Pursuing Surgery?

A short guide for Oxford medical students interested in a surgical career

Hugh Cairns Surgical Society

1st Edition

Foreword

In its 2017 medical student essay prize, the Association for Surgeons in Training (ASiT) asked students to write on the title: “Addressing the recruitment shortfall in surgery- How do we inspire the next generation?”. This question and others like it continue to shock many as denial of the situation has persisted for some years now.

However, it is now undoubtedly the case that the field of surgery, once infamous for its competitiveness, is now facing a crisis as it gets increasingly looked over by both students and junior doctors. Oxford is no exception to this: in a recent publication by the RCS Future Surgeons Forum it was demonstrated that current Oxford students are less likely to pursue a surgical career than the average UK medical student. Perhaps most concerningly, is the fact that our direct comparator in most regards, Cambridge medical school, produces medical students who are much more likely to pursue surgery than the UK average.

Oxford medical students are now faced with a national backdrop of waning enthusiasm for surgery coupled with apparent conditions unique to Oxford that specifically make it less likely for them to pursue a surgical career. This is clearly a situation that demands actions on many levels but as the Co-Presidents and Vice-President of the Hugh Cairns Surgical Society we felt that our society has a vital role to play.

All three of us have obtained and taken up our positions because of our enthusiasm for surgery and we all appreciate the unique set of circumstances that facilitated that. It all could have very easily gone another way and it is with great pride that, against the odds, we can say the 2017-18 Hugh Cairns committee contains a majority of women, as well as LGBT and BME members. We can reflect on all of this and having come through the course and spoken to our committee and colleagues, we are aware of some of the most likely reasons that Oxford medical students seem to have little appetite for surgery.

Under our leadership, the Society has adopted a number of strategies to rectify matters as we believe that every Oxford medical student should be afforded the opportunity to be able to objectively and rationally consider a surgical career and be afforded all of the support they need if they choose to pursue one. This decision should be one free from the influences of prejudice, sexism and machismo and the Oxford medical school should be aspiring to produce the outstanding members of the next surgical generation.

This booklet represents one of our strategies: a readily available and concise trove of objective information that will aid any Oxford medical student regardless of whether they are just considering surgery or if they are firmly decided and wondering what they can do to get ahead. We hope that it will prove useful for current and prospective students for many years to come.

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1. Introduction

Welcome to the Hugh Cairns Surgical Society careers booklet, this is a resource for any medical student, specifically Oxford ones, who are at all interested in pursuing a surgical career. Whether you're a fourth year who's just started thinking about surgery or a fifth year who's firmly committed, you're in the right place and we hope this booklet will be useful for you!

The following chapters cover several topics giving an idea of what a surgical career is like, exploring the reasons for and against it as well as giving information on an academic surgical career and tailored career advice if you're looking to get ahead. This information has all been written by students for students and hopefully this means that you'll find it especially relevant and objective. All too often students are put off from surgery by certain individuals and myths, we've tried to debunk many of these too!

This is only a starting point and this booklet will signpost you to various resources and give you some key bits of advice if you ever feel like you want more information. Certainly, don't hesitate to get in touch with the Hugh Cairns Surgical Society, the many surgeons throughout Oxford or the medical school careers advisor, Dr Lois Brand, if you ever want some help.

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2. What is a surgical career like?

A real insight into life as a surgeon

A typical week for a core surgical trainee

"On a 'normal' day you will start with the ward round and ward jobs. After this, time is divided between outpatient clinics, diagnostics, such as flexible cystoscopies or prostate biopsies, and theatre. Getting to grips with the basic equipment, operations, and management strategies takes time and patience, from you and those around you. An average day 'on call' starts with your normal team for the ward round. Once referrals start to come in, you will need to start assessing patients. If patients need a senior review or operation you can arrange this, and, one hopes, be involved. Being on call is busy, but hands-on. You will often cover other surgical specialties while on call, such as general surgery. "

CT2 – Urology
http://careers.bmj.com/careers/advice/Careers_in_urology

Katie Young, CST in London:
"I'm currently a core surgical trainee in London, hoping to one day be a plastic surgeon specialising in limb reconstruction after trauma. When I was younger I always looked up to my older brother who for years said he wanted to be a hand surgeon, so naturally, I did too. Ironically though, he never studied medicine!

Coming from a long line of doctors I couldn't help but be inspired by my parents and how much they enjoyed their work. I always wanted to be a surgeon and while I was at medical school I threw myself into every surgical specialty.

Although I enjoyed almost all the surgical fields I experienced, I was captivated by plastic surgery, particularly the spectrum of procedures, performed on all ages. I was enamoured by the way the plastic surgeons handled the tissues and respected anatomy in a very different way to all the other surgical specialties.

Now I'm working as a trainee I've found there's no such thing as a typical working day – and that's part of the attraction. Every day is different. Some days I'm in clinic, on the wards, in theatre, on call. Some days I'm sleeping in advance of a night shift. I love this variety. I get to work with so many different people; other doctors, nurses, secretaries not to mention the patients. Hospitals are surprisingly fun to work in.

Plastic surgery is such a diverse specialty, and through our training we are exposed to different fields; from hand surgery to breast reconstruction, craniofacial defects, and skin cancer to name but a few.

The down sides are the pressures which this career path puts upon you. The clinical work is the easy bit; it's ensuring you're on top of all the additional study, courses, conferences and publications to secure your future which is the tough part. The geographical challenges of the

many different jobs and rotations can be hard to manage too. But would knowing all of this have made me change my path? Probably not.

If I had one piece of advice for doctors looking to enter this specialty I'd say be honest with yourself and your trainers. If at any point you don't think it's for you, don't be ashamed to say so. It's not for everyone, and you've got to be happy in what you do, but you won't know until you've had a go.

As a trainee, let alone a consultant, you have to invest a lot of time and money into your career, with many sacrifices along the way. It's worth it (I hope!) but only if it is really right for you."

A typical week for a specialist registrar

Mon	AM – Ward Round and Jobs/Theatre
Tue	AM –Ward Round and then clinic PM – Ward Round + jobs
Wed	AM – Ward Round then Clinic/Jobs PM – Clinic
Thurs	AM – Ward Round then jobs an Theatre PM – Free afternoon
Fri	AM – Ward Round + Jobs PM – Departmental meetings/WR/Jobs

"A typical day involves arriving at 7 am to see patients for theatre that morning, and then at 8 am doing the ward round of your team's patients. It is important to identify on the ward round the key issues that need to be resolved and prioritise unwell patients. The registrar leads and guides a team of junior doctors and specialist nurses. Clinical commitments start from 8 30 am to 9 30 am and can include theatre and outpatient or diagnostic clinics. The daily work is varied, challenging and stimulating. At the end of the day, a final review of the ward is needed to check relevant tests and imaging and ensure that discharges have been completed. If there are unwell patients or you are on call that day, you may need to deal with problems alongside your other sessions."

ST7 Urology -http://careers.bmj.com/careers/advice/Careers_in_urology

A typical week for a consultant

Orthopaedics

Mon	All day Operating Theatre (8:00/8:30)
Tue	AM – Fracture Clinic (9am) PM – Ward Round + SPA time (to do personal development work, sudit etc.)
Wed	AM – Clinic PM – Clinic
Thurs	AM – Theatre PM – Research
Fri	AM – Ward Round (8:30) + SPA PM – Departmental meetings

(NB this does not include Private work – solely NHS hours)
The consultant timetable varies with each specialty (e.g Neurosurgeons start at 7am each day) but one can expect to operate 40% of the time and have clinics and on-calls too.

Most T&O consultants will do on-calls 1 in 6 weeks or up to 1 in 12-15 depending on the size of the unit. The amount of overnight work may mean the consultant can consult over the telephone or has to be in overnight (e.g. obstetric consultants often have to go in at night to operate).

Note for all specialties - Although the EU Working Time Regulation limits the working week to 48 hours many consultant surgeons work well beyond this limit.

Mr Stephen Boyce, consultant general and colorectal surgeon, Oxford:
"I think what I get to do every week is amazing! Most of my work centres on treating patients with colorectal cancer. "Choose well, cut well, do well" is a trusted aphorism amongst surgeons which informs my working practice on a daily basis. Often my patients have been diagnosed with cancer through colonoscopy or imaging and it is for me to me bring together these tests and staging investigations, to explain them to the patient and the implications for them. Together with the patient and their family we need to decide what the best treatment is for them depending on their own health, expectations and priorities in life. These cancer consultations in clinic can be emotionally charged and draining, but I find them immensely rewarding.

Patients react to news of cancer in very different ways but the bravery, stoicism and sometimes humour of patients in this situation always moves me. I never try to influence the decision of the patient, some 90 year olds will actively seek a surgical solution for

their cancer despite the risks, other much younger patients will walk away and choose not to have any treatment, it is their choice.

When the patient chooses surgery then operating on cancer patients is the most demanding, sometimes stressful but always most exhilarating part of my week. To look inside a person's abdomen is an amazing privilege and that Damascene experience I had as a medical student when I reached inside an open abdomen to feel the pulsation of the abdominal aorta is still alive in me every time I operate. The sight of the inside of the abdomen is still wondrous to me.

