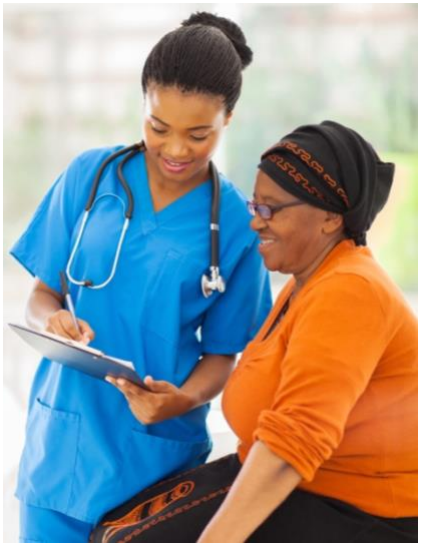
Transforming the Care We Deliver:

The Case for Change and the SCTS Toolkit



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Contents

Preface: The patient experience

Sarah Murray, SCTS Lay Representative

If you ask patients about their hospital stay, care and operation, every answer will be different. Some will receive outstanding care and others may not. The outcomes of operations may be excellent in every case but the care these patients receive pre- and postoperatively by all the members of the team will colour their experience, recovery and possibly even their quality of life.

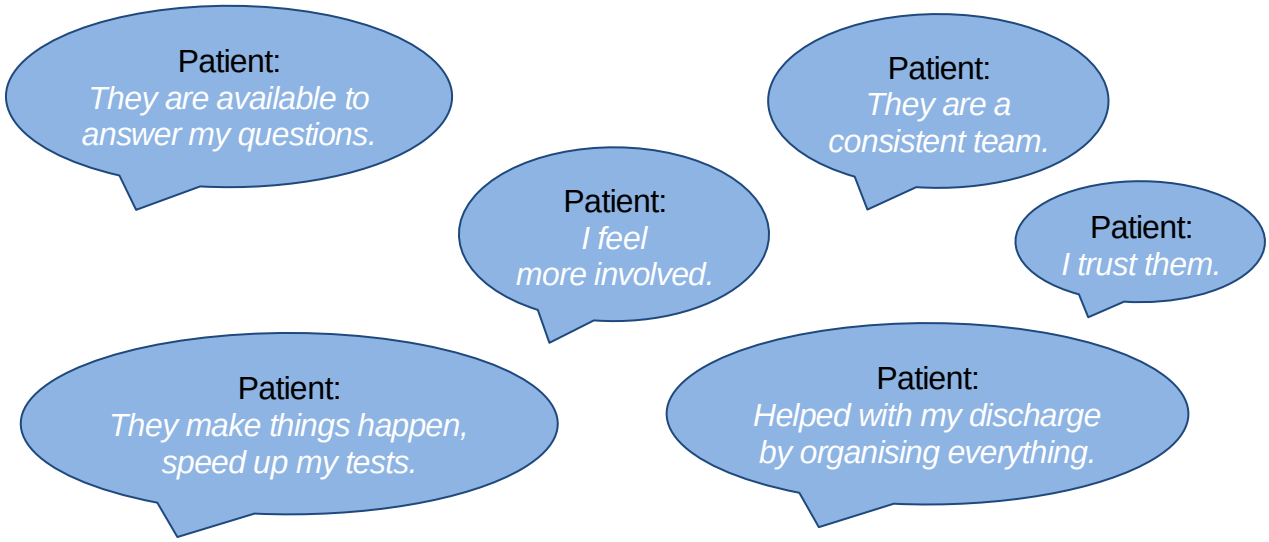
The proposition set out in this SCTS multidisciplinary toolkit therefore makes perfect sense. In fact, it is so simple, one can be forgiven for asking why it has not happened before.

The case for change made in this document represents a brave and exciting challenge to create a consistent and cohesive team-built pathway of teaching, learning and practice in the extended surgical team across the specialty of cardiothoracic surgery. It is designed to create confident and able team members who can provide focused and accurate treatment and care, thereby improving the patient experience.

Patients are demanding more and more to be put at the centre of their treatment. What better way to do this than to grow skills-based practitioners and experienced teams caring for them?

Shared decision making and enabling every member of the surgical team to play a full part in the care they deliver helps to build cohesion, job satisfaction and empowerment. At the same time, it also generates a sense of assurance around the patient as well as a seamless, consistent care pathway. We all want that, surely, when we face life changing surgery – and we have the right to expect it.

This multidisciplinary toolkit is brave and challenging. The opportunity to do the right thing by patients (who may one day be you) should be seized and the time is now.



Source for quotes: Feedback on advanced practitioners from patients and members of the surgical team

Chapter 1: The case for change

Simon Kendall

Delivery of care can develop over significant time periods, in order to bring about improvement and also in reaction to external influences. Each incremental step can appear constructive. Occasionally, however, the sum of all those changes can leave a system falling short of its aspirations, and a significant review and transformation is required.

Although we deliver similar interventions in all our cardiothoracic, cardiac, thoracic and congenital units, each of them has local considerations, meaning that no single model is suitable for all. This document briefly summarises the development of service delivery in our specialty, where we are now, and what innovation has been achieved around the UK and Ireland. Using all that information, we describe what may be applicable and useful in your unit, and we hope we set out the case that change is necessary.

This is a 3–5-year strategy to:

- enable consistent clinical career progression for nursing and allied health professionals;
- improve the quality and consistency of care as well as the patient experience;
- reduce the number of middle grade surgeons and improve their access to surgical training. The aim is three days a week in theatre.

In the ‘beginning’

In the previous millennium, the delivery of cardiothoracic surgical care was medically/surgically based, and nurses were in traditional ward and theatre roles. There were next to no extended roles for nursing and allied health professionals.

The surgeons in training were limited in number and in a competitive pyramidal hierarchy of senior registrar, registrar and senior house officer. The senior registrar was often in theatre four days a week and the registrars three days a week, with weekly outpatient clinics and multidisciplinary team meetings not even invented. On achieving a consultant post, the newly appointed consultant would be confident in theatre but would not have completed a curriculum, would not have passed a quality assured specialist examination and would not have undergone any training in the non-surgical aspects of being a consultant.

The patient received excellent continuity of care in that the same team of doctors/surgeons looked after them throughout their journey. That care was based on the consultant surgeon’s preferences and the outcomes were not collected or audited. The surgeons in training were working excessive hours and the patients were not necessarily getting an alert doctor overseeing their care.

Improvements and changes over the last 25 years

Nursing and allied health professionals

- The introduction of the surgical care practitioner (SCP) to assist in theatre and conduit harvesting
- The extension of the role of the SCP to review outpatients
- The development of a quality assured SCP examination
- Master's degree courses for advanced allied health professionals
- The critical care practitioner providing 24/7 intensive care cover and (in some instances) allowing middle grade surgeons to be non-resident
- Cardiac Advanced Life Support course to allow an emergency postoperative response to be multidisciplinary and less reliant on the medical team
- The establishment and development of the specialist nurse/advanced clinical practitioner role to work independently on wards and in clinics, and to be able to prescribe
- The enhanced role of SCPs and advanced clinical practitioners to deliver pre-assessment, outpatient and drop-in clinics

Medical

- The European Working Time Directive has limited the hours worked each week, necessitating an increase in the number of middle grade surgeons to provide 24/7 cover. Even in the early implementation, this had an immediate impact on theatre opportunities for surgical trainees.
- Improving public health and alternative treatments such as percutaneous coronary intervention has led to a reduction in surgical activity of more than 10%, further reducing exposure to surgical cases.
- Publishing outcomes has led to consultants who are less able to allow trainees to have access to training opportunities.
- A run-through training programme for cardiothoracic surgery has been introduced, commencing after foundation training.
- Separation of cardiac and thoracic surgery has meant the trainee can no longer assimilate knowledge and experience of the broad curriculum in a continuous manner. There now has to be separate exposure.
- Subspecialisation means that experience with one surgeon will not necessarily give exposure to the broad spectrum of the specialty.
- A structured curriculum and a quality assured specialist examination have been introduced. Combined with curriculum-based education (including professional/non-medical topics), this has contributed to successful Certificate of Completion of Training (CCT)/Certificate of Eligibility for Specialist Registration (CESR) candidates being more knowledgeable than their predecessors.
- The introduction of multidisciplinary teams in cardiac and thoracic surgery for improved decision making has detracted from theatre opportunities.

Patient experience

- The quality of handover between shifts has improved.
- Patients have an alert and fresh multidisciplinary team looking after them.
- Unit/trust guidelines are applied to avoid omissions or inconsistencies (e.g. thromboembolic prophylaxis).
- There is more consistency in the quality of conduit harvesting with less wound complications.
- The national audit and publication of outcomes have given patients the reassurance of consistently safe outcomes for operations in any unit in the UK and Ireland.

Why the need for change/transformation?

Nursing and allied health professionals

The enhanced roles for nursing and allied health professionals have been applied in an ad hoc fashion around the UK and Ireland. These roles have been introduced by enthusiastic leaders in surgery, nursing and management. There are significant inconsistencies in the roles, the competences and their remuneration. The opportunities for clinical career progression vary between trusts so there is inequity for enthusiastic potential colleagues.

Medical

Surgeons are achieving their CCT/CESR with lower numbers of cases and a lack of independent (supervised) operating. As new consultants, there is a greater need for mentoring and there are frequent examples of new appointees requiring extra supervision. In general, trainees are in theatre only one or two days a week, not getting enough exposure to be confident and fully competent. In addition, training is now being reduced to seven years so there is an even more pressing need for increased weekly theatre exposure. It is also important to utilise the earlier years of training to lay strong foundations for experience and competence in cardiac and thoracic surgical skills in a flexible and streamlined manner.

There is no ‘seniority’ in the service commitment for middle grade surgeons. They are often on the same resident rota regardless of whether they are newly appointed or about to achieve accreditation. Many hours of training are ‘wasted’ in repetitive service duties and being resident out of hours when there are limited training opportunities.

The middle grade rotas have to be large to comply with the European Working Time Directive so there are often ‘excess’ numbers of surgeons competing for limited theatre opportunities. As a generalisation, these teams consist of trainees with a national training number, trust appointees aiming for their CESR and trust appointees who are fairly permanent staff or moving from trust to trust.

There is frequently a tension, an inequality, in departments with regard to prioritising theatre opportunities for middle grade surgeons. Ideally, all surgeons in training should have equal

access. There is a lack of direction for junior trainees completing the earlier ST1 and ST2 training placements as well as the type of skills and clinical exposure they have.

Patient experience

As described in this document, patient experience is enhanced by increasing the service delivery from nursing and allied health professionals. Their delivery of care is more consistent and of a higher quality than that of the large middle grade surgical tier.

Patients will have more assurance that their newly appointed consultant is not only well qualified and knowledgeable but will also have adequate experience in their training to be confident and even more competent.

Key points

- There are excellent examples of improved patient care and transformation around the nation.
- Units will need to adopt individual solutions.
- There is currently inconsistent access to clinical career progression for allied health professionals.
- Surgeons in training do not have enough access for time in theatre.

Chapter 2: The extended surgical team

Rajesh Shah

The concept of teamwork improving care and outcomes for patients in healthcare is well known and evidenced in the literature. With the case for change made in Chapter 1, our specialty has a unique opportunity to deliver transformative changes in the workforce that will create positive benefits for patients, trainees, allied health professionals (AHPs), employers and professional organisations. Although the concept of the extended surgical team has been extensively developed by the Royal College of Surgeons of England, its implementation in various surgical specialties (including cardiothoracic surgery) has been patchy. The SCTS, however, is keen to promote and influence its development.

With the approval of the new curriculum by the General Medical Council and the reduction in training time to seven years for run-through trainees, the SCTS (in collaboration with the specialty advisory committee) is committed to providing leadership and support to improve training through workforce transformation, for the benefit of patients, trainees, AHPs and organisations delivering cardiothoracic care.

The extended surgical team includes consultants, trainees, trust-appointed doctors, surgical care practitioners, advanced nurse practitioners, advanced clinical practitioners, specialist nurses, physician associates, surgical assistants, pharmacists and administrative staff. The prime objective of the team is to provide high quality care for patients, support trainees, encourage development of AHP roles, and help trust-appointed doctors to achieve their potential in a productive and cost efficient way.

The SCTS is committed to promoting teamwork, leadership development, education, training, equality and diversity, and innovation in pathways of care in its strategy/vision and five-year plan. One of the projects to facilitate is the workforce transformation theme with the cultivation of the extended surgical team in cardiothoracic surgery. The following benefits, principles and key advice are generic to all surgical specialties wishing to foster the concept of the extended surgical team.

Benefits

Benefits of the extended surgical team can include:

- improving continuity of care and patient experience;
- improving the quality of training by allowing trainees to focus on activities with the greatest training benefit;
- improving the development of AHPs;

- improving service efficiency through better coordination of patient flow and reduction of waiting times;
- increasing productivity and staff capacity by spreading the service workload across more members of the surgical team;
- supporting trainees to settle into their posts and providing them with informal training; and
- reducing locum costs.

Effective use of the extended surgical team can also help tackle the challenges and pressures currently faced by those delivering surgical services and surgical training, including:

- the increase in service workload and complexity of cases due to an ageing population with increasing comorbidities;
- the reduction of trainee numbers, especially in ST1/ST2, alongside changes to working hours;
- the concentration of complex services in fewer specialist centres;
- the reduced exposure of trainees to common surgical conditions; and
- the use of trainees to fill gaps in frontline services such as night rotas and provision of ward or theatre cover.

Key principles

The following key principles as defined by the Royal College of Surgeons of England and supported by the SCTS are important in facilitating development of the extended surgical team:

- There is a need for change to traditional workforce models of healthcare delivery.
- Well managed use of the surgical care team can improve patient experience, service delivery and quality of training.
- Healthcare providers should develop a strategic plan for expanding and recruiting these roles.
- When modelling the extended surgical team, one size does not fit all. Any recommendations should be adjusted to meet local need.
- The structure of the surgical care team should be determined with the intent to meet the needs of patients by improving patient care and promoting prompt access to safe services.
- The definition of extended roles and proposed scope of practice is not aimed at fixing and restricting the remit of these roles but rather at promoting clarity of competences. It also facilitates delegation and limits risks to patient safety.
- The introduction of extended roles into the service can be flexible and varied.
- Job plans and descriptions can be adapted within the broader scope and competences of each defined role to meet the demands of the service.

- Extended practitioner roles complement (but do not replace) surgeons and medical staff. They enhance the capability of the surgical team and should evolve together within the team. Their educational development should not compromise the training of future surgeons.
- The implementation of these roles should cover the whole surgical pathway for surgical patients (from admission to discharge), in both the operating and non-operating environment.
- Extended roles should be fully integrated into the surgical team with dedicated job plans, rather than simply filling gaps in the service in an ad hoc manner. The model for developing extended surgical roles should be team-based rather than task-based.
- Staff in extended roles in the surgical team should be able to carry out medical work within defined boundaries. It is acknowledged that there will be some overlap of competences and activities between extended roles, trainees and non-training grade surgeons who make up the surgical team.
- Consultant leadership is crucial to ensure well managed use of each practitioner's different skillsets as well as a balanced allocation of activities and opportunities between trainees, extended roles and other professional staff.
- Due care should be taken to ensure that the training of extended roles does not come at the expense of surgical trainees' access to training opportunities. The primary driver for service design must be developing the best model for delivering high quality patient care.
- Staff in extended roles should undertake both clinical and administrative work.
- Extended roles should work within a medical management model in which the staff are clinically responsible to a consultant.
- The split between service and training is not sharply defined. The educational value of tasks will vary based on experience and level of training so the aim is to create a closer link between the two through an intelligent allocation of tasks and a balanced share of the workload.
- There should be clarity and consistency of roles and titles, educational requirements and scope of practice. Training and assessment of these roles should be standardised and should eventually lead to admission to a national register.
- Consultant leadership and robust clinical governance frameworks alongside a culture that supports training and professional development are crucial for the sustainability and success of the extended surgical team.
- It is accepted that practitioners who trained prior to the current regulations regarding training (or those who trained in other parts of the world) may have skills and capabilities that are equivalent to those of current members of the surgical care team. Further work will be needed to determine the right processes for assessing equivalence.
- The practice of extended roles should be monitored and regulated. The consultant surgeon remains responsible for the overall management of the patient's care.

