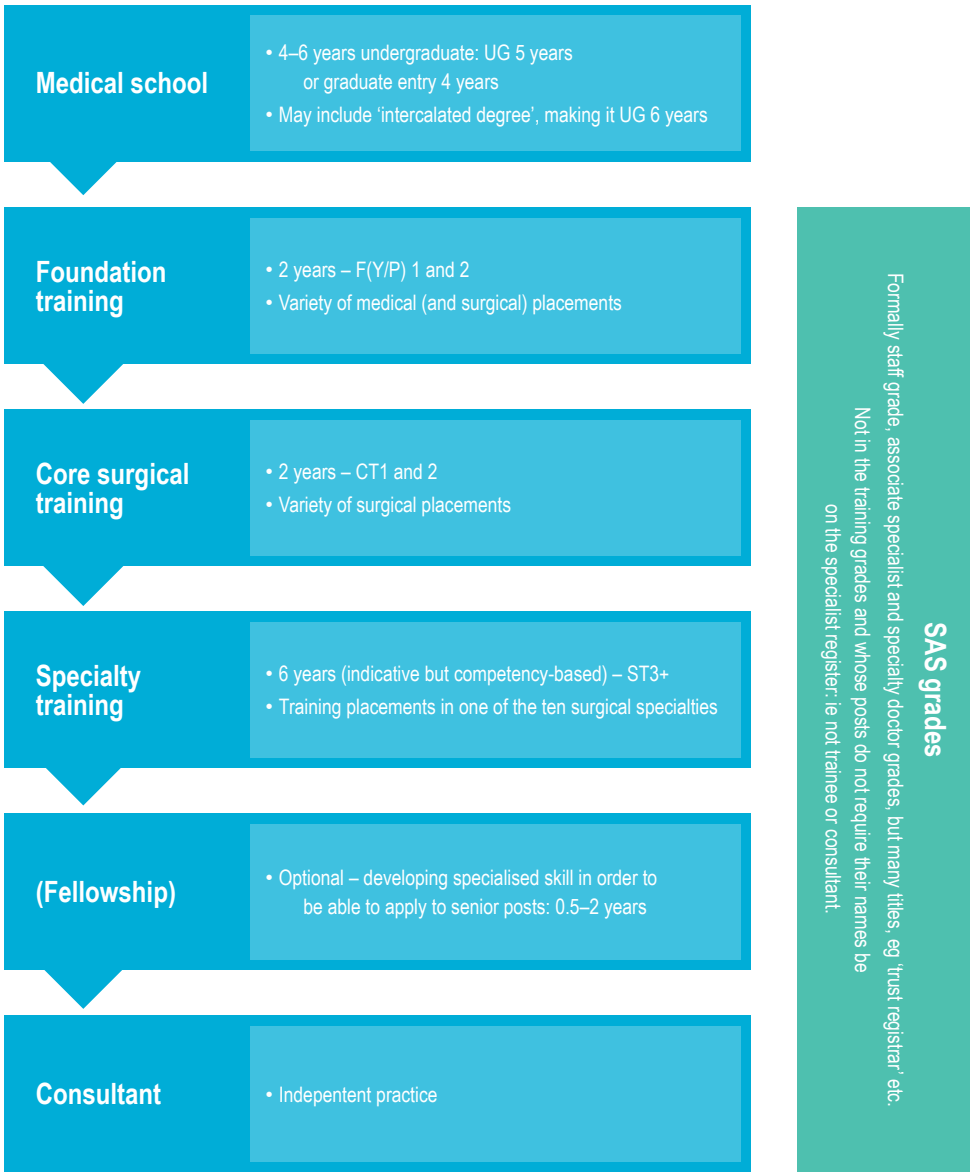
Level 3: Acting with supervision available quickly

Level 4: Acting unsupervised (but with clinical oversight)

(*Adapted from JRCPTB Draft new curriculum for internal medicine*)

Appendix B: current training pathway

Figure 9: the current training pathway



Appendix C: Stakeholders

Improving Surgical Training working group:

- Ian Eardley (working group chair)
- Bill Allum (Chair, JCST)
- David Large (Chair, Trauma and Orthopaedics SAC)
- Tim Terry (Chair, Urology SAC)
- Gareth Griffiths (Chair, ISCP)
- Jon Lund (Chair, General Surgery SAC)
- Kieran O'Flynn (representing urology SAC)
- Rowan Parks (representing ASGBI and the Royal College of Surgeons of Edinburgh)
- Mustafa Rashid (BOTA President)
- Rhiannon Harries (ASiT President)
- Karen Smith (Director Professional and Clinical Standards, RCSEng)
- Erana Sitterlé (Project Manager, RCSEng)

Improving Surgical Training stakeholder group:

Composition as per the working group, with the addition of:

- SSA Trainee Group presidents
- Mr Richard McGregor (RCSEd Trainee Council member)
- Mike Gough (Head of School, Yorkshire and the Humber)
- Pam Peers (Chair, RCS Patient Liaison Group)
- John Abercrombie (RCS Council member, lead for Emergency General Surgery)
- Humphrey Scott (Head of School, KSS)
- Stella Vig (CST Committee Chair)
- Mike Bradburn (Chair, Confederation of Postgraduate Schools of Surgery)