What we do in theatre separates us from other health professionals and makes what we do unique, I still can't believe we get to do it. To be a surgeon you have to live for it. If we have chosen well and the operation is done as well as I can, then hopefully the patient will do well. I aim to see my patients every day they are in hospital until they are recovered. Caring for them through their stay is rewarding, but I never sleep well until they are discharged without serious complication, but when I see them in clinic looking well and recovering it makes it all worth it!"

3. Why you might want to do surgery (and why you might not)

The case for and against

There are a lot of ideas about which characteristics make someone suitable for a surgical career. Whilst some of them do carry weight, many can be easily dispelled.

Over the years, a stereotypical perception of a surgeon has evolved, mainly based on the “old-school” surgical ideals: a stern, often arrogant “macho” male who wants to cut open the abdomen for any reason. This unhelpful and unfair generalisation often discourages potential surgeons from pursuing the career, as they feel their personality is not appropriate for the job.

Today, surgery attracts individuals from all backgrounds and personalities, with each specialty providing a slightly different set of challenges. Below we have outlined the characteristics we believe strongly support choosing a surgical career, and some which might make you consider alternatives.

Good reasons to do surgery

You should consider surgery if you:

- Are looking for a challenging but highly rewarding career.
- Want to take a positive and active approach to treating disease: highly interventional with immediate results.
- Enjoy the hands-on aspects of medicine: as a surgeon you will ultimately spend the majority of time in theatre.
- Feel comfortable in surgical theatres: the unique atmosphere of surgical theatres immediately draws in certain individuals with its focus on precision, efficiency, and sterility.
- Want to work as part of a multi-disciplinary team: in surgery you will co-ordinate and collaborate with physiotherapists, dieticians, therapists, radiologists, anaesthetists, and scrub nurses to name just a few.
- Are adaptable: operating often produces unexpected challenges testing you under pressure whilst patient management can require innovation to match specific patient demands.

- Enjoy the challenges of learning: surgery is rapidly-evolving, forcing surgeons to constantly update their knowledge and skills, as well as being subject to continuous appraisal.
- Have leadership qualities: surgeons often take on leadership roles in clinical teams, and will be required to support the team in difficult situations and inspire confidence.
- Understand that a surgical career is time-intensive: it is likely you will spend more time at the hospital/on-call/in theatres than your colleagues, often with unpredictable hours.
- You want to wear comfortable pyjamas all day.

Good reasons to not do surgery

Surgery might not be the optimal career option if you:

- Want to work regular hours with infrequent on-calls: unfortunately this is an inevitable part of a surgical career, which often includes extensive night and weekend work.
- Like prioritising ward time over clinics and theatres.
- Do not feel comfortable with the practical side of medical attachments and have not enjoyed hands-on experiences in theatres.
- Feel very uncomfortable in high-pressure situations or do not want to work in an environment where you will need to make snap decisions under stress.
- Find the idea of working most of your time in surgical theatres off-putting.

Myth-busting and bad reasons to not do surgery

1. **You need to have incredible innate dexterity to be a surgeon.**

   Whilst certainly helpful, you are not expected to be a virtuoso surgeon straight away. You should feel comfortable and enjoy practical procedures, but most of a surgeon's skill comes from long years of practice. Surgical skills events are a good way to test if you enjoy the manual aspect of the work. Even consultants occasionally have to learn entirely new skills.

2. **I will be in theatres all day and never see patients.**

   Whilst some consultants seemingly never appear at the ward (out of choice not because its not allowed!), as a surgeon and especially a trainee you will spend a lot of time with patients. You will take part in the ward round, work on call, run

clinics, and follow-up patients post-surgery. In many ways surgery is the ultimate patient-centred specialty. However, it is still important to appreciate that theatres are the centre-piece of a surgical career.

3. **I do feel I match the qualities of a typical surgeon.**

   We probably all know one surgeon who matches the stereotypes you have heard about. However, surgery attracts all types of people and the stereotypical surgeon is most definitely a thing of the past. Qualities such as leadership, assertiveness, and confidence are likely to be shared by most surgeons as these develop as part of surgical training and the associated experiences in the hospital. These traits are definitely learnt and developed not something people are necessarily born with.

4. **I will never come home and there will be no time for family or friends.**

   Whilst a surgical career is time-consuming, with appropriate time-management which you will develop during training it is perfectly possible to lead a full life outside of the hospital. In fact you will find surgeons are often the ones with the most extravagant/time-consuming hobbies or are always finding time for exotic holidays: they can simply never sit still!

Women in Surgery

The underrepresentation of women in surgery, particularly at more senior levels, is well documented, and attributed to a variety of reasons – the perceived occupational inflexibility associated with a successful surgical career, a lack of female role models in influential positions, and remnants of sexist behaviour that still haunt the operating theatres and wards are enough to put off any aspiring young surgeon should she not receive sufficient encouragement and guidance to counteract them.

There have been numerous beneficial changes in medical practice which have allowed more women who also wish to have children as well as a medical career – whilst this certainly does not apply to everyone, it has often been viewed as a significant negative factor for many women for whom this is an important future desire. Flexible training is becoming far more common and acceptable, more team-working reduces the necessity of operating single-handedly, and National Training Numbers mean that training jobs are guaranteed to remain open whilst allowing for 6 months maternity leave.

Gender also plays a role in deciding surgical specialty. According to a census carried out by the Royal College of Surgeons (RCS) in 2011, the specialty with the highest number of female consultants is the small specialty of paediatric surgery (21%). This is followed by plastic surgery with 19% female consultants and general surgery with 11%. In the large specialty of orthopaedics and trauma, just 4% of its consultants are female. This is despite advances in surgical equipment and technique that mean that even very physical surgery is a matter of finesse, not brute technique.

Whilst there are fewer consultants in surgical specialties, the entry numbers into surgical specialties are rapidly increasing, for example around 25% of surgical trainees in orthopaedics are now women, so it will not be long before the gender imbalance is redressed and greater representation is reflected in all tiers of the surgical hierarchy. The RCS is encouraging change with its Women in Surgery group (WinS), offering networking opportunities and events for female surgeons at any stage of their career. Medical students are becoming more emboldened to the fact that there is no reigning stereotype of an “alpha male” surgeon that needs to be achieved in order to become a surgeon. Strong female role models are emerging and demonstrating that any woman with a passion for surgery can both look and act like a surgeon.

Useful websites:

- Search Women in Surgery on the RCS website (www.rcseng.ac.uk)
- Medical women’s federation (www.medicalwomensfederation.org.uk)
- Search maternity leave on BMA (www.bma.org)
- Association of surgeons in training (www.asit.org)

4. Surgical Specialities

What are they and what are they like?

General Surgery

General surgery encompasses a broad range of surgery which includes:

- surgical conditions of the gastrointestinal tract from the oesophagus to the anus
- breast conditions
- kidney, pancreas and liver transplantation
- trauma to the abdomen and thorax
- certain skin conditions
- initial assessment of patients with peripheral vascular disease
- general surgery of childhood

General surgery is one of the two largest surgical specialties in the UK (the other being trauma and orthopaedics) employing 31% of the country's consultant surgeons. This is a wide ranging surgical specialty with many sub-specialties.

Sub-specialties within general surgery include:

- breast surgery – assessment of breast symptoms, breast cancer surgery and breast reconstructive surgery where a plastic surgeon is not needed
- lower gastrointestinal surgery – for the diseases of the colon, rectum and anal canal, and particularly cancer of the bowel
- endocrine surgery – for thyroid and other endocrine glands
- upper gastrointestinal – this includes the oesophagus, stomach, liver and pancreas and also incorporates weight-loss surgery
- transplant surgery – renal (kidney), hepatic (liver) and pancreatic transplantations

You'll need to follow a set pattern of two years of foundation training. You will then undertake two years of core training (CT1–2), followed by 5 years of specialist training (ST3-7). This period of training will include completing your royal college exams. The length of training can vary according to your circumstances.

The working hours may sometimes extend beyond the normal working day to include early mornings, evenings and weekends with general surgery often having intense on-call schedules.

However, each speciality varies in hours and lifestyle – for example the life of a breast surgeon is drastically different to that of transplant surgeon: Breast surgery involves planned day cases with no on call whilst transplant surgery involves a lot of on call with some extremely exciting surgeries.

It is good to have an idea which sub specialty you would like to go into but the great thing about general surgery is you have plenty of time to make your decision and can try different ones before picking.

Trauma & Orthopaedics

Originally concerned with fitting braces to children with misaligned limbs and spines (*"orthopaedic"* is derived from the Greek words *"ortho"*, meaning straight, and "*paedion"*, meaning child), orthopaedic surgeons now use surgical techniques to diagnose and treat musculoskeletal injuries that are caused by trauma, congenital diseases, degenerative diseases, infections, and tumours.