Key advice

If you are thinking of extending the surgical team in your hospital, Table 1 gives some key advice from the Royal College of Surgeons of England,[1] endorsed by the SCTS.

Table 1
Advice on extending the surgical team[1]

1	New models should be driven by clearly identified needs – primarily, by the need to improve patient care and the patient experience but also to optimise surgical training.
2	Ideally, adoption of new and extended non-medical roles should reflect a strategic approach to the multiprofessional workforce – there needs to be support across the organisation, and these roles must be fully integrated into governance structures and standard operating procedures.
3	Be clear about routes of entry and create pathways for existing staff to grow into these roles.
4	Understand the commitment required in terms of in-house training and competence assessment – it may mean making sure there is time in consultant job plans for this.
5	Make sure there is clarity over lines of accountability – clinically, managerially and professionally – and how ongoing performance will be assessed (particularly for staff undertaking medical tasks).
6	Develop a structured pathway for career progression – to help retain bright and able staff but also to maximise the benefit that the service can derive from these roles.
7	Identify budgets to support continuing professional development and study leave requirements in order to develop and enhance these roles.
8	Invite those who are sceptical to see how such roles could help them – having consultants introduce and explain the wider team also validates the new set-up.
9	Titles can be an artificial barrier – '*It's not important what you call them, it's more about what training they have had to give them the competences.*'
10	Acknowledge the role played by the multiprofessional team in training junior doctors – this should lead to clearer expectations of this training.
11	Deploy the multiprofessional team in ways that make best use of their skillset, and delegate the right level of autonomy and decision making – don't just give them the tasks that junior doctors are not doing.
12	Consider how to utilise the leadership capabilities of these staff (particularly experienced staff working in extended roles) to the benefit of the wider workforce.

Key points

- It is well recognised and evidenced that teamwork improves outcomes for patients.
- The extended surgical team approach benefits patients, trainees, trust-appointed doctors, allied health professionals, consultants and organisations.
- This approach is applicable to all surgical specialties and wider, consistent implementation in our specialty needs to be considered.

Reference

1. Royal College of Surgeons of England. *A Question of Balance: The Extended Surgical Team*. London: RCS England; 2016.
Available at: https://www.rcseng.ac.uk/careers-in-surgery/surgical-care-team-hub/surgical-care-team-resources/ (cited May 2021).

Chapter 3: Advanced allied health professionals

Bhuvaneswari Krishnamoorthy, Helen Munday and Tara Bartley

Non-medical staff in the UK should be given fully developed roles in the extended surgical team to enhance patient care, augment junior doctors' training and provide a career pathway for allied health professionals (AHPs). A greater number of patients could be treated by the burgeoning non-medical practitioner workforce. These staff include surgical care practitioners (SCPs), advanced clinical practitioners (ACPs), advanced critical care practitioners (ACCPs), physician associates (PAs) and other AHPs. Although this can enhance patient flow, surgical training and consultant teams, these roles must subject to correct governance. They must be properly developed, better aligned with the surgical profession and made part of NHS workforce planning.[1]

Disparities in roles and career development

In some parts of the country, advanced AHP roles are well established. Nevertheless, there needs to be a defined career pathway for these health professionals to ensure they can practise against set standards, there is parity with regard to pay bands and their impact is appreciated. A decade ago, these non-medical practitioners were trained in-house, with no clear training structure or competences. Health Education England (HEE) and academic institutions have since recognised the need to formalise guidance on advanced practice. It is recommended that all practitioners are trained using a structured curriculum with an academic qualification to master's level. Despite this, the mindset of some hospitals has not altered, which is having an enormous impact on this group of practitioners and the care of cardiothoracic patients.

Developing such a workforce is not without its challenges – from a cultural and financial perspective as well as in terms of human resources. As part of a SCTS initiative to provide guidance for the development of extended surgical teams, we have created this toolkit for workforce development. The toolkit looks at the stages of workforce transformation and provides direction for each stage as well as documents to help with this process.

Implications for surgical training and service delivery

'Better training, better care' is the slogan for improving the quality of training for the benefit of patients.[2] The workload of surgical consultants coupled with limitations on the average weekly working hours stipulated by the European Working Time Directive has a huge impact on the training of future cardiothoracic surgeons. Training in clinical practice has been identified as a top priority for core trainees in order to make sure that they acquire enough experience at each level of their training.

Performing procedures independently is clearly one of the targets of the current cardiothoracic curriculum but some trainees are not fortunate enough to gain sufficient experience in all of the

practical procedures required, which in turn affects the quality of patient care. Developing an AHP service with experienced practitioners can eliminate these discrepancies, meaning core trainees can be trained in various surgical skills, providing continuity of surgical training and patient care. This relieves consultant cardiothoracic surgeons of a large part of the burden.

Should all hospitals adapt the same AHP model?

No, clearly one model will not suit every organisation but this SCTS toolkit outlines a number of approaches that can be followed to create and sustain the extended surgical team. Every department has its own obligations to deliver outstanding patient care. The most important aspect is to make sure that surgical training is championed, and that team members have everything they need to stay happy, safe and productive. This can be achieved by expanding the roles of AHPs with distinct career progression, which will transform the future of surgical training and patient care.

This toolkit offers a foundation for strategic structural planning, together with document templates (e.g. business case, job descriptions, job plans, competence assessments), and discusses the impact on clinical practice. It is up to individual cardiothoracic units to extract the information required for their needs. This will create consistency across the UK and Ireland for the advanced AHP workforce.

Successful advanced AHP service delivery

Nationally, there are a number of centres that have developed these services, transforming their patient and staff experiences. The following is a list of some of the trusts/hospitals with established extended surgical teams:

- Manchester University NHS Foundation Trust
- Royal Papworth Hospital NHS Foundation Trust
- South Tees Hospitals NHS Foundation Trust
- University Hospitals Birmingham NHS Foundation Trust
- University Hospitals of North Midlands NHS Trust
- University Hospitals Sussex NHS Foundation Trust
- Golden Jubilee National Hospital
- Royal Infirmary of Edinburgh

The trust will need to have a governance structure for advanced AHP roles across sites with a standard for recruitment, education, training, practice and professional development. This will incorporate the support structure for clinical and academic supervisors as well as the role of the trust oversight group.

This SCTS toolkit has been devised with the help of established governance documents (Appendix 1) and competence assessment forms (Appendices 2–33) for other trusts to adapt in order to develop their extended surgical team.

Benefits for patients and the trust

Workforce developments across the multidisciplinary team (MDT) will benefit patients, offering consistent timely intervention. Moreover, these advanced AHPs will augment surgical training by providing service delivery to enable training, by themselves providing education and training to surgical trainees, and by enhancing multidisciplinary working for healthcare delivery. There are financial and quality benefits for patients and the trust in terms of consistency of care delivery, new ways of working and reduction in locum spend.

Advanced non-medical practitioners in cardiothoracic surgery

Who are they?

This service is delivered by experienced, registered healthcare practitioners who are undertaking or have received a master's level award or equivalent that encompasses the four pillars of clinical practice, leadership and management, education and research with demonstration of core capabilities and area-specific clinical competences. It is a level of practice characterised by a high degree of autonomy and complex decision making.

The advanced AHPs delivering this service include ACPs and medical associate professionals (SCPs, ACCPs and PAs). These practitioners carry out a variety of roles ranging from performing minor surgery to examination, diagnosis and treatment of elective through to critically ill patients in cardiothoracic surgery (Table 2). This SCTS toolkit will ensure there is national consistency in the level of practice across multiprofessional roles that can be distinctly understood by the public, staff, education providers and employers.

Surgical care practitioners

A SCP is defined by the Royal College of Surgeons of England as a 'non-medical practitioner […] working in clinical practice as a member of the extended surgical team, who performs surgical intervention, pre-operative care and post-operative care under the direction and supervision of a consultant surgeon'.[3] SCPs were first introduced in the UK in the cardiothoracic surgical setting in the early 1990s in Oxford and the role subsequently evolved into other surgical specialties, including orthopaedic and general surgery.

Advanced clinical practitioners

ACPs come from a range of professional backgrounds, and include nurses, pharmacists, paramedics, physiotherapists and occupational therapists. They are healthcare professionals educated to master's level who have developed the skills and knowledge to allow them to take on an expanded role and scope of practice in caring for patients. Practitioners who trained prior to the current regulations on training (or those who trained in other parts of the world) will be required to demonstrate the skills and capabilities that are equivalent to those of current members of the surgical care team. The governance of ACPs will ensure competence is established on a yearly basis.

Table 2

Differences between qualifications and the potential range of generic competences for advanced AHPs

Advanced AHPs	Qualifications	Generic competences
SCPs	Background qualifications: • Nursing or operating department practice degree/diploma • Physiotherapy degree • Experience in theatre or intensive care unit • Registered healthcare professional in the UK and Ireland Specific qualifications: • Postgraduate diploma in surgical care practice • MSc in surgical care practice • Non-medical prescription (At the time of writing, this is limited to those with nursing qualifications only. However, NHS England has conducted a consultation (which closed in December 2020) on enabling operating department practitioners to supply and administer medicines using patient group directions.)	• Conduit harvesting • First and second assistant for all major/minor cardiothoracic surgery, and heart and lung transplantation • Opening/closing of sternum and thorax • Pre/postoperative and wound clinics • 24-hour theatre and intensive care unit/ward on-call service • Ordering and interpretation of invasive and non-invasive investigations • Medication prescription within their prescribing scope and professional registration, and in accordance with individual trust medicines management governance • Insertion and removal of intra-aortic balloon pump
ACPs	Background qualifications: • Nursing or AHP degree/diploma (including physiotherapy, paramedic science) • Experience in the area of cardiothoracic surgery • Registered healthcare professional in the UK and Ireland Specific qualifications: • Postgraduate diploma in advanced practice • MSc in advanced practice or advanced clinical practice • Non-medical prescription	• Pre/postoperative and intensive care unit ward rounds • Pre/postoperative clinics • 24-hour on-call service • Ordering and interpretation of invasive and non-invasive investigations • Medication prescription within their prescribing scope and professional registration, and in accordance with individual trust medicines management governance • Insertion of invasive lines, and monitoring of cannulation and bloods • Management of acute and chronically ill patients

ACCPs	Background qualifications: • Nursing diploma/degree • Experience in cardiothoracic intensive care unit • Registered healthcare professional in the UK and Ireland Specific qualifications: • Postgraduate diploma in advanced practice or advanced clinical practice • MSc in advanced practice or advanced clinical practice • Non-medical prescription • Faculty of Intensive Care Medicine qualification • Cardiac Advanced Life Support course	• Postoperative intensive care unit ward rounds • 24-hour on-call service • Insertion of invasive lines, and monitoring of central lines, arterial lines and intravenous access • Intubation and extubation of cardiothoracic patients • Non-medical prescription • Insertion and removal of intra-aortic balloon pump • Insertion of probe and assessment of transoesophageal/transthoracic echo • Ordering and interpretation of invasive and non-invasive investigations • Management of acute and chronically ill patients
PAs	Background qualifications: • Science, biotechnology or biomedical degree • No experience in the area of cardiothoracic surgery needed • Not a registered healthcare professional Specific qualifications: • Postgraduate diploma in physician associate studies • MSc in physician associate studies	• Pre/postoperative patient clerking • Pre/postoperative ward rounds • Ordering basic blood investigations

Physician associates

PAs are medically trained, generalist healthcare professionals who work alongside doctors and provide medical care as an integral part of the cardiothoracic MDT. They are dependent practitioners working with a dedicated medical supervisor but are able to work autonomously with appropriate support. There are current restrictions around eligibility to undertake a prescribing qualification and requesting imaging but it is hoped that these hurdles will be overcome at some point in the future.

How to set up an advanced AHP service

AHPs can carry out a variety of roles to fulfil the demands of the department. The roles undertaken by these practitioners are determined by the needs of the employer and how the trust requires the level of practice to be deployed within its setting. If you want to develop an

advanced AHP service in your department, this SCTS toolkit will support you in setting up this service.

Scope of current service delivery and skillsets

Is an advanced AHP service a good fit for the service required? The starting point for this project is mapping and assessing the existing service. Once this has been done, you should collaborate with key stakeholders such as service users, clinicians, and finance and management personnel, which will allow this programme to ultimately flourish (Figure 1).

Identify the skillsets in the current workforce (Figure 2) and consider any unintended consequences of system-wide workforce development. Map your current patient pathway and ascertain the skillsets required to deliver care for your patient cohort (Appendices 34 and 35).

Business plan

Appendices 36 and 37 include an example business case and proposed plan. The key to success is to use your trust template and work with any personnel in the management team whose role it is to deliver business planning. This might be the programme management support officer or operational manager. There are three main tips for success:

1. Recognise that the business plan will be considered by a panel with different perspectives so your key performance indicators and financial plan need to demonstrate impact. It is best to clearly show how this will be achieved in terms of both cost saving and quality improvement.

2. Put plenty of detail into the body of the plan but have a succinct summary (no more than one page in length) that highlights the impact of the workforce transformation.

3. Reference the national benchmark for other cardiothoracic units, the HEE and Faculty of Intensive Care Medicine framework, and deanery training requirements. It may be helpful to suggest that failure to adopt the workforce transformation project could set the trust at odds with other cardiothoracic centres.

An advanced AHP service can provide stability and continuity of care for patients along with releasing time for core programme training. It will also reduce the premium spend on locum medical staff due to shortages/vacancies. It is worth documenting the current spend and giving a historical picture. Locum spend is not usually deemed to be a substantive factor in a business plan but in reality, it is often worth highlighting.

Attempting to recruit and filling vacancies consumes a considerable amount of clinical and administrative time that could be better utilised elsewhere. The available pool of doctors to recruit from can be a challenge owing to overseas restrictions and specialty knowledge. In addition to being expensive, short-term locums provide ‘stop-gap’ cover at best and can be of variable quality.