Appendix D: Additional stakeholder engagement and consultation

- Sue Holden (Director Medical Education, York Teaching Hospital NHS Foundation Trust) to discuss costings and use of wider surgical team
- Sue Carr (Director Medical Education, University Hospitals of Leicester) to discuss costings
- David Whitney (Non-Executive Director, Chesterfield Royal Hospital) to discuss principles from an employer perspective
- David Wilcock (Advanced Clinical Practitioner Medicine, York Teaching Hospital NHS Foundation Trust) to discuss use of the wider surgical team and non-medical healthcare professionals
- Peter Whitfield (selection lead, Neurosurgery SAC) to discuss run-through training and selection processes
- Sion Barnard (selection lead, Cardiothoracic surgery SAC) to discuss run-through training pilot and selection processes
- Richard Stewart (British Association of Paediatric Surgeons representative on RCS Council) and David Burge (President, British Association of Paediatric Surgeons) to discuss options for paediatric surgery pilot
- RCS Patient Liaison Group to discuss patient views on proposals
- Professor Peter Harris (lay representative, Health Education East Midlands) to discuss patient and lay perspective on proposals
- Ms Danka Neuborn (lay representative, Health Education East Midlands) to discuss patient and lay perspective on proposals

Appendix E: General surgical trainee detailed costing

Assumptions

Total number of General Surgical Trainees (all years)	37

Recruitment Costs	
Number of consultants for selection panels	6
Number of days per annum	3

Time in training	
Years as FY	
Years as CT / ST	7
Total years of training	7
On call	50%

Clinical Training time

		Additional clinical time needed from non trainee as a result of having a trainee present							
Standard week	**No of sessions**	**Yr 1**	**Yr 2**	**Yr 3**	**Yr 4**	**Yr 5**	**Yr 6**	**Yr 7**	**Yr 8**
Operating	3.0	33%	33%	33%	33%	33%	33%	33%	33%
Clinics	2.0	30%	30%	25%	25%	15%	0%	0%	0%
Specialist session - M&M, Audit etc	1.0	50%	50%	50%	50%	50%	25%	25%	25%
Consultant ward round	1.0	25%	25%	25%	25%	25%	25%	25%	25%
On Call	1.5	0%	0%	0%	0%	0%	0%	0%	0%
Training	2.0	0%	0%	0%	0%	0%	0%	0%	0%
Other: (describe)									
Total Sessions	**10.5**								
Number of weeks per annum	**45.0**								

Education and direct teaching

	Time taken by consultant (mins)	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8
Work based assessments - number per annum	10	40	40	40	40	40	40	40	40
Lectures delivered - number per annum	60	30	30	30	30	30	30	30	30
Lecture preparation by lecturer	480	30	30	30	30	30	30	30	30
Number of students in a lecture		40	40	40	40	40	40	40	40
Other: (describe)									

Examination Costs

	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8
ARCP - number of days per annum	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
ARCP - number of consultants involved	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0

Costings

	Before training	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Total
Recruitment										
Consultants on selection panels incl travel	545									545
Total Recruitment	**545**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**545**
Salary costs										
Basic incl on costs		45,587	47,958	50,331	52,703	55,074	57,445	59,818	59,818	428,735
On call inc on costs		22,794	23,979	25,165	26,352	27,537	28,723	29,909	29,909	214,367
Total salary costs		**68,381**	**71,937**	**75,496**	**79,055**	**82,611**	**86,168**	**89,727**	**89,727**	**643,102**
Clinical training costs										
Operating		55,287	55,287	55,287	55,287	55,287	55,287	55,287	55,287	442,292
Clinics		15,974	15,974	13,312	13,312	7,987	-	-	-	66,558
Specialist session - M&M, Audit etc		13,312	13,312	13,312	13,312	13,312	6,656	6,656	6,656	86,526
Consultant ward round		6,074	6,074	6,074	6,074	6,074	6,074	6,074	6,074	48,592
On call		-	-	-	-	-	-	-	-	-
Training		-	-	-	-	-	-	-	-	-
Other: (describe)										-
Total clinical training costs		**90,646**	**90,646**	**87,984**	**87,984**	**82,659**	**68,016**	**68,016**	**68,016**	**643,969**
Direct education costs - assumed to take place in SPA time										
Worked based assessments		767	767	767	767	767	767	767	767	6,133
Lectures delivered		86	86	86	86	86	86	86	86	690
Lecture preparation		690	690	690	690	690	690	690	690	5,520
Other: (describe)										
Total direct education costs		**1,543**	**1,543**	**1,543**	**1,543**	**1,543**	**1,543**	**1,543**	**1,543**	**12,343**
Examination costs		**9,660**	**9,660**	**9,660**	**9,660**	**9,660**	**9,660**	**9,660**	**9,660**	**77,280**
Subtotal	**545**	**170,230**	**173,787**	**174,683**	**178,242**	**176,474**	**165,388**	**168,946**	**168,946**	**1,377,239**
Overheads	**82**	**25,534**	**26,068**	**26,202**	**26,736**	**26,471**	**24,808**	**25,342**	**25,342**	**206,586**
@15% includes admin, JDA, library, management time, HR support, induction										
Total cost	**627**	**195,764**	**199,855**	**200,885**	**204,978**	**202,945**	**190,196**	**194,288**	**194,288**	**1,583,825**

Appendix F: Band 7 pay scale

	-	NI£	SPN£	-
Point 26	31,072	2,310	4,443	37,825
Point 27	32,086	2,416	4,588	39,090
Point 28	33,227	2,534	4,751	40,513
Point 29	34,876	2,706	4,987	42,569
Point 30	35,891	2,811	5,132	43,835
Point 31	37,032	2,930	5,296	45,257
Point 32	38,300	3,062	5,477	46,839
Point 33	39,632	3,200	5,667	48,500
Point 34	40,964	3,370	5,858	50,192
On call	50%			

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