The highly-multidisciplinary specialty focusses on interventions which rapidly and dramatically improve quality of life for patients, combining the knowledge of anatomy with practical skills and technological innovations: if you like the physics/engineering side of medicine it could be the specialty for you.

The ultimate goal can be seen as reconstruction rather than resection, allowing patients to maintain their independence and quality of life. It uniquely combines the excitement (and stress) of the emergency work with the elective management of chronic conditions, such as hip or knee replacements for osteoarthritis.

T&O surgeons generally spend about 40% of their time operating, and the remainder in outpatient clinics, the emergency department and assessing/monitoring patients before and after surgery. A typical week might include three operating sessions, with one comprising trauma cases and the other two being elective surgery.

The available subspecialties include:

- Ankle surgery
- Knee surgery
- Hip surgery
- Upper limb surgery
- Paediatric surgery
- Spinal surgery
- Sports injuries surgery
- Trauma surgery.

Training takes 5 years following completion of core surgical training (which often contains T&O rotations). In terms of competitiveness, orthopaedics sits around the middle of surgical specialties with 2.68 competition ratio for an ST3 job in 2016 (nearly identical to plastic surgery).

Whilst orthopaedic surgery has more male surgeons than any other surgical specialty (at present only 5% of consultants are women), between 2008-2012 there has been a 63% increase in women in T&O surgical training, with the numbers continuing to improve.

Neurosurgery

Neurosurgeons have the unique responsibility of dealing with the most precious component of any human body's capacity – the abilities to think, feel, judge, understand, and experience the world around us, all of which define our humanity and distinguish us from the other species that roam this planet. The brain and related components of the nervous system are complex, unforgiving, and remain, to some extent, functionally mysterious. This makes neurosurgery both an intensely demanding and extremely rewarding specialty to enter, with vast scope for academic research and teaching, as well as the weighty responsibility of life-altering operative challenges.

The most common operations carried out by neurosurgeons involve congenital abnormalities such as spina bifida, hydrocephalus, tumours, cerebral haemorrhage, trauma, and spinal degenerative diseases. Subspecialties branch off in increasingly more limited, specialized fields such as spinal surgery, basal skull surgery and neuro-vascular surgery.

Neurosurgeons generally work in large regional hospitals, often attached to teaching centres. The work commitments are gruelling; neurosurgery is consultant-led, with decisions, and surgery, being required at any hour of the night or day. As such, it is renowned for harbouring the most dedicated trainees as a result of the relatively poor "work-life balance" that it demands. Levels of burnout and stress are reported to be high, although this is somewhat compensated for by one of the highest salaries in any medical or surgical specialty.

Following the foundation programme after medical school, aspiring neurosurgeons are required to apply to a position as an ST1 in neurosurgery followed by 8 years of training, and complete the MRCS exam, followed by a specific FRCS exit exam in neurosurgery. Attaining a training number is exceedingly difficult due to the low numbers of posts available around the country and the high levels of competition that exist for each place. Commitment must be shown early, with demonstration of an interest in neurosurgery and neurosurgical research from medical school onwards. Neurosurgery placements are uncommon within the foundation programme, but experience in surgical specialties and F2 taster attachments will help job applications.

Cardio-thoracic Surgery

Cardio-thoracic surgery is a specialty that deals with complex operations relating to the thorax and includes procedures on the:

- Lungs, typically lobectomy or pneumonectomy for carcinoma
- Heart, typically coronary artery bypass grafting or valve replacement but also includes heart failure surgery
- Aorta & great vessels
- Mediastinum including the lymph nodes and thymus
- Oesophagus

Most cardio-thoracic surgeons ultimately choose to either undertake cardiac (including aortic) surgery or general thoracic surgery, however there a few who still perform mixed surgery. There are also two other smaller sub-specialities, those being heart and lung transplantation and congenital heart surgery.

Training starts either at ST1 level or ST3 (following 2 years of core surgery) and is very competitive with ratios typically between 6:1 and 12:1 at both ST1 and ST3, largely due to there being a small number of posts. Following entry, a trainee will be trained in both cardiac and

thoracic surgery with opportunities to sub-specialise in particular fields such as transplant later on. The training length varies but typically will last between 6 to 8 years.

The procedures in cardio-thoracic surgery, especially cardiac, tend to be long and complex and are performed on an elective basis with a list often containing 2 major surgeries per day, one morning and one afternoon. A list for general thoracic surgery might also include a number of smaller procedures for one session. Emergency work does exist for both fields with some very exciting cases although the on-call tends to be less time intensive than that for general surgery or trauma & orthopaedics. Obviously, transplant surgery is very different as the on-call schedule is very intense and surgeries are performed as soon as organs are available.

Other than theatre time, cardio-thoracic surgeons typically spend their time either in outpatient clinics, where patients have to be evaluated and optimised for surgery, or on specialist ITU wards, with both trainees and consultants being heavily involved in the complex post-operative care of their patients.

Cardio-thoracic surgery whilst witnessing some huge advances in its relatively short history is now often typified as in decline, particularly amongst students, due to the advent of angioplasty, intra-luminal stunting and trans-catheter valve implantation technologies. In the case of general thoracic surgery, the field has never been in decline and post numbers remain stable with the caseload actually increasing as lung cancer rates climb. In the case of cardiac surgery, it is certainly true that there has been a reduction in the number of posts since the turn of the century however the number is currently stable and is projected to remain so in the near future. The caseload for valve replacement has remained stable with TAVI largely taking on patients who would not have been considered for surgery, there is no evidence to show it is superior (only non-inferior) to surgery in high/medium risk patients and we await the results of studies for low risk patients. The caseload for CABG has been in decline but the rate of decline has slowed and there is no doubt that patients with significant multi-vessel disease benefit more from CABG than they do stenting. The caseload will most probably remain stable as off-pump and minimally invasive cardiac surgery become more mainstream with both significantly reducing morbidity in surgery.

Finally, the field also has a great academic tradition in its short history with some truly pioneering surgeons. Many of the centres in the UK output a great deal of research and the speciality always seem to have a new emergent technology on the horizon currently likely to be minimally invasive cardiac surgery as well as a new generation of artificial hearts.

The speciality is very intense, competitive and demanding and you will need to be able to keep a calm head in often very stressful situations as well as display great stamina, dexterity and team-working skills. However, it is undoubtedly one of the most exciting specialities in terms of the nature of work and with the impact of the surgeries often being huge for the patients, it is highly rewarding.

Paediatric Surgery

In contrast to most other specialties, paediatric surgery defines itself by a patient's age rather than a particular technique, condition, or area of the body. Most paediatric surgeons are generalists: diagnosing, treating and supporting the rehabilitation of children with diseases, trauma and malformations from the foetal period to the teenage years. They require an understanding of the embryology and physiology of growth and development, the effects of disease and surgical intervention, as well as the technical agility to work on small structures. Managing children and their families also requires a specific set of skills and professional

attitudes. Paediatric surgeons can anticipate long term partnerships with families, particularly with congenital conditions, and involvement in the transition to adult care.

There are 29 paediatric surgical units in the UK, in which the majority of specialised children's surgery is undertaken. Day-case surgery makes up a large proportion of the clinical workload, with a relatively low level of emergency surgery. This may limit your choice of location but be a better balance for surgeons who wish to work less-than-full-time, or combine surgery with other career goals, such as research, teaching or management. Only 11% of all operations on children are performed by paediatric surgeons – the others are performed mainly by surgeons from other specialties with an interest in paediatric conditions.

Some common elective procedures are:

- Herniotomy for congenital inguinal hernia and hydrocele
- Correction of undescended testis
- Circumcision
- Repair of umbilical hernia

Common emergency procedures include:

- Appendicectomy
- Correction of testicular torsion
- Pyloromyotomy for pyloric stenosis

As in all specialities, there is an increasing trend towards subspecialisation. Such subspecialties include:

- Oncology – unlike in adults, leukaemia remains the most significant cancer in children
- GI & HPB
- Urology – conditions like hypospadias frequently present at birth or in young people
- Cardio-Thoracic surgery
- Neonatal surgery – with obstetricians and foetal medicine specialists, involves antenatal counselling and planning the care of the mother and child from delivery to subsequent surgery, repairing conditions such as gastroschisis and congenital diaphragmatic hernia
- Trauma surgery

Other subspecialties can be reached by training in other surgical specialties, then specialising in paediatric cases. For example, you would take neurosurgery run-through training to later specialise in paediatric neurosurgery.

The paediatric surgery training pathway starts with core surgical training following the foundation programme, you then enter a 5-year paediatric surgical training programme before being able to become a consultant. There are approximately 338 paediatric surgeons in the UK, with 13 posts at ST3 level offered in 2016 and an average of 4.1 applicants per post.