Figure 1

Factors that assist in developing an advanced AHP service (adapted from HEE)[4]

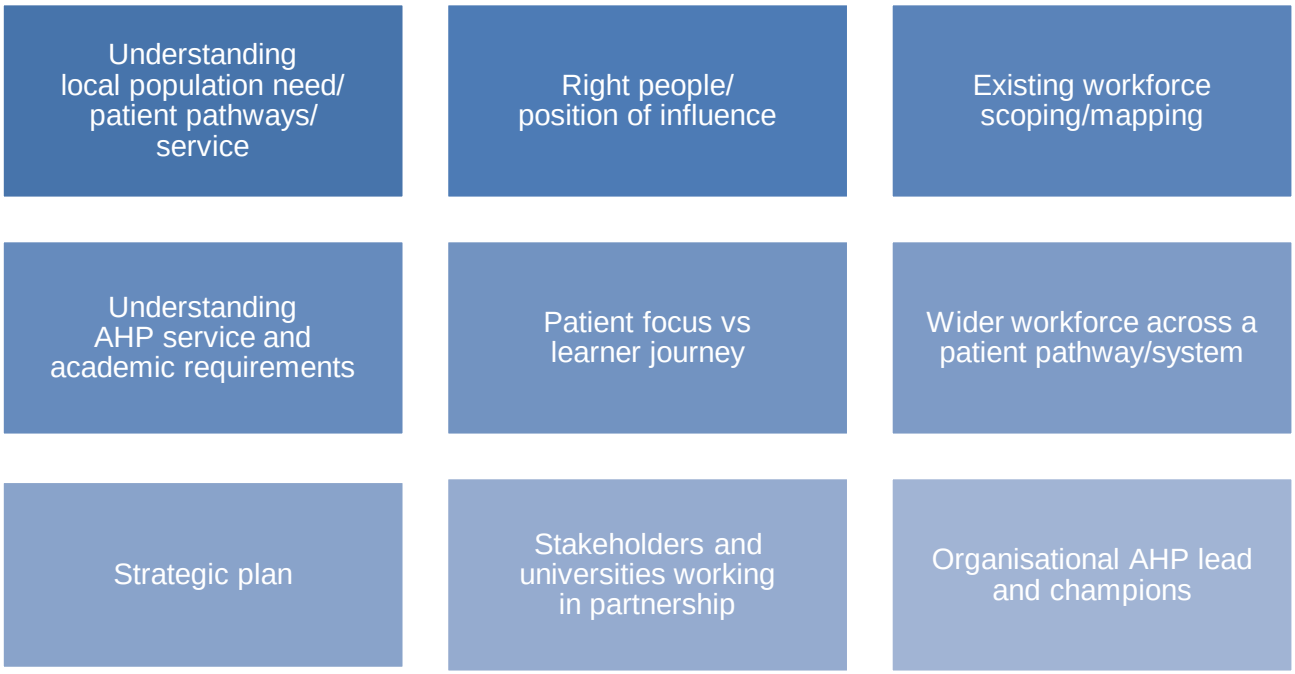


Figure 2

Identifying the skillsets needed for an advanced AHP service (adapted from HEE)[4]

Core trainees have a list of requirements that must be fulfilled to progress their surgical training. In order to meet those criteria, the trust must attend to their training needs. Training is frequently compromised to fill gaps in the rota, which prevents trainee progression and is often reflected in trainee evaluation of the cardiothoracic department. Unfavourable feedback from deanery trainees could result in a threat to deanery-funded positions, and the removal of deanery trainees can have a substantial impact on the cardiothoracic unit and the trust.

Content for the business plan

The business plan for the advanced AHP service should consist of service need–cost analysis, information on key performance indicators, benefits realisation metrics and key financial risks. More details are given below.

Service need–cost analysis:
Cost–benefit analysis is a relatively straightforward tool for deciding whether to pursue a project. It is therefore important to list all the anticipated costs associated with the project and then detail how the benefits will repay these costs. For example, calculate all your hospital expenditure for locum doctor shifts, additional shifts to cover sickness, annual leave etc, and compare the total with the cost of training advanced AHPs and delivery of the advanced AHP service.

Key performance indicators:
Key performance indicators are commonly used across health and care systems to examine and compare performance. They focus on areas such as continuity of patient care, locum spend, staff retention, staff morale/satisfaction, early discharge of patients and improved theatre utilisation.

Benefits realisation metrics:
A benefits realisation plan (Appendix 38) acts as an overview of the main milestones that should be part of your advanced AHP project, running from the project's beginning to when it is fully functioning and beyond. It should serve as a tool to monitor and manage the collective set of benefits associated with advanced AHP service development. By focusing on benefits realisation planning, you can track whether intended benefits have been realised and sustained after the end of the project. Furthermore, the benefits realisation plan helps to provide clarity with regard to who is responsible for the delivery of those benefits.

Key financial risks:
You will need to ensure there is a robust financial plan for executive team approval. Workforce transformation is a key financial undertaking, both in securing money to underpin the undertaking and in sustaining it. However, the business plan can document both quality improvements and financial savings such as reduced length of stay, reduction in medical staffing and locum spend.

Evidence of local departmental data to support the business plan

- Review six months of emergency patient referrals and core trainees working antisocial hours.
- Review six months of duty hours rota and locum cost data.

- Review six months of patient and staff satisfaction feedback.
- Review six months of patient discharge data as well as theatre sessions, on-call commitments, outpatient clinics, wound clinics and ward rounds covered by advanced AHPs.
- Review departmental quality indicators to assess the impact of the workforce transformation.

Recruitment

The business case will demonstrate the improvement(s) to the service for all new advanced AHP roles/teams. There should be a defined population and service need as well as a job plan for all new advanced AHP roles. This should be determined by a consensus between clinical service leaders, senior nurse managers, directorate managers and consultants.

All new roles should have an 80% clinical and 20% non-clinical split for trainee advanced AHPs. Qualified advanced AHPs should have a 90% clinical and 10% non-clinical split to meet all four pillars of clinical practice, leadership and management, education and research.

There should be funding approval for band 6/7 trainees and band 8a qualified advanced AHP roles. Furthermore, it would be prudent to incorporate a band 8b lead role in accordance with the HEE framework.[5] There is a tendency to allocate line management to the matron. This is not ideal as the matron's role is busy and there is no day-to-day clinical interaction.

Funding will also need to be identified with regard to the master's level education for advanced practitioner trainees. ACP and PA funding can be sourced via the apprenticeship route providing the trust and academic institution have a contract, thereby avoiding the financial burden falling to the department.

Named clinical supervisors must be appropriately trained and prepared for these new roles. The clinical supervisor will also be part of the ongoing development and appraisal process. See the governance document in Appendix 1 for expectations of the role.

The recruitment process timeline should be coordinated with the academic organisation's MSc programme. Candidates will have to demonstrate that they meet the academic programme entry requirements. Robust recruitment, selection and interview processes must be in place with joint MSc programme and role interviews where possible (Appendix 1).

Approval for recruitment will need to be sought via the advanced practice oversight group (if one exists in the trust). Similarly, job adverts should be signed off by the corporate advanced practice lead.

All advanced AHP positions should have trust-approved job descriptions and person specifications with 'bolt on' specialty aspects. Examples of job descriptions for trainee and qualified ACPs are available in Appendices 39–42 while those for SCP posts are given in Appendices 43–45. A job description for PAs is available in Appendix 46.

Shortlisting should be undertaken by the advanced AHP local lead and clinical service lead to make sure that the candidates are suitable. Selection must be carried out in accordance with the trust's human resources interview process and documentation. It is suggested that selection is based on interview as well as assessments of:

- Group work to look at the dynamic of the MDT – Teams are usually small in number so you need to look at who has the right interpersonal skills to function in a small team but who can also communicate effectively with the broader MDT.

- A scenario relevant to the clinical area of practice – This will preferably be using a manikin but can also be carried out as a verbal conversation. In order to ascertain a diagnosis, the candidate may request investigation results (e.g. chest x-ray, electrocardiography, arterial blood gas test) as a handout.

If there is a large number of candidates, the group work and scenario assessments can be conducted as a longlisting process, and then shortlisted can be invited to interview. Interviews for trainee advanced AHPs should include a representative from the academic institution to make sure that candidates meet all the entry criteria for the trainee post. Those for qualified advanced AHPs should be undertaken following local hospital policy.

Competences (advanced, specific and generic)

Trainee advanced AHPs

Most universities have a Royal College of Surgeons/Physicians curriculum with competences monitored through workplace-based assessments, reflective summaries, patient and staff feedback, direct observation of procedural skills, case-based discussions, procedure-based assessments and clinical evaluation exercises. They are specific to universities and trainees to make sure that all the relevant forms are signed and completed according to the requirements of their clinical portfolio of evidence. These forms are free of charge and can be obtained from the Intercollegiate Surgical Curriculum Programme website.[6]

Qualified advanced AHPs

Qualified advanced AHPs can develop their clinical skills in advanced, specific procedural and generic competences (Table 3). For specific procedural competences with new clinical skills, the advanced AHP and educational supervisor must demonstrate that these are in line with the clinical role and patient needs. Appropriate training and specific competences must be in place (Appendices 2–33). There needs to be a process for demonstrating ongoing competences such as a completing a logbook and recognised supervision (direct or indirect). This activity must be recorded in the advanced AHP's portfolio to ensure vicarious liability.

Table 3
The core advanced, specific procedural and generic competences for advanced AHPs

Advanced competences	Specific procedural competences	Generic competences
• Internal thoracic artery harvesting • Intra-aortic balloon pump insertion and removal • Insertion of central lines • Femoral or axillary artery exposure for minimally invasive access • Placing patient on cardiopulmonary bypass • Weaning from cardiopulmonary bypass • Insertion of probe and assessment of transoesophageal and transthoracic echo • First and second assistant for cardiothoracic transplantation	• Long saphenous vein harvesting (open, bridging and endoscopic techniques) • Short saphenous vein harvesting • Radial artery harvesting (open and endoscopic techniques) • Median standard sternotomy • Various thoracotomy incisions • First and second assistant for various cardiothoracic surgical procedures • First assistant for robotic cardiothoracic surgery • Ultrasonography of venous and radial artery conduits	• Abdominal examination and diagnosis • Interpretation of x-ray, computed tomography and magnetic resonance imaging • Intubation and extubation • Insertion of arterial and venous access lines • History taking and ward rounds • 24-hour on-call service • Caring for acute and chronically ill patients

Educational requirements and clinical supervision

All advanced AHP trainees undergo a university-based two/three-year postgraduate diploma/MSc programme. The trainees will follow a competence-based Department of Health curriculum under the supervision of a clinical supervisor. This needs to be a joint undertaking between the trust and an academic institution. For patient safety reasons and owing to the aim of delivering excellent surgical care, no in-house training is allowed for these practitioners. All clinical competences will be acquired in the trainee's own clinical unit under the supervision of a suitably qualified person.

Continuing professional development

During the development of the AHP, and following the completion of academic and clinical requirements, continuing professional development must be demonstrable and evidenced, in a way similar to initial training and development. The use of regular, agreed training needs analysis to inform the continuing professional development needs for the individual (particularly linking back to maintenance and improvement of competence levels and professional roles) is a

key aspect of this, and should be included as part of the individual's job plan and in their annual appraisals. This continuing professional development should also be informed by continuous feedback loops from the clinical supervision process and balanced by clear, demonstrable reflective practice. This links directly with ongoing requirements for Nursing and Midwifery Council/Health and Care Professions Council revalidation.

Appraisals

Annual appraisal should be a joint process with the line manager and clinical supervisor. The clinical lead should also be part of the process to ensure fairness. Documentation must reflect achievements, progress in all four pillars of advanced practice and any incidents. The next year's objectives must reflect practice in all four pillars. All advanced AHPs will be required to demonstrate self-awareness with regard to their continuing professional development and their responsibility for acquiring clinical competences.

AHPs should raise any concerns or issues at an early stage of their career progression or training and ensure that this is documented to avoid any untoward incidents (Appendix 1). If any performance concerns are identified but are unable to be addressed through preventive measures, management staff will need to refer to the trust's capability policy for the appropriate next steps. If the trainee advanced AHP's performance or progress continues to be unsatisfactory, or does not meet the expected and agreed levels, this may lead to withdrawal of educational funding and the trainee may be unable to continue in the qualified post.

In following the trust's capability policy, redeployment to an alternative role may be explored in consultation with the trainee AHP. Redeployment should involve looking for a suitable role using the following factors:

- the level of the trainee AHP's performance
- the training, qualifications and skills of the trainee AHP
- the trainee AHP's previous job (including the status of the post)
- the pay band
- the location of the post

Please refer to your trust's redeployment guidance for more information.

Advanced AHP oversight group

It is important to have a representative group in the trust to oversee advanced practice. This group should comprise:

- lead for AHP representative
- educational representative
- finance representative
- human resources representative

- executive medical director
- chief nurse
- workforce representative

Example rotas for core surgical trainees and the AHP team

The rota system in Figure 3 is an example of how core trainees and advanced AHPs can cover four cardiac theatres, two wards, two clinics, and night and on-call services. The tasks currently undertaken by this tier of clinical staff are outlined in Appendix 47. This rota shows the staff available for each day and tasks undertaken, ensuring all necessary activity is covered. The work in most of the columns is self-explanatory. On those days when the core trainees are allocated to 'days', the service commitments are covered by others in the rota so that the trainees can be released to attend theatre.

In addition, there are two further example rotas shown in Figures 4 and 5 with qualified and trainee ACPs to cover the 24/7 clinical services.

Workforce planning and career development for AHPs

Long-term wider workforce planning is essential across all AHP groups. Identification of the requirements for AHPs should be carried out during periods of service change or development, with the use of an accepted service needs analysis tool.

As part of this planning process, there should be a link between the workforce needs (as identified by the trust and by local and national health authorities, such as HEE) and the commissioning of education for advanced AHPs with higher education institutions. It is understood that many individuals who are applying for advanced AHP posts can clearly evidence a multitude of skills, knowledge and academic qualifications. Appropriate training needs analysis will highlight knowledge and skills deficits that must be addressed for an individual to develop into an advanced AHP. This approach may also be applied to an entire system if role development for a cohort of staff is indicated.

All issues of competence, educational requirements and supervision should be considered as part of this analysis. Individuals will have to demonstrate that they meet the core competences and educational requirements of an advanced AHP. They will still require sufficient time to allow consolidation of learning through clinical supervision and support. The transition to an advanced AHP role is considerable and the impact in terms of clinical exposure cannot be underestimated.

Figures 6–8 represent the potential career pathways and development plans for SCPs, ACPs and PAs.