Vascular Surgery

Vascular surgery is one of the most challenging branches of surgery, integrating more traditional procedures such as limb amputation, with cutting edge technologies like interventional radiology where abdominal aortic aneurysms can be managed with stents. This career path is suited to hardworking, dynamic and enthusiastic individuals, who are able to remain calm in emergency situations.
Vascular surgeons treat a wide variety of conditions including:

- Carotid artery disease – Treating atherosclerosis in the carotid arteries that carry blood that can cause a stroke
- Aneurysms– dilation of a blood vessel, which can lead to rupture and death
- Acute limb ischaemia – severe blockage in the arteries of the lower extremities which seriously reduces blood flow and in serious cases may result in limb amputation
- Venous disease – where veins become abnormal or diseased, including the treatment of varicose veins
- Lymphoedema – swelling caused by accumulation of fluid in the body's tissues

The sort of patients vascular surgeons meet regularly are those with significant cardiovascular risk factors, and more elderly patients often have low physiological reserves, making them a challenge to manage both medically and surgically. If you're someone who enjoys coming up with innovative solutions then this is the career path for you. Anyone can get into limb-threatening trouble or a rupture an abdominal aortic aneurysm and with the right management a vascular surgeon can save both. In vascular surgery there is a good mix of 'quick fix' and 'chronic' care; for example younger patients with acutely threatened limbs and or older diabetic patients may require repeated interventions for their feet.

In order to pursue a career in vascular surgery, you must begin as a core surgical trainee. Then, having passed the MRCS exams, apply for an ST3 post in vascular speciality training. In 2016 there were 154 consultant vascular surgeons employed and 66 registrars in England. The increase in diabetes and the increasingly ageing population have resulted in a growing demand for vascular surgery.

Once working as a vascular surgeon, the job is split into roughly 40% surgery, 40% clinic and 20% on the wards. Surgery takes place as part of a multidisciplinary team including anaesthetists, vascular technicians and vascular nurse specialists. Good working relations with other specialities such as neurology, cardiology, oncology, radiology and endocrinology is essential. On-calls can be extremely strenuous, with long hours and a number of long emergency cases each day. It may also be necessary to make numerous out-of-hours hospital visits, therefore making this speciality quite difficult for those wishing to work flexible hours. There is scope for some private practice, mostly in the form of varicose veins.

Although competitive, challenging and at times stressful, vascular surgery rewards those who choose to pursue it with a rewarding career and salary to match.

Plastic Surgery

Plastic surgery has two principle focuses: reconstructive and aesthetic surgery. Reconstructive surgery involves the restoration of appearance and function of the human body after accidents or illnesses. By contrast, aesthetic surgery focuses on changing the body's appearance by choice.

Contrary to popular belief, the vast majority of a plastic surgeon's work is in reconstruction. Reconstructive surgery can be performed following trauma (e.g. burns), congenital defects (e.g. cleft lip and palate) or disease (e.g. skin lesion removal) and presents an extremely varied and rewarding workload. Typical procedures include skin grafting, flap surgery and microsurgery. Many plastic surgeons focus their practice in to one of the many plastics sub-specialties (e.g. breast, skin, trauma) and undertake additional private aesthetic work, as these procedures are often not available on the NHS. A plastic surgeon's expertise in wound healing leads them to work with a wide variety of other specialties, advising on complex wound management or providing follow-up to other surgical procedures.

You can enter plastic surgery at the ST3 level, having completed core surgical training, for 6 years of training. Trainees have 4-5 operating sessions a week with additional outpatient clinics. Emergency procedures (burns and severe injuries) are also part day-to-day life through an on-call rota. Many trainees also complete an 'aesthetic fellowship' allowing them to perform aesthetic surgery.

Otorhinolaryngology

ENT (ear, nose and throat; otolaryngology) is an exceptionally broad surgical specialty.

Patients range from neonates to the elderly. With the exception of paediatric surgeons, otolaryngologists see more children than any other surgical specialty.

Conditions encountered include balance and hearing disorders, smell and taste problems, disease affecting vocalisation, breathing and swallowing, and head and neck tumours. Generally, consultants specialise into one or two subspecialties of ENT:

- Otology – infection, disease and damage affecting hearing and balance, including grommet insertion and cochlear implant surgery.
- Rhinology – nose and sinus disorders including allergy, infection, inflammation, and tumours. Some perform skull base surgery including pituitary tumour resection.
- Laryngology – larynx and throat disease, e.g. vocal nodules, voice problems, tracheal stenosis, cancers.
- Head and neck surgery – diseases of lymph, salivary, thyroid and parathyroid glands, both benign and malignant.
- Facial plastics – cosmetic surgery including rhinoplasty, septoplasty, pinnaplasty, and reconstruction of facial defects.
- Skull base surgery/neurotology – mostly skull base disorders and acoustic neuromas.
- Thyroid and parathyroid surgery – diagnosis and surgical treatment of thyroid and parathyroid tumours.
- Paediatrics – largely congenital conditions, includes cochlear implants, head and neck surgery, and rare conditions including choanal atresia (where the back of the nasal passage is blocked by bone or tissue).

Time is split between managing conditions medically, running outpatient clinics with diagnostic endoscopes and microscopes, and performing ENT surgery. The proportion of operating time is generally smaller than in other specialties.

Surgical emergencies exist in all specialties and otolaryngologists undertake some out-of-hours surgical work, but this is generally less than in many other surgical specialties. ENT has been dubbed ‘Early Nights and Tennis’ by some otolaryngologists, but the truth of this statement likely varies with subspecialty.

There were 664 ENT consultants (11.8% female) in England in 2016. Approximately 40% of the 250 speciality registrar posts are currently occupied by women. The competition ration for core surgical training in 2016 was 2.31. For ENT ST3 it was 1.63.

The ideal situation is to obtain an ENT-themed Foundation post. These can be very competitive due to their applicability to paediatrics, plastics, neurosurgery, oral and maxillofacial surgery, and GP. Thereafter, there are 46 themed ENT core surgical programmes in the country.

ENT speciality training begins at ST3 after core surgical training and typically lasts for 5 years.

Urology

Urology deals with the bladder, kidneys, and urinary problems as well as men’s sexual and reproductive health. It is a broad discipline dealing with all ages, combining the management of medical conditions such as UTIs and benign prostatic hyperplasia, with surgery including kidney stone removal, prostate resection, formation of urinary stomas, bladder reconstruction, stress incontinence solutions, and vasectomy. Particularly within surgery, urology has consistently innovated; it was the first specialty to use minimally invasive techniques such as fibre-optic endoscopy and laparoscopy, whilst increasing numbers of operations are being performed robotically-assisted. Within urology itself there are a number of subspecialties; notably urologic oncology, reconstructive urology, andrology, and endourology.

You can enter urology at the ST3 level after having completed core surgical training. The typical week involves 3 to 4 operating sessions, clinics, and the option of research or teaching. Most of the surgery is elective, so there will rarely be emergency surgery to wake you up at night. These rare emergencies include testicular torsion, penile trauma, and Fournier’s gangrene. Importantly, with an increasingly old population, there will be a greater need than ever for urologists, therefore the specialty is likely to remain in demand for decades to come.

Oral and Maxillofacial Surgery

Oral and maxillofacial surgery (OMFS) is the specialty concerned with the diagnosis and treatment of diseases affecting the mouth, jaws, face, and neck. The specialty was originally conceived out of the need for surgery to manage the broken jaws sustained by servicemen during the two world wars. It is unique in that it requires a dual qualification in medicine and dentistry before specialist surgical training. The first degree in either medicine or surgery will typically take 5 years, whilst the second degree can take between 3-5 years depending on the medical or dental school. Foundation training can be completed after acquiring both degrees, or after obtaining the first medical degree and before starting dentistry. Subsequently trainees start specialist training before becoming consultants. Training can seem long, however most consultants are appointed at a similar age as to in general and plastic surgery.

With both a medical and dentistry degree, OMF surgeons perform a wide range of procedures. This involves removal of impacted teeth, placement of dental/facial implants, complex craniofacial fractures, neck dissections for tumour ablation, and removal of complex jaw tumours. Due to the nature of the work, OMF surgeons often work alongside a variety of specialists in other

fields such as ENT surgeons, clinical oncologists, plastics, radiologists, and neurosurgeons. In order to master these procedures, OMF surgeons can subspecialise, including in the surgical treatment of head and neck cancer, craniofacial trauma, cosmetic surgery, and surgery for craniofacial deformity.

Attending university twice can be a disadvantage as it could entail financial struggles whilst obtaining the second degree. However OMFS involves an interesting broad range of surgery and excellent employment prospects due to the small number of trainees pursuing this path. A typical working week will include 3-4 clinics (special and general), surgery, teaching, administration, and on-call commitments, however this is flexible. The on call commitment is not too onerous therefore working life is enjoyable, and there are good prospects for private practice. Finally, and looking to the future, the most recent breakthroughs in the field involve the development of superior MRI and CT imaging modalities to produce more detailed 3D pictures of the inside of patients' head and neck anatomy and pathology to allow better planning for surgery.

5. Academic Surgery

What is it, should I do it and how do I pursue it?

What is an academic surgeon?

It is necessary to distinguish academic surgery from pursuing research as a means to an end in surgery. A large proportion of surgical trainees pursue research to make themselves more marketable and earn points for selection to specialist training and consultant posts. Academic surgeons pursue research in an ongoing, committed fashion throughout their careers to advance their specialty. They dedicate their working time to both the pursuit of tangible long-term research goals and the advancement of their clinical practice.

The ideal academic surgeon is a triple (or quadruple) threat; they excel in **clinical practice**, **academia**, **education**, and often **administration** also.

The field has much to offer, with members working at the leading edge of their surgical specialties and fields of interest. All academic surgeons are employed by an academic unit (Nuffield Dept. of Surgical Sciences in Oxford) rather than the NHS, though most pursue clinical work in NHS hospitals. A few of the academic surgeons in Oxford at present are:

Professor Peter Friend MD, FRCS: Academic Consultant Transplant and Hepatobiliary Surgeon at the Churchill Hospital and Director of the Oxford Transplant Centre, currently studying techniques for the isolated perfusion of the liver, conducting clinical pilot studies of novel immunosuppressants, and organising multi-centre national trials alongside clinical work. Professor Friend is Director of Studies in Medicine at Magdalene College.

Mr Ashok Handa MBBS FRCS MA: Academic Consultant Vascular Surgeon at the JR Hospital and Director of Surgical Education for the University of Oxford, currently leading the Oxford Abdominal Aortic Aneurysm Study (OxAAA) research group, planning, delivering, assessing and reviewing University of Oxford surgical courses, and now appointed as Associate Director of Clinical Studies, alongside clinical work. Professor Handa is Graduate Tutor at St Catherine's College.

Miss Linda Hands MA MS MBBS: Recently retired (Nov 2017) Academic Consultant Vascular Surgeon at the JR Hospital, Director of the Oxford Telemedicine Institute, and Clinical Director of Cardiothoracic and Vascular Surgery. Professor Hands was also Director of Oxford Vascular Laboratory for over 10 years, served on the Thames Valley Strategic Health Authority and NICE, and in 1992 was the joint-first woman to be appointed to a Consultant Surgeon post in Oxford. She pursued research in cytokine and coagulation changes in the reperfused ischaemic limb, and the use of telemedicine and electronic data to facilitate patient care, and taught clinical students at Green Templeton College.

Academia is ever-expanding in scope. Where once only basic science research was viewed as credible in academia, the definition now includes research in translational, clinical, education, and global health topics. The career is increasingly defined by those who are in it.

What makes a good academic surgeon?

Life as an academic surgeon involves clinical activities, administration, research commitments and teaching. Academic surgeons are typically exceptionally talented and motivated people. Look no further than our own Sir Hugh Cairns as a prime example! However, there are some general characteristics that all academic surgeons seem to share:

- **Innovation and a questioning mind**. Academic surgeons push the boundaries of their fields of scholarship and are constantly looking to change and improve things.
- **Passion and zeal** for *both* surgery and scholarship and an ability to inspire others.
- **Commitment, tenacity, patience, resilience, and organisation**. To succeed, you need to cope with the hurdles of research, publishing and securing research funding, alongside your clinical stresses!
- **Teaching.** The most influential people you find in both medicine and surgery are those that always have a few moments to teach. Whether that be about clinical care, research or the state of education, they speak enthusiastically about their intellectual or technical interests. You must desire to develop educational skills as both mentor and mentee, never shying from either end and using both roles as opportunities for growth.
- **Leadership & Management.** An academic surgeon will need to display a degree of leadership and management in order to be effective at implementing the changes they want to see. Many also take up leadership roles either in academia or in their clinical work. These skills are certainly developed and are not something you have to be born with!
- **Versatility** to shift fluidly between clinical work and research, keeping both sets of skills in tip-top condition.

While academic surgery careers are still viable if you don't meet these criteria, you're certainly more likely to succeed if you do. But don't be frightened off! With a good mentor and genuine enthusiasm for both your surgical and academic pursuits, they're not that difficult to develop.

Q & A with Professor David Taggart and Miss Linda Hands (Professor of Cardiovascular Surgery and Associate Professor of Surgery respectively at Oxford University:

1) How would you describe your career in academic surgery?

Professor David Taggart: Immensely rewarding! Not only has it allowed me to hopefully have successfully promoted the rationale for surgical myocardial revascularization, but to have described techniques to optimize surgical outcomes- while being privileged to have travelled extensively around the globe.
Miss Linda Hands: Diverse and stimulating and very enjoyable-I ended up in it by chance but would never have chosen any other career.

2) If you could offer one piece of advice to students wanting to pursue a career in academic surgery, what would it be?

Professor David Taggart: If you are determined to succeed there is nothing to stop you.
Miss Linda Hands: Focus on the research side and don't get distracted by clinical work (easier said than done!)

3) If you could have done one thing differently (with regards to your academic or surgical career) what would it be?

Professor David Taggart: I would do nothing to change my surgical career as I was determined to be a cardiac surgeon but, in retrospect, should have taken a formal academic rather than an NHS appointment
Miss Linda Hands: Focussed on one area of research.

The Academic Pathway

'So how do I become an academic surgeon?' I hear you cry!

There is no single pathway to becoming an academic surgeon. The two essential components are the completion of surgical training and the acquisition of solid research training (a DPhil/PhD or MD). These can be undertaken completely separately, or more often, with some degree of overlap or integration.

A parallel training track, known as the Clinical Academic Training Pathway, has been developed to facilitate this (fig. 1). You can enter the track at any point, and leave at any point, and it's common to dip in and out of the pathway during training. Holding a clinical academic training post is not crucial to developing a research career, but does provide ring-fenced research time in parallel with clinical training. This time is typically used to pursue research or assemble a successful fellowship proposal for higher degree funding in predoctoral posts, and to intercalate full-time postdoctoral research with specialty clinical training in later posts. Both clinical and academic competencies are assessed annually through the Annual Review of Competence Progression (ARCP) process.

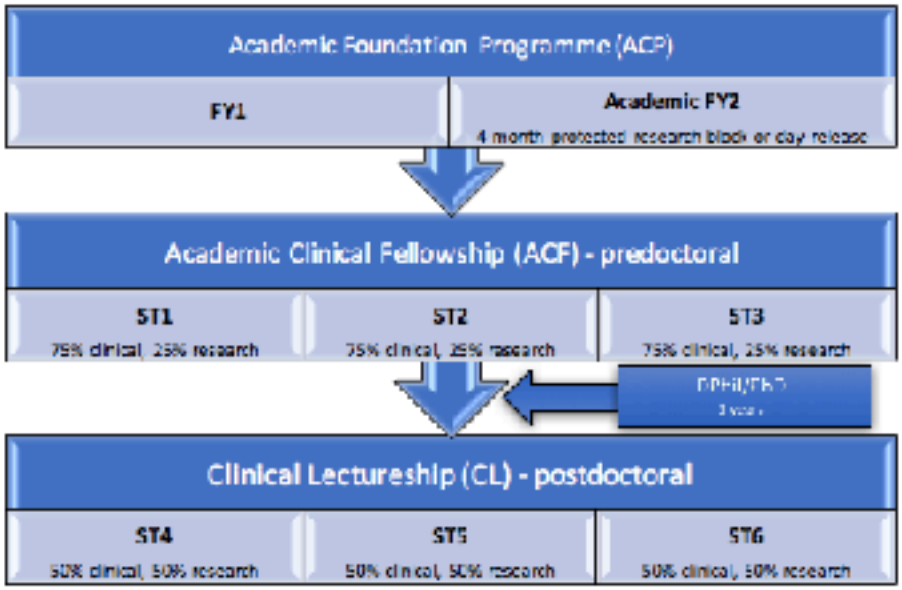

Figure 1. The Clinical Academic Training Pathway. Both clinical and research proficiencies are assessed annually via the ARCP process. It is the trainee's responsibility to gain competence in all necessary skills within the reduced time allocated for clinical work. A DPhil or PhD is generally required for applications to CL posts, but time out of programme to pursue a higher degree can be taken at any time, even while still in medical school (an intercalated MB PhD). The proportion of time allocated to clinical work during a DPhil/PhD will vary depending on the funding body.

Many doctors have obtained DPhil/PhD funding without having held an Academic Foundation Programme (AFP) or Academic Clinical Fellowship (ACF) post – instead they looked for research opportunities throughout their training and have been involved in ongoing research projects alongside their clinical work. Research interests typically become more focused with time.

After completion of a DPhil/PhD, you can obtain research funding for senior career development posts, including a Clinical Lectureship (CL).

Most Academic Consultant Surgeons are appointed from CL posts. Clinicians pursuing academic surgery careers are expected to continue research alongside their clinical commitments. You can then move up the competitive promotional ladder towards a Senior Lectureship post, thereafter increasing your research productivity, funding and leadership until you are in a position to apply for a Professor of Surgery position.

The key decision for any aspiring academic surgeon is choosing what research project to pursue, and who to work with. More common posts include those in neurosurgery, general, vascular, transplant, paediatric, cardiothoracic, and orthopaedic surgery, but there are opportunities in all surgical subspecialties, from interventional radiology to hand surgery. However, not all regions will offer an academic surgical unit in a particular specialty.