Figure 3

Example cardiac surgery rota for core surgical trainees (CSTs) and advanced AHPs

Cardiac surgery rota (4 theatres, 2 wards and 2 clinics)																
	CSTs and trainee ACPs							ACPs, SCPs, trainee SCPs and PAs								
	CST 1	CST 2	CST 3	CST 4	CST 5	tACP 6	tACP 7	ACP 8	ACP 9	SCP 10	SCP 11	SCP 12	tSCP 13	tSCP 14	PA 15	PA 16
Mon	Twilight	Annual leave	Night	Theatre	Theatre	Clinic	Study leave	Day		Theatre	Day off	Theatre	Annual leave	Theatre	Day	
Tue	Twilight	Annual leave	Night	Ward	Clinic	Theatre	Study leave	Day		Admin	Theatre	Theatre	Annual leave	Day off	Day	
Wed	Twilight	Annual leave	Night	Admin	Ward	Theatre	Study leave	Day		Theatre	Theatre	Day off	Annual leave	Admin	Day	
Thu	Twilight	Annual leave	Night	Theatre	Theatre	Admin	Study leave	Day		Theatre	Admin	Theatre	Annual leave	Theatre	Day	
Fri	Twilight	Annual leave		Clinic	Admin	Theatre	Study leave	Day	Long day	Day off	Theatre	Admin	Annual leave	Theatre	Day	Long day
Sat	Twilight	Annual leave	Ward				Study leave		Long day	On call		On call	Annual leave			Long day
Sun	Twilight	Annual leave	Ward				Study leave		Long day	On call		On call	Annual leave			Long day

Figure 4

Example rota for ACPs (9.38 WTE, 24/7 service)

16/3/2020 – 12/4/2020		16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12		Hours
Post																											BH				
ACP 1		D	D		DO	D		D	D	D			DO	DO	DO	AL	AL	AL					DO	D	D	N	N	N		
ACP 2		AL	DO	N			D	DO		D	D		N	N		AL	D	D		DO	DO					D	D		N		
ACP 3		AL	AL	AL								D	D		D				D	D		D	D				D	D			
ACP 4		D			N	N	N					N		D	N			N	N	N			AL	AL	AL						
ACP 5		N	N	DO			D	D	D		D	D	DO	DO	DO	N	N	DO		D	D	D		DO		AL	DO	DO	DO		
tACP 6		SL	AL	D	DO	D	DO	DO		N	N				D	D		D		AL	D		D	N	N		DO	DO	DO		
tACP 7		SL		D	D			N	N				D	D		D	D							D	D			D	D		
tACP 8			D	SL	D			AL	AL			AL	AL			AL			D		N	N	N			D			D		
Day		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
Night		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		

AL = annual leave; BH = bank holiday; D = day; DO = day off; N = night; SL = study leave; tACP = trainee advanced clinical practitioner

Figure 5

Example rota for qualified and trainee ACPs (9.38 WTE, 24/7 service)

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Date	**18 Jan**	**19 Jan**	**20 Jan**	**21 Jan**	**22 Jan**	**23 Jan**	**24 Jan**
ACP 1	Long day	Day off	Day off	Long day	Long day	Day off	Day off
ACP 2	Clinic	Day off	Day off	Day off	Clinic	Day off	Day off
ACP 3	AL	Day off	Day off	Day off	SL	Day off	Day off
ACP 4	Day off	Long day	Day off	Long day	Day off	Day off	Long day
ACP 5	Long day	Day off	Long day	SL	Day off	Day off	Day off
ACP 6	Day off	Long day	Day off	Day off	Day off	Long day	Long day
ACP 7	Night	Night	Night	Day off	Day off	Day off	Day off
ACP 8	Day off	Day off	Day off	Night	Night	Night	Night
tACP 9	Day off	Day off	SL	AL	AL	Day off	Day off
tACP 10	SL	Long day	Long day	Day off	Long day	Long day	Day off
tACP 11	Day off	Day off	Day off	AL	AL	AL	AL
Day	2 + clinic	2 + tACP	1 + tACP	2	1 + tACP + clinic	1 + tACP	2
Night	1	1	1	1	1	1	1
	Mon	**Tue**	**Wed**	**Thu**	**Fri**	**Sat**	**Sun**
Date	**25 Jan**	**26 Jan**	**27 Jan**	**28 Jan**	**29 Jan**	**30 Jan**	**31 Jan**
ACP 1	Day off	Day off	SL	Long day	Long day	Day off	Day off
ACP 2	Day off	SL	SL	Long day	Clinic	Day off	Day off
ACP 3	Day off	SL	Long day	Day off	Day off	Day off	Day off
ACP 4	AL	AL	Day off	Day off	Day off	Long day	Long day
ACP 5	Long day	Day off	Day off	Day off	Day off	Night	Night
ACP 6	Day off	Long day	Long day	Day off	SL	Day off	Day off
ACP 7	Night	Night	Night	Night	Day off	Day off	Day off
ACP 8	Day off	Clinic	Day off	SL	Night	Day off	Long day
tACP 9	Day off	SL	Day off	Day off	Day off	AL	Day off
tACP 10	Long day	SL	Day off	SL	Day off	Day off	Day off
tACP 11	Day off	Long day	Day off	Day off	Long day	Long day	Day off
Day	1 +tACP	2 + clinic	2	2	1 + tACP + clinic	1 + tACP	2
Night	1	1	1	1	1	1	1

AL = annual leave; SL = study leave; tACP = trainee advanced clinical practitioner

Figure 6

Potential career pathway for SCPs with salary bands (proposed to HEE, not yet published)

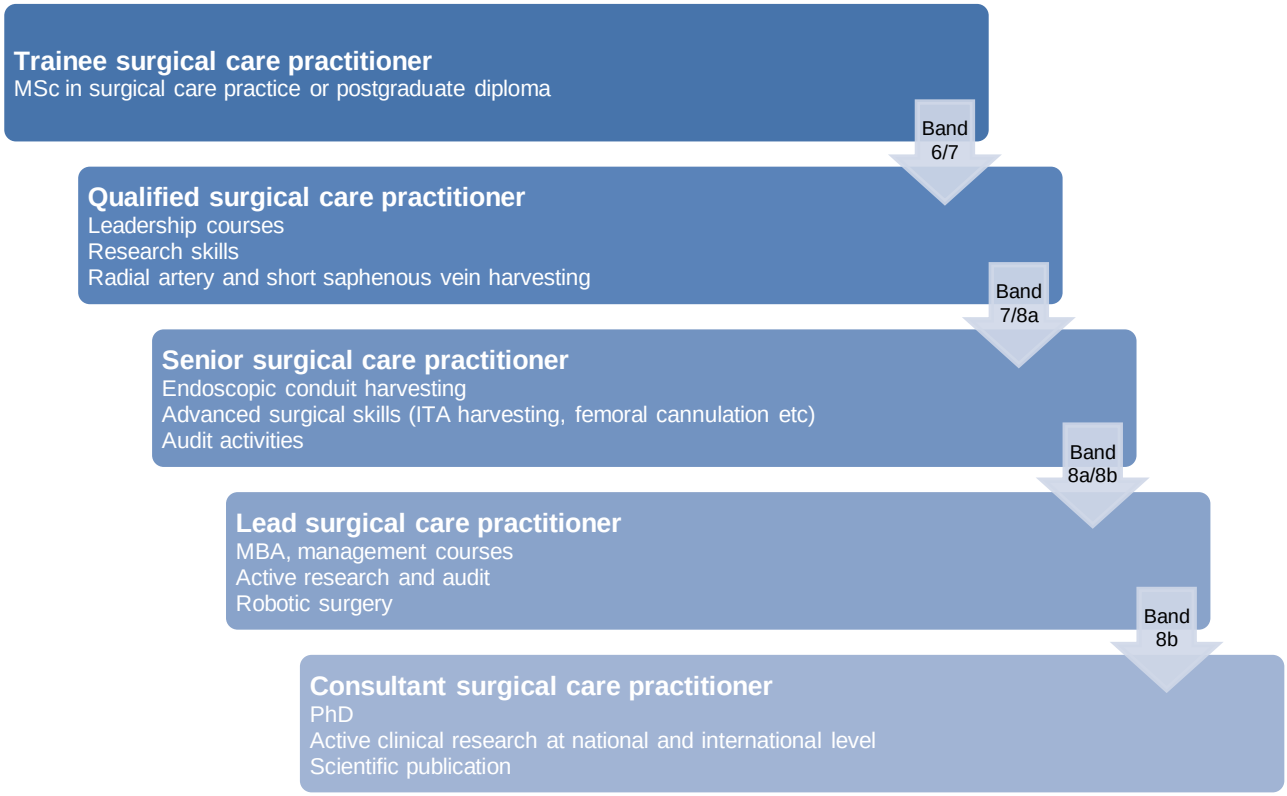


Figure 7

Potential career pathway for ACPs with salary bands (proposed to HEE, not yet published)

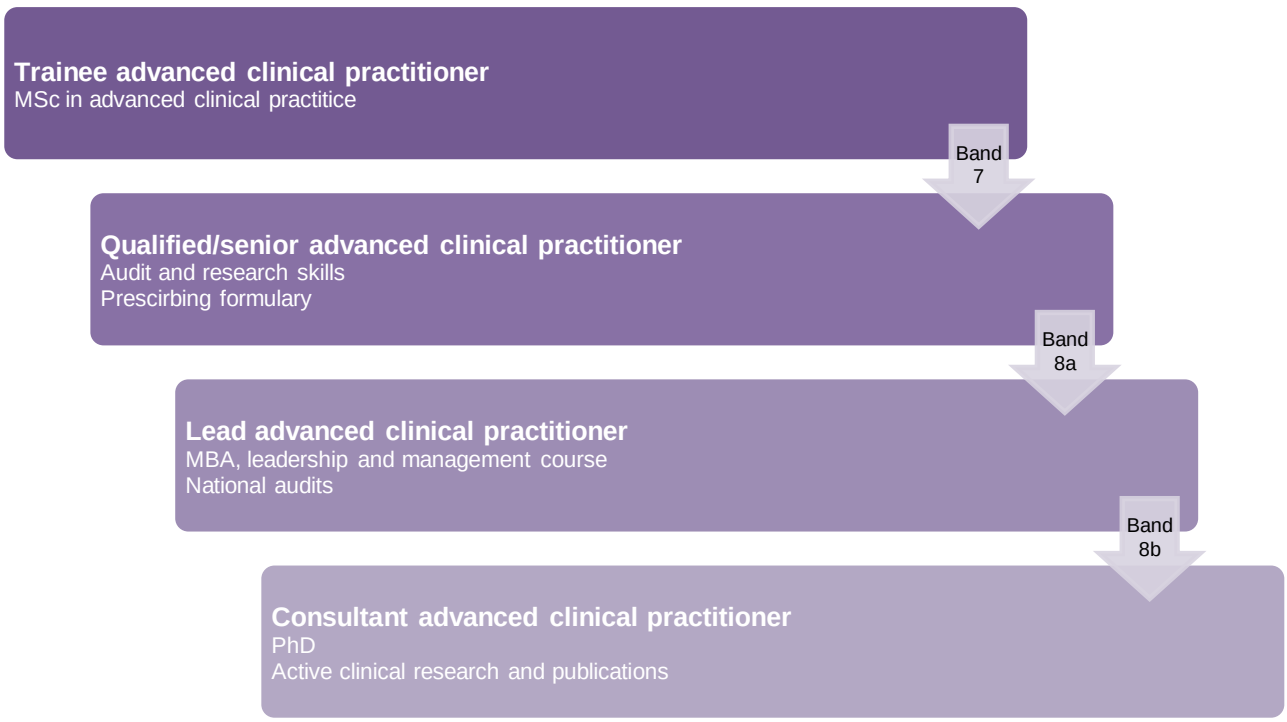
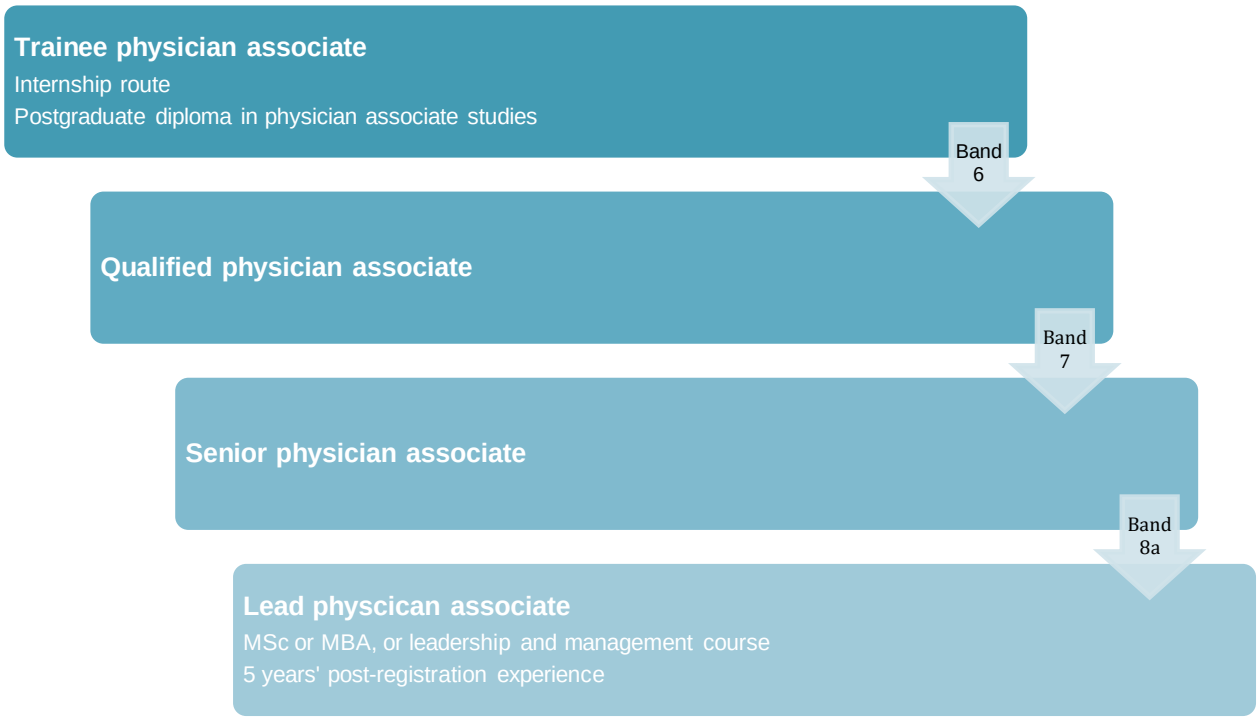


Figure 8

Potential career pathway for PAs with salary bands (adapted from the Royal College of Physicians and Prospects)[7,8]



Workplace education supervision for advanced AHPs

There should be a focus on an integrated multiprofessional approach in advanced practice workplace education supervision. Advanced AHPs are a growing part of the modern healthcare workforce, and their contribution to patient care and pathways is recognised in health and care policy.[5] In order for them to function across the four pillars of advanced practice, they need to attain high levels of training and learning. The Care Quality Commission describes clinical supervision as an opportunity for healthcare practitioners to reflect on and review their practice; discuss individual cases in depth; and change or modify their practice and identify training and continuing development needs.[5]

Supervision for these advanced AHPs should be profession-specific, and this can vary greatly within and across professions. Existing workplace supervision practices may not map neatly to the learning needs of multiprofessional trainee advanced AHPs. Nor can it be assumed that uni-professional colleagues understand the professional scope or typical clinical practice profile of trainee advanced AHPs from different qualifying professions.[5]

HEE suggests that workplace supervision should have following fundamentals:[5]

- Establish the requirements of multiprofessional advanced AHP supervision.
- Establish the training and development of supervisors.

- Improve consistency and limit supervision practice variation across the health and care sector through a combination of a coordinating education supervisor and associate supervisor matched to specialty knowledge and skills development.
- Ensure supervision with a focus on professional and public safety in advanced practice.

In addition, HEE has developed certain minimum criteria and recommendations relating to advanced practice educational supervision:[5,9]

- Educational supervisors should be allocated an absolute minimum of 0.25 programmed activities (equivalent to 1 hour) per trainee per week to provide dedicated workplace supervision training.
- Supervisors should be made aware that the training needs and learning styles of advanced AHPs are different from those of surgical trainees.
- Dedicated educational supervisor training sessions should be implemented so that supervisors can better understand the requirements of workplace supervision for advanced AHP trainees and so that they can adapt their way of teaching.
- There should be a register for educational and clinical supervisors embedded in the hospital training policy.
- Clinical supervisors should engage with the university process to ensure they are familiar with e-learning and the e-portfolio.
- The trust should make sure that the university's learning contract, pre-registration audit of the department, and a signed contract between the clinical supervisor, student and academic institution are in place before the trainee starts training.

More details on training and supervision are available in the HEE document *Workplace Supervision for Advanced Clinical Practice*.[5]

Funding opportunities

One of the biggest challenges is obtaining the funding to support the workforce transformation. Although the business plan should reflect all aspects of the service development, the requirement for trainee ACPs to complete an MSc degree is a significant cost.

The most favourable option is to enrol trainee ACPs on an MSc programme via the apprenticeship route. The apprenticeship funding is £12,000 over the three-year course. This funding can be accessed via the trust's apprenticeship programme. Students who have already completed relevant MSc modules may be able to apply for credit for this learning but strictly speaking, the apprenticeship monies are intended for the whole MSc programme. This is worth considering before trainees are given ad hoc funding for individual modules. Trainees should be willing to demonstrate a commitment to service development and the extended surgical workforce rather than following a piecemeal approach, which may not be sustainable or robust.

It is then critical that the rules of engagement for the apprenticeship pathway are followed. The job plan must reflect an 80/20 split for clinical and non-clinical time. This is to ensure that study

time is secured and that there is an opportunity for students to function across all four pillars of advanced practice. The infrastructure to support students with educational and clinical supervisors will also need to be in place.