Good locations are international centres of excellence with thriving biomedical and clinical research communities and strong sources of funding. Collaborations between academic surgeons, clinical scientists, basic scientists, and industry are strongly encouraged. Established programmes with strong track records are typically best. Again, think about where you want to live, who you want to work with, and who will be mentoring you. This is particularly crucial if you enter the Clinical Academic Training Pathway in an ACF post, undertake a PhD and continue in an ACL post – you'd potentially spend nine continuous years from ST1-ST6 in one centre.

A career in Academic Surgery

When considering a future in academic surgery, it's important to evaluate the career path in relation to your life goals. The same applies to training within the academic pathway. While the following list of pros and cons is by no means complete, it might offer some food for thought.

Pros

- By staying on an academic training pathway, you can remain affiliated to one institution, avoiding the yearly re-adjustment period most trainees face. This may in turn offer you more training opportunities than you would have otherwise obtained.
- On the academic training pathway, you'll be able to complete your surgical training whilst having protected time to bolster your academic portfolio far more than full-time clinicians would be able to.
- As an academic surgeon your position will be unique, bridging the disciplines to interpret and apply translational surgical research, and approaching basic science research knowing where there are gaps to be filled in current clinical practice.

- You can enjoy both short and long-term fruits of your labour – rapid surgical outcomes and long-term academic results.
- You will contribute to the health of individuals in your clinical work, and to society more generally in your academic pursuits.
- You can directly influence peers in many allied fields, including national and international guidelines on clinical practice, and research on many levels.
- National and international travel may be a large part of your job when developing rewarding collaborations.
- You can supervise and train staff at all levels, in addition to contributing to medical education, leadership and management.
- Protected research time, especially during a PhD, can often serve as a useful and appreciated break from the rigours of clinical medicine

Cons

- During training, both academic and clinical pursuits will require significant dedication, such are the demands of training and working in a craft specialty. This can limit opportunities for less-than-full-time employment and may require personal compromises.
- Extra effort will be required to acquire and maintain operating skills through periods of research, possibly with long hours.
- Academic surgery is competitive, both in the field (funding, publications) and for posts to advance your career. Trainees who are unsuccessful in securing funding may fall at the first hurdle.
- Some of the time spent pursuing academia could instead be used to develop a private practice. Within academia, there is limited scope for personally-remunerative private work.
- You could focus more on refining clinical competencies by training in the non-academic training pathway, and still pursue an academic career in future, by obtaining research publications in your free time and through out-of-programme experiences.

Research Opportunities in Medical School

Whether you're looking to pursue a career in academic surgery, or just improve your CV, there are plenty of research opportunities as you pass through medical school. To succeed, you must be motivated and determined, and have a clear idea of what you want to achieve.

What	When	Duration	Notes
Summer project	Summer holidays 1st-3rd year	2-3 months	Often but not exclusively lab-based. Usually a sub-part of an ongoing project in the host lab. Some students join undergraduate team sumer project competitions e.g. Oxford iGEM, BIOMOD. Can often produce a poster presentation. If aiming to obtain a publication, look for PIs that publish regularly with summer students, and critically appraise the project you're offered. Unless you are directly supervised by the PI, it's unlikely to result in first-authorship. Stipends can be obtained from national society bursaries e.g. the Anatomical Society – applications usually close in January.
Intercalated research project	Trinity term 2nd year-3rd year	8 weeks, though often extends into the summer and 3rd year	Often lab-based, but translational and more clinical options available in Oxford. Dissertation marked and will contribute to degree classification. Dissertations may also be entered to external competitions. To avoid stress, critically appraise proposal before accepting. It is not uncommon to gain a publication from this work several years later, but rarely as first author.
Intercalated masters or DPhil/PhD	Between 3rd and 4th year in Oxford	1-2 years or 3-4 years	Almost exclusively basic science and laboratory-based. Must obtain permission from medical school for years out. Will add points to AFP application, but may not be related to your eventual clinical specialty of interest. Apply for funded places (usually designated project), or apply for funding directly from funding bodies (success rate lower).

SSM	4th and 6th year	4 weeks	Not long enough to start and complete a lab project, but a good opportunity to continue one. Translational and clinical projects available, many of which are eventually published. All students make posters and many are taken to national and international conferences.
Elective	Spring of 6th year	10 weeks	Can pursue anything related to medicine. Self-arranged small clinical projects and audits often undertaken overseas. Funding available on application from external bodies. Often a good idea to save up if planning a more expensive elective.

As well as the timetabled periods available for research in medical school, many students pursue research, audit, and review work alongside their clinical studies. Approach clinicians you'd like to work with, ideally with an idea for a small project related to their area of study. Laboratory work is generally harder to timetable but not impossible.

If you can work well on your own, more senior consultants may be willing to edit your review articles, and may help you publish in more reputable journals as a first author, but remember that they have very little time!

There are also local (OxSCAR), national (STARSurg) and international (EuroSurg) surgical research and audit collaborations. These provide great (but competitive) opportunities to get involved in research and audit on a vast, meaningful, but manageable scale. At the time of writing, STARSurg had recently launched the IMAGINE study. All contributors are named as collaborators on publications arising from the work. Though collaborative authorship does not currently provide any points on AFP applications, it is regarded positively in applications to later clinical posts.

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Leadership, Management and Medical Education

Academic pursuits are not purely limited to biomedical and clinical research and there is now a recognition in the NHS, and by academics, of the distinct fields of medical education and leadership & management. Academic surgeons will often combine research with both of these to varying degrees and indeed should as the best clinicians should be researching, leading and teaching; however, they will usually focus on one in order to excel in it.

Medical education focusses on the education of medical practitioners at both undergraduate and postgraduate level. At its core is teaching but it is an academic field in its own right with a rich literature on the comparison of different course structures and teaching methodologies. As well as the delivery of teaching, academic surgeons interested in this field will be heavily involved in the design of courses, workshops and degrees and the very best will seek to produce novel research on new teaching ideas and methods in an attempt to move the field further on.

Students interested in this aspect for academic surgery specifically will want to try and get involved in teaching other medical students whilst at university whilst also gathering feedback and reflecting on their teaching. They can also join a medical education society if their university has one as well as the Junior Association for the Study of Medical Education which is a national body. There are also often teaching workshops and courses available within a university.

Leadership & Management are two key skills in a medical career with leadership being the ability to guide a group of individuals, a team or organisation (often in a transformative way) and management being the ability to plan, organise and co-ordinate a group, team or organisation in order to achieve significant output. One can't be a good leader without being a good manager and vice versa and so the two are combined into an academic discipline which now has a growing prominence and body of research literature behind it.

The Royal Colleges and NHS are now increasingly offering mentoring schemes, fellowships and courses in order to identify and foster potential future leaders and managers and, whilst any senior clinician will need to lead, we now have academic surgeons who are becoming fundamentally involved in the planning and delivery of health services or are producing novel research behind effective leadership and management.

Students interested in this should definitely join the Faculty for Medical Leadership and Management which has sections and schemes specifically dedicated to students. It may also be prudent to try and get involved in work around public health or medical ethics.

All of these fields now have dedicated streams within the IAPT pathway and so now you can apply for academic foundation programmes and clinical fellowships in both medical education and leadership & management. They are not available in all deaneries but the number of posts is growing and the future of both academic fields is very bright.

6. How to get involved

Getting good experience for surgery

Medical school is an excellent time for you to explore your options and to start planning your career. There are many opportunities you can take while still a student that will aid your future career as a surgeon.

Firstly, throw yourself into surgery and see as many operations and clinics as you can. Make the most of your clinical rotations so you can decide whether surgery really is the career you want. Like you did before applying to medical school do your 'work experience'. Talk to surgeons and find out the pros and cons of this speciality.

Now that you've made the wise decision to pursue a career in surgery here are some top tips on how to get involved in surgical things and bulk up your CV at the same time.

- Develop your portfolio - The key to success is a well developed portfolio. This will demonstrate your commitment to surgery and make the application process significantly more straight forward. Attend surgeries and fill them in online on the surgical elogbook for evidence. This is covered in the next chapter.
- Attend a careers event- There are a range of careers events put on by surgical societies and the Royal Colleges to help give you an idea. Each specialty typically puts on an annual careers event too which are well worth attending if you're considering that particular one.
- Join a surgical society - Whether it be your local medical school one or one of the national surgical speciality societies, attending their events and skills sessions is one of the best ways to demonstrate your interest in a surgical career.
- Speak to surgeons – Familiarise yourself with the specialty. Hopefully, you will have many opportunities to get into theatre. Ensure you make the most of these and other experiences in surgical wards by planning what you need to do and hope to achieve.
- Surgical electives - If surgery is your career goal, you will need to build a portfolio comprising as much surgical experience as possible. An elective in a surgical setting is a unique opportunity for you to achieve this.

Getting involved with your surgical society

In Oxford medical school, the student surgical society is the Hugh Cairns Surgical Society (Founded in 2001) to which all clinical students are automatically considered members for with no membership fees involved. Any clinical student is more than welcome to attend the range of talks, events and teaching workshops that the Society puts on throughout the year. We also put on several co-badged events with the Royal Colleges, ASiT and other student societies.

The best way to become aware of these is to join the Hugh Cairns mailing list, facebook page and twitter feeds. We also try and advertise all off our work on the Osler Bulletin and Osler House facebook pages.

If you want to really step up your involvement and be given first hand opportunities to attend training and skills events as well as to help teach and organise student surgical events, then consider applying to join the Committee. The Committee is usually elected around Easter.

Making the most of your surgical placements

To make the most out of surgery the best way is to make use of the assigned time you get on surgery. Here are some top tips on how to survive your rotations and get the most out of them

- Be on time! Surgeons start early so make sure to attend the morning ward rounds as then you will be more likely to be taken to surgery rather than trying to enter theatre once they've already started. Ask the team what the best etiquette is too, some may want you to attend the WHO check in at the start of each list whilst others may just want you to join in between cases.
- Try and see the patients you are going to see in theatre before (this is sometimes difficult but going on the morning ward round, reading the notes or asking a junior doctor to explain what is happening will go a long way).
- Ask to scrub in – don't be disheartened if they say no but being keen will be remembered

Organisations and societies for students interested in surgery

Organisation/Society	What is it?	Best way to get involved
Hugh Cairns Surgical Society	The Oxford University student surgical society which is aimed at all Oxford medical undergraduates interested in surgery	Like us on facebook, follow us on twitter or email us to join our mailing list: https://www.facebook.com/HughCairnsSurgicalSociety/ hughcairnssoc@gmail.com
Royal College of Surgeons & Royal College of Surgeons Edinburgh	The Royal Colleges support all surgeons and those interested in surgery	https://www.rcseng.ac.uk/careers-in-surgery/medical-students/ https://www.rcsed.ac.uk/professional-support-development-resources/career-support/career-advice-for-medical-students/how-can-i-get-ahead
OXSCAR	Research opportunities in surgery in Oxford	http://www.oxscar.org/
STARsurg	National Surgical research collaborative for students	https://starsurg.org/
ASiT	A national body representing the interests of surgical trainees and medical students	https://www.asit.org/resources/medical-students

7. How to get ahead

Developing your portfolio and yourself for your future career

If you're strongly considering a surgical career at this point then this chapter explains on how you can make yourself more competitive later on. Although, our main advice would be to enjoy being a student and only do extra-curricular activities that you enjoy doing as you have your foundation years to career build.

However, that said, there a few things that you will no longer be able to do as effectively (or at all) after graduation; this mainly being showing early commitment to surgery by joining your surgical society, doing surgery on your elective and attending conferences/skills days relevant to surgery. All of this was outlined in the last chapter.

Due to the competitive nature of certain surgical specialities or academic careers, understandably a number of students wish to utilise their free time constructively to enhance their ability to compete. This is who this chapter is mainly aimed at and it is structured around the medical portfolio framework.

If you also want to know the specific nature of the entry requirements for your specialty then each training programme produces an online person specification which is freely available and lays out what the selectors would like to see in an applicant.

What is a portfolio and how do I structure it?

A portfolio is a collection of evidence of a person's educational achievements, career experience and skills. It is used as an adjunct to job and training post applications throughout academic and medical careers, typically coming into use from Core and Specialty training posts onwards although even academic foundation programme applications can ask for evidence of achievements.

A portfolio will be of limited use to a medical student and you shouldn't feel pressure to keep one. However, keeping will one get you into useful habits (such as getting feedback and creating plans) post-graduation so you can really hit the ground running and get ahead.

It is also just a useful way to organise your achievements and work (you may well need to evidence achievements made in medical school in your later career) and allows you to identify any gaps you might to work on. The personal development aspects of the portfolio will also help you with career planning and your studies in general.

The portfolio should be divided into separate sections, each of which we'll now cover in this chapter.

CV

The portfolio should begin with a curriculum vitae. Medical CVs are very different to other professional CVs because of the nature and length of postgraduate training and the qualities of a good doctor, thus middle to late career CVs can approach 13 pages whereas most professions limit CVs to 2-4 pages. The following is only a set of suggestions, your CV should be your own work and there are many different approaches to write one. We hope that this advice will prove useful though!

We would recommend that a medical student work to maintain a 2 page CV and it is always useful (at any stage of your career) to have a single page version of your CV.

The CV should always have excellent grammar, punctuation and format with good examples being readily available on websites like StudentBMJ or BMJCareers. It should begin with your contact details including term-time and home address, email, mobile number etc.

At this point it is useful to write a one to two sentence career statement to provide a context to your CV, ie “It is my current intention to pursue a career in general surgery as well as to pursue academic achievements in clinical research”.

You should then list your educational achievements in a chronological order: briefly sum up your school achievements into the numbers of As and A*s obtained along with any scholarships then break down your medical degree year by year listing the exams you’ve passed along with any merits. Devote a paragraph summary to your intercalated degree and highlight your award in it.

At this point, you may wish to have a section on clinical experience. Do not list all of your clinical placements, instead list ones relevant to your career statement or the position you are applying for. For surgery, stating how many hours you’ve logged in theatres is one easy way to show commitment and interest.

Follow this with a section on prizes, publications and presentations; make sure you highlight and show off your achievements. You can then put sections on leadership & teamwork achievements and then finally a section on teaching experience.

Finish off with a short paragraph on your hobbies and interests and then bullet point list any particular skills you have ie BLS training, driving license, languages spoken.

You should give the details of at least two referees (ideally one clinical and one academic) to accompany your CV.

Clinical Experience

This section should focus on clinical experience that is especially relevant to your career path. For surgery, it should contain a log of your theatre hours as well as any details of SSMs, career days or self-arranged time in specialities you’re interested in.

Keeping a surgical log may seem daunting but the Royal Colleges provide an elogbook (http://www.elogbook.org) that is free for medical students and easy to use. Log every operation you see in there (whether you observe or assist) and then you can regularly print off the up to date log for your portfolio. This will certainly help to evidence an early commitment to surgery and help you stand out.

Clinical experience is consistently one of the most influential factors on specialty choice and so trying to get a flavour of specialities you're interested (however faint the interest is) is something we highly recommend. Not only will it help you make an informed decision but it shows any selector that you have researched the field and your career path thoroughly.

Publications

Publications are often a key focus in CVs and portfolios as they (usually) represent a substantive piece of work that has made a contribution to the academic literature. From a medical student perspective they represent a point on the Foundation Programme Application System, are a part of Academic Foundation Programme selection and can be a stepping stone to further publications.

Unfortunately, publications are difficult to obtain for medical students because the level of input is often not usually realistic given the time constraints of the course. However, we will go through the different routes nonetheless and, with enough conscientiousness, you will hopefully find success.

The route of basic science research is arguably the most difficult because significant time needs to be invested for output. The intercalated degree represents a possible opportunity but success through this is mixed; nevertheless try and stay in touch with your lab to keep abreast of developments and opportunities. An SSM is another opportunity to have time blocked for this type of research but again success is mixed.
If your prospective work is library based as opposed to lab based then you might well be able to conduct the work in your spare time so long as your deadlines are realistic and your timekeeping good. Finally, the narrative review represents an opportunity although your proposal will have to be very novel; if you have the idea though then take it to an authority in the field (there'll be plenty of them in Oxford!).

Clinical research represents an excellent opportunity because although there is limited scope for you to become involved in clinical trial work, there are plenty of potential research questions that can be answered from the current literature. A literature review can be done in your spare time (read the methodology from published ones and/or your EBM booklets for info on how to do one) and if the research question is relevant with no other reviews on the matter then academic clinicians will be happy to help you publish it.
If you want to step it up to a systematic review (readily publishable) then you can contact the Centre for Evidence Based Medicine and they can help you out from start to finish.

Research in medical education is another route and, for medical students, usually involves qualitative data collection on a novel teaching concept, event or method. If you are passionate about teaching and have an idea then look it up to see the literature on it. If there have already been some studies see if you can improve on them, if not then contribute to the literature. There are a number of medical educationalists in Oxford who can help you out at the Oxford University Medical Education Fellowship and the recently founded Osler Society for Medical Education is an Oxford student-led group that aims to support academic ventures in medical education.

Finally, audit & quality improvement work (if high quality and relevant) can potentially be published. Often this is achieved through collaborative work and key examples are STARSurg (http://starsurg.org) and OxSCAR (http://www.oxscar.org). The former is national student collaborative that runs an annual project that results in collaborative authorship for all contributors; the latter has launched a project enabling medical students to carry out and receive funding for quality improvement projects with support for publication and presentation. Both of these are covered later in this chapter.

Our firm recommendation is not to stress about publications and only pursue ventures that you have a genuine interest in and motivation for. A number of AFP candidates with zero publications are successful each year whilst a number with double digit publications are not. Indeed, several outstanding academic clinicians in Oxford only entered academia late in their careers.
If you want to pursue an academic-clinical career at this stage then you should always be able to construct a nice narrative of your work, trying to show you are an academic with long standing interest who has successfully pursued and followed up on work in the field. Although spamming letters to journal editors is an easy means to getting your number of publications up, it is very hard to defend in interview.