Additional funding opportunities may be available through HEE, which has training grants of up to £11,000 per student to support training in the workplace (for example, funding the 0.25 programmed activities recommended for educational/clinical supervision). The local HEE faculty lead can be contacted for further information.

Credentialing

To date, advanced practice has not been registered by professional bodies such as the Nursing and Midwifery Council. This is because there has been a plethora of different roles, titles and skills with no overarching governance. Both the Royal College of Nursing and HEE have acknowledged that ACPs need to have their practice recognised. Moreover, organisations and patients require clarity on where such roles fit in the health organisation, what they can deliver and the governance for safe practice. While there are no plans for registration with professional bodies, the Royal College of Nursing and HEE have established routes for nurses and ACPs to gain credentialing for their experience, qualifications and role as a means of demonstrating that they are working at a standard that meets certain criteria.

The Royal College of Nursing has four credentialing models for nurses that depend on the applicant's education level. These include a route for those who have not completed an MSc in advanced practice but are working at this level. Further details are available from the Royal College of Nursing website.[10]

HEE has also devised a credentialing process whereby health professionals can apply for recognition. In addition, HEE is working with recognised educational providers such as universities and the royal colleges to validate the credentials if the specific MSc course meets the multiprofessional requirements and quality assurance processes. HEE has commissioned the overarching framework from which a curriculum is developed and where a credential already exists, there will be a mechanism by which HEE will recognise this. In essence, this will simplify the process for ACPs to be credentialed, which in turn will enable trusts, other health professionals and patients to gain a greater understanding of the skills and roles in advanced practice as well as the governance of this group of practitioners. Additional information can be accessed via the HEE website.[11]

Demonstrating impact

Demonstrating the impact of advanced AHP service delivery in any given environment should be considered in two distinct areas: service level impact and quality assurance.

Service level impact

In most cases, advanced AHP services are created to deliver multiprofessional models of service, with multiprofessional working emphasised. This would include the use of advanced

AHPs working in parallel with medical staff to generate sustainable solutions to workforce planning challenges.

As these models develop, the key areas of evaluation are that services remain safe and effective. Baseline data should be collected prior to implementation of the new model or initial pilot phase, with follow-up and review after the service has changed. This should include:

- activity analysis (caseload and case type)
- adverse events
- stability of service
- service development
- patient satisfaction
- performance against national targets/outcomes/key performance indicators

Evidence of national impact

- University Hospitals Birmingham NHS Foundation Trust (2009)
- University Hospitals Sussex NHS Foundation Trust (2016)
- South Tees Hospitals NHS Foundation Trust developed a 24-hour SCP on-call service in 2015. Appendices 36 and 37 include the business case and proposed plan.

Quality assurance

Quality of care should be evaluated to make sure that quality assurance has been achieved and to assess the impact on key performance indicators. This should be done as part of the supervision model with patient record review and direct supervision being used to evaluate the competence and effectiveness of each individual. Quality of care should then be reviewed thematically across the service. This should be embedded into any AHP assurance framework.

Further recommendations

This SCTS toolkit is a framework that can be adapted by hospitals to evaluate their practice and demonstrate the impact of having an extended surgical AHP team. Once the advanced practice programme has been implemented, further consideration should be given to:

- full development of the complete competence structure, reflecting all four pillars of advanced practice;
- development of linked networks for advanced AHPs as a means of support;
- identifying and supporting further opportunities for AHPs to raise their local, regional, national and international profile;
- linking with higher education institutions on further development of the research base for AHP service impact;
- succession planning;
- AHP career development and career pathways;
- how to embed professional accountability infrastructure for AHPs across all settings and employers.

Key points

- Preliminary work includes scoping the current service as well as future vision – be ambitious!
- Multidisciplinary team engagement of key stakeholders is crucial.
- Seek expertise to write the business plan. Every word counts – think impact!
- Identify and plan to overcome infrastructure hurdles in advance (e.g. IT access, imaging protocol, job plan, job description).
- Develop an educational pathway by building a relationship with an academic institution and identifying funding opportunities.
- Establish clinical support and supervisors.
- Put in place a robust recruitment and selection process.
- Develop a robust governance structure.
- Don't reinvent the wheel. Use the resources and expertise from the SCTS.
- Leadership is the key to success.

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Appendices

The appendices below can be downloaded from: https://scts.org/sctstoolkit.aspx

Appendix 1: ACP governance document
Appendix 2: Competences history taking
Appendix 3: Competences abdominal examination
Appendix 4: Competences cardiac examination
Appendix 5: Competences respiratory system examination
Appendix 6: Competences arterial sample
Appendix 7: Competences ABG interpretation
Appendix 8: Competences AXR
Appendix 9: Competences CXR
Appendix 10: Competences ECG
Appendix 11: Competences TOE
Appendix 12: Competences carotids
Appendix 13: Competences anaesthetic room and operating theatre
Appendix 14: Competences intubation
Appendix 15: Competences arterial line insertion
Appendix 16: Competences central line insertion
Appendix 17: Competences artificial ventilation
Appendix 18: Competences pacemaker
Appendix 19: Competences long saphenous vein
Appendix 20: Competences short saphenous vein

Appendix 21: Competences radial artery
Appendix 22: Competences internal thoracic artery
Appendix 23: Competences median sternotomy
Appendix 24: Competences median sternotomy closure
Appendix 25: Competences anterolateral thoracotomy
Appendix 26: Competences anterolateral thoracotomy closure
Appendix 27: Competences posterolateral thoracotomy
Appendix 28: Competences posterolateral thoracotomy closure
Appendix 29: Competences discharge
Appendix 30: Competences collaborative working and professional issues
Appendix 31: Competences communication, documentation, information
Appendix 32: Competences reflections and audit
Appendix 33: Template for ward round and discharge documents
Appendix 34: Mapping of current posts
Appendix 35: Assessment for future ACP posts
Appendix 36: Business case
Appendix 37: Proposed plan
Appendix 38: Benefits realisation plan
Appendix 39: Job description ACP, trainee, band 7
Appendix 40: Job description ACP, qualified, band 8a
Appendix 41: Job description ACP, lead, band 8b
Appendix 42: Job description ACP, corporate lead, band 8c
Appendix 43: RCS England guidance on SCP role
Appendix 44: Job description SCP, trainee, band 6
Appendix 45: Job description SCP, band 8a/b
Appendix 46: Job description PA, band 8a
Appendix 47: Job plan ACP

Chapter 4: NTN trainees

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This section of the SCTS toolkit aims to guide cardiothoracic surgical departments in terms of what is required to produce excellent surgeons while adhering to limitations produced by mandatory legislative changes to UK medical practice. It is fundamental for us to appreciate that the world in which we live and do our training is unrecognisable when compared with that of previous generations of cardiothoracic surgeons. We can no longer rely on what has worked in the past when planning adequate training for the consultants of tomorrow.

Training must guarantee patient safety but we must also bear in mind that these trainees are the consultants of the future, who will be operating on patients of the UK, Ireland and beyond. Departments and trainers should acknowledge that the training pathway and the training atmosphere have changed significantly over the past 15 years, and it is no longer acceptable to approach training as a simple 'cut and paste' job from their own training experiences. Trainers should still, of course, use the important points from what they have learnt and adapt training methods but they should also realise that many elements of 'training' from years gone by are no longer fit for purpose.

We propose that the most important change required to produce excellent cardiothoracic surgical consultants is to increase operative exposure and experience. Under stipulations of the new lengths of training programmes, this means having trainees in theatre 3 days a week (6 sessions), equating to approximately 24 hours of the 'allowable' working week. The remaining time should be focused on the other important competences defined in the curriculum, split between clinical care (intensive care unit and ward), on-call commitments, multidisciplinary team (MDT) meetings, clinics and administrative work including organisation of patient care. This proposed system would require trainees to operate with more than one consultant on a regular basis.

The UK training system has produced some of the world's best cardiothoracic surgeons and through openly published results, we have seen patient outcomes data rank among the best in the world. Entry into cardiothoracic surgery through the UK national selection programme remains the most competitive of all the surgical specialties at both ST1 and ST3 levels. The applications comprise large numbers of highly capable individuals who have worked exceptionally hard to get on this career pathway. The training programmes promise to deliver the resources and tools to become a competent cardiac or thoracic surgical consultant. It is clear from surveys that changes in departmental structures, rota patterns and some legislative factors have led to training becoming pressured and ineffective. Changes such as the introduction of entry at ST1 (as well as the established ST3 route) mean that trainees often have relatively little theatre experience and need closer supervision.

This is in conflict with the historical 'training' methods that many of the current generation of consultants experienced, where a 'sink or swim' independent approach was favoured. The invaluable direct mentorship of consultants at ST1 level has also been lost to some extent. The good news is that with increased availability of simulation (aligned with first-class multimedia learning tools), trainees now have opportunities to condense their training time and so learning can be more efficient.

Current national training programme

Cardiothoracic trainees are able to apply for a national training number (NTN) at either ST1 or ST3 level, with the former being the more recently introduced (and more popular) entry point. ST1 entrants can apply part way through their second year as a doctor, during their foundation training. ST3 entrants usually apply midway through their second year of core training (or even later) and many will have been clinical fellows in departments for a variable period of time before securing their NTN. They generally have much more experience working in cardiothoracic surgery, with some already being independent operators, having undertaken several hundred cases as first operator. Their application to interview is heavily affected by the operative 'matrix' that awards points related to numbers of specific cardiothoracic sub-procedures performed (sternotomy, vein harvest etc) as a factor of time spent in the specialty, rather than as an absolute figure.

Run-through training (ST1 entry) has traditionally lasted eight years but crucially, it is moving to a seven-year programme from August 2021 with a plan to condense the early training period, which is currently viewed as inefficient. These ST1 entrants are a far more homogenous group, frequently having less than six months' experience of formally working in a cardiothoracic department.

ST3 entry is still available but applicant numbers are reducing every year as the enthusiasm for run-through (ST1) training increases. ST3 entrants will continue to train for six years until award of their Certificate of Completion of Training. Within each rotation, formal meetings with supervisors need to occur and must be recorded on the trainee's e-portfolio, along with learning experiences and courses completed.

At present, from the perspective of operative experience, in order to qualify for the Certificate of Completion of Training, trainees are required to have performed at least 250 major cases, a proportion of which should be without their supervisor scrubbed. There has been much debate regarding a more prescriptive operative experience in the form of 'indicative numbers', with suggestions that trainees should perform a certain number of 'parts' of full operations. However, currently, completing 250 cases is the only formally defined marker. Some trainees will reach competence faster with a certain trainer than they would if they were with a different trainer. Although the 'perfect' combination is almost impossible, the goal should be to allow trainees enough experience for them to achieve as close to the peak of their potential as possible.

All trainees also have to undergo an annual review of competence progression, where they must prove that they have made appropriate progress during the previous year before they can

proceed to the next grade of training. Once they have been awarded a NTN, trainees are based in a specific regional deanery. They can only move out of that deanery if they are formally approved for an interdeanery transfer (which requires exceptional extenuating circumstances and is extremely difficult in practice). Alternatively, they have the option of undertaking an out-of-programme training year in an area of specialist interest or formal research (e.g. for an MD or PhD degree). Owing to the very low numbers of NTNs appointed each year, most trainees are limited to a specific region for at least six of their eight years of training, irrespective of other influences (which include the availability of consultant positions in the region).

Nearly all cardiothoracic consultant appointments are in a single subspecialty (either cardiac surgery or thoracic surgery). Around 80% of successful applicants to the NTN programme are planning a career in cardiac rather than thoracic surgery. This in part has led to a surplus of trainees seeking to become consultant cardiac surgeons, exceeding the current demand for such appointments in the UK and Ireland, and leaving thoracic and congenital surgery under-provided.

In the final FRCS (CTh) examination, trainees are examined to a very high standard (level of a day 1 consultant) in both subspecialties and are required to have a good level of experience (surgical and otherwise) across cardiac as well as thoracic surgery with at least six months' experience in the non-dominant subspecialty. Most trainees do a year in the non-dominant subspecialty, with the combination of both the advantages and disadvantages of being away from their dominant field. Trainees will almost certainly have to decide at an early stage of their training pathway which subspecialty to choose, which leads to reduced flexibility. This more fixed route has significant implications for the career choice that individuals can make. The benefits and drawbacks of splitting the specialty (and therefore the training pathway) into two parts have been debated for years. It is unlikely this will change in the near future.

Transplant and congenital surgery share similarities when it comes to formal exposure during training. They are both varied in length and sometimes there is no specific time dedicated to these subspecialties in a particular regional training programme. Training to be a competent transplant or congenital surgeon carries with it even more complexity in terms of accessing training opportunities. Given how small these subspecialties are, it is likely that operating and clinical experience in these areas present an opportunity to make good progress in the development of non-consultant surgeons. Spending time in these subspecialties will be a more routine occurrence, and it is widely accepted that the knowledge and experience that a trainee develops in them is potentially very valuable.

'Wire skills' (including endovascular interventions) are not integrated in the curriculum although it has been argued that they should be. Clearly, the landscape has changed, and interventional options such as percutaneous coronary intervention and transcatheter aortic valve implantation are an integral and increasingly important part of treating cardiac 'surgical' patients. At present, this is firmly the domain of the cardiologists although combined or hybrid approaches are becoming more common.

The evolution of training in departments must be flexible enough to allow experience in these areas to future proof training as well as to equip tomorrow's consultants with the experience required to deliver and manage interventions indicated for cardiac patients in order to achieve the best outcomes. This most importantly relates to the amount of time available in a rota to seek out novel techniques and allow learning away from an overly full, prescriptive working pattern. Moreover, spending time in the cardiology team may provide a more useful cardiac surgical skillset than the current system of broad surgical training with surgical skills of only limited usefulness.

What has changed?

Ignoring the expansion of therapies available and the increased scrutiny faced by surgeons, there have been major changes to the way we now learn. Trainees in the current era spend many hours in simulation training in a wide array of skills away from patients. The cultivation of a trainee from being an outstanding medical student and foundation doctor to becoming a competent, compassionate, confident and technically excellent consultant surgeon is a complex and varied process. Different trainees learn at different speeds, and they therefore require different atmospheres and emphasis in their experiences. Equally, different departments have different requirements of trainees to keep the department working well and maintain the service/training balance. Each combination of department and trainee is unique and offers a distinctive path to the end goal.

When looking into training experiences across the country, it is clear that the traditional 'firm' model of operating (with strictly one trainee attached to one consultant) is no longer feasible in the vast majority of cases. The mean caseload of a consultant cardiac surgeon before the COVID-19 pandemic was just over 100 cases per year. The current Certificate of Completion of Training requirement is that a trainee needs in excess of 250 'major index cases' as first operator during their training years (5 or 6 years as a registrar if we assume the first 2 years are largely completed at a more junior level).

Thoracic trainees appear to have less difficulty with attainment of this target but most cardiac trainees (even if they were to do half of all of their consultant's cases from the start of their registrar years) will make only satisfactory progress towards the total required for the Certificate of Completion of Training. This does not even take into account time taken off for study leave, courses and conferences or exams, let alone annual leave and sickness.

Increasingly, trainees are entering the specialty relatively inexperienced through ST1 entry and a large proportion of the ST3 entrants have not completed a whole case. This is one reason why the proposal for trainees to be in theatre for three days each week (rather than for the current two days) is being established. This will allow trainees to learn from more than one consultant, with a variety of learning experiences and methodologies. We have seen this model work well in several departments, notably at Royal Papworth Hospital, which has produced some of the most successful graduates from its deanery in terms of 'trainee to consultant appointment' ratios.

Current departmental and training models

Each of the cardiothoracic departments in the UK and Ireland is set up and run in slightly different ways. Many offer both main subspecialties but some do cardiac only, some thoracic only, some offer congenital and some offer transplantation. The wide variety means that complete standardisation is impossible. Although some degree of standardisation is important to ensure quality benchmarks are met, the route to excellent patient care and the excellent training of trainees in these departments varies in a number of ways. We are not suggesting that every department should immediately and stringently follow these proposals, and it is true that the diversity we see in colleagues is a positive thing. We need to keep some flexibility but the suggestions in this document should be followed in spirit at least if we want to ensure that the environment in which we work and learn is improved.

Some of the larger departments that run up to eight operating lists a day have split on-call commitments. This allows senior trainees to spend more time in theatre while also being on call off site or non-resident. They may be called in for emergency operations or re-explorations and for clinical advice from colleagues who need support. Many of these larger departments run teams of consultants and juniors. Each team is themed (mitral, aortic etc). Holding a ‘senior tier’ registrar position in these models not only accentuates the theatre experience in a subspecialty but also allows deeper learning of perioperative management in these often complex patients.

Many departments still run a firm-based structure with each registrar assigned to one consultant. The excellent mentoring available through such close supervision is highly valuable but as mentioned previously, the mean number of cases performed annually by one consultant is just over 100 so their workload is clearly not enough to cope with the increased exposure required for three days of theatre a week.

Deaneries also show great variation, with some regions having just one or two centres where trainees are based throughout their entire period of specialist training. This does have some advantages in that it allows more detailed knowledge of the trainees (with all the associated benefits and drawbacks). In contrast, others (e.g. London) have up to nine cardiothoracic surgical centres, with trainees usually staying 1–2 years in any particular centre. This fractures the continuity of training to some extent but allows a much greater breadth of experience and offers the trainees more autonomy.

The negative impact on other activities due to resident on-call duties (1:8 rota)

The calculation in Table 4 highlights the significance of resident on-call rotas and the surprising proportion of a trainee’s working life that is spent holding the on-call bleep in such set-ups.

Table 4

Calculations for how much time a trainee spends on call each week as a proportion of the total working hours

Total hours worked over 8 weeks = 384 hours (8 weeks x 48 hours)

- Hours spent on call over an 8-week cycle = 175 hours (14 shifts, 12.5 hours each)
  Proportion of total working hours each week covering on-call duties only = **45.5%**

Adjustments that could improve this situation include removing on-call shifts for:

- weekday nights (5 fewer shifts over 8 weeks) = 112.5 hours over 8 weeks = 29%
- weekday nights and weekend nights (7 fewer shifts) = 22.5%
- weekday daytime and weekday nights (10 fewer shifts) = 13%

The reality of restricting leave to days when not on call

As leave is usually only able to be taken on days when the trainee is not on call, with a conservative 27 days of annual leave and 10 days of study leave for conferences and courses, this shifts the proportion of on-call hours further in the wrong direction. This equates to an average of 7 hours each week, meaning a total of only 41 hours are worked on average per week (or 328 hours over an 8-week cycle). This represents 53% of hours worked during the year holding the on-call bleep with the leave adjustment.

Key positive changes to training patterns in recent years

- More simulation at early stages of training, both inside and outside theatre
- Greater use of technology to reduce time away from departments and the operating room
- Reduced reliance on trainees to run cardiac intensive care due to intensivist-led units
- Increased utilisation of surgical care practitioners and APs on the wards to deal more efficiently with service provision
- Improved e-portfolio systems allowing trainees to formalise their competence and use this as evidence when creating learning agreements and identifying training needs

Key changes that have damaged training

- Rotas have a disproportionate amount of time taken up by on-call shifts. (As demonstrated above, a standard 1:8 rota has a trainee spending in excess of 45% of their time holding the on-call bleep.)
- The European Working Time Directive mandates an average of no more than 48 hours in work each week and the 2016 junior doctors' contract necessitates further rest periods after certain periods of work.
- There are variable requirements for hundreds of workplace-based assessments with no clear standardisation between deaneries in terms of number or quality.
- It is increasingly difficult for trainees to acquire enough theatre exposure to achieve the stipulated number of major cases (indicative number) to be deemed competent and fulfil Certificate of Completion of Training criteria.

- Some departments continue to rely heavily on trainees to deliver cardiac intensive care cover, which pulls trainees away from operative experience.

Ideal approach to training in departments

Fundamentally, our jobs as cardiothoracic surgeons come down to one priority: achieving the best possible outcome for our patients. This, however, can be divided into three different components:

1. in the short term, for the patients we look after today;
2. in the medium term, for the patients we look after in the next 3–5 years;
3. in the long term, for the patients we look after as the interventions we offer change.

The focus on training must balance the short-term considerations in a proactive and thoughtful manner while recognising that investment in learning opportunities actually benefits the wider department and not just the trainee. To use a specific training example, think of the junior trainee who is learning to close chests. The list is in danger of running late. The preferred approach would be to acknowledge that the trainee needs to learn this crucial skill and therefore make use of the opportunity, allowing the trainee to close the chest. On the next such occasion, the trainee will be more efficient and with time, the trainee can be left to close the chest alone. In the medium term, this will free up the consultant for other activities while enabling the trainee to make good progress.

A poorer approach would be to look only at the short-term gain and focus on getting the patient out of theatre as quickly as possible. The trainee would make no progress, and would actually become demotivated and frustrated for the short-term benefit of saving a few minutes. With this tactic, in the medium term, the trainee is no better off, the supervisor still has to stay scrubbed (or available) and everyone becomes increasingly more frustrated. By investing in training rather than maintaining complete focus on service provision, this may in fact improve service delivery as more ‘senior’ members are created as trainees become more competent.

As already pointed out, the ‘sink or swim’ option is also poor. Simply leaving the trainee to close the chest alone would help to free up the consultant but would possibly lead to a prolonged closure where an inexperienced trainee would be put under negative time pressure and be unlikely to learn from the experience effectively.

In the first scenario, the trainee has ‘buy-in’ as they closed the chest; their enthusiasm and motivation are nurtured, and they are keen to help make theatres run efficiently as they know that more training opportunities will come their way. Conversely, in the alternative scenario, the trainee makes no progress, feels disenfranchised and is far less likely to go the extra mile or help out. (Such help may be unquantifiable but is nevertheless important.) A department that supports trainees (and allows them the flexibility and time to learn from regular and substantial training) will benefit from more motivated and enthusiastic colleagues.

It is evident that a department that prioritises training will establish a clear training culture, normalising the behaviours required to build experience and competence in colleagues. The

atmosphere of shared learning that this creates is seen time and again to infect the whole department with a drive to improve work in all areas.

The worst scenario would be for a trainee to languish, becoming demotivated and burnt out by an environment of service provision and unsupported learning, with a lack of technical skill development and the accompanying huge waste of resource. Furthermore, there is no development of the senior workforce of the future, thereby leaving a potential void in suitably qualified senior trainees for consultant posts when they are advertised.

Supporting trainees to find their optimal pathway

There is potential that some trainees find they are not committed to becoming (nor are able to become) a consultant cardiothoracic surgeon and it is important that this mismatch is recognised early in the training pathway so that the trainee can identify a new career path as soon as possible. This mismatch may happen for a number of different reasons and occurs in all specialties. This should certainly not be seen as a failure of training or the individual but as a recognition that everyone has different strengths.

It is much more difficult to recognise these problems when there is not a structured training atmosphere as it is harder to identify whether the trainee is failing to progress or is becoming burnt out and demoralised owing to the environment, or whether a new career path is indeed required. Comprehensive and formal evaluations of the situation with experienced trainers are needed for both NTN and trust-appointed surgeons. If a department or deanery has a uniformly positive and proactive training culture, the identification of trainees who are better suited to a career other than cardiothoracic surgery is far easier and can be made much earlier.

Examples of good practice

In order to be able to deliver good training opportunities in the 48 hours that a trainee is allowed to be on site in hospital each week, many centres have moved away from the typical ‘on call = on site’ system. In the traditional system, if you are the ‘on-site on-call’ registrar, you are not supposed to leave the hospital grounds at all. This is the system worked by most surgical registrars and with the removal of rest facilities, on-call rooms etc, it is far more challenging to deal with year on year.

Notable examples of training programmes that have broken away from the historical traditions include the Royal Brompton Hospital and St Bartholomew’s Hospital, where trainees are non-resident. This means that their ration of working hours is packed more densely with actual operating and learning opportunities. This has in part been possible owing to the size of the department but appropriate utilisation of allied health professional (AHP) colleagues can free up rota time in smaller departments. Although this means that the trainees are ‘on call’ and working for well over 48 hours a week, the down time (especially overnight) is not included in the limit. A crucial change we have seen between generations is the removal of the ward on-call room where trainees can rest. Where they still exist, they allow safe rest rather than making trainees travel when this could be unsafe.

'*The advanced AHP team, fundamentally for the service, provides continuity of care on the wards and a consistent source of knowledge for rotating juniors, ensuring that a high standard of care is provided to our patients.*'

Faisal Javed, ST2 Cardiothoracic Surgery NTN, Queen Elizabeth Hospital Birmingham

'*At the Queen Elizabeth Hospital Birmingham, the synergistic relationship between the advanced AHPs and surgical trainees has benefited patients and mutual learning. Trainees have accelerated their learning and capability to look after patients. With the support of advanced AHPs, trainees are able to attend theatre, deal with emergency calls and assess sick patients in the intensive care unit with the registrar.*'

Yassir Iqbal, ST8 Cardiac Surgery NTN, Queen Elizabeth Hospital Birmingham

Having achieved the competences associated with performing resident on-call duties, the Wales Deanery has been able to allow trainees to undertake non-resident on-call shifts. This facilitates more access to theatre time and other required competences in the curriculum (e.g. attendance at MDT meetings and outpatient clinics).

In Birmingham, Hammersmith and Brighton (among others), systems have been developed accordingly to enable ward and intensive care duties to be covered safely and effectively by staff who are not doctors in training. This frees up the surgical trainees to concentrate on developing surgical and other clinical skills and expertise. This has been enabled by developing teams of advanced AHPs who exclusively carry out ward responsibilities and ensure continuity of care, which has previously been fractured by the European Working Time Directive limitations.

Advanced AHPs may come from a range of backgrounds (predominantly cardiac or intensive care nursing) and typically train for the role over a five-year period. The introduction of advanced AHPs has allowed a reduction in the numbers of registrar grade doctors who have been needed to ensure a compliant on-call rota. This means that those who are left in post have more exposure to the key parts of their clinical training and most importantly, more theatre time.

The above changes also help to establish an efficient working environment and foster a clear training mentality in the team. Safe patient care remains paramount and is ensured while enabling trainees to make the best use of their time in hospital.

How operating with more than one consultant would work

An important factor in the delivery of a successful cardiothoracic surgical training programme is case selection. Every case has a plethora of training opportunities for all the different development needs. If it is a relatively simple case, the senior trainee can take the lead or supervisory role for a more junior trainee. In such circumstances, junior trainees can be supervised in a number of different components of the procedure, commensurate with their experience and ability. This may mean a junior trainee would scrub in for just part of a

procedure in different theatres to benefit from the relevant learning opportunities and gain competence rapidly.

This will demand a significant shift in attitudes and acceptance of the concept of trainees scrubbing in for shorter periods in the early years of training is vital. Such a change would still require all members of the extended surgical team to have an in-depth knowledge of the patient, and to be present for the team briefing and timeout steps of the World Health Organization's surgical safety checklist.

One of the limitations of having one trainee to one consultant is the difficulties of case-to-trainee matching. Working with multiple consultants increases access to the spectrum of cases, allowing a greater flexibility with allocation to cases that are more appropriate to a trainee's level, rather than allocation to the caseload of a specific consultant for a specific period of time. This should be normalised and it should not be seen as one trainee impinging on another trainee's list as the same can be done for all non-consultant grades, who will likely have different priorities and levels of experience.

This process should be published formally (through an emailed/printed rota) and this can serve as a more detailed insight into the opportunities made available during the week than generic nominal allocations. It is best if the team member allocating the deployment is a trainee themself as this provides useful managerial experience. Ideally, the rota organiser should be at ST6 level or above with an understanding of the training needs of individuals as well as casemix and operating approaches adopted in the department. Furthermore, the rota organiser will need to communicate clearly with the consultants to make sure that they are happy with the proposed plan for the following week and it does not come as a surprise on the day.

It is also important not to discount the key skills learnt through ward rounds, MDT meetings, clinics and 'holding the bleep'. The main problem is that the balance of learning has shifted away from the fundamental aspects of a cardiothoracic surgeon (i.e. excellent technical operating). Many departments have grouped consultants into teams to allow clarity for nursing staff, secretaries and others to allocate tasks appropriately, with the default for more urgent work being the on-call team. This again establishes the 'team', and builds opportunities to develop crucial communication skills and shared learning opportunities. The ability to deal with an emergency in the middle of the night is a crucial and basic requirement, not only as a resident trainee initially but then also as a more senior non-resident trainee, which prepares them for their consultant role.

It is for these reasons that junior trainees in the early years of their training programme should still be actively involved as the initial point of contact through an on-call rota. Towards the end of training, the skills required to plan patient management appropriately from the end of the phone become much more relevant. This also holds true for cardiothoracic intensive care. While variability exists in units with regard to when the surgical team is contacted about patient management, being the first port of call will inevitably restrict the hours available for other training priorities. Consequently, suggestions to make senior trainees non-resident offer many associated benefits.

'*Consultant team allocations allow a breadth of casemix and opportunity. Registrars attend theatres most appropriate to their training needs. Junior and senior trainees work together to get the most from cases, fostering excellent working relationships and cooperative patient care.*'

Ismail Vokshi, ST6 Cardiac Surgery NTN, Royal Papworth Hospital

'*Allocations to multiple consultants vastly widen the scope for learning, both in theatre and management in the postoperative period.*'

Oliver Harrison, ST6 Thoracic Surgery NTN, Southampton General Hospital

Operating in the private sector

Private sector training opportunities have been particularly topical during the COVID-19 pandemic. A significant proportion of NHS cases are processed through the private sector. These are often 'off limits' for trainees as they take place in a non-NHS institution. With the number of cases being a limiting factor, and the encouragement of flexibility in seeking and delivering training, it would seem prudent to consider this as a potential avenue.

The caveats of operating in the private sector include different contractual obligations as well as the requirements for models of remuneration. However, these have been temporarily overcome in some centres owing to the national emergency pandemic measures and this undoubtedly increases the exposure to further cases with associated opportunities of training.

Practical changes in departments and rota design

Below we describe a generic 'best practice' rota design and the training requirements for each phase of training. It is important to note that over the coming years, training will move to a 'three-phase' system to accommodate the new seven-year curriculum:

- Phase 1 (first 3 years of surgical training after foundation programme if ST1 entry or first 4 years if ST3 entry)
- Phase 2 (2-year period in the middle of specialist training)
- Phase 3 (final 2 years of training)

Phase 1 is the most confusing compared with the current system as trainees will start on a registrar rota at different times depending on their point of entry and deanery. Although the annual review of competence progression will continue to be a regular undertaking, the phases can broadly be used to inform what trainees should be focusing on and what their clinical commitments should be. As mentioned earlier, every department works in different ways and there is no 'one size fits all' model. However, working towards (or sometimes past) the suggestions should improve the situation.

Table 5 can be used as a generic template for the progress required to gain competence. Interim assessments should be performed every few months to ensure that there is no time wasted where trainees do not reach their objective for the end of the rotation. Should a trainee not meet the competence required at the end of the year, then that trainee should not necessarily fail to progress but this will be discussed at the annual review of competence progression. There may be factors related to the trainer and the department as well as the trainee, and these must all be taken into consideration. If the trainee has been in theatre for six sessions a week and there have been no major issues affecting case numbers, then this should be referred centrally and an external review performed to assess whether training in the department should continue or whether remedial action needs to be taken.