Presentations

Presentations are another important part of a medical CV and portfolio; presentation is a key skill and it, like publication, shows that someone has produced a substantive piece of work. Presentations come into two formats: poster and oral. The latter is generally considered more prestigious as there is usually a higher threshold to successfully submit one. They are also categorised as local, regional, national and international in order of increasing prestige.

The main occasions where presentations take place are dedicated events such as conferences and symposiums. They will typically have a specific medical student section for poster submission and a number then shortlist the best posters for oral presentation. It always pays to look carefully at the submission criteria in order to give you an idea and maximise your chance of acceptance.

Poster competitions for medical students often focus on case studies, research work and literature reviews. Case studies in particular are amenable for medical students because you will naturally come across so many cases and clinicians who know of interesting cases (always feel free to ask) and the write up is usually short.

The STARSurg collaborative allows any collaborator to present the results of projects they have collaborated in once the results are released. The OxSCAR group also have a specific scheme where they facilitate medical students to conduct QIPs which they can present at their meetings as well as national conferences. Also don't forget that your SSM poster will be ready made and likely to get accepted for presentations.

Specific opportunities to note for presentations are the:
- Conference in Academic Surgery (a national student conference held annually in Oxford)
- ASiT national conference (an annual international conference with a medical student section)
- Doctor's Academy research conference (an annual international conference with a medical student section)
- Oxford Surgical Symposium (an annual regional event held annually in Oxford with a medical student section)
- OxSCAR meetings (quarterly regional meetings with presentation opportunities)
- Conferences organised by the Specialty society you are interested in such as BAPRAS or BOAS

Finally, presentations are a useful way to get something out of work you have done that you weren't able to publish and an excellent candidate will seek to get the majority of their work published or presented. We highly recommend looking back at work you have done so far and seeing if any of it is suitable for poster or oral presentation.

Prizes

Prizes are academic achievements designed to reward candidates with excellent scholarship in their field of interest and so are a wonderful opportunity to demonstrate your ability in your CV and portfolio.

The Oxford Medical School has its own systems of merits and distinctions which are definitely worthy of inclusion here and the procedures for which are laid out ahead of each assessment you do. Even scholarships obtained in your school days should be included as evidence of continued potential. Much like presentations however, prizes are considered more prestigious if they are part of regional or national competitions as opposed to local ones.

Beyond those examples, there are a number of prize opportunities elsewhere often coming in the form of essay competitions. Indeed, several surgical speciality bodies as well as ASiT and the Hugh Cairns Surgical Society run these competitions which typically come with the bonus of a cash prize. Two websites where several medical student prize opportunities are collated are the Clinical School weblearn pages and the Royal Society of Medicine website.

Finally, both the RCS and RCSEd run student prize competitions which are especially prestigious in the context of a surgical career. The RCS typically put an abstract call out each year with the best abstracts shortlisted to give an oral presentation at the college. The RCSEd meanwhile does a national surgical skills competition which consists of regional heats and then a national final. The details for both of these are on their respective websites.

Audit & Quality Improvement

Audit is the process of comparing clinical practice to a given standard (and is not to be confused with research which instead creates new knowledge) and detects underperformance in order to identify issues where interventions can be made, followed by re-auditing following those interventions (thus “closing” the audit loop).

Quality improvement work goes hand in hand with auditing and is an applied science that emphasises innovation, rapid-cycle testing in the field, and spread in order to generate learning about what changes, in which contexts, produce improvements. Typically, an improvement in an aspect of clinical performance is targeted and small, rapid tests conducted with a range of ideas to deliver improvement. The tests are then refined and scaled up as results come in.

Both processes are powerful tools for improving a healthcare system and so have become a mandatory part of clinical governance with doctors at all stages of their careers (including in the foundation programme) having to conduct them. It is not a mandatory part of the medical school curriculum however and one should feel no pressure to perform one.

In of themselves, whilst they are a good section to consider in your portfolio and CV if you are interested in clinical governance in future or leadership & management posts, they are not a standard part of foundation applications, even for academic foundation programmes. Thus their main utility for students is the potential opportunity for publication or presentation which have been dealt with in previous sections of this chapter.

If you have a genuine interest in audit, quality improvement, leadership, management or clinical governance then the Faculty for Medical Leadership and Management and the Institute of Healthcare Improvement have great resources including e-learning courses.

Teaching

Medical education is another fundamental part of clinical governance with all doctors having to do a mandatory mount of teaching during their training. It is also an academic and career path in its own right and is the easiest thing to organise out of this entire section. Teaching comes in many forms and the best teachers and best portfolios will display a range of techniques across a range of audiences.

For medical students, you will most likely be teaching your fellow medical students or school children who are interested in a medical career, utilising small group teaching and tutorials. However, if you can get opportunities to deliver lectures, teach different audiences or develop learning materials then they will really help you stand apart. The organisation of teaching and learning is a different skill entirely and again, something that will help you stand out. The assessment of teaching concepts and ideas can also generate potential presentation and publication opportunities.

In any teaching you do, you should try and get feedback from those you teach in order to develop yourself. It is also good practice to regularly write reflective pieces on your teaching and feedback you have received clearly demonstrating how you can and have developed; it is also good to get peers to appraise your teaching in order to further help your development. From a practical aspect, feedback and reflection is latterly used as evidence of mandatory teaching you have to conduct as part of your training and so regularly doing both is a good habit to get into early.

In Oxford, many of the medical student societies conduct teaching, including the Hugh Cairns Surgical Society, and so it is quite easy to get involved. A recently founded society is the William Osler Society for Medical Education which aims to help foster teaching ideas, encourage student led teaching and develop academic teaching ideas. They are an excellent port of call if medical education interests you and have their own website (www.oxfordmedicaleducation.com/osme/)

Leadership, management & teamwork

Leadership is the ability to guide a group of individuals, a team or organisation. In discussing leadership and management together, leadership is often defined as a transformational skill. Leaders should have a distinct vision that will move forward and enhance the organisation they are leading. They should then be able to motivate others to share that vision and effectively manage to a team to achieve a defined and appropriate set of results. In contrast, management without any leadership merely leads to the status quo being maintained and no progress forward made.

Management is the ability to plan, organise and co-ordinate a group, team or organisation in order to achieve significant output. It is subtly distinct from leadership and requires different skills: . Ultimately, effective management is needed to get a group to work and leadership without management is typically characterised by grandiose visions that are never actually achieved. Ultimately, leadership with management is the key to success and it is a skill set that you will need throughout medicine, especially in surgery.

Leadership and management opportunities are abundant in medical school because of the sheer number of societies and committees operating at various levels. Typically these skills are best emphasised in senior roles and the larger or more prestigious the group, the greater the skill required and credited. The key to developing and demonstrating these skills is active application

of them (ie seek to improve anything you find yourself in charge of) instead of passive participation in your role.

Teamworking is a dynamic process involving two or more individuals that share and operate towards common goals. It again requires a different skill set to leadership or management that you will require throughout your career. Opportunities to develop these skills will again arise with involvement in sporting teams, student societies etc.

It is also possible to develop these skills and show interest in the field in ways beyond just trying to obtain relevant positions. The Faculty for Medical Leadership & Management allows student members and has specific resources and events for those interested in the fields, one can also seek to enhance them by producing reflective pieces on specific situations in which you have demonstrated them.

Reflective pieces & Personal Development

Reflective pieces and personal development plans are components of a portfolio that become mandatory once one enters clinical training (they are also required on certain parts of the course too) but they are simple tools that you can adopt right now and should ultimately prove useful. When discussing your development, regardless of the area it is in, a key way to show you are conscientious and to assure your quality is to demonstrate that you collect feedback and reflect on it.

Following any clinical, teaching or leadership experience you can do a short 1-2 page piece that briefly summarises what happened, things that were done well, things that could be done better and the lessons that you have learnt. There are plenty of online resources, for example on the BMJ (http://careers.bmj.com/careers/advice/view-article.html?id=1328 and http://careers.bmj.com/careers/advice/Reflective_writing_as_an_agent_for_change), and it doesn't have to be something that you have done. For instance, you could choose to reflect on a clinical experience that you have just observed.

Personal development not only encompasses feedback and reflection after placements but also should involve forward planning. A key part of the career appraisal processes now are personal development plans. These are very simple short documents with templates available online (http://careers.bmj.com/careers/advice/How_to_prepare_a_personal_development_plan) which usually specify key objectives and how they are to be achieved over a period of time. They will help appraisal, show your efficiency (if you show you consistently achieve goals you set in advance) but also help you most importantly in regards to which opportunities to go for and which to turn down.

Skills

Quite simply any skill that you have developed that has not previously been mentioned in this section goes under this heading although try to keep it medically related. A few examples are any BLS/ALS training you receive, any skills courses you attend or workshops you participate in.