Registrar competence sign-off (first 6 months)

During the first six-month period on the registrar rota, specific competences are signed off. This has its root in anaesthetics, in which all trainees are required to be deemed safe in a series of basic tasks before they can undertake on-call shifts alone.

The competences require two consultants to sign off the trainee:

- Cardiac surgery – perform median sternotomy independently and put the patient on cardiopulmonary bypass
- Thoracic surgery – perform thoracotomy independently and close thoracotomy after appropriate haemostasis

This is in addition to other skill development but it will be used to establish good training practices and shared responsibility for the trainee's development.

Rota design and number of 'training' registrars

Training opportunities are a finite resource. Expecting a department to train both NTN and trust-appointed surgeons when there is, for example, one operating list a day and eight middle grade registrars is completely unrealistic, and is destined to fail. It is good practice to have an overlap with senior registrars teaching juniors, as described earlier.

If a trainee is in hospital for 42 weeks a year (accounting for study and annual leave), the target is to have the trainee in theatre 3 times a week (or 126 operating days). If a department runs 2 theatres daily, there would be 10 theatre days a week for 50 weeks a year (or 500 theatre days). Those two theatres could therefore accommodate four trainees in total. This calculation can be easily used for any department, with the number of trainees a department can accommodate being double the number of daily theatre lists that run. It is self-evident that if your department has ten trainees but just two operating lists a day, problems with training are likely as even with trainees being rostered for just two days in theatre a week (as they are now), the department is too crowded.

Table 5

Generic template for the progress required to gain competence in cardiothoracic surgery

Phase of training	Year of training	Rota design	Main focus of training	Competence reached by end of year
Phase 1	ST1 or CT1 and CT2	6 months of cardiothoracic surgery with 3 days (6 sessions) in theatre each week, up to 1:8 on-call rota. Ideally, no nights. Follow-up clinics and new patient clinics should be done routinely.	Comprehensive basic surgical skills, chest drain insertion, opening and closing the chest, and acting as first assistant	Can open and close independently, and can put patient on bypass with supervision. Can perform pleural biopsy with supervision.
	ST2 (7-year curriculum) or ST3 (8-year curriculum)	Nights on call but flexibility to remove should they need more time in theatre. 3 days in theatre each week. Max 25% on call (holding bleep) as a proportion of hours worked in average week. Encouraged to spend time in transplant or congenital surgery for 3–6 months (may be out of deanery). Flexibility to do lists with cardiology for catheter techniques. Follow-up clinics and new patient clinics should be done routinely.	First 6 months: set up case competence (2 sign-offs). Median sternotomy, intra-aortic balloon pump insertion, cannulate for cardiopulmonary bypass, haemostasis and close median sternotomy. Thoracotomy, port placement, dissection around hilar vessels, pleural biopsy.	Can perform a sternotomy, harvest the internal thoracic artery and cannulate for cardiopulmonary bypass independently. Can complete coronary anastomosis, lung wedge resection and hilar dissection with supervision.
	ST3 (7-year curriculum) or ST4 (8-year curriculum)		Gaining competence in individual aspects of major procedures and completing minor cases	Can complete CABG +/- AVR with supervision. Can complete simple lobectomies with supervision. Completes 10 major cases by the end of the year.
Phase 2	ST4 (7-year curriculum) or ST5 (8-year curriculum)	Should only be doing on-site night and weekend shifts if more on-call experience is required. Otherwise, no on-site night or on-call shifts. Must be allocated 3 days (6 sessions) in theatre and attend MDT meetings routinely. Clinic attendance for new patients. Option to have daytime on-call duties covered by other means if required to do resident on-call shifts.		Can complete both CABG and AVR with supervision. Can complete a lobectomy with supervision. Completes 20 major cases by the end of the year.
	ST5 (7-year curriculum) or ST6 (8-year curriculum)		Gaining independence in operating and comprehensive surgical skills	Can complete both CABG and AVR independently. Can perform a lobectomy, exposure to sleeve resections, mediastinal tumours and chest wall resections under minimal supervision. Completes 60 major cases by the end of the year.
Phase 3	ST6 (7-year curriculum) or ST7 (8-year curriculum)	MUST NOT undertake resident on-call shifts overnight or at weekends. Runs own 'training lists'. Attends consultant meetings and MDT meetings. In theatre 3+ days a week. Undertakes supervised consultant on-call duties. Coordinates theatre allocations for all middle grades in department.		Can open redo cases with supervision and can peripherally cannulate patient for bypass. Can complete lobectomies independently. If supervised, can undertake complex cases such as sleeve resections, chest wall resections and mediastinal tumours. Completes 60 major cases by the end of the year.
	ST7 (7-year curriculum) or ST8 (8-year curriculum)		Fine tuning surgical techniques, and gaining experience with more complex and emergency cases	Can complete any 'simple' procedure without supervision and can perform complex surgery supervised. Completes 100 major cases by the end of the year.

ST1 and CT1/CT2 trainees are in some ways ‘supernumerary’ and should be directed to appropriate theatre allocations to build their essential skills. This can best and most appropriately be performed and controlled by a senior training surgeon. This change would still require them to have an in-depth knowledge of the patient, and to be present for the team briefing and timeout steps of the World Health Organization’s surgical safety checklist.

In the absence of other forms of patient cover such as advanced AHPs (see above), most on-site rotas need at least eight registrars. In such situations, daytime cover for the on-call bleep should be allocated away from the trainee for the reasons outlined earlier. If, for example, they were to participate in a 1:8 on-call rota, they would actually spend 47.5% of their hours in a role that does not allow them in theatre, which is not productive.

Proportion of clinical time spent holding the bleep

Under the European Working Time Directive and the 2016 junior doctors’ contract, average weekly working hours are limited to 48. That equates to 384 hours over 8 weeks. With the adjustment needed to compensate for bank holidays, it approaches 46 hours a week (or 368 hours over 8 weeks).

Currently, an on-call bleep must be held by someone for 24 hours a day, with 30 minutes for a safe handover between shifts. That equates to 175 hours over 8 weeks (effectively 175 hours that someone on that rota holds the bleep in that 8-week period). This accounts for 45.5% of total working hours but using the bank holiday adjustment, it worsens to 47.5%. This one simple calculation demonstrates why resident on-call shifts for trainees can become a negative factor for more senior trainees who have achieved their competences as a resident surgeon.

Cultural shift in surgical experience

It is not necessarily constructive for trainees to be mandated to stay in theatre for a whole case regardless of the training value and availability of opportunities elsewhere in the department. Although there is no suggestion that this should compromise patient care, the move to a competence-based procedural pathway early in a training programme requires repetition and consolidation of technical skills.

In practical terms, this means that trainees would have the flexibility (and be strongly encouraged) to come to theatre and open chests, cannulate, close chests etc while supervised by a more senior member of the team. This single change will exponentially increase the opportunities to develop specific procedural skills.

It would also be appropriate for a trainee with a particular interest or area of training to move between theatres. This would allow trainees to gain huge levels of experience and knowledge in a much shorter period of time.

Phase 3 rota design (last two years of training)

As shown in the example rota in Table 6, there would be no on-site on-call commitments in order to free up the timetable for ‘consultant-like’ activities. If there are three senior registrars on

the non-resident rota and they are assumed to be required in hospital (or active) for around three hours a week, the rota in Table 6 would work well. This active time for non-resident on-call duties is calculated by considering the level of out-of-hours activity observed and may vary between centres. If one centre performs little emergency out-of-hours work, it may be even lower than this. This means the registrars would come in on 1:3 weekends for around three hours to undertake the ward round and they would be called in for around six hours during their week of non-resident on-call shifts. This is approximately the system employed at the Royal Brompton Hospital, where senior trainees are non-resident.

Table 6
Example rota for a registrar in the last two years of training

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Activity	Theatre	Theatre	MDT and clinic	Theatre	MDT and admin		
Time	07:30 – 18:00	07:30 – 18:00	08:00 – 16:00	07:30 – 18:00	08:00 – 12:00		
Hours	10.5	10.5	8	10.5	4		
	Note that average hour calculations to meet contractual requirements need to be around 46 owing to bank holidays and other complexities and intricacies of rota design.					Cumulative hours 43.5 a week	

Conclusions and COVID-19 (written 2021)

The COVID-19 pandemic has caused a huge reduction in standard cardiothoracic practice in the UK from March 2020 onwards. As a result, training progression and opportunities have drastically declined. In particular, cardiac surgery (with its dependence on bed space in the intensive care unit) has been heavily hit, with most elective work cancelled during peak times of the coronavirus outbreak.

The situation has been turbulent with wide variation in how trainees have been affected, related to the prevalence of the pandemic in different regions. Broadly speaking, trainees have reported being involved in only around a quarter of the cases they were over the previous year, and they are working in an atmosphere of greatly increased stress and anxiety. There has also been a great increase in clinical complexity as the urgent and unstable patients are being prioritised, and many non-complex patients are now being sent for interventional options rather than surgery. This has had an enormous impact on the ‘patient pool’ for surgical training. Other clinical factors (including perioperative COVID-19 infection) are resulting in a risky and prolonged patient pathway, ultimately slowing throughput in the department and having negative knock-on effects on other patients and the wider team.

When we emerge from the pandemic and start to restore normal operative practices, we have an opportunity never before presented to our specialty: an opportunity to take stock and rebuild our departments for the better. We have the potential to improve patient care and training, and to use best practice examples to restructure our departments and learn from the experience of others.

COVID-19 may have driven us apart physically but we can use the forced shutdown nationally to take the time to talk to other departments and learn from their experiences. This will allow us to move forwards with positive changes following such a historic and terrible time.

Key points

- Traditional models of training in cardiothoracic surgery are no longer appropriate in the modern era of restricted working hours and shortened training time.
- A dedicated focus on the training requirements of each individual trainee (particularly operative skills) is required to achieve competent consultants by the end of training.
- Minimising redundancy in the training pathway is possible through the use of simulation adjuncts as well as increased directed theatre time (3 days per week) with regular review of training requirements and competence achievement.
- The extended roles of AHPs as well as medical team (critical care) management of cardiothoracic patients should be embraced to facilitate the availability of surgical trainees in meeting operative competences.
- A cultural change is needed in departments to accept the flexibility of operative training and maximise opportunities for training in every case.

Chapter 5: Trust-appointed doctors

Zahid Mahmood

Trust-appointed doctors comprise both trust-appointed trainees (trust grade doctors, clinical fellows, senior clinical fellows) and so called SAS doctors (including staff grade, associate specialist and specialty doctors). These two groups of staff are on different career trajectories. SAS doctors are in non-consultant career grade posts, providing a service function, whereas trust-appointed trainees are in training posts working towards becoming a consultant via the Certificate of Eligibility for Specialist Registration (CESR) route. It is this latter group of doctors who should be given appropriate training opportunities in theatre and this is why SAS doctors are so vital in providing a service role.

In general, middle grade teams in cardiothoracic surgery consist of surgical trainees with a national training number (NTN), trust-appointed trainees (aiming for the CESR) and SAS doctors (who are generally permanent staff). The requirement for the middle grade rota to be compliant with the European Working Time Directive has meant that there are 'excess' numbers of middle grade surgeons, causing a mismatch between staffing the rota and the availability of sufficient training opportunities. Owing to these opportunities being so limited, competition is fierce.

Ideally, all surgeons in training should have equal access to opportunities for training in theatre as well as other educational support. Unfortunately, prioritisation of training remains challenging because of the European Working Time Directive and the service needs of cardiothoracic units.

There is inadequate recognition of the importance of middle grade surgeons with regard to service delivery. Many departments have a middle grade rota that includes all the surgeons delivering the same service, irrespective of their seniority. Consequently, a surgeon near to consultancy would be doing the same on-call delivery as a newly appointed surgeon in training. Several hours of potential training are 'wasted' in routine service, especially during resident on-call shifts, when training opportunities are already scarce.

Three-to-five-year strategy

It is essential for trusts to identify staff members who are likely to succeed and who will benefit the most, and to then make training opportunities available in theatre for these staff. Access to wider education, management and research opportunities should be made more equitable so as to allow career development and progression through a structured appraisal process.

The aim is to support trust-appointed trainees in terms of training and educational opportunities. Broadly, this will be via allocating each trust grade trainee to theatre for 2–3 days each week. This will require a reduction in the number of trust-appointed trainees in the middle grade tier so as to reduce competition and improve access to surgical training.

It is proposed that delivery of most of the 'purely' service related aspects of the middle grade rota is supported by non-medical healthcare professionals through development of the existing roles of advanced clinical practitioners and similar allied health professionals. This will free up trust-appointed trainees for allocation to operative training in theatre. Some areas of this extended role of allied health professionals that might support (or even replace) trust grade trainees include undertaking follow-up outpatient clinics, out-of-hours on-call duties (to enable non-resident on-call shifts for senior trust-appointed trainees) and routine ward work.

In addition to facilitating operative training, this proposal also aims to expand other aspects of learning and education. This can be accomplished through increased clinical and operative experience, better access to educational opportunities, increased management experience, clearer job descriptions/job plans and improved access to mentors/regional advisors, as described below.

Clinical experience

Curriculum-based approach for training

- Allocation of a clinical supervisor and educational supervisor along with an appraiser
- Focused appraisal with defined professional development plans
- Structured assessment of level of training and progression of competence in the specialty
- Support in accessing the Intercollegiate Surgical Curriculum Programme portal to facilitate the aforesaid process (https://www.iscp.ac.uk/media/1067/step_guide_for_sas_doctors.pdf)

Clinics and multidisciplinary team meetings

- Maximum 1 outpatient clinic per week
- Minimum 1 multidisciplinary team meeting per week

On-call commitments

- Opportunity to be taken off the on-call rota after successfully passing the exit fellowship examination
- Opportunity to attend emergencies relevant to competences for the Certificate of Completion of Training/CESR (e.g. aortic dissections, stridor/airway compromise, trauma, endocarditis, massive haemoptysis)

Operative experience

- Operative opportunities in theatre for trust-appointed trainees should be increased in line with the opportunities available in phases 1–3 of the NTN curriculum.
- The aim is for trust grade trainees to spend an average of 2–3 days in theatre per week.
- Perioperative physicians together with allied health professionals and SAS doctors should be used for service provision so that trust-appointed trainees can attend theatre.
- Senior trust grade trainees should be allowed to choose appropriate cases across different consultant operating lists to build up independent operating experience.
- There should be an emphasis on trust-appointed trainees achieving operative independence (particularly in their specialty) to ensure they are competitive for consultant posts.

Access to educational opportunities

- FRCS (CTh) examination courses and advice sessions
- CESR guidance sessions and support in preparing an application for the CESR
- Advice on research, audit and quality improvement activities
- Equitable access to SCTS education courses (similar to NTN doctors)
- Professional development courses (including leadership/communication) and advice relevant to the specialty to improve patient safety
- Financial support and study leave allocation for courses mandated by the Certificate of Completion of Training/CESR (e.g. good clinical practice, research methodology, NHS management, *Training the Trainers* courses) and subspecialist courses in addition to SCTS delivered training courses
- Encourage trust-appointed trainees to use their 30-day study leave allowance to focus on gaining operative exposure/observerships in their area of subspecialist interest in other units.
- The SCTS offers travelling fellowships that are specifically for trust grade doctors (https://scts.org/fellowships/).
- There should be mandatory budget allocations across all trusts for study leave for trust-appointed trainees.

Management experience

- Senior trust grade trainees should be encouraged to administer the rota in cardiac/thoracic units.
- Trust-appointed trainees should also be encouraged to take an active interest in postgraduate teaching and organising continuing medical education sessions as well as morbidity and mortality meetings
- Attending consultant meetings and helping to schedule waiting lists

Job descriptions/job plans

The SCTS is developing a network of trust grade doctor representatives to coordinate the standardisation of job descriptions and monitor progression (in line with the phase of training).

Mentors/regional advisors

The SCTS has launched a mentorship programme to support trust-appointed doctors. The mentors and regional advisors available through this programme can be approached for any professional advice.

Key points

- There is a general lack of recognition of the importance of the middle grade trust-appointed surgical workforce.
- The SCTS aims to create a structured framework designed to support such doctors towards achieving certification (via the CESR route).
- This will be enabled by increasing clinical and operative experience, improving access to educational opportunities, increasing management experience, creating clearer job descriptions/job plans and improving access to mentors/regional advisors.

Chapter 6: The perioperative physician

Narain Moorjani

Perioperative medicine is a multidisciplinary subspecialty that aims to deliver the best possible care for patients before, during and after major surgery to improve patient outcomes and quality of life. It seeks to identify and address the individual needs of complex patients through all stages of their surgical journey, from the time of contemplation of and the decision to offer surgery through the operative period to full recovery but excluding the operation or procedure itself. Its growth has been driven by more complex patients undergoing surgery as well as evolving anaesthetic and surgical techniques, and it aims to optimise patient outcomes by using the best available evidence-based practice. This chapter describes the concepts involved in perioperative medicine, followed by the qualities and roles of a perioperative physician.

Developing this concept of delivering structured care to patients undergoing cardiac and thoracic surgery by a multidisciplinary perioperative team will also enhance the opportunities for surgical trainees to spend more time in the operating room. It requires assessment and management of the entire patient pathway, including optimisation of the patient prior to surgery from the initial referral to the time of the operation and care delivered in the postoperative period, which may extend beyond the index admission for surgery.[1] This will be achieved through:

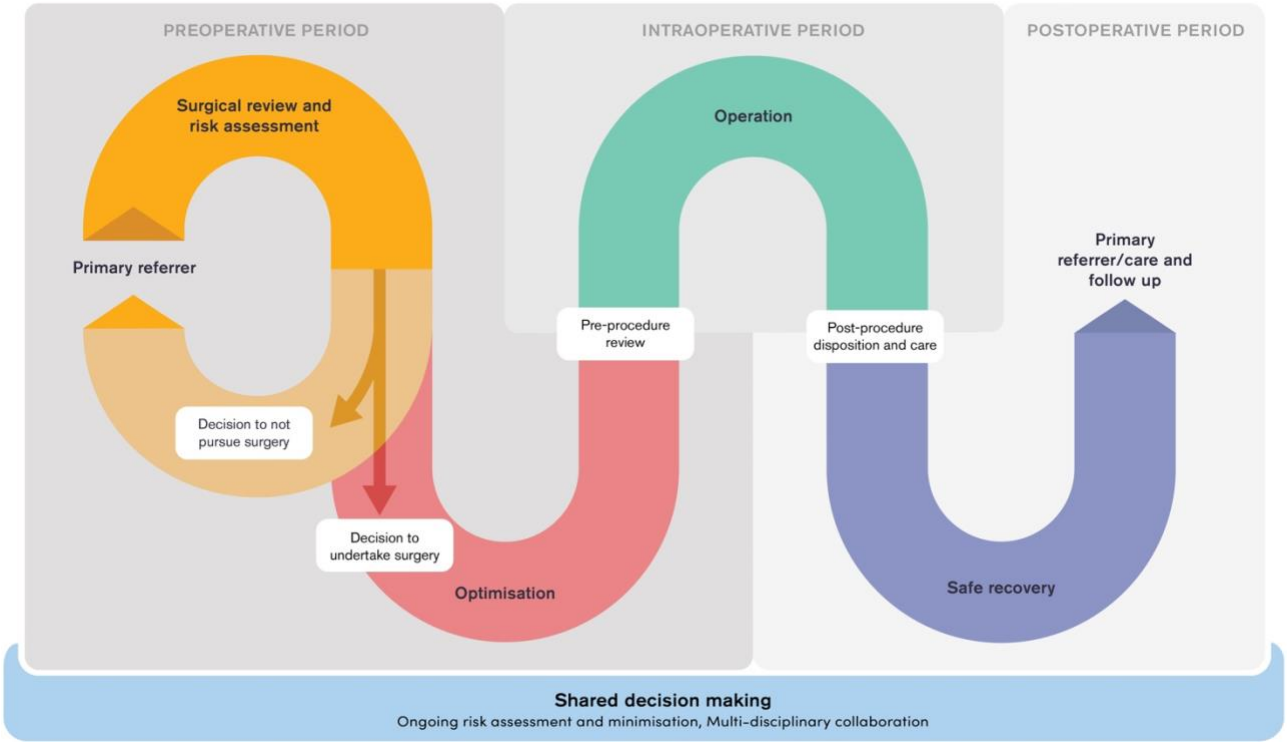
- refining existing care pathways and developing new multidisciplinary pathways;
- reducing avoidable harm after major surgery by examining factors that might increase the risk of complications (using a pre-emptive model of postoperative care planning);
- timely and effective handling of complications, thereby reducing the potential of 'failure to rescue'; and
- creating a collaborative and multiprofessional teamwork culture to enhance patient safety.

Perioperative medicine seeks to get the best clinical outcomes possible, reduce complication rates and increase patient satisfaction, and it can help to support an effective and sustainable surgical programme. It can also provide a single point of contact for primary and secondary care to ensure the individual needs of these complex patients are carefully coordinated from the time of contemplation of surgery, including over a period of many months following the operation.

Shared decision making is a key principle that underpins perioperative medical care and allows patients to understand the importance of their values and preferences in the decision making process, reiterating the principle of individualised postoperative care (Figure 9).[2] This patient centred approach aims to support and empower patients to determine what is important to them. It stresses the importance of explaining the risks and benefits of all treatment options to help patients decide whether surgery is the right option for them (as well as to prepare them for and help them recover from surgery), and it is especially important in high risk patients.

Figure 9

Shared decision making and the perioperative care pathway. Reproduced with permission from the Australian and New Zealand College of Anaesthetists, 2021.



As surgeons increasingly focus on new evolving technical procedures, other specialists are required to take a greater responsibility for the wider care of a surgical patient with complex medical needs. It is no longer realistic to expect surgeons to have an in-depth knowledge of recent advances in the management of patients with complex needs, who develop acute medical problems. While the surgeon can deliver expertise and skill in performing the operation, the involvement of a multidisciplinary team is paramount in the delivery of excellent outcomes for patients undergoing cardiothoracic surgery.

A key member of this team is the perioperative physician, whose role is to lead the multidisciplinary group of practitioners to deliver excellent, patient focused, holistic perioperative medical care of cardiothoracic surgical patients. The perioperative physician may come from a variety of specialties (including anaesthesia, intensive care, surgery, acute medicine, cardiology, respiratory medicine and care of the elderly) and will work in close collaboration with surgical colleagues. He or she will have undergone a programme of appropriate training, education and certification to develop the necessary skills and competences for the role.

Perioperative physicians will undertake daily ward rounds on the surgical wards to coordinate perioperative care and treatment plans for all patients, including in-house urgent patients awaiting cardiac or thoracic surgery. They will attend complex patients/high risk multidisciplinary team meetings to discuss and facilitate preoperative optimisation of complex/high risk patients; preoperative and early postoperative optimisation clinics, and daily discharge planning meetings (Figure 10). Perioperative physicians will work in close collaboration with the surgical, anaesthetic and critical care teams to ensure that patient flow is efficiently managed, and to

formally receive patients discharged from the critical care area following surgery, including medication reconciliation. They will also attend the weekly intensive care unit multidisciplinary team meetings. Perioperative physicians will supervise the work of the junior medical doctors and advanced clinical practitioners on the wards, and coordinate surgical input in the care of patients on the ward.

Figure 10

Example weekly timetable for a consultant perioperative physician in cardiothoracic surgery

	Activity
Monday 08:00 – 12:00 12:00 – 13:00 13:00 – 14:00 14:00 – 15:00 15:00 – 15:30 15:30 – 16:30	 Ward round/admission planning IHU MDM (discuss patients awaiting urgent cardiac/thoracic surgery) Patient related administration Audit Discharge planning meeting Research and development related to role
Tuesday 08:00 – 12:00 12:00 – 13:00 13:00 – 14:00 14:00 – 17:00	 Ward round/admission planning IHU MDM (discuss patients awaiting urgent cardiac/thoracic surgery) Patient related administration Preoperative and early postoperative optimisation clinic
Wednesday 08:00 – 12:00 12:00 – 13:00 13:00 – 14:00 14:00 – 15:00 15:00 – 15:30 15:60 – 16:30	 Ward round/admission planning IHU MDM (discuss patients awaiting urgent cardiac/thoracic surgery) Patient related administration Management Discharge planning meeting ICU MDM
Thursday 08:00 – 12:00 12:00 – 13:00 13:00 – 14:00 14:00 – 17:00	 Ward round/admission planning IHU MDM (discuss patients awaiting urgent cardiac/thoracic surgery) Patient related administration Preoperative and early postoperative optimisation clinic
Friday 08:00 – 12:00 12:00 – 13:00 13:00 – 14:00 14:00 – 15:00 15:00 – 15:30 15:30 – 16:30	 Ward round/admission planning IHU MDM (discuss patients awaiting urgent cardiac/thoracic surgery) Patient related administration Teaching Discharge planning meeting Research and development related to role
Saturday 09:00 – 12:00	 Ward round
Sunday 09:00 – 12:00	 Ward round

ICU = intensive care unit; IHU = in-house urgent; MDM = multidisciplinary team meeting

In cardiothoracic surgery, this concept of care already exists for patients undergoing cardiothoracic transplantation and pulmonary thromboendarterectomy surgery, where patients are optimised preoperatively and managed/reviewed on a daily basis postoperatively by transplant physicians and pulmonary hypertension respiratory physicians respectively.

In addition, by having the primary focus of the perioperative physician on caring for patients outside the operating room, it will enhance the opportunities for surgical trainees to spend more time performing surgery while the delivery of care and optimisation of these patients is conducted by a separate specific multidisciplinary team. Examples of the active role that the perioperative medicine team can perform complementing the surgical team in the care of patients undergoing cardiac or thoracic surgery include:

- Medically optimising patients undergoing cardiac or thoracic surgery, who have complex coexisting medical disease (e.g. heart failure, diabetes, hypertension, anaemia, pulmonary hypertension, respiratory disease, cognitive dysfunction, renal dysfunction, hepatic dysfunction or obesity)

- Performing a structured surgical risk assessment to help high risk patients decide whether to have surgery – Once the decision to operate has been made, an individualised perioperative care plan can be developed to mitigate against or reduce the risk of complications occurring, including determining the most appropriate level of care required immediately after surgery, and plans for rehabilitation and proactive discharge planning.

- Prehabilitation – This is a multimodal process that focuses on supporting patients to improve their fitness and functional capacity before surgery to enhance their ability to cope with a stressful event, with the aim of improving postoperative outcomes and length of hospital stay, and reducing postoperative pain and complications. It may include physical exercise, smoking cessation, reduction of alcohol consumption, psychological support and nutritional supplementation. Prehabilitation also has the potential to help to prevent other health issues in the longer term.

- Active management of frailty and cognitive disorders in preoperative clinics, which can help with shared decision making around perioperative risk and initiate multidisciplinary packages of care to optimise the patient's preoperative condition, thereby improving postoperative outcomes

- Initiation of prophylactic medications (e.g. beta-blockers or amiodarone) preoperatively to reduce the incidence of atrial fibrillation following surgery

- Pre-emptive and active management of surgical complications (e.g. surgical site infections, postoperative bleeding, anaemia, pneumonia, respiratory failure, air leak, thromboembolic disease or delirium) and end of life care

- Active pain management, which should start before surgery, through early patient engagement, education and development of individualised postoperative care planning

- Active management of postoperative medication regimes, including secondary prevention of coronary artery disease (using antiplatelet agents, statins, beta-blockers, angiotensin converting enzyme inhibitors), anticoagulation following valve surgery or atrial fibrillation and antimicrobial therapy (in conjunction with the microbiology service)

- Enhanced recovery, which represents a multimodal, multidisciplinary approach to the care of the surgical patient, such as pre-emptive administration of medications to help avoid complications, nausea and vomiting control, fluid management, avoidance or early removal of drains and tubes, early mobilisation and rehabilitation, and postoperative patient education

- Discharge planning to coordinate care in the community, which can reduce healthcare resource use (especially length of hospital stay)

- Improving communication with primary care, including coordinating the production of high quality hospital discharge summaries

- Proactive follow-up, where selected patients who have been identified with ongoing medical problems at discharge can be reviewed in postoperative clinics prior to the standard surgical review to help reduce unplanned readmissions

Key points

- The role of the perioperative physician in cardiothoracic surgery is to lead a multidisciplinary group of practitioners to deliver excellent, patient focused, holistic perioperative medical care.
- The primary focus of the perioperative physician is to care for patients outside the operating room. This will enhance the opportunities for both nationally-appointed and trust-appointed surgical trainees to spend more time performing surgery.

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Glossary

Advanced AHPs	*Advanced allied health professionals*: Healthcare practitioners who have completed further training to achieve competence in diagnostic and/or prescribing skills, allowing them to diagnose and treat patients under the supervision of senior clinicians
ARCP	*Annual review of competence progression*: Annual review of the trainee's training and progression in competences
CCT	*Certificate of Completion of Training*: Award by the specialty advisory committee and General Medical Council to national trainees at the end of specialty training declaring competence achieved for a day 1 consultant
CESR	*Certificate of Eligibility for Specialist Registration*: Award by the General Medical Council at the end of specialty training (for doctors who were not in a national training scheme) declaring competence achieved for a day 1 consultant
EWTD	*European Working Time Directive*: A legal act of the EU that limits rotas to a maximum adjusted average of 48 hours. Along with the 2016 junior doctors' contract, it limits both time worked and time paid for.
FRCS (CTh)	*Fellowship of the Royal College of Surgeons (Cardiothoracic Surgery)*: Examination in the specialty of cardiothoracic surgery awarded by the Joint Committee on Intercollegiate Examinations
HEE	*Health Education England*: An executive non-departmental public body of the Department of Health and Social Care. Its function is to provide national leadership and coordination for the education and training of the health workforce in England.
ISCP	*Intercollegiate Surgical Curriculum Programme*: Acts as the online e-portfolio system, and keeps a record of research, audit, teaching and similar. It is also used for yearly assessments, multisource feedback and documenting meetings with supervisors.
MDT meetings	*Multidisciplinary team meetings*: Meetings where decisions are taken for patient care involving healthcare professionals from several different disciplines or specialties

NTN doctor	*National training number doctor*: A doctor who has successfully been appointed at the national recruitment process to a regional specialty training programme. (In contrast, a non-NTN doctor refers to any non-consultant grade doctor who has been appointed by the trust, with variable number of years of experience, from very junior with limited experience to approaching consultant eligibility.)
Progression	Advancing in grade (e.g. from ST3 to ST4) towards consultancy
SAS doctors	*Staff grade, associate specialist and specialty doctors*: Doctors and surgeons appointed by hospital trusts (not consultants)
ST1	*Specialty trainee year 1*: A doctor who has applied to the newer run-through (coupled) training programme and has <18 months of surgical training experience before applying
ST3	*Specialty trainee year 3*: A doctor who has applied to the traditional uncoupled training pathway. May have many years of experience in surgery (and in particular, in cardiothoracic surgery) and at the very least has completed two years of core surgical training.
WBA	*Workplace-based assessment*: A guided review of a learning event to capture aspects of actualised learning